

RWE

**Enoch Hill Wind Farm
Variation Application
Volume 1 Main Report
June 2020**

wood.





Report for

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Preface

This Environmental Impact Assessment Report (EIAR) has been prepared by Wood Environment & Infrastructure Solutions UK Limited (“Wood”) on behalf of RWE Renewables UK Developments Ltd (RWE). RWE Renewables has become a “super player” in the field of renewable energy generation, including being a global leader in offshore wind, with a goal to become climate-neutral by 2040.

This report sets out the findings of an Environmental Impact Assessment (EIA) to accompany an application under section 36C of the Electricity Act 1989 and under S57 (2) and S57 (2ZA) of the Town and Country Planning (Scotland) Act 1997 to vary the consented Enoch Hill Wind Farm (“the Variation Development”) located between the settlements of Dalmellington and New Cumnock in East Ayrshire. Chapter 3 of the EIAR provides further information on the location of Enoch Hill Wind Farm and a description of the proposed variation to the consented scheme.

The proposed variation comprises an increase in the rotor diameter and blade tip height of all 16 turbines, with all other associated infrastructure remaining unchanged. This relatively modest variation would allow the installed capacity of Enoch Hill Wind Farm to be increased from up to 54.4MW as consented, to an estimated 80MW, thereby increasing the contribution towards Scotland’s target of the equivalent of 50% of the energy for heat, transport and electricity consumption to be supplied from renewable sources by 2030. It is also proposed that the 25 year period of consent is increased to 30 years.







Terminology

For the purposes of this report the following terminology is used:

- The '**Consented Development**' - the 16 turbines and associated infrastructure of Enoch Hill Wind Farm consented by the Scottish Ministers on 13 September 2019;
- The '**Variation Development**' - the proposed revised Enoch Hill Wind Farm whereby for all 16 turbines the rotor diameter would be increased to up to 136m and blade tip height increased to up to 149.9m, with their locations and all other associated infrastructure remaining unchanged. It is also proposed that the 25 year period of consent is increased to 30 years;
- The '**2015 ES**' - the Enoch Hill Wind Farm Environmental Statement that accompanied a section 36 application for a 19 Turbine proposed development located on the same site as the Consented Development;
- The '**2017 FEI**' – Further Environmental Information to the 2015 ES that was submitted in 2017. This considered an amendment to the (then) proposed development by way of the deletion of three turbines and change to the locations of the other 16 turbines. This 16 Turbine layout was consented, as the Consented Development, on 13 September 2019;
- The '**Development Site**' - the site of the Consented Development and of the Variation Development, located approximately 5km to the south west of New Cumnock and approximately 7km north east of Dalmellington and centred at National Grid Reference (NGR) E257360, N608630. The site boundary is shown on Figure V3.1. and it should be noted that this now covers a slightly smaller area for the Variation Development than for the Consented Development;
- The '**Applicant**' is RWE Renewables UK Developments Ltd (the applicant for the variation is the same legal entity that sought and holds the benefit of the section 36 consent for the Consented Development, but the company name changed from E.ON Climate & Renewables UK Developments Ltd following the acquisition of this part of E.ON business by RWE on 30 September 2019). The company number remains 03758407; and
- The '**ECU**' is the Energy Consents Unit of the Scottish Government.





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Note: Some Figures (9.16, 9.26, 9.29, 9.35, 9.36, 9.39, 9.42, 9.44-9.48, 9.51-9.54) from the 2017 FEI LVIA have not been updated as part of the Variation Development LVIA as they are not affected by the changes to the Consented Development and the baseline analysis based upon these figures as presented in the 2017 FEI remains valid.





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Appendix V6A	Carbon Calculator - Justification for Values Used
Appendix V9A	LVIA Methodology and Glossary
Appendix V9B	Viewpoint Analysis
Appendix V9C	Residential Visual Amenity Assessment
Appendix V9D	Comparative Analysis of Scenarios A and B
Appendix V12A	Ornithology Collision Risk Modelling Report
Appendix V14A	Swept Path Analysis Pinch Point Summary & Revised Swept Path Analysis Figures
Appendix V17A	Radar Line of Sight Analysis





1. Introduction

1.1 Overview of the Variation Development

1.1.1 In September 2019, Enoch Hill Wind Farm (the "Consented Development") was granted consent under section 36 of the Electricity Act 1989 and deemed planning permission under section 57 of the Town and Country Planning (Scotland) Act 1997 by the Scottish Ministers. The consent is for a wind farm generating station with a generating capacity exceeding 50 Megawatts, with up to 16 wind turbines with a tip height of up to 130 m and associated infrastructure. The "Applicant", RWE Renewables UK Developments Ltd (RWE) is seeking to amend the consent (the "Variation Development") to:

- Increase the period of consent from 25 to 30 years;
- Increase the rotor diameter (to a maximum of 136m) and maximum tip height (from up to 130m to up to 149.9m) of all 16 turbines; and
- Change the erroneous company number (05266294) listed in error on pages 1 and 38 of the decision notice for the Consented Development to the correct company number (03758407).

1.1.2 The Variation Development could have a nameplate installed capacity of 80MW based on potential candidate turbines, a 47% increase on the 54.4MW installed capacity of the Consented Development.

1.2 The Applicant and the Project Team

1.2.1 This Environmental Impact Assessment (EIA) Report has been prepared on behalf of the Applicant by Wood Environment & Infrastructure Solutions UK Limited (hereafter referred to as Wood), with the support of Osprey Consulting Services Ltd in respect of aviation.

1.2.2 Wood is registered with the Institute of Environmental Management and Assessment (IEMA)'s EIA Quality Mark scheme. The scheme allows organisations that lead the co-ordination of EIAs in the UK to make a commitment to excellence in their EIA activities and have this commitment independently reviewed.

1.2.3 A statement outlining the relevant experience and qualifications of the competent experts who have prepared this EIA Report is provided in Appendix V1A.

1.3 Purpose of the Environmental Impact Assessment Report

1.3.1 This document forms the EIA Report (EIAR) which supports an application made by the Applicant to the Scottish Government Energy Consents Unit (ECU) under section 36C of the Electricity Act 1989 and under S57 (2ZA) of the Town and Country Planning (Scotland) Act 1997 to vary the consent and apply for a new deemed planning permission for Enoch Hill Wind Farm.

1.3.2 The EIA Report is available at:

- <http://www.rwe.com/enochhill>

- 1.3.3 The Electricity Works (Miscellaneous Temporary Modifications) (Coronavirus) (Scotland) Regulations 2020 came into effect on Friday 24th April. These allow a temporary relaxation of the usual requirement to make documents available for public inspection and hence hard copies of the application documents have not been lodged at locations accessible to the public. The public will however be able to access the documents at the Applicant's website as noted above.
- 1.3.4 The Variation Development falls within Schedule 2 of the EIA Regulations and the Applicant, in agreement with the ECU, acknowledges that EIA is required. In accordance with good practice, a Scoping Report was prepared to identify the potentially significant environmental effects of the Variation Development; with those that were considered as being likely to be significant assessed further in this EIA Report.
- 1.3.5 This reflects the requirement of the EIA Regulations for the EIA Report to only assess impacts that are likely to result in significant effects. In addition, the Electricity Works (Environmental Impact Assessment) (Scotland) Amendment Regulations 2017 make it clear that, for a variation application relating to an EIA development, further assessment required to inform the application should consider the impacts of the variation itself and how those differ from the original scheme, rather than requiring the whole development to be assessed again.
- 1.3.6 The Scoping Report was issued to the ECU together with a request for a Scoping Opinion under the EIA Regulations on 6th February 2020, under which the Scottish Ministers are required to consult with the 'consultation bodies' as defined in the EIA Regulations.
- 1.3.7 Drawing upon the Scoping Opinion and subsequent assessment work, the EIA Report includes an assessment of the likely significant environmental effects of the Variation Development. The overall approach that has been taken to defining significance, as well as further information about the approach to preparing the EIA Report, are outlined in Chapter 4 of this document.

1.4 Scope of the EIA Report

- 1.4.1 As set out in Schedule 4 of the EIA Regulations, the following information should be included in an EIA Report:
- The location of the development;
 - The description of the physical characteristics of the Variation Development and land-use requirements of the Development Site, considering construction and operation (including requisite demolition works where relevant);
 - Operational processes such as energy, materials and natural resources used;
 - An estimate of any expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases);
 - The reasonable alternatives that the developer has studied, which are relevant to the Variation Development and its specific characteristics, including an indication of the main reasons for the chosen option, with a comparison of their environmental effects;
 - The baseline environment and an outline of its likely evolution (as far as natural changes to that baseline can be assessed with reasonable effort) in the absence of the development;
 - A description of the likely significant effects of the construction and operation of the Variation Development on environmental factors - population, human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and landscape including the cumulation of

effects with other existing and/ or approved development taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources, and the technologies and substances used;

- A description of the methods used in the assessment to determine whether significant effects are likely to occur;
- A description of measures and monitoring that have been identified to address likely adverse significant effects, during construction and/or operational phases;
- A description of any significant effects on the environment deriving from the development's vulnerability to major accidents and/ or disasters;
- A non-technical summary; and
- A list of references.

1.4.2

Regulation 4 and Schedule 4 of the EIA Regulations require that the environmental topics listed in column 1 of Table 1.1 need to be considered when preparing an EIA Report. Column 2 lists where these topics are included in this EIA Report, with reference to the relevant chapter numbers (note that for ease of cross-reference with the 2015 ES and 2017 FEI, technical chapter numbers remain unchanged).

Table 1.1 Environmental Topics to be addressed in the EIA Report and Chapter References

Topics ¹ that need to be assessed under the EIA Regulations	Chapter titles in this EIA Report
Population	Visual effects - Chapter 9 (Landscape & Visual); Chapter 14 (traffic and transport); Chapter 7 (noise); Chapter 15 (recreation and socio-economics)]
Human health	Human health [Chapters 7 (noise), 8 (Shadow Flicker) and 9 (Landscape & Visual)]
Biodiversity	Biodiversity (Chapter 11, Ecology)
Land	Land quality, geology and soils (Chapter 13)
Soil	Land quality, geology and soils (Chapter 13)
Water	Water (Chapter 13)
Air	Air quality (scoped out of the 2015 ES, 2017 FEI and this assessment)
Climate	Climate (Chapter 6 - Renewable Energy Policy, Carbon Balance and Peat Management)
Material assets	Use of non-renewable resources (scoped out of the 2015 ES, 2017 FEI and this assessment)
Cultural heritage	Historic environment (Chapter 14)
Landscape	Landscape & Visual (Chapter 9)

¹ In this EIA Report, the word 'topic' is used when referring to the environment that could be affected by the Variation Development. Other words with the same general meaning are used in the EIA Regulations, notably 'factor' and 'aspect', but these are not used in the same context within this EIA Report.

Topics ¹ that need to be assessed under the EIA Regulations	Chapter titles in this EIA Report
The inter-relationship between the above factors	These are discussed within each Technical Chapter as relevant.
Vulnerability to major accidents or disasters	Major accidents and disasters (Chapter 16)

1.5 Structure of this EIA Report

1.5.1 This EIA Report comprises 4 volumes:

- Volume 1 (i.e. this volume) is sub-divided into the following chapters:
 - ▶ Chapter 2 explains the need for the Variation Development, outlines the main alternatives considered for meeting this need and indicates the main reasons for the preferred choice;
 - ▶ Chapter 3 provides a description of the Variation Development;
 - ▶ Chapter 4 details the approach that has been adopted in preparing the EIA Report;
 - ▶ Chapter 5 provides an overview of the legislation and policies that are relevant to the EIA Report;
 - ▶ Chapters 6 to 17 set out the technical assessments for the environmental topics considered in the EIA Report. For ease of cross-reference with the 2015 ES and 2017 FEI technical chapter numbers remain unchanged, some are therefore included in this EIA Report where significant effects as a result of the proposed variation to the Consented Development are unlikely. Where this is the case, this is noted in the technical chapter of this EIA Report.
- Volume 2 contains the figures referred to in Volume 1;
- Volume 3 contains the appendices referred to in Volume 1;
- Volume 4 is a Non-Technical Summary (NTS), which is also available as a standalone document;

1.5.2 A glossary of technical terms and abbreviations is provided as Appendix V1B in Volume 3.

2. Scheme Need and Alternatives

2.1 Need for the Project

- 2.1.1 In order to meet international obligations, the UK government is committed to reducing greenhouse gas emissions in an effort to reduce the level of future climate change. Further detail is provided in Chapter 6 of this EIA Report and in the updated Planning Statement which accompanies the section 36C application. As the UK has one of the windiest climates in Europe, it has great potential to generate electricity from wind power, and, if constructed, the Variation Development would provide an increased contribution towards renewable generation capacity in comparison to the Consented Development. The Scottish Government have stated that onshore wind is now amongst the lowest cost forms of power generation of any kind and is a vital component of the huge industrial opportunity that renewables create for Scotland. Further, it states that energy and climate change goals mean that onshore wind must continue to play a vital role in Scotland's future¹.
- 2.1.2 Scottish renewable energy targets have increased in recent years. The Scottish Government's target is to achieve 100% of gross electricity consumption from renewables by 2020 with net zero targets of all greenhouse gases by 2045. In December 2019, the Scottish Government stated that in 2018, 20.9% of total Scottish energy consumption came from renewable sources, 1.7 percentage points higher than 2017². Therefore, there is a recognised need to dramatically increase renewable electricity generation, with onshore wind identified by the Scottish Government as being of critical importance. A significant increase in wind energy capacity will be required if Scotland is to achieve its ambition to reduce greenhouse gas emissions to a net-zero state by 2045 and the Variation Development would contribute substantially in achieving these targets.
- 2.1.3 The Consented Development was predicted to produce up to 54.4MW of renewable energy. It has been calculated that with a relatively modest increase in height of the consented turbines (from up to 130m tip height to up to 149.9m for all 16 turbines) a large increase in generation capacity can be achieved to in the order of 80MW of renewable energy (a 47% increase).
- 2.1.4 The Scottish Government's Onshore Wind Policy Statement (December 2017) supports the use of larger turbines where they are appropriately sited. The Applicant considers that the Development Site and the surrounding landscape have the capacity to support the larger turbines proposed.
- 2.1.5 It is noted that national planning and energy policy makes it clear that there is no requirement for renewable energy developments to demonstrate an overall need for new renewable generation or a need to justify them being in a specific location over other locations (though environmental impacts resulting from development of the chosen site must be acceptable).

¹ The future of energy in Scotland: Scottish energy strategy - <https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/pages/5/> last accessed 11.05.20

² Energy Statistics for Scotland - Q3 2019 Figure <https://www2.gov.scot/Resource/0054/00549213.pdf> last accessed 24.03.20

2.2 Consideration of Alternatives

Introduction

- 2.2.1 The EIA Regulations make two references to the consideration of alternatives, as follows.
- In regulation 5(2)(d) of Part 1 it states that an EIA Report should include "*a description of the reasonable alternatives studied by the developer, which are relevant to the development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment*"; and
 - Paragraph 2 of Schedule 4 states that an EIA Report should include "*A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.*"
- 2.2.2 In terms of the Variation Development, this EIA Report is inherently compliant with the requirements relating to alternatives under the EIA Regulations since it outlines the likely effects on the environment arising from an alternative to the consented Enoch Hill Wind Farm. Each technical chapter of this EIA Report inherently focuses on, and therefore sets out how, the effects of the Variation Development differ (if at all) from the effects of the Consented Development, as reported in the 2015 ES and 2017 FEI.
- 2.2.3 The amendments to the Consented Development are proposed as changes in available technology since the section 36 application was submitted mean that a modest increase in the height and rotor diameter of the turbines, along with an increase in the period of consent, would allow a large increase in the renewable energy generation capacity. The Variation Development would therefore make a greater contribution to UK and Scottish Government renewable energy targets than the Consented Development.
- 2.2.4 The Site Selection and Design Evolution chapters of the 2015 ES and 2017 FEI (Chapter 3 for each document) describe the Development Site identification process and design criteria. The examination of alternative layout designs in Chapter 3 of the 2015 ES and 2017 FEI (e.g. alternative turbine numbers and locations) and Section 2.2.2 of this EIA Report is considered to be compliant with the EIA Regulations, which require reasonable alternatives that have been considered by the developer to be reported.

2.3 References

The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the EIA Regulations).
http://www.legislation.gov.uk/ssi/2017/101/pdfs/ssi_20170101_en.pdf

Scottish Government Onshore Wind Policy Statement (December 2017)
<https://www.gov.scot/Resource/0052/00529536.pdf>

3. Description of the Proposed Development

3.1 Introduction

3.1.1 In writing the scheme description, consideration has been given to the requirements of Schedule 4 of the EIA Regulations (as applied to variation applications); in which paragraph 1 states that the description should include:

- a) *"A description of the location of the proposed varied development;*
- b) *A description of the physical characteristics of the proposed varied development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;*
- c) *A description of the main characteristics of the operational phase of the proposed varied development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;*
- d) *An estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases."*

3.1.2 These requirements are addressed in the sub-sections below.

3.2 Development Description

Site Location

3.2.1 The Development Site is located in East Ayrshire between the settlements of Dalmellington (located approximately 7km to the south west of the Development Site) and New Cumnock (located approximately 5km to the north east of the Development Site), close to the northern border of the Dumfries and Galloway Council (DGC) administrative area. The nearest residential properties to the Development Site are Maneight Farm and Meiklehill located to the north. The location and wider geographical context of the Development Site is shown on Figure V3.1 with the Development Site Boundary shown in Figure V3.2. It should be noted the Development Site Boundary encloses a smaller area than was the case for the Consented Development. This is for reasons relating to the landowner and does not affect the infrastructure or micro-siting allowance.

Existing Site and Surroundings

3.2.2 The B741 runs in an east - west direction along the northern part of the Development Site, connecting the aforementioned settlements of Dalmellington and New Cumnock. Carsphairn Forest is located to the west and south of the Development Site boundary, with open cast mining to the north and open moorland to the east.

3.2.3 The elevation of the Development Site is between 210m – 569m above ordnance datum (AOD) and covers an area of approximately 1,219ha (the previous, slightly larger boundary of the Development Site for the Consented Development, covered an area of 1,466ha), the majority of which is rough grazing land. The topography of the Development Site is characterised by four summits; Rigg Hill, Enoch Hill, Chang Hill and Benty Cowan Hill. The highest of these is Enoch Hill at 569m above ordnance datum (AOD).

Development Proposals

3.2.4 The Consented Development comprises the following infrastructure:

- 16 wind turbines of up to 130m to blade tip height and up to 106m rotor diameter;
- Access tracks connecting infrastructure elements;
- A new vehicular access point from the public highway;
- Hard standing areas e.g. crane pads;
- Potential borrow pit(s);
- Two anemometer masts;
- Temporary working areas e.g. construction compound; and
- Wind Farm Control Building and Scottish Power Energy Networks (SPEN) substation and electrical cabling between this and the turbines.

3.2.5 The Applicant is seeking to vary the Consented Development to the following parameters on which this EIA is being assessed:

- Increase the maximum rotor diameter and maximum tip height of all 16 turbines as specified in Table 3.1 below, the location of which will remain unchanged;
- Increase the period of consent to *operate* the generating station from 25 to 30 years; and
- Remove any specified or implied limitation on the MW generation capacity of all 16 turbines¹.

3.2.6 Table 3.1 provides a summary of the key features of the Variation Development, with the infrastructure layout as described in the following sections shown on Figure V3.3.

Table 3.1 Key Development Features of the Variation Development

Component	Description
Wind Turbines	Number: Up to 16 (see Table 3.3 for grid references). Turbine Heights (to blade tip): Up to 149.9m (rotor diameter: up to 136m).
Turbine Foundations	Number: up to 16 Footprint per Turbine: ~0.05ha based on a 25m diameter foundation. Foundation Depth: 2-3m dependent on ground conditions.
Turbine Crane Pads	Number: up to 16 Dimensions: 25m by 50m Footprint per Crane Pad: ~ 0.125ha
'Permanent' Anemometer Mast(s)	Maximum number: 2 (located at National Grid Reference (NGR) E 255533, N 607642 and E 256259, N 606618) Mast Height: up to 80m Crane Pad Dimensions: 20m x 20m Footprint per Crane Pad: ~0.04ha

¹ The Decision Notice for the Consented Development does not refer to any maximum MW capacity for Enoch Hill Wind Farm, indicating there is no upper limit. However, the Applicant wishes to put this beyond doubt given there are references to the previous 54.4MW capacity in the supporting ES etc. In practice the generating capacity will be limited by the size of available turbines which can be accommodated within the varied turbine parameters for the Variation Development. There is therefore no need to impose any specific upper limit on the MW capacity of any individual turbines of the Variation Development as a whole.

Component	Description
Wind Farm Control Building and Compound and SPEN Substation and Compound	Location: Approximately centred on NGR E 255430, N 608980 Dimensions: 180m by 110m Control Building Height: up to 5.5m Maximum Compound Footprint: 1.98ha
Access Tracks (including turning heads and junctions)	Length: ~12.07km / Running Width: up to 6m (wider on bends, see 2017 FEI Chapter 4, Sections 4.2.13 to 4.2.16 for more details). Footprint: ~ 7.8ha
Passing Places	Number: estimated 24 Dimensions: 30m in length, up to 5m wide Footprint: Approximately 0.36ha
Watercourse Crossings	Maximum number: up to 5 culverts.
Borrow Pit(s)	Number: up to 2.
Temporary Construction Compound	Number: 1 Locations: centred on NGR E 255405, N 609120. Dimensions: ~ 100m by 100m, Total footprint: ~1ha
Cable Trenches	Depth: 1m / Width: 1.2m Cables will be installed alongside access tracks.

3.2.7 Table 3.2 shows the dimensions and estimated installed capacity of turbines for the Consented Development and Variation Development for comparative purposes.

Table 3.2 Turbine Comparison between Consented and Variation Development

Consented Development	Variation Development
Number: up to 16. Estimated Rated Output per turbine: 3.4 MW. Turbine Heights (to blade tip): up to 130m (hub height: up to 80m and rotor diameter: up to 106m).	Number: up to 16. Estimated Rated Output per turbine: 5 MW. Turbine Heights (to blade tip): up to 149.9m and rotor diameter: up to 136m.

Site Access

3.2.8 The access to the Development Site is unchanged from the 2015 ES and 2017 FEI, i.e. it will be located off the B741 on the north western edge of the Development Site boundary.

Abnormal Loads

3.2.9 Details of proposed routing for abnormal loads are unchanged from the 2015 ES and 2017 FEI; refer to the 2017 FEI **Chapter 4, Sections 4.3.2 to 4.3.4** for details.

General Construction Traffic

3.2.10 Details of the type and routing of general construction traffic are unchanged from the 2015 ES and 2017 FEI; refer to the 2017 FEI **Chapter 4, Section 4.3.5** for details.

Turbine Layout

3.2.11 The layout of the Variation Development is shown on Figure V3.3. The turbine locations, along with the location of the two 'permanent' on-site anemometry masts, are presented in Table 3.3.

Table 3.3 Wind Turbine and 'Permanent' Anemometry Mast Locations

Component	Maximum Height (m)	Location (NGR)
Turbine 1	149.9	E 255563, N 607866
Turbine 2	149.9	E 255934, N 608200
Turbine 3	149.9	E 255716, N 607356
Turbine 4	149.9	E 256142, N 606876
Turbine 5	149.9	E 256373, N 608072
Turbine 6	149.9	E 256490 N 607097
Turbine 7	149.9	E 256621, N 606524
Turbine 8	149.9	E 256651, N 607737
Turbine 9	149.9	E 256920, N 607348
Turbine 10	149.9	E 257209, N 607066
Turbine 11	149.9	E 257160, N 607685
Turbine 12	149.9	E 257360, N 606678
Turbine 13	149.9	E 257491, N 607348
Turbine 14	149.9	E 257659, N 608057
Turbine 15	149.9	E 256028, N 607726
Turbine 16	149.9	E 256400, N 606200
Anemometry Mast 1	80	E 255533, N 607642
Anemometry Mast 2	80	E 256259, N 606618

Micrositing

- 3.2.12 The proposed micrositing allowance remains unchanged from the 2015 ES and 2017 FEI (i.e. 50m micrositing for turbines, met masts, buildings and cranepads or hardstanding areas, and 25m micrositing for access tracks, with the exception of any realignment necessary to connect to microsited turbines and crane pads, where the allowance may be up to 50m): refer to the 2017 FEI **Chapter 4, Sections 4.2.3 to 4.2.7** for details.

On-site Access Tracks

- 3.2.13 The details of the access tracks are unchanged from the 2015 ES and 2017 FEI. A total of approximately 12.07km of new on-site access tracks will be constructed, approximately 1,700m of which will be floating tracks. Refer to the 2017 FEI **ES Chapter 4, Sections 4.2.13 to 4.2.16** for other details of on-site access tracks.

Crane Pads

- 3.2.14 The design of crane pads is unchanged from the 2015 ES and 2017 FEI: refer to the 2015 ES and 2017 FEI **Chapter 4, Sections 4.2.17 to 4.2.18** for details.

Temporary Construction Compound and Laydown Area

3.2.15 The details of the temporary construction compound are unchanged from the 2015 ES and 2017 FEI, refer to the 2017 FEI **Chapter 4, Sections 4.2.19 to 4.2.20** for details.

'Permanent' Anemometry Masts

3.2.16 The details of the anemometry masts are unchanged from the 2015 ES and 2017 FEI, refer to the 2017 FEI **Chapter 4, Section 4.2.21** for details.

On-site Electrical Connections

3.2.17 Approximately 10km of 33kV underground cable (trefoil cable in 10km of trenches) will be required on-site to connect the turbines and the control building. Refer to the 2017 FEI **Chapter 4, Sections 4.2.22 to 4.5.24** for other details of the on-site electrical connections which are unchanged from the 2015 ES and 2017 FEI.

Control Building and Substation

3.2.18 The control building and substation remain unchanged from the 2015 ES and 2017 FEI: refer to the 2017 FEI **Chapter 4, Sections 4.2.25 to 4.2.26** for details.

Operational Land Take

3.2.19 The total operational land take (i.e. the Variation Development footprint post-construction) is unchanged from the 2015 ES and 2017 FEI and as shown in Table 3.4.

Table 3.4 Footprint Area by Component

Component	Area (~ha)
Tracks (including turning heads and junctions)	7.83
Passing Places	0.36
Crane Pads	2
Control Building and Compound	1.98
Turbine Bases	0.8
Met Mast foundations and crane pads	0.09
TOTAL LAND-TAKE	13.06
Temporary Construction Compound	1.0
Borrow Pit	4



Off-site Electrical Connection

- 3.2.20 Details of the off-site electrical connection are unchanged from the 2015 ES and 2017 FEI, refer to the 2017 FEI **Chapter 4, Section 4.2.28** for details.

Waste Management

- 3.2.21 Details of site waste management during operation are unchanged from the 2015 ES and 2017 FEI; refer to the 2017 FEI **Chapter 4 Section 4.4.22 to Section 4.4.26** for details.

Vulnerability to Major Accidents and Disasters

- 3.2.22 Given its location, the vulnerability of the Variation Development (and Consented Development) to major accidents and natural disasters such as flooding, sea level rise, or earthquakes is considered to be low, at worst.
- 3.2.23 Furthermore, the construction works for the Variation Development will be undertaken in accordance with primary health and safety legislation, including the Health and Safety at Work Act 1974 and the Construction (Design and Management) (CDM) Regulations 2015 which will include a requirement to produce emergency procedures in a Construction Phase (Health & Safety) Plan in accordance with the Regulations.
- 3.2.24 Further information in relation to this topic is provided in Chapter 16 of this document.

Site Security and Lighting

- 3.2.25 Details of the site security and lighting arrangements are unchanged from the 2015 ES and 2017 FEI; refer to the 2017 FEI **Chapter 4, Section 4.5.18** for details.

Proposed Working Hours

- 3.2.26 Details of the hours of working are unchanged from the 2015 ES and 2017 FEI; refer to the 2017 FEI **Chapter 4, Sections 4.4.6 to 4.4.7** for details.

Development Timescales and Programme

- 3.2.27 Details of the proposed programme duration are unchanged from the 2015 ES and 2017 FEI; refer to the 2017 FEI **Chapter 4, Sections 4.4.2 to 4.4.5** for details.

Rock Requirements

- 3.2.28 Construction of access tracks, hardstandings, foundations, and compounds for the Variation Development are unchanged from the 2017 FEI as they were of a size which would support larger turbines. Table 3.5 below provides a breakdown of the 85,025m³ of rock required and it is anticipated that this will be sourced from the on-site borrow pit(s).

Table 3.5 Summary of Rock Volumes Required During Construction

Infrastructure	Total Rock Volume (m ³)
Hardstandings and foundations	23,600
Access tracks	46,525
Temporary compounds	5,000
Control building compound	9,900
Total Rock Volume	85,025

3.2.29 Details of the on-site rock source search area and borrow pit are unchanged from the 2017 FEI, refer to 2017 FEI, **Chapter 4, Sections 4.5.61 to 4.5.62** for details.

Concrete Batching Plants

3.2.30 The majority of concrete is required for turbine foundations, with additional material required for control building, transformers and 'permanent' anemometry mast foundations. Table 3.6 provides an estimate for each main element; which are unchanged from the 2017 FEI.

Table 3.6 Estimated Volume of Concrete

Infrastructure	Total Volume of Concrete (m ³)
Wind turbine foundation x 16	Up to 12,000
Control building foundation	360
Sub Station HV Plinths	375
Anemometry mast foundations	25
Turbine kiosk foundations	144
Total Concrete Volume	Up to 12,904

3.2.31 Details of the concrete batching plants are unchanged from the 2017 FEI; refer to the 2017 FEI **Chapter 4, Sections 4.5.65 to 4.5.67** for details.

Monitoring of Construction Works

3.2.32 The construction mobilisation would likely be spread over an approximate 12 month period. It is envisaged that the Variation Development would be constructed employing several main contractors; one for the civil infrastructure works, one for the electrical works, and one for the supply, erection and commissioning of the wind turbines - all of whom would be coordinated and overseen by a project manager. In order to monitor the site work, a number of site representatives would be employed full time to ensure the quality and health and safety aspects of the construction, and to ensure the development is carried out in accordance with the Construction Method Statement (CMS) methodologies.

- 3.2.33 The site representatives would be individuals with previous experience of wind farm construction and would be supported on site by a suitably qualified ecology/environmental clerk of works, as required. The site representatives would carry out daily checks to monitor on-going activities. In addition to this, and in conjunction with the appropriate technical specialists (e.g. ecologist, hydrologist, archaeologist etc.), environmental audits of the site operations would be undertaken on a regular basis.
- 3.2.34 In line with appropriate guidance, competent operatives would be employed for handling, storing and arranging for the disposal of potentially polluting substances. Licensed waste disposal companies would be used to dispose of potentially polluting wastes.

Transport Movements

- 3.2.35 Other than in relation to abnormal indivisible loads (AIL), for which updated swept path figures have been produced given the increase in turbine blade length (see Chapter 14 of this EIA Report), transport movements are unchanged from the 2017 FEI. Refer to **Chapter 14** of the 2017 FEI.

3.3 Evolution of the Proposed Scheme

Site Identification Process

- 3.3.1 Refer to **Chapters 3** of the 2015 ES and 2017 FEI.

Site Context

- 3.3.2 Refer to **Chapters 3** of the 2015 ES and 2017 FEI.

Design Evolution

- 3.3.3 Refer to Tables 3.1 of **Chapters 3** of the 2015 ES and 2017 FEI for a summary of the design evolution process that led to identification of the Consented Development.
- 3.3.4 Since consent was granted in September 2017, further wind yield assessment and financial modelling has been undertaken by the Applicant. This has led to the proposed turbine rotor diameter and height increase under the Variation Development.

3.4 Decommissioning

- 3.4.1 Details of the decommissioning process are unchanged from the 2017 FEI; refer to the 2017 FEI **Chapter 4, Sections 4.7.1 to 4.7.10** for details.

4. Approach to Preparing the Environmental Impact Assessment Report

4.1 The Environmental Impact Assessment Process

- 4.1.1 The preparation of the EIA Report is one of the key stages in the EIA process, as it brings together information about any potentially significant environmental effects, which Scottish Ministers will use to inform its decision about whether the Variation Development should be allowed to proceed.

4.2 EIA Terminology

Impacts and Effects

- 4.2.1 In some EIA Reports, the terms 'impacts' and 'effects' are used interchangeably, whilst in others the terms are given different meanings. Some use 'impact' to mean the cause of an 'effect', whilst others use the converse meaning. This variety of definitions has led to a great deal of confusion over the terms, both among the authors and the readers of EIA Reports.
- 4.2.2 The convention used in this EIA Report is to use 'impacts' only within the context of the term EIA, which describes the process from scoping through EIA Report preparation to subsequent monitoring and other work. Otherwise, this document uses the word 'effects' when describing the environmental consequences of the Variation Development, which may for example come about as a result of physical activities that would take place if the development were to proceed (e.g. vehicle movements during construction operations). The environmental changes that occur as a result of these activities (e.g. loss of vegetation prior to the start of construction work or an increase in noise levels) may in some cases cause another change, which in turn results in another environmental effect.
- 4.2.3 The predicted environmental effects are the consequences of the environmental changes for specific environmental receptors. For example, with respect to a species of bat, the loss of roosting sites or foraging areas (the change) could reduce its population size (the effect); with regard to people, an increase in noise levels (the change) could affect people's amenity, reducing their enjoyment of the local area (the effect).
- 4.2.4 This EIA Report is concerned with assessing the significance of the environmental effects of the Variation Development, which requires the activities that will be undertaken to be understood and the resultant changes to be identified and quantified, often based on predictive assessment work.

Spatial and Temporal Scope

- 4.2.5 Spatial scope is the area over which changes to the environment are predicted to occur as a result of a proposed development. In practice, an EIA should focus on those areas where these effects are likely to be significant.
- 4.2.6 In this EIA Report, the spatial scope varies between environmental topics and is therefore described in each of the topic chapters. For example, the spatial effects of a development on landscape and visual amenity will probably cover a much greater area to that affected by noise.

4.2.7 The temporal scope covers the time period over which changes to the environment and the resultant effects are predicted to occur, and are typically defined as either being temporary or permanent.

4.3 EIA Scoping

4.3.1 Scoping involves identifying the following:

- The people and environmental resources (collectively known as 'receptors') that could be significantly affected by the proposed development;
- The work required to take forward the assessment of those effects identified as being potentially significant.

4.3.2 Our approach involves starting the scoping process at the outset of our EIA work, with the initial conclusions about the potentially significant effects of the development being set out in a scoping report. The preparation of the scoping report is informed by information about the legislative and policy context that will influence the scheme. It is also informed by the simple rule that, to be significant, an effect must be of sufficient importance that it should influence the process of decision-making about whether or not consent should be granted for a proposed development or an element of it. In this EIA Report, this is referred to as the 'significance test'.

4.3.3 At the scoping report stage, the conclusion that is made using the significance test is based upon professional judgement, with reference to the project description, and available information about:

- The magnitude and other characteristics of the potential changes that are expected to be caused by the proposed development;
- The sensitivity of relevant receptors to these changes;
- The effects of these changes on relevant receptors; and
- The value of receptors.

4.3.4 A precautionary approach is taken such that if the information that is available at the scoping report stage does not enable a robust conclusion to be reached that a potential effect is not likely to be significant, the effect is taken forward for further assessment.

4.3.5 The scoping report for the Variation Development was submitted for comment to the Energy Consents Unit (ECU) along with a request for a Scoping Opinion on 4th February 2020 and is attached at Appendix V4A.

4.3.6 Subsequent to the issuing of the scoping report, the scope of the assessment has been progressively refined in response to comments from the ECU and from consultees (see Section 4.4), together with environmental information that has been obtained from work carried out as part of the EIA and the evolution of the project proposals. A summary of further consultation undertaken is provided in Table 4.2.

4.3.7 The environmental topic chapters (6-17) detail the final scope of the assessment in relation to effects that were assessed as potentially significant; and therefore needed to be subject to more detailed assessment. All other effects (i.e. those that are not referred to in the technical chapters) are not likely to be significant.

4.4 Consultation

Scoping Opinion

4.4.1 The ECU issued a formal Scoping Opinion on 21/04/20 and this is presented in full in Appendix V4B. The scoping responses and how they are addressed in the EIA are summarised in Table 4.1.

Table 4.1 Summary of Scoping Opinion

Consultee(s)	Response	Chapter where considered in this EIA Report
Ayrshire Rivers Trust (April 2020)	Stated that as the Variation Development is located within the River Nith catchment (https://www.river-nith.com) and outside the Ayrshire Rivers Trust (ART) governance area. As such, ART it will not be commenting on the Enoch Hill Wind Farm Variation proposal.	N/A
BT (February 2020)	Responded stating that the "Project indicated should not cause interference to BT's current and presently planned radio network."	Chapter 16 - Infrastructure and other issues.
Energy Consents Unit (ECU) (April 2020)	<p>Provided a list of consultees who were provided with the Scoping Report and those who had not responded.</p> <p>Stated that Scottish Ministers are satisfied with the scope of the EIA set out at Section 3 of the Scoping Report.</p> <p>Stated that further Enquires should be undertaken with Scottish Water.</p> <p>Stated that an assessment of the potential impacts, risks, and any mitigation which would be provided should be carried out in relation to Private Water Supplies (PWS)</p> <p>Stated that an assessment of impacts on peat should be carried out.</p> <p>Recommended by that the final list of viewpoints and visualisations should be agreed following discussion with East Ayrshire Council (EAC), Historic Environment Scotland (HES) and Scottish Natural Heritage (SNH). Stated that the additional viewpoints as requested by EAC should be included.</p> <p>Agreed with the scope of the noise assessment. Stated that the noise assessment report should be formatted as per Table 6.1 of the IOA "A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise". Stated that EAC's response on noise should be taken account of.</p> <p>Stated that the points raised by SNH and HES should be taken account of.</p> <p>Stated that the Environmental Impact Assessment Report (EIAR) should include search areas of the proposed locations for on-site borrow pits. The EIAR should present high-level details of the borrow pit designs including indicative borrow pit plans.</p>	<p>The points raised are addressed in:</p> <ul style="list-style-type: none"> ● Chapter 7 – Noise; ● Chapter 9 – LVIA; ● Chapter 15 - Socio-economics; and ● Chapter 16 - Infrastructure and other issues. <p>With regards to the borrow pits, the information presented with the 2015 ES and 2017 FEI is unchanged. This includes high level details of the borrow pit designs presented as Appendix 4.A of the 2017 FEI.</p> <p>As the ground level infrastructure is unchanged under the Variation Development proposals, the assessment of Geology/Hydrology/Hydrogeology effects (including on Private Water Supplies and Peat) remains unchanged from the 2015 ES and 2017 FEI and no further assessment is therefore necessary. It should be noted that EAC agree with this approach.</p>

Consultee(s)	Response	Chapter where considered in this EIA Report
Dumfries and Galloway Council (April 2020)	Did not have any comments on the Scoping Report.	N/A
Defence Infrastructure Organisation (DIO) - MoD (March 2020)	<p>The DIO stated that the Variation Development would cause a potential obstruction hazard to military low flying training activities. To address these effects it stated that the Variation Development should be fitted with MOD accredited aviation safety lighting. Perimeter turbines should be fitted with 25 candela omni-directional red lighting or infrared lighting with an optimised flash pattern of 60 flashes per minute of 200ms to 500ms duration at the highest practicable point.</p> <p>The DIO also stated that MOD Safeguarding wishes to be consulted and notified of the progression of planning applications and submissions relating to this proposal to verify that it will not adversely affect defence interests.</p>	Chapter 17 - Aviation
East Ayrshire Council (EAC) (March 2020)	<p>General Provided general information on the format, methodology and content required in the NTS and EIA report.</p> <p>Agreed that Shadow Flicker, Historic Environment, Geology/Hydrology/Hydrogeology, Traffic and Transport (with the exception of updated Swept Path Analysis) and Socio-economics (with the exception of certain tourism and recreational impacts) could be scoped out of assessment.</p> <p>LVIA <i>Cumulative Schemes</i> EAC provided several updates to the cumulative table for the following schemes:</p> <ul style="list-style-type: none"> ● Greenburn Wind Farm; ● Pencloe; ● Polquhairn; ● Lethans; ● Glenmuckloch; and ● Linburn Farm. <p><i>Methodology</i> EAC are broadly content with the LVIA methodology and agreed that a night-time lighting assessment can be scoped out provided it would remain acceptable to use non-visible infrared lighting on all turbines (and this would be stated in a planning condition).</p> <p><i>Viewpoint Locations</i> EAC are broadly satisfied with the proposed viewpoints (VPs) within East Ayrshire. However have requested wirelines from VPs 10 and 11, state that VP12 should include a full photomontage, that VP14 and VP17 should be included and that the VPs in Dumfries and Galloway and South Ayrshire should be discussed with the relevant councils.</p> <p>Ecology Stated that relevant consultees should be consulted to confirm the baseline, otherwise agrees that with the</p>	<p>Chapter 9 – LVIA; Chapter 11 – Ecology; Chapter 12 – Ornithology; Chapter 15 – Socio-economics; and Chapter 16 - Infrastructure and other issues.</p>

Consultee(s)	Response	Chapter where considered in this EIA Report
	<p>exception of bats, ecology can be scoped out.</p> <p>Ornithology Agree that this can be scoped out other than to reassess bird collision risk and that it should be checked with relevant consultees whether this should be done only for Golden Plover or should include other species.</p> <p>Infrastructure, Telecommunications and Safety Agreed with the scope proposed for this topic.</p> <p>Aviation Stated that there should be an assessment of the proposed larger variation turbines on aviation interests.</p> <p>Decommissioning and Restoration and Planning Monitoring Officer (PMO) Stated that the applicant should provide a financial estimate in relation to Decommissioning and Restoration. Stated that it would seek the Scottish Ministers agreement to the Council appointing a PMO to be secured via a Section 75 legal agreement.</p>	
<p>Galloway Fisheries Trust (April 2020)</p>	<p>State that since the variation is for an increase in tip height, an increase in rotor diameter and operational period, it does not have any comments relating to the Application for Variation Scoping Report.</p>	<p>N/A</p>
<p>Glasgow Prestwick Airport (GPA) (March 2020)</p>	<p>State that its Line of Sight Analysis (LOS) indicates all turbines will be visible to its Primary Radar – and would therefore generate unacceptable clutter on its Air Traffic Radar Displays. The Terma Scanter 4002, a newly installed radar, may be able to mitigate the Variation Development but requires a Baseline Flight Trial and a Technical Feasibility Assessment to confirm this. Noted that GPA is in discussion with the Applicant to agree a Radar Mitigation Agreement.</p>	<p>Chapter 17 - Aviation</p>
<p>Glencairn Community Council (GCC)</p>	<p>Asked for Wireframes from two viewpoints as follows:</p> <ul style="list-style-type: none"> • NX 69874 98989 Striding Arches, Colt Hill; and • NX 68064 97060 Benbrack and Striding Arches. <p>These were produced and sent to the ECU which sent them to GCC.</p>	<p>Chapter 9 – LVIA</p>
<p>Historic Environment Scotland (March 2020)</p>	<p>Content that the potential impacts on Craigengillan Garden and Designed Landscape (GDL), would be unlikely to materially change and therefore agree that it can be scoped out of assessment. Have requested that further information is provided before they agree that Dumfries GDL can be scoped out of assessment.</p> <p>Content that enough information has been provided to confirm that other impacts its interests are unlikely to be significant.</p>	<p>Chapter 10 - Historic Environment See table 4.2 below which reports Historic Environment Scotland's subsequent agreement that based on the further information supplied they were content for Dumfries House to be scoped out of the EIA.</p>

Consultee(s)	Response	Chapter where considered in this EIA Report
The Joint Radio Company (JRC) (July 2018)	No response was received to the Scoping Report.	Chapter 16 - Infrastructure and other issues
Marine Scotland (March 2020)	<p>Recommend that planning condition 32 for the Consented Development is carried forward to protect the water quality and fish populations within and downstream of the Variation Development and that up to date pre-construction water and fish population surveys are carried out.</p> <p>State that the Applicant should consider all adjacent wind farms (operational and consented) in the design of the proposed monitoring programmes particularly in the selection of control sites.</p>	N/A (scoped out)
National Air Traffic Services (NATS) (March 2020)	Stated that it has no objection to the variation on the assumption that the planning condition (condition 24) imposed on the original consent remains in place.	Chapter 17 - Aviation
New Cumnock Community Council (NCC) (April 2020)	Provided a generic guidance document (dated October 2016) which listed 6 VPs in order to assist with development visual impact assessment by NCC.	Chapter 9 – LVIA
Scottish Forestry (April 2020)	<p>Stated that the Variation Development borders on to forests and any additional felling needed now or subsequently will need Scottish Forestry approval, where the felling is outside the consented area. This refers also to associated works including quarrying and the creation of borrow pits.</p> <p>Stated that Scottish Government Control of Woodland Removal Policy be added to the essential planning framework.</p>	N/A as minimal, if any, felling is likely to be required on or outwith the Development Site.
Scottish Water (March 2020)	<p>Stated that it has no objection to the planning application. State that it is unable to reserve capacity at its water supply and waste water treatment works for the Proposed Development.</p> <p>Noted that the Variation Development falls partly within a drinking water catchment where a Scottish Water abstraction is located. This supplies the Lochinvar Water Treatment Works and it is essential that water quality and water quantity are protected and that it should be notified in the event of an incident occurring. Note that it is a relatively large catchment and the activity is in the upper reaches of the catchment therefore is likely to be low risk.</p>	Chapter 13 - Geology, Hydrology and Hydrogeology
Scotways (March 2020)	Stated that with no change to the ground level infrastructure it has no comments to make at this time.	N/A

Consultee(s)	Response	Chapter where considered in this EIA Report
SEPA (March 2020)	Stated that it has no objection to the Variation Development. Stated its response depends on there being no changes to the size of turbine foundations or depth or extent of peat excavation. Stated that further information should be provided to describe the proposed changes in peat volumes or habitat losses if there was an increase the extent of peat excavation which exceeds the agreed micro-siting arrangements.	Chapter 13 - Geology, Hydrology and Hydrogeology
SNH (March 2020)	<p>Agree that a 35km study area and viewpoint selection is suitable, that the updated capacity studies for Dumfries and Galloway and East Ayrshire should be used to inform the assessment and that a detailed assessment of impacts on the Merrick Wild Land Area can be scoped out.</p> <p>State that that the application should include a comparative ZTV to blade tip for the proposed and consented schemes. State that an updated cumulative baseline to at least the end of January 2020 should be included.</p>	Chapter 9 – LVIA
SNH (March 2020)	<p>In respect of ecology, stated that the Muirkirk and North Lowther Uplands SPA, Muirkirk Uplands SSSI and North Lowther Uplands SSSI can be scoped out of assessment.</p> <p>Agree that no update ecological surveys are required. Recommend that pre-construction surveys for legally protected species should be carried out at an appropriate time of year for the species, no more than eight months preceding commencement of construction, and that a watching brief is then implemented by the ECoW during construction. The species that should be surveyed for include, but are not limited to, breeding birds, otter, water vole, badger and pine marten.</p> <p>Stated that there is no requirement to update the collision risk assessment for bats and that provided that the mitigation measures previously proposed in the ES and FEI are adhered to, the impact on bats from the proposed variation is likely to remain not significant.</p>	Chapter 11 - Ecology.
SNH (March 2020)	<p>In respect of ornithology, SNH are satisfied that further bird survey work is not required to support the variation application and support the proposals to update the collision risk calculations for golden plover.</p> <p>Recommended that no ground clearance or other operational activity should be undertaken during the main bird breeding season March to August inclusive. If this is not possible, an ornithologist should be engaged to survey the ground and trees immediately prior to such works to advise the developers of any bird nesting activity. If nesting birds are found during pre-construction surveys, a suitably sized buffer zone should be set up around the nest.</p> <p>Recommended that should consent be granted, the applicant should follow SNH guidance on dealing with construction and breeding birds, March 2016.</p>	Chapter 12 - Ornithology.

Consultee(s)	Response	Chapter where considered in this EIA Report
SNH (March 2020)	In respect of habitats and peat, SNH are satisfied for assessment of receptors related to geology, hydrology and hydrogeology to be scoped out of the EIA for the Variation Development.	N/A
Transport Scotland (April 2020)	Are satisfied that the only additional assessment proposed for Transport relates to Abnormal Indivisible Loads (AIL). State that swept path analysis should be undertaken and details provided with regard to any required changes to street furniture or structures along the route as required for larger turbines.	Chapter 14 – Traffic and Transport.
Visit Scotland	<p>Stated the importance of tourism to Scotland and of scenery to tourism. Visit Scotland requested that any potential detrimental impact of the Proposed Development on tourism should be identified and considered in full. Visit Scotland also suggested consideration be given to Scottish Government's 2008 research on the impact of wind farms on tourism</p> <p>www.scotland.gov.uk/Publications/2008/03/07113507/1</p> <p>It strongly recommended that any detrimental effects of the Proposed Development on Tourism be identified and considered in full.</p>	Chapter 15 - Socio-economics.

4.4.2 Topic specific refinements to the work scope following additional post-scoping report consultation are summarised in Table 4.2.

Table 4.2 Summary of Consultation Following Issue of the Scoping Opinion

Consultee(s)	Response	Chapter where considered in this EIA Report
Dumfries and Galloway Council (April 2020)	<p>Agreed that the following Viewpoints (VPs) could be scoped out of the LVIA:</p> <ul style="list-style-type: none"> • VP 3. Core Path 667 Water of Deugh (4.5km distance to south); • VP 19. Meikle Millyea (23.7km distance to south); • VP 20. Kirriereoch Hill (23.9km distance to south west); • VP 21. Merrick (24.7km distance to south west); and • VP 22. East Mount Lowther (29.8km distance to east). 	Chapter 9 – LVIA
Historic Environment Scotland (April 2020)	Agreed that based on the further information supplied that they were content for Dumfries House to be scoped out of the EIA.	Chapter 10 - Historic Environment

Consultee(s)	Response	Chapter where considered in this EIA Report
South Ayrshire Council (April 2020)	State that having reviewed the scoping request and scoping response it can advise that it concurs with the reasoning expressed in the Scoping Report and it therefore agrees that VP18 Shalloch on Minnoch can be scoped out on the basis of that rationale.	Chapter 9 – LVIA

4.5 Overview of Assessment Methodology

Introduction

- 4.5.1 All the topic assessments presented in the EIA Report have been undertaken on the basis of a common understanding of the nature of the project, as described in Chapter 3.
- 4.5.2 For those topics considered in this EIA Report, noting that many have been scoped out given the nature of the variations proposed, the assessment of effects has been undertaken by competent experts with relevant specialist skills, drawing on their experience of working on other development projects, good practice in EIA and on relevant published information. A list of these experts and their qualifications has been provided in Appendix V1A. For some topics, use has been made of modelling or other methodologies, as appropriate.
- 4.5.3 With certain exceptions, for each topic considered in this EIA Report the chapter uses the following common format:
1. Introduction;
 2. Limitations of this assessment;
 3. Legislative and policy context;
 4. Data gathering methodology;
 5. Overall baseline (where appropriate), with the detailed baseline being set out within section 9;
 6. Scope of the assessment;
 7. Environmental measures embedded into the scheme;
 8. Assessment methodology;
 9. Assessment of effects - this sub-section excludes cumulative effects and deals separately with each receptor or category of receptors that could be significantly affected. The assessment is made against the predicted future baseline (see Section 4.6 below);
 10. Assessment of cumulative effects;
 11. Additional mitigation;
 12. Conclusions of significance evaluation;
 13. Implementation of environmental measures;
 14. References

- 4.5.4 Where a topic work scope was limited and only a limited amount of assessment work was necessary to demonstrate that effects would not be significant (i.e. all effects are 'scoped-out'), this is presented in a new section 6 'Assessment of potential effects'. In such chapters, sub-Sections 7 to 10 would not then be required.

4.6 Identification of Baseline Conditions

- 4.6.1 As the various elements of the Variation Development would be built over a period of approximately 12 months from a start date yet to be determined and then operated for 30 years (if the variation to increase the operational period from 25-30 years is granted), it cannot be assumed that the baseline conditions, would be the same as the current baseline at the time of construction or during operation. Where relevant, technical chapters therefore provide a description of the potential changes to the baseline in the absence of the project.
- 4.6.2 To determine the baseline conditions that should be used for the assessment of the likely significant effects of the Variation Development, it is necessary to consider whether conditions are likely to change by the 'assessment years' that are selected for the construction and operation of the Variation Development. If this future baseline is more likely to occur than the existing baseline, the former is used for the assessment of effects. However, in many cases it will be concluded that the existing baseline is just as likely, or even more likely, to occur in the assessment years than would be the case with any future baseline conditions. In this case, the existing baseline is used for the assessment.
- 4.6.3 The baseline is determined for the 'Study Area' for each environmental topic by a combination of desk-based research, including consultation with the relevant statutory and non-statutory authorities, together with field survey work (where required). In its simplest form, the Study Area comprises the site of the Variation Development. However, as for most developments, the Study Area also includes land outside the site, especially where effects are likely to extend beyond such geographical limits. 'Zones of influence' (Zols), where the Variation Development could affect off-site areas are therefore considered for each technical topic considered in the EIA.
- 4.6.4 Details of the relevant Zols are discussed in the baseline section of each environmental topic chapter considered. These chapters also explain the basis for defining the future baseline conditions, where this is appropriate. This is based on the following:
- Changes to the baseline that can be predicted based on reasonable assumptions and modelling calculations, e.g. the application of traffic growth factors based on relevant guidance;
 - Information relating to other likely and predictable changes, e.g. climate change, which could affect current prevailing environmental conditions; and
 - Information about other relevant developments, including the nature of the development proposals, their likely timing and their location relative to the Variation Development.

4.7 Overview to Approach to Significance Evaluation Methodology

Introduction

- 4.7.1 One of the requirements of an EIA Report is to set out the conclusions that have been reached about the likely significant environmental effects that it is predicted will result from the Variation Development. Reaching a conclusion about which effects, if any, are likely to be significant is the culmination of an iterative process that involves the following stages:

- Identifying those effects that could potentially be significant (see Section 4.4 on scoping);
 - Assessing the effects of the proposed variations to the Consented Development against the baseline conditions; and concluding whether these are likely to be significant.
- 4.7.2 Chapters 6 to 17 describe the approaches that have been used, in relation to the stages outlined in the bullet points above, for each of the environmental topics that are considered in this EIA Report.

Identification of Likely Significant Effects

- 4.7.3 To inform the identification of likely significant effects, all of those involved in the preparation of the EIA Report were supplied with information about the proposed variation to the Consented Development; noting that this is limited to increases in turbine hub and tip height, rotor diameter, and operational life, and that otherwise the infrastructure and the methods of construction, operation and decommissioning effectively remain unchanged to those considered in the 2015 ES and 2017 FEI.
- 4.7.4 As noted in Chapter 1, the Electricity Works (Environmental Impact Assessment) (Scotland) Amendment Regulations 2017 make it clear that for a variation application relating to an EIA development, any further assessment required to inform the application should primarily consider the impacts of the variation itself rather than requiring the whole development to be assessed again. As such, the identification of receptors that needed to be considered within this EIA Report drew on available information about only the environmental changes as a result of the proposed variations to the Consented Development. Furthermore Regulation 5(4) of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 states: "*With a view to avoiding duplication of assessments, account is to be taken of the available results of other relevant assessments in preparing the EIA report*" and cross reference has therefore been made to the 2015 ES and 2017 FEI where the results of assessments have not changed.
- 4.7.5 The technical assessments, undertaken in Chapters 6 to 17 of this EIA Report, describe how environmental changes resulting from the proposed variation are assessed to determine the significance of effects, together with the topic specific approaches that have been used to identify the receptors that could be significantly affected by the Variation Development.

Types of Effects

- 4.7.6 *Paragraph 4 of Schedule 4 of the EIA Regulations states that "The description of the likely significant effects on the factors specified in regulation 4(3) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development."*
- 4.7.7 Where appropriate, this EIA Report considers all these types of effects where they are relevant to different environmental topic chapters, with the exception of cumulative effects, which are dealt with separately in Section 4.8.

Direct Effects

- 4.7.8 Direct effects are those that result directly from a proposed development. For example, where a machine disturbs an area of habitat; the associated physical activity could result in a change to the receptor.

Indirect and Secondary Effects

- 4.7.9 Indirect and secondary effects are those that result from consequential change caused by the proposed development. As such, they would normally occur on a different receptor, later in time or at locations farther away than direct effects. An example would be where an area of habitat disturbed by machinery results in loss of vegetation and soil compaction which increases silted run-off rates into nearby watercourses, smothering gravel beds downstream used by spawning salmon.

Transboundary Effects

- 4.7.10 Transboundary effects are those that would affect the environment in another state within the European Economic Area (EEA).

Temporal Effects

- 4.7.11 As discussed in Section 4.2, temporal effects are typically defined as being permanent or temporary as follows:
- Permanent - these are effects that will remain even when the proposed development is complete, although these effects may be caused by environmental changes that are permanent or temporary. For example, an excavator that is driven over an area of valuable habitat could cause so much damage that the effect on this vegetation would be permanent; and
 - Temporary – these are effects that are related to environmental changes associated with a particular activity and that will cease when that activity finishes. For example, an increase in noise levels during construction may affect nearby residential receptors, but any effects would cease on completion of this phase of a proposed development. Where effects are temporary, they may be defined as short, medium or long-term, the duration of which may depend on the receptor in question and would therefore be defined in technical chapters as appropriate.

Significance Evaluation

Overview

- 4.7.12 The receptors that could be significantly affected are identified within each topic chapter. The approach that is adopted to determine whether the effects on these receptors are significant is to apply a combination of professional judgement and a topic-specific significance evaluation methodology that draws on the results of the assessment work that has been carried out.
- 4.7.13 In applying this approach to significance evaluation, it is necessary to ensure that there is consistency between each environmental topic in the level at which effects are considered to be significant. Therefore, it is inappropriate for the assessment of one topic to conclude that minor effects are significant, when, for another topic, only comparatively major effects are significant.
- 4.7.14 In order to achieve the desired level of consistency, each environmental topic lead has been guided in their decision-making about likely significance by the '*significance test*' that informed the preparation of the scoping report (see Section 4.4 above), as well as the relevant topic-specific significance evaluation methodology.
- 4.7.15 The conclusion about significance is arrived at using professional judgement, with reference to the project description, and available information about the magnitude and other characteristics of the potential changes that are expected to be caused by the proposed variation to the Consented Development, receptors' sensitivity to these changes and the effects of these changes on relevant receptors.

- 4.7.16 In some cases, use of the 'significance test' alone will enable a conclusion to be reached in the 'Scope of the assessment' section of the topic chapter, without the need for more detailed assessment, that a potential effect is not likely to be significant. However, in other cases, effects identified in the 'Scope of the assessment' section are taken forward for further assessment in the subsequent section(s) of each topic chapter.
- 4.7.17 For some of these effects, relatively little assessment work may be required to reach a conclusion that an effect is not significant, whereas in other cases, more extensive assessment work is required. Sometimes the application of the 'significance test' is sufficient to support this conclusion but, in other cases, the relevant topic-specific significance evaluation methodology is used to inform the evaluation of significance (to determine whether an effect is or is not significant).
- 4.7.18 Having applied the relevant topic-specific significance evaluation methodology, the topic specialists check the conclusions against the significance test. If this test results in a different conclusion to that reached using the significance evaluation methodology, a detailed justification is provided as to why this different conclusion is valid.
- 4.7.19 For some of the topics that are assessed in the EIA Report, there is published guidance available about significance evaluation. Where such guidance exists, it has been used to inform the development of the significance evaluation methodologies that are used in this EIA Report. For other topics, it has been necessary to develop methodologies without the benefit of guidance. This has involved technical specialists drawing on their previous experience of significance evaluation in EIA.
- 4.7.20 While there may be variation depending on the technical topic being considered, significance evaluation generally involves combining information about the sensitivity, importance or value of a receptor, and the magnitude and other characteristics of the changes that affect the receptor. The approach to using this information for significance evaluation is outlined below.

Receptor Sensitivity, Importance, or Value

- 4.7.21 The sensitivity or value of a receptor is largely a product of its importance as informed by legislation and policy, and as qualified by professional judgement. For example, receptors for landscape, biodiversity or the historic environment may be defined as being of international or national importance. Lower value resources may be defined as being sensitive or important at a county or district level. For each environmental topic, it is necessary to provide a detailed rationale that explains how the categories of sensitivity/importance/value have been used.
- 4.7.22 The use of a location or physical element that may be representative of receptors, e.g. people, would also play a part in its classification in terms of sensitivity, importance, or value. For example, when considering effects on the amenity of people, a location used for recreational purposes may be valued more than a place of work.

Magnitude of Change

- 4.7.23 The magnitude of change affecting a receptor as a result of the Variation Development would be identified on a scale from very low to very high. As with receptor sensitivity and value, a rationale is provided in each topic chapter that explains how the categories of environmental change are defined. For certain topics, the magnitude of change would be related to guidance on what levels of change are acceptable (e.g. for air quality or noise), and be based on numerical parameters. For other changes, it will be a matter of professional judgement to determine the magnitude of change, using descriptive terms.

Determination of Significance

- 4.7.24 The significance of effects is determined with reference to information about the nature of the development, the receptors that could be affected and their sensitivity, importance or value, together with the magnitudes of environmental change that are likely to occur.
- 4.7.25 Significance evaluation for many environmental topics can be guided by the use of matrices that combine sensitivity/value and the characteristics of environmental changes as shown in the example in Table 4.3. In addition, professional judgement is applied because, for certain environmental topics, the lines between the sensitivities or magnitudes of change may not be clearly defined and the resulting assessment conclusions may need clarifying.

Table 4.3 Significance Evaluation Matrix

		Magnitude of change				
		Very high	High	Medium	Low	Very low
Sensitivity/importance/value	Very high	Major (Significant)	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Probably significant)
	High	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)
	Medium	Major (Significant)	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)
	Very Low	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)

- 4.7.26 Within this matrix that is used in most significance evaluation exercises, reference is made to:
- Major effects, which will always be determined as being significant in EIA terms;
 - Moderate effects are likely to be significant, although there may be circumstances where such effects are considered not significant on the basis of professional judgement; and
 - Minor or negligible effects, which will always be determined as not significant.
- 4.7.27 Variations to this approach, which may be applicable to specific environmental topics, will be detailed in the relevant 'Significance evaluation methodology' sub-section contained in each environmental topic chapter.
- 4.7.28 Definitions of how the categories that are used in the matrix are derived for each topic are also set out in each environmental topic chapter, along with the relevant explanation and descriptions of receptor sensitivity, magnitude of change and levels of effect that are considered significant under the EIA Regulations.

4.8 Assessment of Cumulative Effects

- 4.8.1 For each environmental topic that is dealt with in this EIA Report, an assessment is undertaken of how the environmental effects resulting from the Variation Development, could combine with the same topic-related effects generated by other developments to affect a common receptor. To do this, it is important to first identify which other developments need to be included in the cumulative effects assessment (CEA) under each environmental topic assessment undertaken. The starting point for this is to determine the Zols from the Variation Development for each receptor that could be significantly affected under each environmental topic considered.
- 4.8.2 Identifying the other developments that should be considered in the CEA involves first acknowledging that the availability of information necessary to conduct this will partly depend on the prevailing status of the other relevant developments.
- 4.8.3 In the context of the Variation Development, the relevant SNH guidance¹ states that the CEA should be undertaken only for operational and consented wind energy development and other planning applications for wind energy development. In addition paragraph 5 of Schedule 4 of the EIA Regulations states "*cumulation of effects with other existing and/or approved development*". Therefore, such developments, where they are located within the Zol for a given environmental topic, have been subject to CEA. These other developments are discussed, as appropriate, in the sub-section of each environmental topic chapter that deals with the assessment of cumulative effects.
- 4.8.4 Types of development other than wind farms have been considered, but none were identified that needed to be included in the CEA. Chapter 9 of the 2015 ES included a cumulative landscape and visual impact assessment (CLVIA) which was updated in Chapter 9 of the 2017 FEI. This latter assessment was based on the identification (as at August 2016) of wind energy developments within a 70km Search Area from the Development Site. In line with SNH guidance (Assessing the Cumulative Impacts of Onshore Wind Energy [March 2012]), the CLVIA considered the potential for cumulative effects with other operational, consented and planning application stage wind farm developments within a 35km Study Area from the Development Site, as detailed in Table 9.4 of the 2017 FEI.
- 4.8.5 To account for potential changes to cumulative wind energy development within this 35km Study Area, an updated cumulative search was undertaken in March 2020 using data available from relevant planning authority websites. The sites considered for inclusion in the updated CEA (as of March 2020) are listed in Table 4.4 below.

Table 4.4 Cumulative Wind Energy Developments (As at 4 March 2020)

Reference	Name	Distance (from Variation Development) (m)	Number of turbines	Height to blade tip (m)	Status in 2017 FEI	Current Status (as of 4 th March 2020)
E01	Windy Standard Extension	2,393	30	120	Existing	Existing
E02	Afton	4,335	27	100/120	Consented	Existing
E03	Windy Standard	4,934	36	52	Existing	Existing
E04	High Park Farm	6,254	1	75	Existing	Existing

¹ Assessing the Cumulative Impact of Onshore Wind Energy Developments, SNH (2012)

Reference	Name	Distance (from Variation Development) (m)	Number of turbines	Height to blade tip (m)	Status in 2017 FEI	Current Status (as of 4 th March 2020)
E05	Hare Hill	7,123	20	63.5	Existing	Existing
E06	Hare Hill Extension	8,000	35	70/75/81/86/91	Consented	Existing
E07	Mansfield Mains *	8,892	1	44.85	Consented	Existing
E08	Sanquhar	11,095	9	130	Consented	Existing
E09	Dersalloch	12,697	23	125	Consented	Existing
E10	Whiteside Hill	13,610	10	121.2	Consented	Existing
E11	Wether Hill	17,142	14	91	Existing	Existing
E12	Sunnyside	19,586	2	62	Existing	Existing
E13	Bankend Rig	26,224	11	76	Existing	Existing
E14	Blackcraig	26,241	23	110	Consented	Existing
E15	Hadyard Hill	27,277	52	100	Existing	Existing
E16	Galawhistle	28,569	22	110.2/121.2	Consented	Existing
E17	Dungavel	29,443	13	100/120	Existing	Existing
E18	Hagshaw Hill Extension	30,347	20	80	Existing	Existing
E19	Andershaw	31,249	11	140	Consented	Existing
E20	Nutberry	31,364	6	125	Existing	Existing
E21	Low Bowhill	31,523	1	67	Existing	Existing
E22	Middle Muir	31,649	15	136/149.9	Consented	Existing
E23	North Threave Farm	32,072	1	53.7	N/A	Existing
E24	West Dykes	32,077	1	77	N/A	Existing
E25	Whitelee Extension 2	32,435	39	140	Existing	Existing
E26	Calder Water	32,753	13	144.5	Existing	Existing
E27	Kype Muir	32,756	26	132	Consented	Existing
E28	Hazelside Farm (T1)	32,822	1	74	Consented	Existing
E29	Auchrobert	33,606	12	132	Consented	Existing
E30	Whitelee Extension 1	34,064	36	135	Existing	Existing
E31	West Browncastle	34,165	12	126.5	Existing	Existing
E32	Whitelee	34,413	144	110	Existing	Existing
E33	Low Waterhead	34,620	1	67	N/A	Existing

Reference	Name	Distance (from Variation Development) (m)	Number of turbines	Height to blade tip (m)	Status in 2017 FEI	Current Status (as of 4 th March 2020)
E34	Tralorg	34,989	8	100	N/A	Existing
C01	South Kyle	241	50	149.5	Application	Consented
C02	Pencloe	1,887	19	125	Application	Consented
C03	Benbrack	4,928	18	132/135/149.9	Application	Consented
C04	Over Hill	5,132	10	149.9	N/A	Consented
C05	Windy Rig	7,604	12	125	Application	Consented
C06	Taiglim Farm *	8,441	1	33.6	Consented	Consented
C07	Polquhairn	10,153	9	100	Application	Consented
C08	Sandy Knowe	11,120	24	125	Application	Consented
C09	Lorg	12,297	9	130/149.5	Application	Consented
C10	Lethans	12,510	22	136/152/176	Application	Consented
C11	Knockshinnoch	13,303	2	126.5	Application	Consented
C12	Glenmuckloch	13,884	8	149.9	Consented	Consented
C13	Torrs Hill	17,532	2	100	Consented	Consented
C14	Penbreck	19,825	9	125/145	Consented	Consented
C15	Glenshimmeroch	19,996	10	149.9	N/A	Consented
C16	Twentyshilling Hill	20,830	9	125	Consented	Consented
C17	NHS Ailsa Hospital	22,590	1	78	N/A	Consented
C18	Kennoxhead	23,415	19	145	Consented	Consented
C19	Knockman Hill	24,647	5	81	Consented	Consented
C20	Bankend Rig Extension	26,112	3	126.5	Application	Consented
C21	Kirk Hill	29,059	8	110	Scoping	Consented
C22	Cumberhead	29,221	11	126.5	Consented	Consented
C23	Stoneyhill Farm	30,088	1	100	Consented	Consented
C24	Kype Muir Extension	30,508	15	156/176/200/220	Consented	Consented
C25	Hagshaw Hill	31,120	26	55	N/A	Consented
C26	Chapelton Farm	31,223	3	67	Consented	Consented
C27	Penwhapple Reservoir	32,056	1	67	N/A	Consented

Reference	Name	Distance (from Variation Development) (m)	Number of turbines	Height to blade tip (m)	Status in 2017 FEI	Current Status (as of 4 th March 2020)
C28	Mount Farm	32,561	1	129.8	N/A	Consented
C29	Dalquhandy	32,652	15	131	Consented	Consented
C30	Hazelside Farm (T2)	32,892	1	74	Consented	Consented
C31	Douglas West	33,482	13	149.9	Application	Consented
C32	Sneddon Law	33,571	15	130	Consented	Consented
C33	Hallburn Farm	33,607	1	67	Consented	Consented
C34	Mochrum Fell	33,882	8	116.5/126.5	Consented	Consented
C35	Cleughhead Farm	34,576	1	79	Consented	Consented
C36	High Waterhead	34,735	1	67	N/A	Consented
A01	Pencloe Variation	1,887	19	149.9	N/A	Application
A02	Windy Standard Phase III	3,323	20	125/177.5	Scoping	Application
A03	North Kyle	3,784	54	149.9	N/A	Application
A04	Sanquhar II	6,195	50	200 / 149	Scoping	Application
A05	Shepherd's Rig	11,933	19	149.9/125	Scoping	Application
A06	Lethans Variation	12,510	22	176/200/220	N/A	Application
A07	Cornharrow	16,033	8	149.9	N/A	Application
A08	Troston Loch	19,953	14	149.9	N/A	Application
A09	North Lowther	24,438	35	150	Scoping	Application
A10	Fell	26,965	9	180-200	N/A	Application
A11	Hare Craig	27,435	8	149.9-230	N/A	Application
A12	Douglas West Extension	31,767	13	200	N/A	Application
A13	Feoch	31,872	1	67	Application	Application

5. Planning Policy Context

5.1 Introduction

- 5.1.1 The key pieces of parent legislation applicable to the 2015 section 36 application were The Electricity Act 1989 and The Town and Country Planning (Scotland) Act 1997. As there have been no relevant and material changes to either of these in the intervening period, this Chapter provides only an overview of subsequent changes to the planning policy framework since completion of the 2015 ES and 2017 FEI which are of relevance to the Variation Development EIA. As this chapter only identifies relevant planning policy changes it should be read in conjunction with Chapters 5 Planning Policy Context of the 2015 ES and 2017 FEI.
- 5.1.2 This Chapter does not assess the accordence of the Variation Development against planning policy; a separate Planning Statement Addendum has been prepared to support the application and should be referred to for a detailed planning policy appraisal.
- 5.1.3 The relevant EIA regulations are the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended). The 2017 Regulations clarify that for a variation application relating to an EIA development, further assessment required to inform the application should only consider the impacts of the variation itself rather than requiring the whole development to be assessed again.

5.2 National Planning Policy, Guidance and Advice

- 5.2.1 There have been no changes to the key national planning policy documents, namely the Scottish Planning Policy (SPP) (2014) and the National Planning Framework 3 (NPF3) (2014), since the completion of the 2015 ES. However, the following relevant changes to national guidance and advice publications have occurred:
- The Historic Environment Scotland Policy (April 2019) has replaced the Scottish Historic Environment Policy (2011) and the Managing Change in the Historic Environment: Setting guidance note has been revised (June 2016);
 - The Scottish Government's Chief Planner issued a letter regarding renewable energy targets and the consideration of socio-economic impacts (dated 11 November 2015) and Draft Advice on Net Economic Benefit and Planning (March 2016);
 - The Carbon and Peatland Map 2016, published by Scottish Natural Heritage (SNH) on 29 June 2016, maps areas considered likely to host Scotland's nationally important resource of deep peat, carbon rich soils and priority peatlands habitats. Under Table 1 of the SPP (2014) these are to be identified on wind energy spatial frameworks as "Group 2 – Areas of Significant Protection"; and
 - In June 2016, the Scottish Government published its draft Peatland and Energy Policy Statement, which provides the basis from which the Scottish Government and its agencies will act in developing and implementing policies in relation to peatland and energy. This policy is a material consideration for new energy developments and the impact they may have on peatland habitats.
- 5.2.2 The new Historic Environment Scotland Policy (April 2019) includes 6 policies for managing the historic environment, including that:
- *'HEP1 – Decisions affecting any part of the historic environment should be informed by an inclusive understanding of its breadth and cultural significance;*

- *HEP2 – Decisions affecting the historic environment should ensure that its understanding and enjoyment as well as its benefits are secured for present and future generations; and*
- *HEP4 – Changes to specific assets and their context should be managed in a way that protects the historic environment. Opportunities for enhancement should be identified where appropriate. If detrimental impact on the historic environment is unavoidable, it should be minimised. Steps should be taken to demonstrate that alternatives have been explored, and mitigation measures should be put in place.'*

5.3 Development Plan

5.3.1 The variation application is made under Section 36C of the Electricity Act and as such the Development Plan does not have the same position and status in an Electricity Act application, as would have been the case if the application had been made under the Town and Country Planning (Scotland) Act 1997.

5.3.2 The current development plan for the Development Site comprises:

- The Adopted East Ayrshire Local Plan 2017.

East Ayrshire Local Plan (2017)

5.3.3 The East Ayrshire Local Development Plan¹ (LDP) 2017 (the Local Plan) was adopted by East Ayrshire Council (EAC) in February 2017. The LDP aim is that *'East Ayrshire will be a desirable place in which to live, work, invest and visit'*.

5.3.1 The LDP Plan sets out a vision statement (paragraph 2.14) for 'The Rural Area' of East Ayrshire, which the Development Site lies within:

"The rural area of East Ayrshire will be one of its most valuable assets. Limited housing and business development will have taken place to sustain the rural economy and sympathetic tourism opportunities will have been developed attracting more people into the area. Whilst wind energy development will have taken place to ensure that East Ayrshire plays its part in contributing towards a low carbon Scotland, this will not dominate or adversely affect the attractiveness of the rural area and its value as a setting for East Ayrshire's towns and villages or its ability to attract new residents, businesses and visitors."

5.3.2 The LDP 2017 contains a number of policies of relevance along with a proposed wind energy spatial framework. Of note, Policy OP1: Overarching Policy sets out a number of criteria relating to general environmental and amenity issues which should be considered in the determination of all development proposals. Policy TOUR4: The Dark Sky Park sets out assessment criteria for development proposals located within the Galloway Forest Dark Sky Park, including the Transition Area, which extends for a 10km radius from the Park, and which the Development Site lies on the edge of.

5.3.3 Policy RE1: Renewable Energy Developments sets out the overarching criteria for all renewable energy proposals. However, this policy is subject to exceptions, one of which is onshore wind as it is specifically subject to Policy RE3, so policy RE1 is not relevant/applicable to the Variation Development.

¹ Available at: <https://www.east-ayrshire.gov.uk/PlanningAndTheEnvironment/Development-plans/LocalAndStatutoryDevelopmentPlans/East-Ayrshire-Local-Development-Plan-2017.aspx> (Accessed 18/03/20)

- 5.3.4 Map 12 of the LDP Plan sets out a spatial framework for wind energy development above 50m in height. In line with the SPP (June 2014), this spatial framework identifies three groups of areas:
- Group 1: Areas where development will not be acceptable (only applicable to National Parks and National Scenic Areas, none of which are located within East Ayrshire);
 - Group 2: Areas of significant protection; and
 - Group 3: Areas with potential for development.
- 5.3.5 According to Map 12 the Development Site covers areas identified within Group 3 and Group 2, though is primarily in Group 3. In relation to the proposed spatial framework, Policy RE3: Wind Energy Proposals over 50 Metres in Height states that significant protection will be afforded to Group 2 areas. In these areas wind energy developments must demonstrate that *"any significant effects on the qualities of these areas can be substantially overcome by siting, design or other mitigation and where the proposal is acceptable in terms of all applicable Renewable Energy criteria set out in Schedule 1"*. Policy RE3 also provides support for proposed wind energy developments in Group 3 areas *"where it can be demonstrated that they are acceptable in terms of all applicable Renewable Energy Assessment Criteria set out in Schedule 1"*.
- 5.3.6 In the PLI Report² for the Consented Development the application site was described as:
- 'primarily within group 3 (areas with potential for wind energy development) with a small area of class 2 carbon and peatland within the application site but to the east of the proposed turbines – this area would be considered as group 2 (areas of significant protection). Furthermore, part of the north-eastern edge of the application site is within two kilometres of the small settlement of Burnside so falls within group 2 classification'.*
- 5.3.7 Paragraph 2.48 of the PLI Report backs up the above statement and the Reporter states the following here:
- 'I find that the lack of infrastructure/turbines proposed within two kilometres of settlements and the avoidance of carbon rich soils/deep peat means that the proposed development can be considered as falling within group 3 (areas with potential for wind farm development) following the provisions of SPP and the development'.*
- 5.3.8 Schedule 1: Renewable Energy Assessment Criteria sets out a number of assessment criteria for renewable energy developments, which are similar to those stated in paragraph 169 of SPP including:
- Landscape and visual impacts;
 - Cumulative impacts – likely cumulative impacts arising from all considerations below, recognising that in some areas the cumulative impact of existing and consented energy development may limit capacity for further development;
 - Impacts on carbon rich soils, deep peat and peatland habitats, using the carbon calculator;
 - Effects on the natural heritage, including birds. Renewable energy proposals will only be approved where the planning author has ascertained that they would not have an adverse effect on the integrity of a Natura 2000 site;
 - Impacts on wild land;
 - Impacts on all of the historic environment;

² WIN-190-5 Enoch Hill PLI Report

- Effects on hydrology, the water environment, flood risk and groundwater dependent terrestrial ecosystems;
- Impacts on forestry and woodland;
- Effects on greenhouse gas emissions;
- Impacts on communities and individual dwellings, including visual impact, residential amenity, noise and shadow flicker;
- Impacts on tourism and recreation;
- Public access including impact on long distance walking and cycling routes and scenic routes identified in National Planning Framework 3;
- Net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities;
- Impacts on aviation and defence interests;
- Impacts on road traffic including during construction and decommissioning;
- Impacts on adjacent trunk roads;
- Impacts on telecommunications and broadcasting installations, particularly ensuring that transmission links are not compromised;
- The appropriate siting and design of turbines and ancillary works;
- The scale of contribution to renewable energy targets; and
- Opportunities for energy storage.

5.3.9 All other (subject specific) proposed policies of relevance to the Variation Development are listed in Table 5.1 below.

Table 5.1 Other Relevant Policies within the East Ayrshire Local Plan (2017)

Policy	Requirements
ENV1 – Listed Buildings	<p><i>'Listed buildings play an important role in defining and enhancing the quality of East Ayrshire's environment and contribute to the character of local communities. The Council will support:</i></p> <ul style="list-style-type: none"> • <i>The retention and preservation of all listed buildings and buildings within conservation areas.'</i>
ENV2 – Scheduled Monuments and Archaeological Resources	<p><i>'Development that would have an adverse effect on Scheduled Monuments or on their settings shall not be supported unless there are exceptional overriding circumstances.</i></p> <p><i>Other archaeological resources should be preserved in situ wherever possible. The developer may be required to supply a archaeological evaluation report prior to the determination of a planning application.'</i></p>
ENV3 – Conservation Areas	<p><i>'Development or demolition within a conservation area or affecting its setting, shall preserve and enhance its character and be consistent with any relevant conservation area appraisal or management plan. Any development should be sympathetic to the area in terms of its layout, size, scale, design, siting, material and colour and should seek to enhance the architectural and historic qualities of the area.</i></p>
ENV4 – Gardens and Designed Landscapes	<p><i>'Those of regional and local importance, are protected and their enhancement encouraged. Development will not be supported where it will have significant adverse impacts upon:</i></p>

Policy	Requirements
	<ul style="list-style-type: none"> (i) its character; (ii) important views to, from and within it and; (iii) important features that contribute to its value and that justify its designation, where applicable.'
ENV5 – Nature Conservation	<p><i>'The importance of nature conservation and biodiversity will be fully recognised in the assessment of development proposals.</i></p> <ul style="list-style-type: none"> (i) Any development likely to have a significant effect on a Natura 2000 site which is not directly connected with or necessary to its conservation management must be subject to a "Habitats Regulations Appraisal". Such development will only be approved if the appraisal shows that there will be no adverse effect on the integrity of the site; (ii) Any development affecting a SSSI will only be permitted where it will not adversely affect the integrity of the area or the qualities for which it has been designated or where any significant adverse effects on the qualities for which it is designated are clearly outweighed by social, environmental or economic benefits of national importance. (iii) Any development that may adversely impact on areas of local importance for nature conservation, including provisional wildlife sites, local geodiversity sites and local nature reserves, will be expected to demonstrate how any impact can be avoided or mitigated. (iv) If there is evidence that protected species may be affected by a development, steps must be taken to establish their presence. The planning and design of any development which has the potential to impact on a protected species will require to take into account the level of protection afforded by legislation and any impacts must be fully considered prior to the submission of any planning application. (v) Any new development must protect, and where appropriate incorporate and/or extend, existing habitat networks, helping to further develop the Central Scotland Green Network in Ayrshire.'
ENV6 – Wild Land and Sensitive Landscape Areas	<p><i>'Areas of wild land, as identified on the 2014 SNH map of wild land areas, have little or no scope to accommodate new development and are safeguarded on the LDP maps. Any development proposed must be able to demonstrate that any adverse effects on the qualities of wild land can be substantially overcome by siting, design or other mitigation.</i></p> <p><i>The Council will give priority and prime consideration to the protection and enhancement of the landscape in its consideration of development proposals within the Sensitive Landscape Areas identified on the LDP maps.</i></p> <p><i>Any development deemed to have unacceptable impacts on wild land and SLAs will not be supported by the Council. All development proposals within these areas will also require to be assessed against policy ENV 8: Protecting and Enhancing the Landscape.'</i></p>
ENV8 – Protecting and Enhancing the Landscape	<p><i>'The protection and enhancement of East Ayrshire's landscape character as identified in the Ayrshire Landscape Character Assessment will be a key consideration in assessing the appropriateness of development proposals in the rural area. The Council will require that:</i></p> <ul style="list-style-type: none"> (i) Development proposals are sited and designed to respect the nature and landscape character of the area and to minimise visual impact. Particular attention will be paid to size, scale, layout, materials, design, finish and colour. (ii) Where visual impacts are unavoidable, development proposals should include adequate mitigation measures to minimise such impacts on the landscape. (iii) Particular features that contribute to the value, quality and character of the landscape are conserved and enhanced. Development that would result in the loss of valuable landscape features, to such an extent that character and value of the landscape, are unacceptably diminished, will not be supported. Such landscape features include: <ul style="list-style-type: none"> a. Settings of settlements and buildings within the landscape; b. Skylines, distinctive landform features, landmark hills and prominent views; c. Woodlands, hedgerows and trees; d. Field patterns and means of enclosure, including dry stone dykes; and e. Rights of way and footpaths

Policy	Requirements
ENV9 – Trees, Woodland and Forestry	<p><i>Development that would create unacceptable visual intrusion or irreparable damage to landscape character will not be supported by the Council.'</i></p> <p><i>The Council will support the retention of individual trees, hedgerows and woodlands within both settlements and rural areas, where such trees contribute to the amenity, nature conservation and landscape value of the area. There will be a presumption against the felling of ancient semi-natural woodlands and trees protected by Preservation Orders.</i></p> <p><i>The Council will support proposals for woodland and forestry expansion where they:</i></p> <ul style="list-style-type: none"> <i>(i) are consistent with the Ayrshire and Arran Forestry and Woodland Strategy and contribute to Ayrshire's green network;</i> <i>(ii) take account of the landscape and ecological qualities of the area;</i> <i>(iii) demonstrate that recreational opportunities have been fully considered;</i> <p><i>Proposals that involve the removal of woodland will only be supported where it would achieve significant and clearly defined public benefits and is in line with the Scottish Government's Control of Woodland Policy. Where removal can be fully justified, compensatory planting will be required to the satisfaction of the Council and Forestry Commission Scotland and in line with the provisions of the Ayrshire and Arran Forestry & Woodland Strategy which forms Supplementary Guidance to this LDP. Non statutory guidance in the form of The Ayrshire and Arran Forestry and Woodland Strategy supports policy ENV 9 by providing detailed guidance on the most appropriate tree species and locations for woodland removal and creation.'</i></p>
ENV10 – Carbon Rich Soils	<p><i>'In recognition of the role of peatland soils as valuable carbon stores or "sinks", the Council will seek to minimise adverse impacts from development on such soils, including by the release of CO2 to the atmosphere. The Council will support and promote the restoration of peatland habitats, where there is potential for such habitats to become active carbon stores and help to reduce net carbon emissions.</i></p> <p><i>However, development may be permitted for renewable energy generating developments on carbon rich soils where it can be demonstrated (in accordance with the Scottish Government's 'carbon calculator' or other equivalent evidence) that the balance of advantage in terms of climate change mitigation lies with the energy generation proposal, and that any significant effects on these areas can be substantially overcome by siting, design or other mitigation.'</i></p>
ENV12 – Water, Air, Light and Noise Pollution	<p><i>'Water</i></p> <p><i>In line with the Water Framework Directive, the Council will give priority to maintaining and improving the quality of all water bodies and ground water. There will be a presumption against any development that will have an adverse impact on the water environment in terms of pollution levels and the ecological value of water habitats. Where developments are proposed on or close to existing water bodies, design solutions should explore how best to maintain their water quality and, where possible improve the water bodies through maintaining them as wildlife corridors where biodiversity can be improved. Maintenance access buffer strips of a minimum 6 metres in width should be provided between the development and the adjacent watercourse. The Council will not be supportive of developments which will, or which have the potential to, cause significant adverse impacts on water bodies as a result of morphological changes to water bodies such as engineering activities in the form of culverts or changes to the banks or bed. Development will be required to connect to the public sewerage system, where possible, and manage surface water through sustainable drainage systems (SuDS).</i></p> <p><i>Air</i></p> <p><i>All developers will be required to ensure that their proposals have minimal adverse impact on air quality. Air quality assessments will be required for any proposed development which the Council considers may significantly impact upon air quality, either on its own or cumulatively. Development that will have a significant adverse impact on air quality will not be supported.</i></p> <p><i>Light</i></p> <p><i>All development proposals must incorporate design measures which minimise or reduce light pollution. Developers will require to demonstrate that consideration has been given to reducing light pollution, by minimising unnecessary lighting and using the most appropriate forms of lighting to carry out</i></p>

Policy	Requirements
	<p><i>specific tasks. Within the Dark Sky Park and surrounding area, particular priority is given to minimising light pollution, to maintain the integrity of the designation.</i></p> <p><i>Noise</i> <i>All new development must take full account of any Noise Action Plan and Noise Management Areas that are in operation in the area and ensure that significant adverse noise impacts on surrounding properties and uses are avoided. A noise impact assessment may be required in this regard and noise mitigation measures may be required through planning conditions and/or Section 75 Obligations.'</i></p>
RE5 - Financial Guarantees	<p><i>'Where necessary in terms of the scale and complexity of the proposal, and the consequences of any failure to restore the site, the Council will require an appropriate financial guarantee in respect of wind energy, waste management, landfill and electrical infrastructure proposals, to ensure that all decommissioning, restoration, aftercare and mitigation requirements attached to planning consents can be met in full.</i></p> <p><i>Any planning permission granted for such developments will be appropriately conditioned and/or subject to a Section 75 obligation to ensure that an appropriate financial guarantee is put in place to the satisfaction of the Council. No development will be permitted on site until any legal obligation and planning conditions have been discharged by the Council.</i></p> <p><i>The financial guarantee mechanism and the amount covered will be reviewed at regular intervals by an independent party. The developer will be required to demonstrate to the satisfaction of the Council that the guarantees continue to be of a sufficient level to cover all potential restoration, aftercare, decommissioning and mitigation costs.</i></p> <p><i>Supplementary Guidance on Financial Guarantees supports policy RE5 by providing further detail on:</i></p> <ul style="list-style-type: none"> <i>• why financial guarantees are required;</i> <i>• Different types of financial guarantees that are available on the market;</i> <i>• The approach to securing financial guarantees in terms of the process the Council will undertake; and</i> <i>• How financial guarantees will be monitored and reviewed.'</i>
T1 - Transportation Requirements for New Development	<p><i>'The Council will require developers to ensure that their proposals meet with all the requisite standards of the Ayrshire Roads Alliance and align with the Regional and Local Transport Strategies. Developments which do not meet these standards will not be considered acceptable and will not receive Council support.</i></p> <p><i>All new development will require to fully embrace active travel by incorporating new, and providing links to existing footpaths, cycle routes and public transport routes. Developments which maximise the extent to which travel demands are met first through walking, then cycling, then public transport and finally through the use of private cars will be particularly supported.</i></p> <p><i>Where considered appropriate, developers will be requested to enter into Section 75 Obligations with the Council with regard to making financial contributions towards the provision of transportation infrastructure improvements and/or public transport services which may be required as a result of their development.'</i></p>
T4 - Development and Protection of Core Paths and Natural Routes	<p><i>'The Council will promote and be particularly supportive of the development of a long distance route from Darvel to Muirkirk which forms part of National Development 8 within National Planning Framework 3.</i></p> <p><i>Development of new routes for core paths, footpaths, bridleways or cycle paths should demonstrate to the Council that they will not have an adverse effect on the integrity of a Natura 2000 site.</i></p> <p><i>The Council will not be supportive of development which disrupts or adversely impacts on any existing or potential core path, right of way, bridle path, or footpath used by the general public for recreational or other purposes, particularly where the route concerned forms, or has the potential to form, part of the network of circular routes or footpath links between settlements, actively promoted by the Council.</i></p> <p><i>Where such disruption or adverse impact is demonstrated to be unavoidable, the Council will require developers, as an integral part of the proposed development, to provide for the appropriate diversion of the route in question elsewhere within the development site or to put into place appropriate measures to mitigate and overcome the adverse impact expected.'</i></p>

East Ayrshire Local Development Plan 2

- 5.3.10 Work on the East Ayrshire Local Development Plan 2 is underway. The main issues report was due for publication in March 2020. However, due to the current situation involving Coronavirus, work on the Local Development Plan 2 has been delayed. We understand that the Development Planning and Regeneration team are, however, continuing to work on the preparation of the Main Issues Report and are hopeful that it will be published for consultation before the end of Quarter 2 2020 (by the end of June).

5.4 Other Material Considerations

East Ayrshire Landscape Wind Capacity Study (2018)

- 5.4.1 This study³ revises and updates the 2013 East Ayrshire Landscape Wind Capacity Study. It aims to inform strategic planning for wind energy development in line with Scottish Planning Policy and to also provide guidance on the appraisal of individual wind farm and wind turbine proposals in East Ayrshire.
- 5.4.2 Key findings from the study include:
- There is some scope to site additional wind farm development with turbines above 70m in height within upland areas of East Ayrshire although this will be limited by potential cumulative and other landscape and visual constraints including effects on adjacent smaller scale settled valleys and lowland landscapes.
- 5.4.3 The Variation Development lies predominantly within the Southern Uplands landscape character type (20a), although north eastern parts of the Development Site are located within the Upland Basin landscape character type (15) and the southern extent of the Development Site borders the Southern Uplands & Forestry landscape character type (20c).
- 5.4.4 The study notes for this landscape type that there would 'high' sensitivity to the very large turbines >130m as this size of turbine would be more likely to overwhelm the relief of the lower western uplands and significantly affect the adjoining Upland Basin (landscape character type 15).

East Ayrshire Landscape Wind Capacity Study (2013)

- 5.4.5 This study considered the sensitivity of landscape character types within East Ayrshire to a range of wind turbine developments. The document is non-statutory Supplementary Guidance produced by East Ayrshire Council and has now been superseded by the 2018 capacity study.
- 5.4.6 Within this study the 'large' typology covers all wind turbines with a blade tip height of 70m or higher and therefore is applicable to the Variation Development. Map 3 within the document indicates that the Development Site lies predominantly within the Southern Uplands landscape character type (20a), although north eastern parts of the Development Site are located within the Upland Basin landscape character type (15) and the southern extent of the Development Site borders the Southern Uplands & Forestry landscape character type (20c).
- 5.4.7 The Development Site is largely located within a recommended area of search for medium typology (50-70m tip height) wind energy development as it largely falls within landscape character areas which have been assessed as having medium or lower landscape sensitivity. A small area at the north west corner of the Development Site is located within a recommended area of search for large typology (>70m tip height), while a small area at the north east corner is located outwith the

³ East Ayrshire Council (2018) Landscape Wind Capacity Study. At: <https://www.east-ayrshire.gov.uk/Resources/PDF/L/Landscape-wind-capacity-study.pdf>

recommended area of search for medium or large typology wind energy development. It should be noted that turbines are not proposed to be located within either the north west or north east of the Development Site.

- 5.4.8 It should be noted that the methodology which underpins the recommended spatial framework in this document is not consistent with the approach outlined in SPP (June 2014). As such, this document does not represent a spatial framework for wind energy developments for the purposes of complying with the SPP at paragraph 161.

East Ayrshire LDP Supplementary Guidance

- 5.4.9 The East Ayrshire LDP is supported by a set of statutory and non-statutory Supplementary Guidance documents. Three Supplementary Guidance documents have been published alongside the East Ayrshire LDP, of which two, 'Planning for Wind Energy' and 'Financial Guarantees' (both of which are Statutory Guidance), are of relevance to the Variation Development.

Planning for Wind Energy Supplementary Guidance

- 5.4.10 This guidance⁴ supports the implementation of proposed policies RE3 and RE4 within the East Ayrshire LDP by clarifying the criteria against which proposed medium and large scale wind energy development will be assessed. However, policy RE4 is not of relevance to the Variation Development.
- 5.4.11 In Section 1.3 it is noted that "*a broad upland arc*" running around the eastern and south-eastern edges of East Ayrshire represents a landscape type commonly associated with wind energy development. The Development Site is located within this upland arc.
- 5.4.12 Table 2 within the document lists individual constraints within East Ayrshire relevant to the spatial framework methodology set out in Table 1 of the SPP. A footnote to Table 2 of the document states that on the advice of SNH, category 6 (deep peat) and category 5 (deep peat and other carbon rich soils) areas as shown on the 1:250,000 Soil carbon richness map have been considered as constraints. All of the identified constraints are mapped in Map 3 to produce the proposed wind energy spatial framework for East Ayrshire. Section 2.3 of the document clarifies the implications of the proposed wind energy spatial framework for wind energy proposals. It is noted that only Group 1 areas are to be afforded a presumption against wind energy development and that "*whilst group 2 areas are to be given significant protection, there may be limited opportunities for sensitively sited wind energy proposals, where it can be demonstrated that any significant effects on the qualities of these areas can be substantially overcome by siting, design or other mitigation, through assessment against the criteria listed in Schedule 1 of the Plan. Within Group 3 areas, proposals will be supported where it can be demonstrated that they are acceptable in terms of the criteria listed in Schedule 1 of the Plan and detailed in Section 3 below*".
- 5.4.13 Section 3 then sets out detailed criteria and information requirements to be considered in the determination of wind energy planning applications (and section 36 applications). Criteria of relevance to the Section 36 application for the Variation Development are:
- Wind energy applications should be supported by an LVIA, which "*must follow best practice in the selection of viewpoint locations and in the preparation of photomontage/panoramic images. (Visual representation of wind farms (SNH – July 2014)*". Viewpoints considered within the LVIA must be agreed with the Council and for larger schemes should be discussed with SNH.

⁴ Available at: <https://www.east-ayrshire.gov.uk/Resources/PDF/P/Planning-SG-Planning-for-Wind-Energy.pdf> (Accessed 19/03/20)

- Applicants should have regard to the East Ayrshire Landscape Wind Capacity Study⁵ (2018), which constitutes approved non-statutory supplementary guidance. The study is referred to within Chapter 9 – LVIA of this EIA Report and within the Planning Statement which accompanies the application for the Variation Development’.
- Section 3.1.1 sets out detailed guidance regarding the assessment of cumulative impacts from wind energy developments within LVIAs.
- In relation to carbon rich soils, section 3.1.3 states that “*areas of carbon rich soils, deep peat and priority peatland habitats are identified within the spatial framework as areas requiring special protection. In line with Policy RE3 of the LDP, any proposal in such an area will only be permitted where any significant effects on the environmental quality of such soils can be substantially overcome by siting, design or mitigation*”. This section also requires developments on peatlands to utilise the Scottish Government’s carbon calculator to balance predicted carbon savings and losses. The carbon calculator has been completed for the Variation Development and the results are summarised in Chapter 6 of this EIA Report.
- Sections 3.1.4 – 3.3.3 state that applicants should fully assess impacts on natural heritage, historic environment features, water quality, flood risk, net total annual CO₂ savings, residential amenity (noise, shadow flicker and visual dominance), relevant tourism receptors, the local economy (including employment and wider socio-economic benefits), aviation and defence interests (particularly Glasgow Prestwick Airport), traffic levels and the functioning of the road network, and broadcasting installations.
- Section 3.3.4 sets out guidance for the siting and design of infrastructure and ancillary work and notes that the impacts of this development will be considered in the determination of proposals.
- Section 3.3.6 requires all applications to be accompanied by a sufficiently detailed restoration programme, the details of which will be secured through a section 75 obligation.
- Section 5 details a checklist of required environmental and other information which must be provided in support of applications for wind energy development.

Financial Guarantees Supplementary Guidance

5.4.14 This document⁶ provides guidance to support proposed policy RE5, which seeks to ensure suitable financial guarantees are in place for certain development types including wind energy developments to ensure that all decommissioning, restoration and aftercare obligations can be fully met. Section 3 of the document sets out EAC’s proposed process for independently valuing the costs associated with decommissioning and restoration of a proposed development and for securing financial guarantees from applicants.

Dumfries & Galloway Development Plan

5.4.15 Although the Variation Development is located within the EAC area, the Dumfries and Galloway Development Plan has been considered in view of the proximity of the Development Site to its administrative boundary, although the policy cannot directly apply to development outside Dumfries and Galloway. The Dumfries and Galloway Development Plan comprises the Dumfries & Galloway

⁵ East Ayrshire Council (2018) Local Development Plan Non-Statutory Planning Guidance - East Ayrshire Landscape Wind Capacity Study 2018. Available at: <https://www.east-ayrshire.gov.uk/Resources/PDF/L/Landscape-wind-capacity-study.pdf>

⁶ East Ayrshire Council Financial Guarantees Supplementary Guidance. At: <https://www.east-ayrshire.gov.uk/Resources/PDF/P/Planning-SG-FinancialGuarantees.pdf>

- Local Development Plan 2⁷ (adopted 2019) ('the Dumfries and Galloway LDP') and associated Statutory Supplementary Guidance.
- 5.4.16 Page 12 of the LDP2 sets out the 20-year vision for Dumfries and Galloway and as part of this, there will be *"a viable rural economy and community characterised by ...a range of renewable energy developments"*.
- 5.4.17 Page 15 of the LDP2 references the Scottish Government's Climate Change Bill and the decarbonisation target for 2050 and identifies that *"planning policy is seen as a key tool to help deliver climate change action"*. Paragraph 3.21 notes DGC's intention to develop a Regional Energy Strategy.
- 5.4.18 Policies of relevance within the Dumfries and Galloway LDP 2 include Policy: IN1 Renewable Energy and Policy IN2: Wind Energy Development (Part 1 Assessment of Windfarm Proposals only). The relevant sections of Policy IN1 seeks to protect environmental receptors including the landscape, cultural and natural heritage, water and fishing interests, air quality and general amenity from unacceptable significant adverse impact. Part 1 of Policy IN2 provides additional relevant assessment criteria including:
- "...Renewable Energy Benefits:*
- *The scale of contribution to renewable energy generation targets, effects on greenhouse gas emissions and opportunities for energy storage.*
- Socio-economic benefits:*
- *Net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities.*
- Landscape and visual impact:*
- *The extent to which the landscape is capable of accommodating the development without significant detrimental landscape or visual impacts, including effects on wild land; and.*
 - *That the design and scale of the proposal is appropriate to the scale and character of its setting, respecting the main features of the site and the wider environment and that it fully addresses the potential for mitigation.*
- Cumulative Impact:*
- *The extent of any detrimental landscape or visual impact from two or more wind energy developments and the potential for mitigation.*
- Impact on local communities:*
- *The extent of any detrimental impact on communities and local amenity including assessment of the impacts of noise, shadow flicker, visual dominance and the potential for associated mitigation.*
- Impact on Aviation and Defence Interests:*
- *The extent to which the proposal addresses any impacts arising from location within an area subject to potential aviation and defence constraints including the Eskdalemuir Safeguard Area.*
- Other Impacts and considerations:*
- *The extent to which the proposal avoids or adequately resolves any other significant adverse impact including: on the natural and historic environment, cultural heritage, biodiversity; forest and woodlands; and tourism and recreational interests..."*

⁷ Available at: <https://www.dumgal.gov.uk/ldp2> (Accessed 19/03/20)

- 5.4.19 It is acknowledged on Page 29 that the renewable energy field is constantly evolving with existing technologies developing and new technologies coming forward, including improving the efficiency of existing wind farm schemes for example, through blade extensions, modifications to the turbines or repowering.
- 5.4.20 Table 5.2 lists other policies within the Dumfries and Galloway LDP which are of relevance to the Variation Development.

Table 5.2 Relevant Policies within the Dumfries and Galloway LDP 2 (2019)

Policy Reference	Policy Title
Policy OP1	Development Considerations
Policy ED11	Galloway and Southern Ayrshire Biosphere
Policy ED12	Dark Skies
Policy HE1	Listed Buildings
Policy HE6	Historic Gardens and Designed Landscapes
Policy NE2	Regional Scenic Areas
Policy NE3	Areas of Wild Land
Policy NE4	Sites of International Importance for Biodiversity and Geodiversity
Policy NE5	Species of National Importance
Policy NE6	Sites of National Importance for Biodiversity and Geodiversity
Policy NE7	Forestry and Woodland
Policy NE11	Supporting the Water Environment
Policy CF4	Access Routes

- 5.4.21 Policies IN1 and IN2 relate to renewable energy developments and are set out in full below.
- 5.4.22 **Policy IN1: Renewable Energy** states that *"The Council will support development proposals for all renewable energy generation and/or storage which are located, sited and designed appropriately. The acceptability* of any proposed development, either individually or in combination, will be assessed against the following considerations:*
- *Landscape and visual impact;*
 - *Cumulative impact;*

- *Impact on local communities and individual dwellings, including visual impact, residential amenity, noise and shadow flicker;*
- *The impact on natural and historic environment (including cultural heritage and biodiversity);*
- *The impact on forestry and woodlands;*
- *The impact on tourism and recreational interests.*

To enable this assessment, sufficient detail should be submitted, to include the following as relevant to the scale and nature of the proposal:

- *Any associated infrastructure requirements including road and grid connections (where subject to planning consent);*
- *Environmental and other impacts associated with the construction and operational phases of the development including details of any visual impact, noise and odour issues;*
- *Relevant provisions for the restoration of the site;*
- *The scale of contribution to renewable energy generation targets;*
- *Effect on greenhouse gas emissions; and*
- *Net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities.*

**Acceptability will be determined through an assessment of the details of the proposal including its benefits and the extent to which its environmental and cumulative impacts can be satisfactorily addressed”.*

5.4.23

Policy IN2: Wind Energy is as follows:

'Assessment of all Wind Farm Proposals

The Council will support wind energy proposals which are located, sited and designed appropriately. The acceptability of any proposed wind energy development, either individually or in combination, will be assessed against the following considerations:*

Renewable Energy Benefits

The scale of contribution to renewable energy generation targets, effect on greenhouse gas emissions and opportunities for energy storage.

Socio Economic Benefits

Net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities.

Landscape and Visual Impact

The extent to which the landscape is capable of accommodating the development without significant detrimental landscape or visual impacts, including effects on wild land; and

That the design and scale of the proposal is appropriate to the scale and character of its setting, respecting the main features of the site and the wider environment and that it fully addresses the potential for mitigation.

Cumulative Impact:

The extent of any detrimental landscape or visual impact from two or more wind energy developments and the potential for mitigation.

Impact on Local Communities

The extent of any detrimental impact on communities and local amenity including assessment of the impacts of noise, shadow flicker, visual dominance and the potential for associated mitigation.

Impact on Aviation and Defence Interests

The extent to which the proposal addresses any impacts arising from location within an area subject to potential aviation and defence constraints including the Eskdalemuir Safeguard Area.

Other Impacts and Considerations

The extent to which the proposal avoids or adequately resolves any other significant adverse impact including: on the natural and historic environment, cultural heritage, biodiversity; forest and woodlands; and tourism and recreational interests...''

5.5 Dumfries and Galloway Supplementary Guidance

5.5.1 The Dumfries and Galloway LDP is supported by multiple statutory Supplementary Guidance Documents. Of these, the Wind Energy Development: Development Management Considerations⁸ (including landscape capacity appendices) published in February 2020 is of relevance to the Variation Development. Similar to the East Ayrshire Planning for Wind Energy Supplementary Guidance, this document provides guidance regarding potential environmental and other impacts which should be assessed through the EIA process or through other supporting documents.

5.5.2 The considerations in this guidance includes:

- Renewable energy benefits;
- Socio-economic benefits;
- Landscape and visual impacts;
- Cumulative impact;
- Impact on local communities and residential interests;
- Impact on infrastructure, aviation and defence interests; and
- Other interests and considerations:
 - ▶ Biodiversity;
 - ▶ Forests and woodlands;
 - ▶ Carbon rich soils, hydrology, the water environment and flood risk;
 - ▶ Historic environment and cultural heritage;
 - ▶ Tourism and recreational interests;

⁸ Dumfries and Galloway Council (2020) Wind Energy Development Management Considerations. At: https://www.dumgal.gov.uk/media/22639/Wind-Energy-Development-Development-Management-Considerations/pdf/Wind_Energy_SG_Final_PDF_February_2020_Version.pdf?m=637184984806630000

- ▶ Public access;
- ▶ Physical site constraints; and
- ▶ Legal obligations and bonds (in terms of restoration, interference to television and radio reception, repair of damage to the public road network)⁹.

5.5.3 A new Dumfries and Galloway Wind Farm Landscape Capacity Study¹⁰ (DGWLCS) has been produced as an updated version of the existing appendix to the current SG. This guidance was adopted in February 2020. It assesses the sensitivity of landscape character types, and more locally defined character areas, to different sizes of wind turbine development.

5.1 References

Dumfries and Galloway Council. Local Development Plan 2 Supplementary Guidance. Available at: <https://www.dumgal.gov.uk/article/17034/LDP2-Supplementary-Guidance> (Accessed 19/03/2020).

Dumfries and Galloway Council (2019). Local Development Plan 2. Available at: <https://www.dumgal.gov.uk/ldp2> (Accessed 19/03/2020).

East Ayrshire Council (2017). Adopted East Ayrshire Local Plan. Available at: <https://www.east-ayrshire.gov.uk/PlanningAndTheEnvironment/Development-plans/LocalAndStatutoryDevelopmentPlans/East-Ayrshire-Local-Development-Plan-2017.aspx> (Accessed 19/03/2020).

East Ayrshire Council (2013) Landscape Wind Capacity Study. Available at: <http://www.east-ayrshire.gov.uk/Resources/PDF/L/Landscape-wind-capacity-study---main-study.pdf> (Accessed 19/03/2020).

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East Ayrshire Council. (2017) Financial Guarantees Supplementary Guidance. Available at: <https://www.east-ayrshire.gov.uk/Resources/PDF/P/Planning-SG-FinancialGuarantees.pdf> (Accessed 19/03/2020).

East Ayrshire Council. (2017) Planning for Wind Energy Supplementary Guidance. Available at: <https://www.east-ayrshire.gov.uk/Resources/PDF/P/Planning-SG-Planning-for-Wind-Energy.pdf> (Accessed 19/03/2020).

⁹ No planning obligations relating to TV and radio signal interference and repair of damage to the road network were considered necessary for the Consented Development therefore none are considered to be required for the Variation Development.

¹⁰ Dumfries and Galloway Council (2020) Wind Farm Landscape Capacity Study. At: https://www.dumgal.gov.uk/media/22640/Part-1-Wind-Energy-Development-Development-Management-Considerations-Appendix-C-DGWFLCS/pdf/Wind_Energy_Appendix_C_Landscape_SG_LDP2_Adopted.pdf?m=637184996412100000



6. Renewable Energy Policy, Carbon Balance and Peat Management

6.1 Introduction

6.1.1 This chapter summarises changes in renewable energy policy and climate change frameworks since the completion of the 2015 ES and 2017 FEI. The assessment of peat-related effects as a result of the Variation Development is also provided, alongside revised information in relation to renewable energy generation and carbon balance figures.

6.2 Changes to Renewable Energy Policy and Climate Change Frameworks

6.2.1 This section summarises changes in renewable energy policy and climate change frameworks since the completion of the 2015 ES and 2017 FEI; other renewable energy policy and climate change frameworks that remain relevant are provided in Chapters 6 of the 2015 ES and 2017 FEI.

International Policy and Targets

2030 Clean Energy Package

6.2.2 In November 2018 the European Parliament approved an updated energy policy legislative framework¹ that will facilitate the clean energy transition. The framework fixes two new targets for the EU for 2030: a binding renewable energy target of at least 32% and an energy efficiency target of at least 32.5% - with a possible upward revision in 2023. It is anticipated that when these policies are fully implemented, they will lead to steeper emission reductions for the whole of the EU than previously required - some 45% by 2030 relative to 1990 (compared to the previous target of a 40% reduction).

6.2.3 On 29 March 2017 the UK submitted formal notification under Article 50 of the Treaty of the EU confirming that the UK intended to leave the EU, and this was enacted by leaving the European Union on 31 January 2020. The process of leaving the EU is not however anticipated to change the requirement to meet the EU policy targets outlined in this section, as it is considered that any final withdrawal bill will convert all existing EU laws, rules and targets into domestic UK governance, either on a time-limited basis or indefinitely.

6.2.4 To achieve the ambitious clean energy goals, the framework also introduces a governance regulation, which defines how member states will collaborate with each other and with the Commission. Each Member State is now required to draft integrated National Energy and Climate Plans for 2021 to 2030 outlining how they will achieve their respective targets. The clean energy package came into force in December 2018 and was expected to be formally adopted in the first half of 2019.

Paris Agreement (2015)

6.2.5 The primary policy change of relevance since the submission of the section 36 application for the Consented Development is that the Paris Agreement (the United Nations Framework Convention on

¹ EU Updated Energy Policy Legislative Framework. Available at:

<https://www.europarl.europa.eu/factsheets/en/sheet/68/energy-policy-general-principles> (Accessed 23/03/20)

Climate Change (UNFCCC, 2015²) was agreed in December 2015, and following ratification by signatories responsible for more than 55% of global greenhouse gas emissions, came into force on 5 October 2016 (UNFCCC, 2016³). The Paris Agreement's main aim is to keep a global temperature rise this century "well below" 2 degrees Celsius (°C) and to drive efforts to limit the temperature increase even further to 1.5°C above pre-industrial levels. The main climate change mitigation delivery mechanism is the submission of five yearly Nationally Determined Contributions (NDCs) by all signatories with a steadily increasing ambition in the long term. The first global 'stocktake' is to take place in 2023 and others will follow every five years thereafter.

- 6.2.6 The relevance of the Paris Agreement to the Variation Development is that it now governs the setting of, and efforts to achieve, European and national targets for greenhouse gas emissions reduction over the long term. This should ensure a continued, strong focus on the decarbonisation of the energy generation sector, including through the deployment of mature renewable energy technologies such as onshore wind.

Special Report on Global Warming of 1.5°C (2018)

- 6.2.7 Contained within the Decision of the 21st Conference of Parties of the UNFCCC to adopt the Paris Agreement was an invitation for the Intergovernmental Panel on Climate Change (IPCC) '...to provide a Special Report in 2018 on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways'.
- 6.2.8 The IPCC responded to this invitation through the preparation of the 'Special Report on the impacts of global warming of 1.5°C'⁴, which was published in October 2018. The report presents a study on the impacts and possible methods of keeping temperature from warming by more than 1.5°C. It points out the differences between allowing temperatures to rise towards 2°C above pre-industrial times, or keeping them nearer to 1.5°C.
- 6.2.9 The report finds that a rise by 1.5°C could be reached in as little as 11 years – and almost certainly within 20 years without major cuts in carbon dioxide (CO₂) emissions if global warming continues to increase at the current rate. To limit the temperature rise to 1.5°C, global net human-caused emissions of CO₂ would need to fall by about 45% from 2010 levels by 2030 in order to reach 'net-zero' around 2050. However, to achieve these emissions reductions, "rapid and far-reaching" transitions in land, energy, industry, buildings, transport, and cities and "unprecedented change" would be required.
- 6.2.10 The report estimates that renewables would be required to supply 70-85% of electricity by 2050 in 1.5°C pathways. Making this monumental shift in energy production would require substantial new investment in low-carbon technologies and energy efficiency.

² United Nations Framework Convention on Climate Change (UNFCCC) (2015), The Paris Agreement. At: http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf

³ UNFCCC (2016), Adoption of the Paris Agreement. At: <https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

⁴ IPCC (2018), Summary for Policymakers. In: Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. At: https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf

European Policy and Targets

Intended Nationally Determined Contributions of the EU and its Member States (2015)

- 6.2.11 At the European level, the European Union's (EU) submission⁵ to the Paris Agreement establishes an overall binding commitment to reduce domestic greenhouse gas emissions by at least 40% by 2030 compared to 1990 levels, in line with targets set out in the EU 2030 Climate & Energy Policy Framework (October 2014). Given the result of the United Kingdom (UK) EU referendum held on 23 June 2016, in due course it may be necessary for the UK Government to submit separate NDCs to the UNFCCC as it would still be bound by national and international de-carbonisation obligations.
- 6.2.12 It is noted that the UK left the European Union on 31 January 2020. However, it is understood that during the transition period that currently applies until the end of 2020, whereby the UK and EU are to negotiate additional arrangements, all the above commitments still apply.

UK Policy and Targets

The Fifth Carbon Budget (2016)

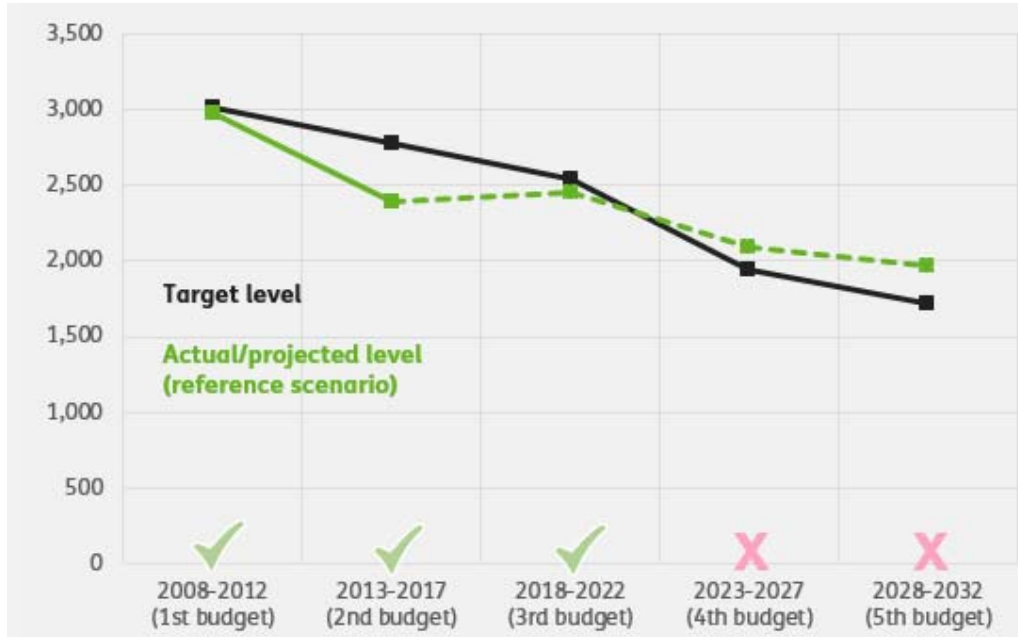
- 6.2.13 At the UK level, on 30 June 2016, the UK Government confirmed its intention to set the Fifth Carbon Budget⁶ to reduce UK greenhouse gas emissions relative to 1990 levels by 57% by 2028-32. This is in line with advice provided to the UK Government by the UK Committee on Climate Change. The Fifth Carbon Budget was officially set through The Carbon Budget Order 2016 which came into effect on 21 July 2016.
- 6.2.14 The UK has met its first Carbon Budget (23% reduction of UK greenhouse gas emissions between 2008-2012) and is on track to meet the 2nd Carbon Budget (29% reduction of UK greenhouse gas emissions between 2013-2017) and 3rd Carbon Budget (35% reduction of UK greenhouse gas emissions between 2018-2022). However, the UK is currently not on track to meet the 4th Carbon Budget⁷ (50% reduction of UK greenhouse gas emissions between 2023-2027), or the 5th Carbon Budget (57% reduction in greenhouse gas emissions 2028-32).
- 6.2.15 As can be seen in Figure 6.1 below, the projected carbon reductions for the 4th and 5th carbon reduction budgets will not be met. The projections show that the 4th budget will be narrowly missed (approximately 2,100 versus target of 1,900) but the gap increases for the 5th carbon reduction budget – the projection is just under 2,000 and the target approximately 1,750 so the gap between the projection and the target is growing.
- 6.2.16 To meet future carbon budgets and the 100% target for 2050 it will therefore require the government to apply more challenging measures.

⁵ Latvian Presidency of the Council of the European Union (2015), Intended Nationally Determined Contribution of the EU and its Member States. At: https://ec.europa.eu/clima/sites/clima/files/docs/2015030601_eu_indc_en.pdf

⁶ Department of Energy & Climate Change (now part of the Department for Business, Energy & Industrial Strategy) (2016), The Carbon Budget Order 2016. At: <http://www.legislation.gov.uk/ukxi/2016/785/made>

⁷ Statistics from <https://www.theccc.org.uk/reducing-carbon-emissions/carbon-budgets-and-targets/> (Accessed May 2020)

Figure 6.1 Progress Against UK Carbon Reduction Targets



Source: <https://fullfact.org/environment/uk-greenhouse-gas-emissions>

The UK Clean Growth Strategy (2017)

- 6.2.17 In October 2017, the UK Government published the Clean Growth Strategy (CGS) 'Leading the Way to a Low Carbon Future'⁸. The key message of the Strategy is that clean growth means growing our national income while cutting greenhouse gas emissions. The CGS sets out a comprehensive set of policies and proposals that aim to accelerate the pace of 'clean growth' i.e. deliver increased economic growth and decreased emissions. It states that *"in order to meet these objectives, the UK will need to nurture low carbon technologies, processes and systems that are as cheap as possible"*. The Strategy is considered to be *"at the heart of the UK's Industrial Strategy"*.
- 6.2.18 The Strategy draws on the UK's commitments under the Climate Change Act 2008, as they were at the time and prior to the new net zero target that was brought in under the Climate Change Act (2050 Target Amendment) Order 2019, i.e. the commitment to reduce UK greenhouse gas emissions and the associated 'Carbon Budgets' relative to 1990 levels by at least 80% by 2050. It is reported that the UK outperformed the target emissions reduction of the first carbon budget (2008 to 2012) and is projected to outperform against the second and third budgets (covering 2013 to 2022). However, the Strategy considered that in order to meet the fourth and fifth carbon budgets (covering the period 2023 to 2027 and 2028 to 2032) *"we will need to drive a significant acceleration in the pace of decarbonisation and in this strategy we have set out stretching domestic policies that keep us on track to meet our carbon budgets"*.
- 6.2.19 The Strategy references the 2015 Paris Agreement and states that *"the actions and investments that will be needed to meet the Paris commitments will ensure the shift to clean growth will be at the forefront of policy and economic decisions made by governments and businesses in the coming decades"*.

⁸ Department for Business, Energy & Industrial Strategy (2017), Clean Growth Strategy. At: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700496/clean-growth-strategy-correction-april-2018.pdf

The UK Industrial Strategy (2017)

- 6.2.20 The Industrial Strategy entitled 'Building a Britain fit for the future'⁹ was published by the UK Government in November 2017. The overall aim of this Strategy is to create an economy that boosts productivity and earning power throughout the UK. The Strategy identifies four 'Grand Challenges' that are set to put the UK at the forefront of the industries of the future and one of these is 'Clean Growth', against which it is stated that the Government will "*maximise the advantages for UK industry from the global shift to clean growth*".
- 6.2.21 Key policy areas relate to ideas, people, infrastructure, business environment and places. In discussing Clean Growth, the UK Industrial Strategy states "*we will maximise the advantages for UK industry from the global shift to clean growth – through leading the world in the development, manufacture and use of low carbon technologies, systems and services that cost less than high carbon alternatives*".

Climate Change Act 2008 (2050 Target Amendment) Order 2019

- 6.2.22 The UK adopted a 2050 net zero emissions reduction target¹⁰ in June 2019, strengthening its previous 2050 goal of at least an 80% GHG emission reduction below 1990 levels by 2050 (UK Government, 2019). As part of this net zero 2050 target, the Climate Change Committee recommended that Scotland achieve net zero by 2045, and that Wales achieve a 95% reduction below 1990 levels by 2050, reflecting their individual respective circumstances.
- 6.2.23 In light of this net zero emissions reduction target future carbon budgets are set to be revised down more steeply in light of this net zero target.

Consultation of Onshore Wind in CfD Auction

- 6.2.24 The Department for Business, Energy & Industrial Strategy (BEIS) has been consulting on the inclusion of onshore wind in the next Contracts for Difference (CfD) auction. The consultation was due to close on the 22nd of May 2020. There may therefore be a potential reintroduction of onshore wind in the next CfD auction.

Scottish Policy and Targets

The 2020 Routemap for Renewable Energy in Scotland – 2015 Update

- 6.2.25 The 2020 Routemap was first published by the Scottish Government in 2011 and updated in 2012, 2013 and 2015. The Routemap is an important Scottish Government policy document reflecting its express determination to exhibit Scotland's "*rich renewable resources*" for economic and carbon benefits.
- 6.2.26 The 2015 update¹¹ provides statistics on deployment of renewables and sectoral updates. The indications at the time were that the 50% renewable electricity target for 2015 had been met almost one year ahead of schedule.

⁹ Department for Business, Energy & Industrial Strategy (2017), Industrial Strategy: building a Britain fit for the future. At: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/730048/industrial-strategy-white-paper-web-ready-a4-version.pdf

¹⁰ The Climate Change Act 2008 (2050 Target Amendment) Order 2019. Available online at: <https://www.legislation.gov.uk/ukxi/2019/1056/contents/made>

¹¹ The Scottish Government (2015), 2020 Routemap for Renewable Energy in Scotland – Update. At: <https://www2.gov.scot/Resource/0048/00485407.pdf>

- 6.2.27 With specific regard to onshore wind, the report emphasises that *“onshore wind has a pivotal role in delivering our 2020 renewable targets”* and concludes that the Scottish Government’s policy on wind farm applications *“strikes a careful balance between maximising Scotland’s huge green energy potential and protecting environmental interests and residential amenity”*.

The Chief Planner Letter to all Heads of Planning (2015)

- 6.2.28 The Scottish Government’s Chief Planner issued a letter to all Heads of Planning in Scotland on 11 November 2015 entitled ‘Energy Targets and Scottish Planning Policy’¹². The letter was issued in the context of UK Government announcements on energy targets and the early closure of the Renewables Obligation for onshore wind.
- 6.2.29 The letter serves to re-emphasise that the Scottish Government’s current position on onshore wind farms remains as set out within Scottish Planning Policy (2014) and the Electricity Generation Policy Statement (2013). Therefore, the Scottish Government’s policy remains unchanged and continues to *“support new onshore renewable energy developments, including onshore wind farms and particularly community-owned and shared ownership scheme”*. Importantly, it adds that *“this policy support continues in the situation where renewable energy targets have been reached”*.
- 6.2.30 With regard to the target of 100% of gross electricity consumption from renewables by 2020, the letter states that *“this target is a statement of intent and that it is known Scotland has the potential resource to deliver and exceed it”* and adds that *“this does not place a cap on the support for renewable energy developments, including onshore wind once the target has been reached”*.

The Scottish Energy Strategy (2017)

- 6.2.31 The Scottish Energy Strategy: the future of energy in Scotland¹³, which was published in December 2017, sets out the Scottish Government’s 2050 vision for energy in Scotland as *“a flourishing, competitive local and national energy sector, delivering secure, affordable, clean energy for Scotland’s households, communities and businesses”*. This Strategy reiterates the role that Scotland can play in delivering international and national commitments on reducing greenhouse gas emissions and notes that renewable energy and its associated infrastructure is now a major industrial sector in its own right, helping to sustain economic growth and employment.
- 6.2.32 The 2050 vision is built around six priorities. Of particular relevance to the Variation Development is the priority regarding ‘Renewable and low carbon solutions’. Against this priority the Scottish Government state that they will *“continue to champion and explore the potential of Scotland’s huge renewable energy resource, and its ability to meet our local and national heat, transport and electricity needs – helping to achieve our ambitious emissions reductions targets.”*
- 6.2.33 The Scottish Energy Strategy contains new energy systems targets for 2030 as follows:
- *“The equivalent of 50% of the energy for Scotland’s heat, transport and electricity consumption to be supplied from renewable sources.*
 - *An increase by 30% in the productivity of energy use across the Scottish economy.”*

¹² The Scottish Government (2015), Energy Targets and Scottish Planning Policy. At: <https://www.gov.scot/binaries/content/documents/govscot/publications/correspondence/2015/11/energy-targets-and-scottish-planning-policy-chief-planner-letter/documents/161914a2-f6fd-49fa-9e62-ef76a76831b7/161914a2-f6fd-49fa-9e62-ef76a76831b7/govscot%3Adocument>

¹³ The Scottish Government (2017), The Scottish Energy Strategy: the future of energy in Scotland. At: <https://www.gov.scot/binaries/content/documents/govscot/publications/publication/2017/12/scottish-energy-strategy-future-energy-scotland-9781788515276/documents/00529523-pdf/00529523-pdf/govscot%3Adocument>

- 6.2.34 With regard to the new 50% target, it is stated that “Government analysis underpinning this target shows that renewable electricity – which has already outperformed our interim 2015 target of 50% - could rise to over 140% of Scottish electricity consumption, ensuring its contribution to the wider renewable energy target for 2030. This assumes a considerably higher market penetration of renewable electricity than today – requiring in the region of 17 GW on installed capacity in 2030 (compared to 9.55 GW in June 2017)...”.
- 6.2.35 Onshore wind is identified as a key technology and the Scottish Energy Strategy states “we will push for UK-wide policy support for onshore wind and take action of our own to prioritise and deliver a route to market – combined with a Land Use Planning approach which continues to support development while protecting our landscapes”. This Strategy also sets out the Scottish Government’s clear position on onshore wind:
- “Our energy and climate change goals mean that onshore wind must continue to play a vital role in Scotland’s future.... That means continuing to support development in the right places, and increasingly, the extension and replacement of existing sites and new and larger turbines, all based on an appropriate, case by case assessment of their effects and impacts. ...It means developers and communities working together and continuing to strike the right balance between environmental impacts, local support, benefits, and where possible, economic benefits deriving from community ownership”.*

The Onshore Wind Policy Statement (2017)

- 6.2.36 The Onshore Wind Policy Statement¹⁴, which sets out the Scottish Government’s position on onshore wind was published in December 2017. This Statement views onshore wind development as essential to Scotland’s transformation to a fully decarbonised energy system by 2050 and recognises that it brings opportunities which underpin the vision to grow a low carbon economy and build a fairer society. As a result, it is identified that “Scotland will continue to need more onshore wind development and capacity, in locations across our landscape where it can be accommodated”.
- 6.2.37 The Onshore Wind Policy Statement reaffirms the Scottish Government’s commitment to existing onshore wind policy, which is to support deployment of onshore wind whilst protecting the environment and residential amenity and maximising local benefits. It recognises that onshore wind is a mature sector and is the lowest cost renewable electricity at scale. Recognising that onshore wind faces challenges due to changes to subsidies at the UK level, it also establishes that the Scottish Government is supportive of the need to design new wind farms to maximise efficiency and hence ensure development is viable and sustainable.
- 6.2.38 The Scottish Government acknowledges that onshore wind technology is moving towards more powerful turbines and that, by necessity, this will require taller towers and larger blades. It is noted that in some cases this may allow for fewer, but larger wind turbines, with the opportunity for landscape improvement, as well as increasing the amount of electricity generated. The Onshore Wind Policy Statement sets out that the Scottish Government “fully supports the delivery of large wind turbines in landscapes judged to be capable of accommodating them without significant adverse impacts”.

The Climate Change Plan (2018)

- 6.2.39 The Climate Change Plan, which was published in February 2018, sits alongside the Scottish Government’s Energy Strategy. It sets out policies and proposals on how the Scottish Government

¹⁴ The Scottish Government (2017), Onshore Wind Policy Statement. At: <https://www.gov.scot/binaries/content/documents/govscot/publications/publication/2017/12/onshore-wind-policy-statement-9781788515283/documents/00529536-pdf/00529536-pdf/govscot%3Adocument>

intends to meet its greenhouse gas emission reduction targets from 2018 – 2032, which provide the strategic framework for transition to a low carbon Scotland. The plan includes transformational outcomes in transport, heat, electricity generation and energy efficiency, along with increased natural carbon sinks and more efficient agricultural practices. The plan aims that by 2032, Scotland will have reduced its greenhouse gas emissions by 66% relative to 1990 levels. Policy ambitions in the electricity sector include:

- By 2032 – Scotland’s electricity system will be largely from renewable sources; and
- From 2020 onwards, Scotland’s electricity grid intensity will be below 50g of CO₂ per kilowatt hour.

6.2.40 The achievement of these ambitions is to be aided by the “*high penetration of renewables, using a range of technologies including onshore wind*” (page 74) amongst others.

The Climate Change (Emissions Reduction Targets) (Scotland) Act 2020

6.2.41 The Climate Change (Emissions Reductions Targets) (Scotland) Act¹⁵ received Royal Assent on 31st October 2019 and amends the Climate Change (Scotland) Act 2009. The primary objective of the Act is to raise the ambition of the greenhouse gas emissions reduction targets that are set out in the Climate Change (Scotland) Act 2009 (“the 2009 Act”) and associated regulations.

6.2.42 The Act sets a legally binding net zero target of all greenhouse gases by 2045. This target date is five years ahead of the current date set for the rest of the UK and aims to ensure Scotland contributes to the worldwide efforts to deliver on the Paris Agreement.

6.2.43 Setting a net-zero target by 2045 is an ambitious target and places Scotland at the forefront of efforts to combat climate change. Through this Act and other associated Government strategies and policies, the Scottish Government aim to provide certainty and credibility to businesses, industries and investors that are vital partners in Scotland’s transition to a low carbon economy.

Energy Statistics for Scotland – Q3 and Q4 Figures (2019)

6.2.44 The Scottish Government’s target is to achieve 30% of total national energy use from renewable sources by 2020. In December 2019, the Scottish Government published the ‘Energy Statistics for Scotland – Q3 Figures’¹⁶ which identified that in 2018, 76.2% of total energy consumption in Scotland came from renewable sources, up from 70.1% in 2017.

6.2.45 Scotland continued its strong start to 2019 in terms of renewable electricity generation – 6,815GWh between July-September 2019, by far the highest for any quarter 3 to date. Generation this quarter was the equivalent of powering two-thirds of all Scottish households for a year.

6.2.46 Scotland generated 21,699GWh of renewable electricity in the first nine months of 2019, up 23% from the same point in 2018. Scotland’s overall renewable electricity capacity was 11.7GW as of September 2019, up by 0.9GW from September 2018. Of this total, 9,121 GWh was generated by wind, which represents a 10.3% increase from the same period in 2017 and accounts for 32.8 % of total UK wind-generated electricity.

6.2.47 Electricity generation from fossil fuels increased, up from 10.3% in 2017 to 15.7% in 2018. Statistics for 2019 were published by the Scottish Government on the 26th of March. Paragraph 6.2.49 below provides more information on these latest stats.

¹⁵ The Climate Change (Emissions Reductions Targets) (Scotland) Act. Available online at:

<http://www.legislation.gov.uk/asp/2019/15/enacted>

¹⁶ The Scottish Government (2018), Energy Statistics for Scotland – Q2 Figures. Available online at:

<https://www2.gov.scot/Resource/0054/00541525.pdf>

- 6.2.48 Paragraph 17 of the 'Electricity Generation Policy Statement'¹⁷ (July 2013) states that the Scottish Government estimates that its target of generating the equivalent of 100% of gross annual electricity consumption of renewable energy by 2020 will require around 14 – 16 GW of installed capacity to be deployed. Figures released in the Q3 update show that as of September 2019, 11.7 GW of renewable electricity capacity was operational in Scotland. The Q3 update indicates there is an additional 12.9 GW of capacity either under construction, consented or in planning, although it is noted that the target relates to installed (not consented or prospective capacity), and there is no certainty that all of the consented schemes or those in planning will progress to construction.
- 6.2.49 Quarter 4 energy statistics for Scotland have now been published by the Government and these show that with the total renewable energy capacity now at over 11GW, the sector is over three times bigger than it was at the end of 2009. Onshore wind is the biggest single technology, accounting for 70 per cent of installed capacity, while offshore wind, hydro and solar are Scotland's other major sources of renewable power.
- 6.2.50 There is significant additional capacity in development across Scotland, with projects either in planning or already consented which total nearly 13GW. Capacity increases in the short term will come from onshore wind, with 4GW of capacity already consented and a further 3.8GW in planning. Offshore wind has 4GW already consented. There is also 307MW of solar projects at various stages of development and 344MW of wave and tidal projects either in planning or already consented. As with the quarter 3 update, there is no certainty that all of the consented schemes or those in planning will progress to construction. It therefore remains the case that there is a significant shortfall against the Scottish 2020 renewable electricity generation target (which relates to operational development) and, looking beyond that, the target of generating 50% of energy from renewable sources by 2030 is a deliberately challenging one.
- 6.2.51 The increased efficiency as a result of the Variation Development would significantly enhance overall renewable energy generation yield and greenhouse gas emissions reduction when compared to the Consented Development, thereby making an increased contribution to these currently unmet targets.

6.3 Peat Management

- 6.3.1 A peat management plan (PMP) (Appendix 6.A of the 2017 FEI and peat slide risk assessment (PSRA) (Appendix 6.B of the 2017 FEI) were produced (these were updated versions of the same documents from the 2015 ES). Comprehensive peat probing surveys were carried out to inform these reports in accordance with SEPA's peat depth probing survey guidance at the time. Whilst this guidance was updated in 2017, the survey work carried out to inform the 2015 ES and 2017 FEI remains valid as it complies with the updated SEPA guidance.
- 6.3.2 The predicted volume of excavated peat required for the Consented Development is set out within Table 2.2 of the PMP (Appendix 6.A of the 2017 FEI), with Table 2.3 of the same document confirming that all excavated peat can be re-used within the Development Site for habitat reinstatement. As the changes proposed by the Variation Development, when compared to the Consented Development, relate to the increase in the size of above ground turbine components, with all other infrastructure elements remaining unchanged, it was stated in the Variation Development Scoping Report that the results of the PMP and PSRA remain valid and no update to them is therefore required.

¹⁷ The Scottish Government (2013), Electricity Generation Policy Statement 2013. Available at <https://www.gov.scot/publications/electricity-generation-policy-statement-2013/>

- 6.3.3 No scoping responses were received which stated that any further assessment work was required in relation to peat and it is therefore considered that the PMP and PSRA remain valid for the Variation Development.

6.4 Potential Contribution of the Variation Development to Government Objectives

Energy Yield

- 6.4.1 The installed capacity of a wind turbine is a measure of its maximum rated output, which in the context of the Variation Development is an estimated 80MW¹⁸ (assuming 16 x 5MW machines). Calculations of the likely electricity generation of the turbines are dependent on the 'capacity factor', which involves an assessment of the actual output of the development against its installed capacity¹⁹.
- 6.4.2 On this basis, and with an estimated installed capacity of 80MW, the amount of electricity produced by the Variation Development has been estimated to be 263,500MWh per year²⁰ based on a site specific capacity factor of 37.6% derived from over two years of wind monitoring from the temporary anemometer masts installed at the Development Site (noting that this capacity factor is greater than the 5 years average Scottish capacity factor of 27% and UK capacity factor of 26.7%²¹).
- 6.4.3 This 37.6% capacity factor has been used to calculate potential annual energy yield for the Variation Development, shown in Table 6.1 below.

Carbon Dioxide Savings and Electricity Generation

- 6.4.4 It is widely accepted that electricity produced from wind energy has a positive benefit with regard to reducing CO₂ emissions. However, there has been much debate about the actual level of emissions savings that might arise from a wind farm development. In estimating the actual saving it is important to consider the mix of alternative sources of electricity generation, for example, coal, oil and gas powered. To represent this energy mix, Renewable UK recommend the use of a static figure of 430g of CO₂ saved for every kWh generated (Renewable UK, UKWED Figures explained, 2014). A figure of 430g of CO₂ savings per kWh has therefore been assumed for the purposes of this assessment, with savings of CO₂ estimated on the basis of a range of capacity factors.
- 6.4.5 The Department for Business, Energy and Industrial Strategy (BEIS), formerly the Department for Energy and Climate Change (DECC) produces a range of statistics detailing electricity consumption across the UK. The average domestic consumption in Scotland, based on sales per household, was 3,910 kWh in 2018 (compared to a UK average figure of 3,794 kWh in 2018²²).

¹⁸ The installed capacity for the Consented Development presented in the 2017 FEI was 54.4MW.

¹⁹ The net capacity factor of a wind farm is the ratio of its actual energy output (after energy losses within the wind farm have been accounted for) over a defined period of time (typically a year) to its energy output, had it operated at maximum power output continuously, over the same period of time.

²⁰ As presented in the 2017 FEI, estimated electricity generation based on the site-specific capacity factor at that time of 32.92%, was 156,878MWh and this would increase to 263,500MWh using the updated site-specific capacity factor of 37.6%, although it should be noted that as different capacity factors are used, these figures are not directly comparable.

²¹ The capacity figure for the Variation Development based on empirical data is substantially greater than the average Scottish and UK capacity factor of 27%, the long term average figure for Scotland and the UK published by Department of Energy and Climate Change (DECC), Energy Trends Section 6: Renewables (ET6.1 Renewable Electricity Capacity and Generation, January 2018. Capacity factor for UK-

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/437811/et6_1.xls.

²² Scotland Energy Statistics: <https://www2.gov.scot/Topics/Statistics/Browse/Business/Energy> (Accessed 23/03/20)

- 6.4.6 The average domestic consumption in East Ayrshire in 2018 was 3,343 kWh, which is lower than both the Scottish and UK average. The electricity generated by the Variation Development will enter the National Grid, and therefore cannot be tracked to the individual consumer, but the electricity is likely to supply demand in the geographical area of the grid connection point. Therefore, it is relevant to consider electricity demand in the vicinity of the Variation Development (i.e. within East Ayrshire).
- 6.4.7 The potential electricity generation and 'Homes Equivalent' electricity generation (based on 3,343kWh annual domestic consumption in East Ayrshire) are provided in Table 6.1. The potential CO₂ savings as a result of the Variation Development generating electricity instead of conventional power stations, with an assumed 430g CO₂ per kWh generated, are also presented. Results are presented for both average and site specific capacity factors.

Table 6.1 Potential CO₂ Savings and Electricity Generation

Capacity Factor (%)	Electricity Generation (MWh per year) ²³	Homes Equivalent (based on average consumption) ²⁴	Carbon dioxide savings (Tonnes of CO ₂ per year) based on Renewable UK savings figure
27%	189,216	56,600	81,363
37.6%	263,500	78,821	113,305

6.5 Carbon Balance of the Development

Overview

- 6.5.1 The following sections outline the specific values for the carbon losses and carbon gains associated with the Variation Development. For each input parameter (as outlined in Appendix V6A to this document), an expected minimum and maximum value is required to provide an expected, minimum and maximum scenario for the carbon payback. For the Variation Development, a turbine capacity of 5MW has been input with 16 as the number of turbines for the expected, minimum and maximum scenarios.²⁵
- 6.5.2 It should be noted that since the 2017 FEI was submitted, the carbon calculator specified by the Scottish Government has moved from a standalone spreadsheet to an online calculator. For this application, the online Carbon Calculator Tool v1.6.0 was used on 28/03/2020, the reference number is not supplied in this EIA Report, but has been communicated separately to the ECU and relevant consultees.

Carbon Losses

- 6.5.3 The manufacturing, construction and installation (including concrete) of the wind turbines at the Variation Development has an associated carbon cost. Using figures from the online calculator, the expected case carbon emission savings associated with the manufacture, construction and

²³ For example using a 37.6% capacity factor, figures are derived as follows: 80MW (16 × 5MW turbine) × 8,760 hours/year × 0.376 (capacity factor) = 263,500MWh.

²⁴ This is calculated using the most recent statistics from the DECC showing that annual local (Enoch Hill, East Ayrshire) average domestic household consumption is 3,343kWh : <https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics>

²⁵ It should be noted that while the turbine capacity used for the expected and maximum scenarios is the same, other input parameters vary and so the outputs are unlikely to be the same.

- decommissioning of the 16 turbines of 5MW installed capacity, is 69,744 tonnes CO₂ equivalent (t CO₂e), which equates to approximately 48.4% of total CO₂ losses.
- 6.5.4 The carbon payback model attributes carbon losses due to the requirement for extra capacity to back up wind power generation at times of peak demand. This is quantified as a percentage of total capacity, which was input as 5% for this case (the recommended figure within the model) and equates to 47,304 t CO₂e (i.e. approximately 32.8% of total CO₂ losses).
- 6.5.5 Carbon losses associated with CO₂ release from soil organic matter for the expected case amount to 25,568 t CO₂e which equates to approximately 17.7% of total CO₂ losses. These losses result from peat removal and drainage effects following excavation for items of infrastructure, notably turbine foundations, hard standings and access tracks, as well as borrow pits. It is worth noting that this figure assumes 100% loss of CO₂ from removed/disturbed peat, as this is the default value within the carbon model and cannot be amended. In reality, losses are likely to be considerably less than this, as it is expected that all of the peat will be used in reinstating the Development Site (see the 2017 FEI Peat Management Plan (PMP), 2017 FEI Appendix 6.A).
- 6.5.6 Further small carbon losses are generated by the reduction of carbon fixing potential which occurs due to the loss of bog plants as a result of wind farm construction. For the expected case, this is 1,247t CO₂e, which equates to less than 0.9% of total CO₂ losses.

Carbon Gains

- 6.5.7 There are no carbon gains due to improvement of felled plantation land, bog restoration or early removal of drainage from foundations and hardstandings. A very small gain is found in the restoration of peat from the borrow pits. Within the 2017 PMP (see 2017 FEI Appendix 6.A) it is predicted that all peat will be re-used for habitat reinstatement and this also applies to the Variation Development.

6.6 Carbon Payback of the Development

- 6.6.1 To calculate the carbon payback period, the online calculator uses three different fossil fuel displacement scenarios, which are updated automatically using data from Digest of United Kingdom Energy Statistics (DUKES):
- Grid mix, the mix of electricity sources supplying the UK as a whole;
 - Coal fired for coal fired electricity generation; and
 - Fossil fuel mix for fossil fuel sourced electricity generation alone.
- 6.6.2 Nayak *et al* 2011²⁶ recommend using the fossil fuel sourced grid mix scenario as the most appropriate for calculating the carbon payback time (the counterfactual). Based on this scenario, the payback for the Variation Development is predicted to be 1.2 years for the expected outcome (i.e. 16 turbines of 5MW installed capacity).
- 6.6.3 The payback period could be as low as 0.6 years for the minimum scenario, but increases to 1.5 years for the maximum scenario. The carbon payback for each scenario is shown in Table 6.2 below (with figures from the 2017 FEI presented in parentheses for comparison).

²⁶ Nayak, D. R., Miller, D., Nolan, A., Smith, P. and Smith, J. (2008) Calculating carbon savings for wind farms on Scottish peatlands – A new approach, Corrected in 2010 (updated paper by Smith et al 2011).

Table 6.2 Payback in years for each Scenario used in the Carbon Calculator

Fuel Source	Carbon Payback Time (years)* Expected Value	Carbon Payback Time (Years)* Minimum value	Carbon Payback Time (Years)* Maximum Value
Coal Fired	0.6 (0.9)	0.3 (0.4)	0.7 (1.6)
Grid Mix	2.2 (2.0)	1.2 (1.0)	2.7 (3.6)
Fossil Fuel Mix	1.2 (1.2)	0.7 (0.6)	1.5 (2.2)

*The equivalent figure from the 2017 FEI is in brackets for comparison – it should be noted however that the methodology used for the carbon calculator has changed since 2017.

6.7 Summary

- 6.7.1 The calculation of carbon balance and payback has been based on the expected values where site specific data is available and worst-case assumptions where it is not.
- 6.7.2 It is predicted that the carbon loss in developing the Variation Development will be paid back in ~1.2 years (4% of the 30 year operational life) based upon the fossil fuel mix and the expected outcome. Even considering the maximum scenario, the Variation Development will have achieved the carbon balance within ~1.5 years (5% of the 30 year operational life).
- 6.7.3 On the basis of potential annual CO₂ savings of 113,305 tonnes/year (based on figure of 430g of CO₂ savings per kWh and a site specific capacity factor of 37.6%), the Variation Development could result in a total carbon saving of approximately 3.4M tonnes over its 30 year operational life, and generate electricity to annually supply the equivalent of 78,821 average homes in East Ayrshire.

6.8 References

Department for Business, Energy & Industrial Strategy (2018) Digest of United Kingdom Energy Statistics 2018 [Online] Available at: Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/736148/DUKES_2018.pdf

Nayak, D. R., Miller, D., Nolan, A., Smith, P. and Smith, J. (2008) Calculating carbon savings for wind farms on Scottish peatlands – A new approach, Corrected in 2010 (updated paper by Smith *et al.*, 2011).



7. Noise

7.1 Introduction

- 7.1.1 This chapter assesses the potential significant effects of the Variation Development with respect to noise. As an update to the assessment presented in the 2015 ES and 2017 FEI, this chapter only consists of those elements which have been updated to take account of the proposed variations to the Consented Development. These variations, i.e. an increase in maximum tip height and rotor diameter for all turbines, and an increase in the operational period from 25 to 30 years will allow larger turbine typologies which could have different sound power levels to those assessed in the 2017 FEI. All other noise related elements in terms of road traffic and construction remain unchanged, therefore this chapter considers operational turbine noise only.
- 7.1.2 Whilst the selection of the candidate machine for the Variation Development would be determined by a competitive tendering exercise and has not yet been confirmed, a conservative approach has been taken using a sound power 'envelope' encompassing the maximum sound power level at each incremental wind speed, irrespective of which turbine it is associated with (i.e. the turbine with the highest sound power level at each incremental wind speed is used). This is the same approach that was used for the noise assessment presented in the 2015 ES and 2017 FEI.

7.2 Limitations of this Assessment

- 7.2.1 No limitations relating to noise have been identified that affect the robustness of the assessment of the potential significant effects during the operation of the Variation Development.

7.3 Relevant Legislation, Planning Policy, Technical Guidance

- 7.3.1 Chapter 5 – Planning Policy Context provides a review of all changes to applicable planning policies, advice and guidance of relevance to the Variation Development since the submission of the 2017 FEI. Any changes relating to wind farm noise emissions are noted in the following sections.

Legislative Context

- 7.3.2 There have been no changes to legislation of relevance to this chapter.

Planning Policy Context

- 7.3.3 Relevant national planning policies are contained within the Scottish Planning Policy (SPP) and the National Planning Framework 3 (NPF3), though these documents do not contain detailed policies specifically related to potential noise impacts from development proposals.
- 7.3.4 Whilst there have been no changes in planning policy since the 2017 FEI, Table 7.1 presents the main documents for context with this updated assessment.

Table 7.1 Relevant planning policy and guidance

Policy / Guidance Reference	Policy / Guidance Issue
National Planning Advice	
Planning Advice Note 1/2011	PAN 1/2011 provides general guidance and advice on the role of the planning system in helping to prevent and limit the adverse effects of noise.
Ayrshire Joint Structure Plan	
Ayrshire Joint Structure Plan – Addendum to the Structure Plan Technical Report TR03/2006 (2009)	A report which advises councils on wind farms in Ayrshire. The report recommends a turbine separation distance of 700m and that properties in the vicinity of a wind farm should not experience noise levels, due to the wind farm, in excess of 35dB(A) under all wind conditions.
Guidance on the Assessment of Noise from Wind Farms	
ETSU-R-97, 'The Assessment and Rating of Noise from Wind Farms', The Working Group on Noise from Wind Turbines	Information and advice to developers and planners on the environmental assessment of noise from wind turbines. The guidance offers a framework for the measurement of wind farm noise and gives indicative noise levels that offer a reasonable degree of protection to wind farm neighbours.
Institute of Acoustics 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'	A good practice guide (GPG) produced by a noise working group set up by the Institute of Acoustics (IoA) presenting current good practice in the application of ETSU-R-97 assessment methodology for wind turbine developments above 50kW.

7.4 Data Gathering Methodology

Study Area

- 7.4.1 The study area for this assessment covers the closest residential receptors in each direction from the Development Site. These are the same as assessed in the 2017 FEI as no new receptors have been established in the meantime (see 'potential receptors' in section 7.7).

Desk Study

- 7.4.2 Sources of information used for the noise assessment are listed in Table 7.2.

Table 7.2 Sources of Turbine Information

Site	Turbine type	Source
Enoch Hill & Benbrack	Nordex 117 3 MW	Noise level, Power curves, Thrust curves: Nordex N117 3000 (Nordex, F008_244_A03_EN, Rev 00 (October 2010). Hub height 91 m.
Enoch Hill & Benbrack	Nordex N133	Octave sound power levels, Nordex N133/4.8 (Nordex, F008_272_A14_EN, Revision 01, July 2018). Serrated edge data used at 83 m hub height.

Site	Turbine type	Source
Enoch Hill & Benbrack	Siemens 120DD	Standard Acoustic Emission, SWT-DD-120, Rev.0 (Siemens Gamesa, WP ON EMEA EN L&OS-40-0000-016AA95-00, June 2018)
Enoch Hill & Benbrack	Vestas V136 – 4.2MW	Windy Point Wind Farm, Noise Impact Assessment (Windy Point Wind Park Ltd, 10034449-CAMO-R-01, October 2017). Serrated edge blade. Unknown hub height for data.
Enoch Hill & Benbrack	Vestas V117 – 3.45 MW	Mt Emerald Wind Farm Revised A-weighted Noise Assessment (Rp 002 R01 2015545ML, January 2017) with reference to Vestas document V117-3.45 MW Third octave noise emission (DMS 0055-1397_V01). Serrated turbine edge, hub height 90m.
Afton	NEG Micon NM80 2.75M	Afton Wind Farm Proposal, Environmental Statement: Technical Appendix, Noise, (RPS, 2004) from Test Report: Sound power level, Wind turbine NM80/2750. (DANAK, P8.012.02, October 2002). Hub height 57m.
South Kyle Wind Farm	Vestas V90 3MW	South Kyle Environmental Statement (Vattenfall, August 2013). Dersalloch and Windy Standard extension also consist of Vestas V90 turbines.
Windy Standard	Vestas V47 660Kv	Pencloe Wind Farm Environmental Statement (Jacobs, 2016) with reference to General Specification 660 kW Variable Slip Wind Turbines (Vestas, 943111, R4, May 2000).
Pencloe Wind Farm	Siemens SWT-3.2-101	Pencloe Wind Farm Environmental Statement (Jacobs, 2016) with reference to Standard Acoustic Emission (Siemens, E W ON UNA COE LS GS-10-000-000-00, May 2014).
Windy Rig	Nordex N90 2.5 MW	Technical Report, Octave sound power levels (Nordex, F008_144_A04_EN, October 2013).
Windy Standard Phase III	Siemens SWT-3.2-113 & Siemens SWT-3.2-82	Windy Standard III Environmental Statement. Technical Appendix 11.2: Operational Noise Assessment (TNEI Services Ltd, July 2015)
Overhill Wind Farm	Senvion 3.4M114 Wind Turbine	East Ayrshire Environmental Assessment, 16/05/2017 Revision 3 Noise & Vibration (Hoare Lea, 2017) from Test Report SD-3.2-WT.PC.02-A-C-EN.
Hare Hill Extension	Gamsea G52	Sanquhar II Community Wind Farm – EIA Report. Section 11 – Noise, with reference to Turbine type for each site included in Noise Assessment.
Sanquhar II	Enercon -115 EP3 4MW	Sanquhar II EIA Report, January 2019. With reference to Chapter 11, Sound power levels for Enercon -115 EP3 4MW.
North Kyle Wind Farm	Vestas V136-STE	North Kyle Environmental Impact Assessment Report, Technical Appendix 6.1.
Greenburn Wind Park	Vestas V136 4.0/4.2 MW	Greenburn Wind Park, Environmental Impact Assessment Report Volume 1. (March 2020)

Survey Work

7.4.3 The baseline data sources most relevant to the assessment of noise from the Variation Development are those detailed within the 2017 FEI and the comprehensive background noise survey undertaken in 2014 to inform the impact assessment.

7.5 Overall Baseline

7.5.1 It has been assumed that the prevailing baseline noise conditions have not changed significantly from those presented within the 2015 ES. The results of background noise monitoring, and the

associated noise limits derived using methodology advocated within the ETSU-R-97 Guidance, therefore remain applicable for this EIA. Furthermore, as baseline noise levels normally increase over time, the use of the previous background noise level to represent residential receptors is considered a conservative approach.

7.6 Consultation

- 7.6.1 East Ayrshire Council (EAC) had no objections to the proposed approach. This proposal consisted of the use of previous baseline data and analysis and the scoping out of vibration, construction and decommissioning phases and operational traffic (leaving operational turbine noise as the only part of the assessment that requires to be updated for the Variation Development).

7.7 Scope of the Assessment

- 7.7.1 The spatial scope remains unchanged from the 2017 FEI and the same receptors from that assessment are considered in this EIA Report chapter. The only variation from the Consented Development that affects the noise assessment is the larger wind turbine typologies proposed, which changes their height and sound power levels. The Applicant is also applying to extend the operational period of the Variation Development from 25 to 30 years. As such no other changes to the assessment results have been anticipated beyond changing the operational wind farm noise. Construction and decommissioning noise effects are therefore as per the results presented in the 2017 FEI and are therefore not considered further within this chapter.

Potential Receptors

- 7.7.2 The assessed receptors are the same as presented in the 2017 FEI (i.e. eight receptors are assessed as follows: Meikle Hill; Nith Lodge; Maneight; Knockburnie; Dalleagles; Dalleagles Terrace; Brockloch; and Laglaff).

7.8 Assessment Methodology

- 7.8.1 There have been no changes to the assessment methodology outlined in the 2017 FEI. The noise limits for receptors considered in this chapter, prediction methods using ETSU-R-97 and IOA GPG, and evaluation of effect significance remain the same.

7.9 Environmental Measures Embedded into the Development Proposals

- 7.9.1 Wind farm noise assessment is part of an iterative design process, the aim of which is to achieve a design from which noise emissions meet limits derived following the approach given in ETSU-R-97 and/or relevant local guidelines. Where this can be achieved, the design of the scheme is such that necessary operational noise limits are met and no additional mitigation measures are required.
- 7.9.2 A range of turbine models would be appropriate for the Variation Development. The final selection of turbine would follow a competitive tendering process and thus the actual model of turbine may differ from those upon which the assessment has been based. However, the final choice of turbine would be required to comply with the noise criterion levels which have been established within the noise assessment for the Variation Development.

- 7.9.3 In order to reflect the range of commercially available turbines which would be appropriate for the Variation Development, the noise predictions are based upon an 'assessment envelope', which results in predictions for a generic turbine. To achieve this, a range of commercially available turbines have been considered, and at each wind speed the greatest sound power level has been selected. Thus, the assessment is not based upon a single turbine, rather what is a worst-case at each wind speed based upon a range of turbines potentially suitable for the Development Site.
- 7.9.4 The turbines considered for the purposes of the assessment envelope are the: Vestas V117, Vestas V136, Nordex 117, Nordex 133 and Siemens 120DD. Details of the sound power levels selected for each wind speed are given in Table 7.3 below and include a 2 decibel (dB) uncertainty correction added. Embedded mitigation includes the divergence from the full operation of each candidate turbine as follows:
- Nordex N133 – reduced Mode 6 using serrated edge blade technology; and
 - Siemens 120 DD – reduced mode 2.
- 7.9.5 All other turbines have been modelled on full power. It should be noted that the Siemens 120 DD turbine full power is mode 1, unlike all other turbines where this is commonly known as mode 0.

Table 7.3 Sound Power Levels (dBA) used for Assessment Envelope (+2dB uncertainty added)

Candidate Turbine	Standardised 10m Height Wind Speed (V10) ms ⁻¹								
	4	5	6	7	8	9	10	11	12
Nordex N117	100.0	104.4	107.0	107.6	108.0	108.0	108.0	108.0	108.0
Nordex N133 (Mode 6 serrated edge)	96.2	101.6	105.0	105.0	105.0	105.0	105.0	105.0	105.0
Siemens 120DD (Mode 2)	101.1	105.3	108.3	109.0	109.0	109.0	109.0	109.0	109.0
Vestas V117	99.1	102.4	105.4	108.0	108.8	108.8	108.8	108.8	108.8
Vestas V136	98.1	101.7	104.7	105.9	105.9	105.9	105.9	105.9	105.9
Assessment Envelope¹	101.1	105.3	108.3	109.0	109.0	109.0	109.0	109.0	109.0

¹ As the Siemens 120DD is the noisiest turbine under consideration, the sound power levels of this turbine and the assessment envelope are effectively the same.

Table 7.4 Octave band sound power level assessment envelope

Wind Speed	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
4 m/s	82.8	88.5	92.3	93.7	95.7	94.8	90.4	80.9
5 m/s	85.5	91.8	95.3	98.1	100.1	99.2	94.8	85.3
6 m/s	88	94.8	98.2	101.2	103.2	102.3	97.9	88.4
7 m/s	89.3	97	100.1	101.8	103.3	103	98.3	89.3
8 m/s	89.9	97.1	100	101.6	103.3	103	98.3	89.3
9 m/s	91.7	97.7	99.8	101.2	103.4	103.1	98.4	89.4
10 m/s	91.7	97.7	99.8	101.2	103.4	103.1	98.4	89.4
11 m/s	91.7	97.7	99.8	101.2	103.4	103.1	98.4	89.4
12 m/s	91.7	97.7	99.8	101.2	103.4	103.1	98.4	89.4

7.10 Assessment of Noise Effects

Predicted Effects and their Significance (Variation Development Only)

7.10.1 Table 7.5 and Table 7.6 present the following information for each wind speed for each of the eight assessed properties for day-time and night-time respectively:

- Values of the quiet day-time amenity and night-time background noise curve at the integer wind speeds, measured and adjusted for wind shear;
- The quiet day-time amenity and night-time noise limits derived from the background noise curve, in accordance with the ETSU-R-97 Guidance;
- The predicted turbine noise levels from the Variation Development based on worst-case downwind noise propagation at receptors, assuming turbines are operating simultaneously; and
- The margin by which the predicted turbine noise meets the noise limits at each wind speed using the worst-case downwind noise predictions (negative values indicate the predicted noise levels are lower than the noise limits).

7.10.2 It should be noted that the predicted turbine noise is equal for both the day and night-time periods and the assessments are presented separately to take account of the different noise limits which are applicable during these two periods.

Table 7.5 Day-time Noise Assessment

Noise Parameters, L_{A90} , 10mins, dB	Standardised 10m Height Wind Speed (V10) ms^{-1}								
	4	5	6	7	8	9	10	11	12
R1 – Meikle Hill									
Background Noise Level	23.8	24.7	26.0	27.7	29.9	32.9	36.6	36.6	36.6
ETSU-R-97 Derived Noise Limit	35.0	35.0	35.0	35.0	35.0	37.9	40.5	40.5	40.5
Predicted Noise Level	22.6	26.2	29.2	30.4	30.4	30.6	30.6	30.6	30.6
Margin Under Noise Limit	-12.4	-8.8	-5.8	-4.6	-4.6	-7.3	-9.9	-9.9	-9.9
R2 – Nith Lodge									
Background Noise Level	23.8	24.7	26.0	27.7	29.9	32.9	36.6	36.6	36.6
ETSU-R-97 Derived Noise Limit	35.0	35.0	35.0	35.0	35.0	37.9	40.9	40.9	40.9
Predicted Noise Level	21.1	24.7	27.7	28.9	28.9	29.1	29.1	29.1	29.1
Margin Under Noise Limit	-13.9	-10.3	-7.3	-6.1	-6.1	-8.8	-11.8	-11.8	-11.8
R3 – Maneight									
Background Noise Level	23.8	24.7	26.0	27.7	29.9	32.9	36.6	36.6	36.6
ETSU-R-97 Derived Noise Limit	35.0	35.0	35.0	35.0	35.0	37.9	41.1	41.1	41.1
Predicted Noise Level	23.7	27.4	30.4	31.5	31.5	31.7	31.7	31.7	31.7
Margin Under Noise Limit	-11.3	-7.6	-4.6	-3.5	-3.5	-6.2	-9.4	-9.4	-9.4
R4 – Knockburnie									
Background Noise Level	26.4	26.8	27.3	28.0	29.1	30.6	32.7	32.7	32.7

Noise Parameters, $L_{A90,10\text{mins}}$, dB	Standardised 10m Height Wind Speed (V10) ms^{-1}								
	4	5	6	7	8	9	10	11	12
ETSU-R-97 Derived Noise Limit	45.0	44.9	44.9	44.8	44.8	44.8	44.8	44.8	44.8
Predicted Noise Level	26.1	30.2	33.2	33.1	33.0	33.2	33.2	33.3	33.4
Margin Under Noise Limit	-18.9	-14.7	-11.7	-11.7	-11.8	-11.6	-11.6	-11.5	-11.4
R5 – Dalleagles									
Background Noise Level	29.8	30.3	30.9	31.7	32.5	33.4	24.4	34.4	34.4
ETSU-R-97 Derived Noise Limit	35.0	35.3	35.9	36.7	37.5	38.4	39.4	39.4	39.4
Predicted Noise Level	23.3	27.9	29.9	31.1	31.1	31.3	31.3	31.3	31.3
Margin Under Noise Limit	-11.7	-7.4	-6.0	-5.6	-6.4	-7.1	-8.1	-8.1	-8.1
R6 – Dalleagles Terrace									
Background Noise Level	29.8	30.3	30.9	31.7	32.5	33.4	24.4	34.4	34.4
ETSU-R-97 Derived Noise Limit	35.0	35.3	35.9	36.7	37.5	38.4	39.4	39.4	39.4
Predicted Noise Level	23.1	26.7	29.7	30.9	30.9	31.1	31.1	31.1	31.1
Margin Under Noise Limit	-11.9	-8.6	-6.2	-5.8	-6.6	-7.3	-8.3	-8.3	-8.3
R7 – Brockloch									
Background Noise Level	27.7	28.7	29.9	31.1	32.5	34.1	35.7	35.7	35.7
ETSU-R-97 Derived Noise Limit	45.0	44.9	44.8	44.7	44.7	44.7	44.7	44.7	44.7
Predicted Noise Level	20.2	23.8	26.7	28.1	28.0	28.4	28.4	28.4	28.4

Noise Parameters, L_{A90} , 10mins, dB	Standardised 10m Height Wind Speed (V10) ms^{-1}									
	4	5	6	7	8	9	10	11	12	
Margin Under Noise Limit	-24.8	-21.1	-18.1	-16.6	-16.7	-16.3	-16.3	-16.3	-16.3	
R8 – Laglaff										
Background Noise Level	27.7	28.7	29.9	31.1	32.5	34.1	35.7	35.7	35.7	
ETSU-R-97 Derived Noise Limit	35.0	35.0	35.0	36.1	37.5	38.9	39.7	39.7	39.7	
Predicted Noise Level	19.3	22.7	25.7	27.1	27.1	27.5	27.5	27.5	27.5	
Margin Under Noise Limit	-15.7	-12.3	-9.3	-9.0	-10.4	-11.4	-12.2	-12.2	-12.2	

Table 7.6 Night-time Noise Assessment

Noise Parameters, L_{A90} , 10mins, dB	Standardised 10m Height Wind Speed (V10) ms^{-1}									
	4	5	6	7	8	9	10	11	12	
R1 – Meikle Hill										
Background Noise Level	20.6	20.9	21.3	21.9	22.7	23.7	24.9	26.3	27.9	
ETSU-R-97 Derived Noise Limit	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	
Predicted Noise Level	22.6	26.2	29.2	30.4	30.4	30.6	30.6	30.6	30.6	
Margin Under Noise Limit	-15.4	-11.8	-8.8	-7.6	-7.6	-7.4	-7.4	-7.4	-7.4	
R2 – Nith Lodge										
Background Noise Level	20.6	20.9	21.3	21.9	22.7	23.7	24.9	26.3	27.9	
ETSU-R-97 Derived Noise Limit	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	
Predicted Noise Level	21.1	24.7	27.7	28.9	28.9	29.1	29.1	29.1	29.1	

Noise Parameters, $L_{A90, 10mins}$, dB	Standardised 10m Height Wind Speed (V10) ms^{-1}								
	4	5	6	7	8	9	10	11	12
Margin Under Noise Limit	-16.9	-13.3	-10.3	-9.1	-9.1	-8.9	-8.9	-8.9	-8.9
R3 – Maneight									
Background Noise Level	20.6	20.9	21.3	21.9	22.7	23.7	24.9	26.3	27.9
ETSU-R-97 Derived Noise Limit	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Predicted Noise Level	23.7	27.4	30.4	31.5	31.5	31.7	31.7	31.7	31.7
Margin Under Noise Limit	-14.3	-10.6	-7.6	-6.5	-6.5	-6.3	-6.3	-6.3	-6.3
R4 – Knockburnie									
Background Noise Level	24.6	24.7	24.9	25.1	25.5	25.9	26.3	26.9	27.5
ETSU-R-97 Derived Noise Limit	45.0	44.9	44.9	44.8	44.8	44.8	44.8	44.8	44.8
Predicted Noise Level	26.1	30.2	33.2	33.1	33.0	33.2	33.2	33.3	33.4
Margin Under Noise Limit	-18.9	-14.7	-11.7	-11.7	-11.8	-11.6	-11.6	-11.5	-11.4
R5 – Dalleagles									
Background Noise Level	23.2	23.1	23.2	23.4	23.8	24.4	25.1	26.0	27.1
ETSU-R-97 Derived Noise Limit	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Predicted Noise Level	23.3	27.9	29.9	31.1	31.1	31.3	31.3	31.3	31.3
Margin Under Noise Limit	-14.7	-10.1	-8.1	-6.9	-6.9	-6.7	-6.7	-6.7	-6.7
R6 – Dalleagles Terrace									
Background Noise Level	23.2	23.1	23.2	23.4	23.8	24.4	25.1	26.0	27.1



Noise Parameters, $L_{A90, 10mins}$, dB	Standardised 10m Height Wind Speed (V10) ms^{-1}								
	4	5	6	7	8	9	10	11	12
ETSU-R-97 Derived Noise Limit	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Predicted Noise Level	23.1	26.7	29.7	30.9	30.9	31.1	31.1	31.1	31.1
Margin Under Noise Limit	-14.9	-11.3	-8.3	-7.1	-7.1	-6.9	-6.9	-6.9	-6.9
R7 – Brockloch									
Background Noise Level	25.3	25.3	25.5	25.9	26.3	26.9	27.7	28.6	29.6
ETSU-R-97 Derived Noise Limit	45.0	44.9	44.8	44.7	44.7	44.7	44.7	44.7	44.7
Predicted Noise Level	20.2	23.8	26.7	28.1	28.0	28.4	28.4	28.4	28.4
Margin Under Noise Limit	-24.8	-21.1	-18.1	-16.6	-16.7	-16.3	-16.3	-16.3	-16.3
R8 – Laglaff									
Background Noise Level	25.3	25.3	25.5	25.9	26.3	26.9	27.7	28.6	29.6
ETSU-R-97 Derived Noise Limit	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Predicted Noise Level	19.3	22.7	25.7	27.1	27.1	27.5	27.5	27.5	27.5
Margin Under Noise Limit	-18.7	-15.3	-12.3	-10.9	-10.9	-10.5	-10.5	-10.5	-10.5

7.10.3 The results of the noise predictions show that with embedded mitigation noted in paragraph 7.9.4 that there are no exceedances of the ETSU-R-97. On the basis that ETSU-R-97 criteria are not exceeded, effects would not be significant.

Predicted Cumulative Effects and their Significance

7.10.4 In addition to considering the noise effects from the Variation Development in isolation, cumulative noise effects taking the closest existing, consented and application wind farm developments within 10 km of the Development Site (calculated as the distance between the closest turbines of each



development) have also been assessed. In addition Greenburn Wind Farm, although it was still a scoping site at the time the cumulative baseline was compiled, has been assessed due to the scoping response from EAC.

7.10.5 Table 7.7 outlines the identified wind farms for the cumulative assessment with sound power levels for associated turbine types presented in Table 7.8 (all inclusive of a 2 dB uncertainty correction).

Table 7.7 Cumulative Wind Developments

Wind Development Name	Status	Number of Turbines	Assumed Turbine Type
Afton	Operational	27	NEG Micon NM80 2.75M
Benbrack	Application	18	Benbrack Assessment envelope
Harehill	Existing	20	Vestas V47 660 kW
Harehill Extension	Existing	35	Gamsea G52
North Kyle	Application	54	V136 4.0/4.2 MW
Over Hill Wind Farm	Consented	10	Senvion 3.4M114 Wind Turbine
Pencloe Wind Farm	Consented	19	Siemens SWT-DD-130
Sanquar II	Application	50	Enercon -115 EP3 4MW
South Kyle Wind Farm	Consented	50	Vestas V90 3MW
Windy Rig	Consented	12	Nordex N90 2.5 MW
Windy Standard	Operational	36	Vestas V47 660Kv
Windy Standard Extension	Operational	30	Vestas V90 3MW
Windy Standard Phase III	Application	20	Siemens SWT-3.2-113 & Siemens SWT-3.2-82
Greenburn Wind Park	Scoping	16	Vestas V136 4.0/4.2 MW

Table 7.8 Sound Power Levels for Cumulative Wind Farm Assessment

Candidate Turbine	Standardised 10m Height Wind Speed (V10) ms ⁻¹								
	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
NEG Micon NM80 2.75M	92.3	96.1	101.2	103.1	103.9	104.7	105.5	105.5	105.5
Enoch Hill Assessment envelope	101.1	105.3	108.3	109.0	109.0	109.0	109.0	109.0	109.0
Senvion 3.4M114 Wind Turbine	99.8	103.5	106.1	106.2	106.2	106.2	106.2	106.2	106.2
Siemens SWT-3.2-101	106.3	108.5	109.0	109.0	109.0	109.0	109.0	109.0	109.0
Vestas V90 3MW	100.2	103.6	107.0	108.4	109.0	108.7	107.5	107.5	107.5
Nordex N90 2.5 MW	99.5	103.0	106.0	107.0	107.5	107.5	107.5	107.5	107.5
Vestas V47 660Kv	100.3	100.7	101.1	101.4	101.8	102.2	102.5	102.9	103.3
Siemens SWT-3.2-113	96.6	101.2	106.0	108.0	108.0	108.0	108.0	108.0	108.0

Candidate Turbine	Standardised 10m Height Wind Speed (V10) ms ⁻¹								
	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
Siemens SWT-3.2-82	99.8	103.5	106.1	106.2	106.2	106.2	106.2	106.2	106.2
Vestas V52	96.6	99.2	103.4	105.9	106.4	106.8	105.7	104.9	104.5
Gamsea G52	95.6	100.0	103.8	105.8	105.8	105.8	105.8	105.8	105.8
Enercon -115 EP3 4MW	95.7	100.6	104.6	106.7	107.3	108.0	108.0	108.0	108.0
Benbrack Assessment Envelope	98.0	101.8	106.5	108.5	109.0	109.0	109.0	109.0	109.0
V136 4.0/4.2 MW	96.6	101.5	105.7	105.9	105.9	105.9	105.9	105.9	105.9
Siemens SWT-DD- 130	92.3	95.3	98.3	102.3	105.0	106.0	106.0	106.0	106.0

7.10.6 Table 7.9 and Table 7.10 present the results of the cumulative noise predictions. The predicted turbine noise levels shown at each receptor assumed that all turbines are operating simultaneously and that receptors are all in a downwind position. In reality, this scenario (all receptors downwind) cannot occur due to the positioning of the turbines of the wind farm sites considered relative to the residential properties assessed and, as such, this is an unrealistic worst-case scenario.

Table 7.9 Daytime Cumulative Noise Assessment

Noise Parameters, LA90, 10mins, dB	Standardised 10m Height Wind Speed (V10) ms ⁻¹								
	4	5	6	7	8	9	10	11	12
R1 – Meikle Hill									
Background Noise Level	23.8	24.7	26.0	27.7	29.9	32.9	36.6	36.6	36.6
ETSU-R-97 Derived Noise Limit	40.0	40.0	40.0	40.0	40.0	40.0	40.5	40.5	40.5
Predicted Noise Level	29.1	33.1	36.6	37.4	37.6	37.5	37.2	37.2	37.1
Margin From Noise Limit	-10.9	-6.9	-3.4	-2.6	-2.4	-2.5	-3.3	-3.3	-3.4
R2 – Nith Lodge									
Background Noise Level	23.8	24.7	26.0	27.7	29.9	32.9	36.6	36.6	36.6
ETSU-R-97 Derived Noise Limit	40.0	40.0	40.0	40.0	40.0	40.0	40.9	40.9	40.9
Predicted Noise Level	29.0	33.1	36.8	37.4	37.5	37.5	37.3	37.3	37.2

Noise Parameters, LA90, 10mins, dB	Standardised 10m Height Wind Speed (V10) ms ⁻¹								
	4	5	6	7	8	9	10	11	12
Margin From Noise Limit	-11.0	-6.9	-3.2	-2.6	-2.5	-2.5	-3.6	-3.6	-3.7
R3 – Maneight									
Background Noise Level	23.8	24.7	26.0	27.7	29.9	32.9	36.6	36.6	36.6
ETSU-R-97 Derived Noise Limit	40.0	40.0	40.0	40.0	40.0	40.0	41.1	41.1	41.1
Predicted Noise Level	30.9	35.1	38.7	39.2	39.3	39.3	39.2	39.2	39.2
Margin From Noise Limit	-9.1	-4.9	-1.3	-0.8	-0.7	-0.7	-1.9	-1.9	-1.9
R4 – Knockburnie									
Background Noise Level	26.4	26.8	27.3	28.0	29.1	30.6	32.7	32.7	32.7
ETSU-R-97 Derived Noise Limit	45.0	44.9	44.9	44.8	44.8	44.8	44.8	44.8	44.8
Predicted Noise Level	29.1	33.2	36.8	37.4	37.5	37.5	37.4	37.4	37.3
Margin From Noise Limit	-15.9	-11.7	-8.1	-7.4	-7.3	-7.3	-7.4	-7.4	-7.5
R5 – Dalleagles									
Background Noise Level	29.8	30.3	30.9	31.7	32.5	33.4	24.4	34.4	34.4
ETSU-R-97 Derived Noise Limit	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Predicted Noise Level	28.4	32.3	35.6	36.4	36.5	36.5	36.4	36.4	36.2
Margin From Noise Limit	-11.6	-7.7	-4.4	-3.6	-3.5	-3.5	-3.6	-3.6	-3.8
R6 – Dalleagles Terrace									
Background Noise Level	29.8	30.3	30.9	31.7	32.5	33.4	24.4	34.4	34.4

Noise Parameters, L _{A90, 10mins} , dB	Standardised 10m Height Wind Speed (V10) ms ⁻¹								
	4	5	6	7	8	9	10	11	12
ETSU-R-97 Derived Noise Limit	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Predicted Noise Level	28.3	32.1	35.4	36.2	36.3	36.3	36.1	36.1	35.9
Margin Under Noise Limit	-11.7	-7.9	-4.6	-3.8	-3.7	-3.7	-3.9	-3.9	-4.1
R7 – Brockloch									
Background Noise Level	27.7	28.7	29.9	31.1	32.5	34.1	35.7	35.7	35.7
ETSU-R-97 Derived Noise Limit	45.0	44.9	44.8	44.7	44.7	44.7	44.7	44.7	44.7
Predicted Noise Level	29.1	32.3	35.0	35.9	36.1	36.1	35.9	35.9	35.2
Margin Under Noise Limit	-15.9	-12.6	-9.8	-8.8	-8.6	-8.6	-8.8	-8.8	-9.5
R8 – Laglaff									
Background Noise Level	27.7	28.7	29.9	31.1	32.5	34.1	35.7	35.7	35.7
ETSU-R-97 Derived Noise Limit	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Predicted Noise Level	29.9	32.9	35.2	36.1	36.3	36.4	36.1	36.1	35.1
Margin Under Noise Limit	-10.1	-7.1	-4.8	-3.9	-3.7	-3.6	-3.9	-3.9	-4.9

Table 7.10 Night-time Cumulative Noise Assessment

Noise Parameters, LA90, 10mins, dB	Standardised 10m Height Wind Speed (V10) ms ⁻¹								
	4	5	6	7	8	9	10	11	12
R1 – Meikle Hill									
Background Noise Level	20.6	20.9	21.3	21.9	22.7	23.7	24.9	26.3	27.9
ETSU-R-97 Derived Noise Limit	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Predicted Noise Level	29.1	33.1	36.6	37.4	37.6	37.5	37.2	37.2	37.1
Margin From Noise Limit	-13.9	-9.9	-6.4	-5.6	-5.4	-5.5	-5.8	-5.8	-5.9
R2 – Nith Lodge									
Background Noise Level	20.6	20.9	21.3	21.9	22.7	23.7	24.9	26.3	27.9
ETSU-R-97 Derived Noise Limit	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Predicted Noise Level	29.0	33.1	36.8	37.4	37.5	37.5	37.3	37.3	37.2
Margin From Noise Limit	-14.0	-9.9	-6.2	-5.6	-5.5	-5.5	-5.7	-5.7	-5.8
R3 – Maneight									
Background Noise Level	20.6	20.9	21.3	21.9	22.7	23.7	24.9	26.3	27.9
ETSU-R-97 Derived Noise Limit	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Predicted Noise Level	30.9	35.1	38.7	39.2	39.3	39.3	39.2	39.2	39.2
Margin From Noise Limit	-12.1	-7.9	-4.3	-3.8	-3.7	-3.7	-3.8	-3.8	-3.8
R4 – Knockburnie									
Background Noise Level	24.6	24.7	24.9	25.1	25.5	25.9	26.3	26.9	27.5



Noise Parameters, LA90, 10mins, dB	Standardised 10m Height Wind Speed (V10) ms ⁻¹								
	4	5	6	7	8	9	10	11	12
ETSU-R-97 Derived Noise Limit	45.0	44.9	44.9	44.8	44.8	44.8	44.8	44.8	44.8
Predicted Noise Level	29.1	33.2	36.8	37.4	37.5	37.5	37.4	37.4	37.3
Margin From Noise Limit	-15.9	-11.7	-8.1	-7.4	-7.3	-7.3	-7.4	-7.4	-7.5
R5 – Dalleagles									
Background Noise Level	23.2	23.1	23.2	23.4	23.8	24.4	25.1	26.0	27.1
ETSU-R-97 Derived Noise Limit	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Predicted Noise Level	28.4	32.3	35.6	36.4	36.5	36.5	36.4	36.4	36.2
Margin From Noise Limit	-14.6	-10.7	-7.4	-6.6	-6.5	-6.5	-6.6	-6.6	-6.8
R6 – Dalleagles Terrace									
Background Noise Level	23.2	23.1	23.2	23.4	23.8	24.4	25.1	26.0	27.1
ETSU-R-97 Derived Noise Limit	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Predicted Noise Level	28.3	32.1	35.4	36.2	36.3	36.3	36.1	36.1	35.9
Margin Under Noise Limit	-14.7	-10.9	-7.6	-6.8	-6.7	-6.7	-6.9	-6.9	-7.1
R7 – Brockloch									
Background Noise Level	25.3	25.3	25.5	25.9	26.3	26.9	27.7	28.6	29.6
ETSU-R-97 Derived Noise Limit	45.0	44.9	44.8	44.7	44.7	44.7	44.7	44.7	44.7
Predicted Noise Level	29.1	32.3	35.0	35.9	36.1	36.1	35.9	35.9	35.2



Noise Parameters, LA90, 10mins, dB	Standardised 10m Height Wind Speed (V10) ms ⁻¹								
	4	5	6	7	8	9	10	11	12
Margin Under Noise Limit	-15.9	-12.6	-9.8	-8.8	-8.6	-8.6	-8.8	-8.8	-9.5
R8 – Laglaff									
Background Noise Level	25.3	25.3	25.5	25.9	26.3	26.9	27.7	28.6	29.6
ETSU-R-97 Derived Noise Limit	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Predicted Noise Level	29.9	32.9	35.2	36.1	36.3	36.4	36.1	36.1	35.1
Margin Under Noise Limit	-13.1	-10.1	-7.8	-6.9	-6.7	-6.6	-6.9	-6.9	-7.9

7.10.7 The results of the cumulative predictions show that there are no exceedances of the ETSU-R-97 criteria with the embedded mitigation noted in paragraph 7.9.4. In addition, it should be noted that the sound levels presented are likely to be higher than will actually occur taking into account the following conservatisms in the noise assessment:

- The predictions assume that receptors are downwind of all turbines simultaneously, when in reality, not all turbines would be upwind of receptors at the same time. For instance, with south-easterly winds, when Maneight would be downwind of the Variation Development, Maneight would be downwind (with the corresponding reductions of noise from downwind conditions) from turbines at the North Kyle site to the northwest of this residence.
- A maximum 2 dB limit on all topographical screening has been applied, as per ETSU-R-97 methodology. However, the sound pathway from some turbines to receptors are significantly obstructed by large hill masses, likely to result in reductions of noise more than 2 dB.
- The assessment criterion is based on historic background noise levels, which could have increased in the intervening time, potentially resulting in less stringent assessment criteria.

7.10.8 Mode 2 of the Siemens DD-120 Turbine is included in the assessment envelope. However, for wind speeds up to 6m/s, this turbine can be run at mode 1 without exceedances of proposed limits for all receptors. For 7m/s and above, the daytime cumulative assessment levels at Maneight will be exceeded if the Siemens DD-120 turbine was chosen for the site and run at Mode 1. Therefore a mixture of modes could potentially be used to achieve maximum efficiency and meet proposed noise limits.

7.11 Conclusions of Significance Evaluation

7.11.1 Based on the sound power levels of the Variation Development not exceeding the assessment envelope design requirements, no exceedances of the ETSU-R-97 criteria are predicted.

7.11.2 As such the operational noise effects of the Variation Development would be not significant.

7.12 Implementation of Environmental Measures

7.12.1 Table 7.11 describes the environmental measures embedded within the Variation Development and the means by which they will be implemented. These are in addition to construction phase related environmental measures outlined in the 2015 ES.

Table 7.11 Summary of Environmental Measures to be Implemented – Relating to Noise

Environmental measure	Responsibility for implementation	Compliance mechanism
Turbine sound power levels to not exceed assessment envelope presented in Table 7.3	Developer/Contractor	Compliance with the Assessment Envelope when choosing final wind turbine type

7.13 References

Guidance

A Good Practice Guide to the Application of ETSU-R-97 for Wind Turbine Noise Assessment, (May 2013).

ISO 9613-2 (1996) Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation. International Standards Organisation.

The Assessment and Rating from Windfarms. ETSU Report ETSU-R-97 (The Working Group on Noise from Wind Turbines, 1996).

Assessments

Afton Wind Farm Proposal, Environmental Statement: Technical Appendix, Noise (RPS, 2004).

Benbrack Wind Farm: Environmental Statement (Amec Environment & Infrastructure UK Limited, 2014).

East Ayrshire Environmental Assessment, 16/05/2017 Revision 3 Noise & Vibration (Hoare Lea, 2017).

Enoch Hill Wind Farm, Environmental Statement, Volume 1: Main Report (Amec Foster Wheeler Environment & Infrastructure UK Limited, September 2015).

Mt Emerald Wind Farm Revised A-weighted Noise Assessment (Rp 002 R01 2015545ML, January 2017) available at <https://dsdmipprd.blob.core.windows.net/general/mt-emerald-arriga-revised-noise-assessment-report.pdf>

Pencloe Wind Farm Environmental Statement (Jacobs, 2016).

Planning Applications Committee Report: Consultation regarding an application made under section 36 of the Electricity Act 1989 for the construction of wind farm comprising of 50 wind turbines and associated works at South Kyle Wind Farm, site east of Dalmellington to Carsphairn Forest (Dumfries and Galloway) available at <http://egenda.dumgal.gov.uk/aksdumgal/images/att32556.pdf>

South Kyle Environmental Statement (Vattenfall, August 2013).

Windy Point Wind Farm, Noise Impact Assessment (Windy Point Wind Park Ltd, October 2017).

Windy Standard III Environmental Statement. Technical Appendix 11.2: Operational Noise Assessment (TNEI Services Ltd, 2015).

Turbine Data

Noise level, Power curves, Thrust curves: Nordex N117 3000 (Nordex, F008_244_A03_EN, Rev 00 (October 2010)).

Octave sound power levels, Nordex N133/4.8 (Nordex, F008_272_A14_EN, July 2018).

Standard Acoustic Emission, SWT-DD-120, Rev.0 (Siemens Gamesa, June 2018).

Technical Report, Octave sound power levels (Nordex, F008_144_A04_EN, October 2013).

8. Shadow Flicker

- 8.1.1 Under certain combinations of geographical position, time of day and year, the sun may appear behind turbine rotors and cast a shadow over neighbouring properties. Where the shadow falls through a narrow window opening, the rotation of the turbine blades results in it appearing to flick on and off, and this effect is known as 'shadow flicker'.
- 8.1.2 The Scottish Government's 'Planning advice relating to onshore wind turbines'¹ states that "*Where this [shadow flicker] could be a problem, developers should provide calculations to quantify the effect. In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule, 10 rotor diameters), 'shadow flicker' should not be a problem*".
- 8.1.3 The 2017 FEI reported that no shadow flicker effects were expected as no residential properties lie within 1,110m (10 x 106m rotor diameter plus 50m micro-siting allowance) of turbines and 130 degrees either side of north from their proposed locations. As the proposed rotor diameter has increased to up to 136m under the Variation Development, the area potentially affected by this phenomenon would increase to 1,410m (10 x 136m rotor diameter plus 50m micro-siting allowance) and consideration of shadow flicker is therefore required.
- 8.1.4 It is however still the case that no residential properties lie within the revised study area. As such, shadow flicker is not predicted and as per the 2015 ES and 2017 FEI there would be no significant effects or mitigation required for this topic.
- 8.1.5 The Scoping Response received by the Energy Consents Unit from East Ayrshire Council stated that it agreed an assessment of Shadow Flicker could be scoped out of the EIA.

¹ <https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/>



9. Landscape and Visual Impact Assessment

9.1 Introduction

- 9.1.1 This chapter assesses the landscape and visual effects of the Variation Development. It should be read with reference to the project description in **Chapter 3: Project Description**.
- 9.1.2 The Variation Development comprises up to 16 wind turbines which are in the same location and layout as the Consented Development. The Variation Development would increase the tip height of all of the turbines from a maximum of 130m to a maximum of 149.9m, with a consequent increase in rotor diameter (up to a maximum of 136m). It is proposed to increase the operational period from 25 to 30 years. All other infrastructure elements would remain the same as the Consented Development.
- 9.1.3 The turbine parameters as described in **Chapter 3: Project Description** have been used as the basis for the assessment and supporting figures, including ZTVs, wirelines and photomontages. The final turbine procurement process will be post consent and subject to competitive tendering. As a result, the exact hub height and rotor dimensions may vary slightly within the overall maximum blade tip height of 149.9m and maximum rotor diameter of 136m.
- 9.1.4 The Landscape and Visual Impact Assessment (LVIA) and cumulative assessment (CLVIA) reported in this chapter has been produced by chartered landscape architects at Wood who are familiar with the previous assessment of the Consented Development in the 2015 Environmental Statement (ES), 2017 Further Environmental Information (FEI) and the Public Local Inquiry (PLI) of the Consented Development in 2018 (DPEA Reference: WIN-190-5). The objective of this assessment has been to determine landscape and visual effects of the Variation Development on the existing landscape resource and visual amenity. The following landscape and visual receptors have been re-assessed.
- Landscape character, key characteristics, and elements;
 - Designated landscapes; and
 - Views and visual amenity experienced by residents, tourists, visitors, and road users.
- 9.1.5 The assessment process has encompassed the construction, operation, and decommissioning of the Variation Development and has included a re-assessment of the residual effects. The process has sought to achieve the highest energy generation capacity for the Development Site, whilst balancing this with environmental considerations and achieving an acceptable design in terms of landscape and visual effects.

Appendices and Figures

- 9.1.6 This chapter is supported by four Appendices as follows:
- **Appendix V9.A:** Methodology and Glossary;
 - **Appendix V9.B:** Viewpoint Analysis;
 - **Appendix V9.C:** Residential Visual Amenity Assessment; and
 - **Appendix V9.D:** Viewpoint 9 and 10 (Wirelines).
- 9.1.7 A number of revised and new figures are provided to illustrate this chapter including plans and visualisations of the Variation Development. For ease of cross referencing with the 2017 FEI, Figure number references used in this chapter have been kept the same as the equivalent figure number

of the 2017 FEI, where relevant, with the addition of a prefix 'V' (variation). A number of figures in the 2017 FEI were also not reproduced as they are not relevant for this assessment. These are Figures 9.16, 9.26, 9.29, 9.35, 9.36, 9.39, 9.42, 9.44-9.48 and 9.51 – 9.54.

9.2 Methodology and Approach

9.2.1 The assessment methodology is set out in **Appendix V9.A**, which includes a glossary of terms and abbreviations used in this chapter. The methodology for the LVIA and CLVIA has been undertaken in accordance with best practice guidance including, but not limited to, the following:

- *Guidelines for Landscape and Visual Impact Assessment, 3rd Edition*, Landscape Institute and IEMA (May 2013) (GLVIA 3);
- *Siting and Designing Windfarms in the Landscape*, Version 3a, SNH (August 2017);
- *Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments*, SNH (2012);
- *Visual Assessment of Windfarms: Best Practice*, Commissioned Report F01AA303A produced for SNH by Newcastle University (2002); and
- *Visual Representation of Wind Farms Version 2.2*, SNH (February 2017).

Determining the Significance of Effects

9.2.1 In accordance with the EIA Regulations, it is important to determine whether the predicted effects, resulting from the Variation Development, are likely to be significant. Significant landscape, visual and cumulative effects are highlighted in **bold** in the text and in most cases, relate to all those effects that result in a 'Substantial' or a 'Substantial / Moderate' effect as indicated in **Table V9.1**. In some circumstances, Moderate levels of effect also have the potential, subject to the assessor's opinion, to be considered as significant and these exceptions are also highlighted in bold and explained as part of the assessment where they occur.

9.2.2 The matrix below uses the same terminology as set out in the 2017 FEI of the Consented Development for consistency and ease of reference.

Table V9.1 Evaluation of Landscape and Visual Effects

		Landscape and Visual Sensitivity			
		High	Medium	Low	Negligible
Magnitude of Change	High	Substantial	Substantial / Moderate	<i>Moderate</i>	Slight
	Medium	Substantial / Moderate	<i>Moderate</i>	Slight	Slight / Negligible
	Low	<i>Moderate</i>	Slight	Slight / Negligible	Negligible
	Negligible	Slight	Slight / Negligible	Negligible	Negligible
	Zero	None / No View			

Policy and Legislation

9.2.3 The LVIA has taken account of national and local planning policy in relation to wind farm development within the 35km study area which is the same study area considered for the Consented Development (**Appendix V9.A: Defining the Study Area**). In particular, reference has

been made to the *East Ayrshire Council (EAC) Local Development Plan, April 2017*, the *East Ayrshire Council Local Development Plan, Supplementary Guidance: Planning for Wind Energy* December 2017 and the *East Ayrshire Council Local Development Plan, Non-Statutory Planning Guidance: East Ayrshire Landscape Wind Capacity Study (EALWCS)* (June 2018). Reference has also been made to the *Dumfries and Galloway Local Development Plan 2* and the *Dumfries and Galloway Wind Farm Landscape Capacity Study (DGWLCS) Supplementary Guidance, February 2020*.

9.2.4 The East Ayrshire Local Development Plan¹ (LDP) 2017 (the Local Plan) was adopted by East Ayrshire Council (EAC) in February 2017. Schedule 1: Renewable Energy Assessment Criteria sets out a number of assessment criteria for renewable energy developments, which are similar to those stated in paragraph 169 of SPP including:

- Landscape and visual impacts;
- Cumulative impacts – likely cumulative impacts arising from all considerations below, recognising that in some areas the cumulative impact of existing and consented energy development may limit capacity for further development;
- Impacts on communities and individual dwellings, including visual impact, residential amenity, noise and shadow flicker;
- Impacts on tourism and recreation; and
- Public access including impact on long distance walking and cycling routes and scenic routes identified in National Planning Framework 3.

9.2.5 Policy ENV8 – Protecting and Enhancing the Landscape is also of particular relevance:

'The protection and enhancement of East Ayrshire's landscape character as identified in the Ayrshire Landscape Character Assessment will be a key consideration in assessing the appropriateness of development proposals in the rural area. The Council will require that:

(i) *Development proposals are sited and designed to respect the nature and landscape character of the area and to minimise visual impact. Particular attention will be paid to size, scale, layout, materials, design, finish and colour.*

(ii) *Where visual impacts are unavoidable, development proposals should include adequate mitigation measures to minimise such impacts on the landscape.*

(iii) *Particular features that contribute to the value, quality and character of the landscape are conserved and enhanced. Development that would result in the loss of valuable landscape features, to such an extent that character and value of the landscape, are unacceptably diminished, will not be supported. Such landscape features include:*

- a. Settings of settlements and buildings within the landscape;*
- b. Skylines, distinctive landform features, landmark hills and prominent views;*
- c. Woodlands, hedgerows and trees;*
- d. Field patterns and means of enclosure, including dry stone dykes; and*
- e. Rights of way and footpaths*

¹ Available at: <https://www.east-ayrshire.gov.uk/PlanningAndTheEnvironment/Development-plans/LocalAndStatutoryDevelopmentPlans/East-Ayrshire-Local-Development-Plan-2017.aspx> (Accessed 18/03/20)

Development that would create unacceptable visual intrusion or irreparable damage to landscape character will not be supported by the Council.'

9.2.6 The Dumfries & Galloway Local Development Plan 2² (adopted 2019) has also been considered given the proximity of the development site to Dumfries Council area, although the policy cannot directly apply to development outside Dumfries and Galloway. Policy: IN1 Renewable Energy and Policy IN2: Wind Energy Development (Part 1 Assessment of Windfarm Proposals only) are relevant.

9.2.7 The relevant sections of Policy IN1 seeks to protect environmental receptors including the landscape, and general amenity from unacceptable significant adverse impact. Part 1 of Policy IN2 provides additional relevant assessment criteria including:

Landscape and visual impact:

- *The extent to which the landscape is capable of accommodating the development without significant detrimental landscape or visual impacts, including effects on wild land; and.*
- *That the design and scale of the proposal is appropriate to the scale and character of its setting, respecting the main features of the site and the wider environment and that it fully addresses the potential for mitigation.*

Cumulative Impact:

- *The extent of any detrimental landscape or visual impact from two or more wind energy developments and the potential for mitigation.*

Impact on local communities:

- *The extent of any detrimental impact on communities and local amenity including assessment of the impacts of noise, shadow flicker, visual dominance and the potential for associated mitigation.*

9.2.8 Further information on Planning Policy is provided in **Chapter 5**. An appraisal of the Variation Development in policy terms is contained with the Planning Statement Addendum.

Wind Farm Capacity Studies

9.2.9 The EALWCS and DGWLCS provide a broad assessment of the sensitivity of landscape to wind farm development within East Ayrshire, and Dumfries and Galloway respectively. In making this assessment, both wind farm capacity studies take account of different landscape character types (LCTs) and a range of landscape constraints and opportunities for wind farm development that are relevant to particular LCTs.

9.2.10 The Variation Development would be located within the *Southern Uplands (20a)* and the *Southern Uplands with Forestry LCT (20c)*, as identified in the EALWCS, which extends over a large area of East Ayrshire to the south and west and further south into Dumfries and Galloway where it is classified as *Southern Uplands with Forest LCT (19a)*.

9.2.11 The EALWCS and DGWLCS are 'broad' studies and a number of caveats should be noted in respect of their guidance as follows:

- The EALWCS is not an up-to-date document in respect of the Variation Development. The Consented Development (16 turbines at 130m to blade tip) is not included in the baseline and neither is the nearby consented Penclow Wind Farm (19 turbines, 125m to blade tip);

² Available at: <https://www.dumgal.gov.uk/ldp2> (Accessed 19/03/20)

- The EALWCS and DGWLCS do not replace the need for individual landscape and visual impact assessments and/or Environmental Assessments for individual wind energy developments, which provide detailed and specific assessment of the likely landscape, visual and cumulative effects; and
- The EALWCS and DGWLCS are broad assessments, and the judgements on sensitivity represent an average across whole LCTs, within which considerable variation can occur.

9.2.12 The summary at the front of the document advises that *"There is some scope to site additional wind farm development with turbines above 70m height within upland areas of East Ayrshire although this will be limited by potential cumulative and other landscape and visual constraints including effects on adjacent smaller scale settled valleys and lowland landscapes."* In respect of repowering the EALWCS advises that *"Larger turbines replacing operational and consented turbines in wind farm 'repowering' schemes could only be accommodated in very few locations in East Ayrshire."* It is worth noting however, that the Variation Development is not a 'new' development, and neither is it included in the EALWCS as one of the repowering options in the context of existing or consented schemes in 2018. As such the guidance provided in the EALWCS is not directly relevant to the Variation Development.

EALWCS: Southern Uplands (20a)

- 9.2.13 The EALWCS does not take account of the full cumulative baseline of existing and consented development that is current within the LCT, Pencloe for example is omitted. Reference is however made to the consented South Kyle Wind Farm (50 turbines, 149.9m to blade tip) and the consented Benbrack Wind Farm (18 turbines, 130m to blade tip) but not the consented Benbrack Variation Wind Farm (18 turbines, up to 149.9m to blade tip) in the neighbouring *Southern Uplands with Forestry* LCT. The 2018 EALWCS also includes an assessment of 'very large' turbines (over 130m high) and considers the capacity for these turbines in the repowering of existing and consented wind farms within LCTs. It is worth noting that the EALWCS assessment of very large turbines > 130m has only been undertaken for landscapes which either accommodate wind farms or where some scope for larger turbines was identified in the 2013 EALWCS. This includes the *Southern Uplands* LCT and the *Southern Uplands with Forestry* LCT.
- 9.2.14 The EALWCS judges the sensitivity of the *Southern Uplands* LCT to new applications of very large typologies (wind turbines over 130m to blade tip) to be of **'High'** sensitivity compared to a **'High-Medium'** sensitivity to the large (70-130m high) turbines. The EALWCS analysis of this LCT is provided in the table on pages 107-9 and of the eight topics considered, three are identified as of 'High' sensitivity. These are landscape context, visual amenity and cumulative effects. The text however makes a distinction in respect of the landscape context, visual amenity, noting the difference between the *"backdrop of higher, rugged and predominantly open hills to the settled Upland Basin (15), contrasting with other lower and simpler upland areas surrounding this basin"* the latter western area relating to the Development Site which corresponds with an area of reduced landscape sensitivity.
- 9.2.15 In summary, the EALWCS concludes (page 111) that there is no scope for *new* wind farm developments of very large typology (turbines > 130m) although the study notes: *"There may be very limited scope for the large typology (turbines 70-130m) to be accommodated as a small extension to operational/consented wind farms sited in this LCT and the adjoining Southern Uplands with Forestry (20c). Additional turbines should be carefully located to avoid significantly exacerbating adverse landscape and visual effects on Glen Afton and the Upland Basin (15). They should not be sited on or close-by the landmark hills of Blackcraig and Craigbraneoch Rig and should be set well back from the northern edge of this LCT. They should not substantially increase the extent of turbine development visible on these hills from the Upland Basin (15) and (where relevant) should aim to improve the layout of the original development in key views to these uplands from the north."*

- 9.2.16 The Consented Development forms an extension to the South Kyle Wind Farm which is within the *Southern Uplands with Forestry* LCT. It is set well back from Glen Afton, landmark hills and the Upland Basin, and is set well back from the northern edge of this LCT. It would not substantially increase the extent of turbine development visible on these hills from the *Upland Basin* LCT due to the overlap with South Kyle.
- 9.2.17 In terms of repowering, the EALWCS advises that there is 'no scope' for repowering of existing wind farms and makes direct reference to the existing Harehill and Afton wind farms. In this sense the EALWCS is not directly relevant to the optimisation of the Consented Development, which is different from either the Harehill or Afton wind farms, being located within the less scenic, lower and simpler hills at further distance from Glen Afton to the west.

EALWCS: Southern Uplands with Forestry (20c)

- 9.2.18 The EALWCS judges the capacity of the *Southern Uplands with Forestry* LCT for additional new development as "close to being reached ... with sensitivity concluded to be High for the Very Large and Large typologies (turbines >70m)." The guidance on page 119 advises that there is no scope for additional new development.
- 9.2.19 *Annex D* of the EALWCS uses viewpoints to assess the potential effects of repowering specific existing wind farms (not including the Consented Development) and as such it is not relevant to the Variation Development. The closest viewpoints considered include Loch Doon and the A713, Dalmellington in respect of potential effects of repowering Dersalloch or South Kyle with very large turbines. The EALWCS concludes that Loch Doon, the Doon Valley and the Girvan valley would be more sensitive to increases in height. Comparative ZTV analysis was also used in the EALWCS which concluded that "the extent of increased visibility ... is not dramatic in most cases". It is worth noting that from Loch Doon the Variation Development would appear 'behind' or beyond the consented South Kyle Wind Farm which would have turbines at a height of 149.5m to blade tip, if built.
- 9.2.20 To conclude, the constraints for this form of development within the *Southern Uplands and the Southern Uplands with Forestry* outlined within the EALWCS are considered in the design evolution of the Variation Development which also takes account of the relevant guidance and opportunities contained within the EALWCS and in particular, the landscape, visual and cumulative effects on the Loch Doon area and the *Upland Basin* LCT.

DGWLCS Southern Uplands with Forest LCT (19a)

- 9.2.21 The East Ayrshire *Southern Uplands with Forestry* (20c) extends over the local authority boundary into the DGWLCS area and although this is essentially the same landscape typology it is retitled *Southern Uplands with Forest* LCT (19a). The sensitivity of this landscape to turbines 80-150m blade tip is judged by the DGWLCS to be 'Medium' and 'High to Medium' for the Very Large typology (turbines 150m+).

Consultation

- 9.2.22 Consultation relevant to the landscape, visual and cumulative assessment, was undertaken with SNH and EAC. SNH and EAC commented on aspects of methodology, sources of information, scope of assessment, viewpoint assessment and cumulative development. Dumfries and Galloway Council (DGC) and South Ayrshire Council (SAC) confirmed their response in relation to scoping out a number of viewpoints from the assessment. New Cumnock Community Council (NCCC) provided a response in relation to viewpoint assessment.
- 9.2.23 A summary of the consultation responses is provided in **Table V9.2**.

Table V9.2 Summary of Issues Raised during Consultation

Consultee Comments	Response to Consultee Comments
Summary of Consultation from Scottish Natural Heritage (SNH) – 6 March 2020	
SNH agree that a 35km study area is suitable for the assessment.	Noted
SNH advise that the assessment should take into account the updated East Ayrshire and Dumfries and Galloway capacity studies.	Addressed
SNH agree that a Wild Land Assessment on the Merrick Wild Land Area can be scoped out.	Noted
SNH advise that the application should include a comparative ZTV to blade tip for the proposed and consented schemes.	Addressed. Figures V9.A – V9.D illustrate the comparative visibility of the Consented and Variation Developments.
SNH agree that 12 viewpoints listed in the Scoping Report are scoped out.	Noted
SNH advise that the cumulative baseline should be at least up to the end of January 2020.	Addressed. The assessment includes cumulative wind farms up to 4 March 2020.
Summary of Consultation from East Ayrshire Council (EAC) – 24 March 2020	
EAC agree that a 35km study area is suitable for the assessment	Noted
EAC agree that a Wild Land Assessment can be scoped out.	Noted
<u>Cumulative Wind Farms:</u> EAC advise that the proposed Greenburn Wind Farm which is due to be submitted imminently is to be included in the cumulative assessment.	At the time of writing this assessment, the Greenburn Wind Farm is at scoping stage. The cumulative assessment has considered a cut-off date of 4 March 2020. In accordance with the SNH guidance, projects at pre-planning or ‘scoping’ stage are not to be included. However, the scoping Greenburn Wind Farm has been shown in Figure V9.7 and has been included in the wirelines.
EAC advise that the assessment should give consideration to other tall structures such as pylons and nearby opencast coal sites.	Addressed
Pencloe and Lethans wind farms – EAC advise that the consented and variation applications of both schemes should be included in the cumulative assessment.	Addressed. The consented and variation of both Pencloe and Lethans have been included in the cumulative assessment, and are shown on the wirelines, where visible.
Polquhairn Wind Farm – EAC advise that a variation of the wind farm is likely to be submitted in summer 2020, and is to be included in the cumulative assessment if the application for the Variation Development is to be submitted after.	The Variation Development application will be submitted before the variation Polquhairn Wind Farm.
Glenmuckloch Wind Farm – EAC note that the tip height of this wind farm should be 149.9m.	Addressed
Linburn Farm – EAC advise that scheme should be removed from the cumulative baseline as its consent has expired.	Addressed
EAC advise that a Residential Visual Amenity Assessment for properties within 2km shall be provided	Addressed in Appendix V9.C .
EAC advise that up to date photography should be provided such as	Addressed. The majority of viewpoints have been re-

Consultee Comments	Response to Consultee Comments
new prominent views or where obstructions now impede original viewpoints.	photographed since the 2017 FEI to take into account changes in the landscape. These viewpoints include 1, 2, 4, 5, 6, 8, 11, 12, 15 and B.
Visualisations – EAC note that those viewpoints which include a photomontage should also include a wireline.	All viewpoint visualisations are produced in accordance with SNH guidance – <i>Visual Representation of Wind Farms</i> , Version 2.2 (2017).
<u>Viewpoints:</u> EAC note that the following ‘scoped out viewpoints’ within East Ayrshire to be included back in the assessment: Viewpoint 14 – A70 between Cumnock and Prestwick – Baseline photo and wireline Viewpoint 17 – A76 Mauchline – Baseline photo and wireline	Included Included
EAC also advise that wirelines to be included for Viewpoints 9 and 10 to confirm visibility of the Variation Development	Included in Appendix V9.D .
Summary of Consultation from Dumfries and Galloway Council (DGC) – 7 April 2020	
DGC confirmed that 5 viewpoints (VPs 3, 19 to 22) can be scoped out of the assessment	Noted
Summary of Consultation from New Cumnock Community Council (NCCC) – 17 April 2020	
NCCC submitted their standard response from October 2016 and suggested including 6 viewpoints in any wind farm LVIA in the area as follows: – A76 Layby – Mansfield Road – A76 – Burnton – B741 – Greenburn	The LVIA has included wirelines and / or photomontages for all 6 viewpoints: – A76 Layby – A76 Sequential Viewpoint 7 (Figure V9.25) – Mansfield Road – Located near Viewpoint B (Figure V9.50) – A76 - A76 Sequential Viewpoint 1 (Figure V9.25) – Burnton – From the location map provided by NCCC, the assumption is that the view is requested from Burnside (Located near Viewpoint 2: Figure V9.28 , and B741 Sequential Viewpoint: Figure V9.24) – B741 – Located near Viewpoint 1 (Figure V9.27) – Greenburn – Viewpoint 4 (Figure V9.31)
Summary of Consultation from South Ayrshire Council (SAC) – 18 May 2020	
SAC confirmed that viewpoint 18 can be scoped out of the assessment.	Noted

Report of the PLI

9.2.24 The PLI Report broadly upheld the landscape and visual findings of the 2017 FEI and recommended consent of the Consented Development. In his conclusions, the Reporter noted that:

‘There would be a limited number of significant landscape and visual impacts, including cumulative impacts. Significant direct landscape impacts would be contained within 2-2.5 kilometres to the host landscapes. There would be no indirect significant landscape impacts. Significant visual impacts would be restricted primarily to the north and north-east between 3-7 kilometres on the edges of New Cumnock; smaller settlements on the B741; short sections of paths and the B741; the Lochside Hotel; New Cumnock Golf Course; and the edges of Knockshinnoch Lagoons. However, the proposal would be seen in combination with existing and consented wind farms and viewed as an integral extension to the consented South Kyle Wind Farm. Most, if not all, of the locations identified where significant visual impacts are predicted already experience, or would experience, views of wind energy development on the southern uplands horizon from existing or consented schemes. The majority of



views from residences, transport routes, paths, summits and other recreational locations assessed would have no significant landscape or visual impacts including cumulatively. Overall, the primary landscape and visual impacts would be acceptable.” Paragraph 6.3 (Reporter’s Conclusions on matters)

9.2.25 Windfarm characterisation within the Southern Uplands LCTs was also considered with the conclusion that ‘Significant cumulative landscape impacts would occur to the southern uplands LCTs as a result of additional physical imposition and impact on the landscape character but not to the extent that defining features of these LCTs would be diluted or that the landscape would become one wholly characterised by wind energy development’. The reporter further stated that “Other than the southern uplands, southern uplands with forestry and upland basin LCTs, I agree with the ES findings (as referred at paragraph 3.182 above) that there would be no significant impact on LCTs located within five kilometres of the proposed development: the upland glens; foothills with forestry and open-cast mining; and the southern uplands with forestry located within Dumfries and Galloway. This finding is not disputed by objecting parties.” [emphasis added].

9.2.26 Consideration of all receptors identified in the 2017 FEI of the Consented Development are maintained for the Variation Development, and the Reporter’s conclusions above continue to be applicable to the Variation Development.

Viewpoint Selection

9.2.27 Viewpoint selection was based on viewpoints identified for the Consented Development. As far as possible, viewpoints have been selected to represent the Variation Development at its most visible, as experienced by a range of receptor groups, from a spread of different directions, and over varying distances.

9.2.28 In total, 14 viewpoints were identified. All of the viewpoint locations have been agreed through consultation with SNH and EAC. These viewpoints are set out in **Table V9.3**.

9.2.29 A further 10 viewpoints (viewpoints 3, 9, 10, 13, 16 and 18-22) were provided as wirelines, attached to the Request for a Scoping Opinion (**Appendix 4.A**). These viewpoints were scoped out (and agreed with consultees) largely due to intervening cumulative development, in particular views from the south and southwest where the Variation Development would be visible behind the consented South Kyle Wind Farm, which would obscure views of the Variation Development.

9.2.30 Wirelines for Viewpoints 9 and 10 are included in **Appendix V9.D** at the request of EAC.

Table V9.3 Assessment Viewpoints

Viewpoint	Distance (m) (nearest turbine)
1. B741 North East of Dalmellington	2,254
2. B741 South West of New Cumnock	3,205
4. New Cumnock Cemetery	5,878
5. Highpoint north of Site (near Auchinross)	6,479
6. Blackcraig Hill	7,256
7. Lochside Hotel	7,187
8. Cairnsmore of Carsphairn	8,727

Viewpoint	Distance (m) (nearest turbine)
11. Auchenroy Hill	10,922
12. Corsencon Hill	11,590
14. A70 Between Cumnock and Prestwick	14,626
15. A76 North of Auchinleck	15,720
17. A76 Mauchline	19,565
A. Drumbroachan Road, Cumnock	14,127
B. Little Garclaugh, Upper Nith Valley	10,178

Cumulative Wind Energy Development

9.2.31 As part of the revised assessment and drawing from SNH guidance³, a cumulative baseline of all operational and consented wind energy development and other planning applications for wind energy development, within the 35km Study Area, is included in the assessment as follows:

- Wind farm development and single turbines above 50m to blade tip height; and
- Micro-generation turbines between 25m and 50m to blade tip height within 10km of the Variation Development.

9.2.32 In accordance with the SNH guidance, projects at pre-panning or 'scoping' stage have not been included. However, at the request of EAC, the scoping Greenburn Wind Farm is shown in **Figure V9.7** and has been included in the wirelines.

9.2.33 In total, 83 other wind energy developments are included in the assessment as listed in **Table V9.4** and illustrated in **Figure V9.7**. The identification number in the table relates to that used in the figures.

Table V9.4 Wind Energy Development Included in the CLVIA

Reference	Name	Distance (from Variation Development) (m)	Number of turbines	Height to blade tip (m)	Status in 2017 FEI	Current Status (as of 4 th March 2020)
E01	Windy Standard Extension	2,393	30	120	Existing	Existing
E02	Afton	4,335	27	100/120	Consented	Existing
E03	Windy Standard	4,934	36	52	Existing	Existing
E04	High Park Farm	6,254	1	75	Existing	Existing
E05	Hare Hill	7,123	20	63.5	Existing	Existing
E06	Hare Hill Extension	8,000	35	70/75/81/86/91	Consented	Existing

³ Scottish Natural Heritage, March 2012, Guidance: Assessing the Cumulative Impacts of Onshore Wind Energy Developments.

Reference	Name	Distance (from Variation Development) (m)	Number of turbines	Height to blade tip (m)	Status in 2017 FEI	Current Status (as of 4 th March 2020)
E07	Mansfield Mains *	8,892	1	44.85	Consented	Existing
E08	Sanquhar	11,095	9	130	Consented	Existing
E09	Dersalloch	12,697	23	125	Consented	Existing
E10	Whiteside Hill	13,610	10	121.2	Consented	Existing
E11	Wether Hill	17,142	14	91	Existing	Existing
E12	Sunnyside	19,586	2	62	Existing	Existing
E13	Bankend Rig	26,224	11	76	Existing	Existing
E14	Blackcraig	26,241	23	110	Consented	Existing
E15	Hadyard Hill	27,277	52	100	Existing	Existing
E16	Galawhistle	28,569	22	110.2/121.2	Consented	Existing
E17	Dungavel	29,443	13	100/120	Existing	Existing
E18	Hagshaw Hill Extension	30,347	20	80	Existing	Existing
E19	Andershaw	31,249	11	140	Consented	Existing
E20	Nutberry	31,364	6	125	Existing	Existing
E21	Low Bowhill	31,523	1	67	Existing	Existing
E22	Middle Muir	31,649	15	136/149.9	Consented	Existing
E23	North Threave Farm	32,072	1	53.7	N/A	Existing
E24	West Dykes	32,077	1	77	N/A	Existing
E25	Whitelee Extension 2	32,435	39	140	Existing	Existing
E26	Calder Water	32,753	13	144.5	Existing	Existing
E27	Kype Muir	32,756	26	132	Consented	Existing
E28	Hazelside Farm (T1)	32,822	1	74	Consented	Existing
E29	Auchrobert	33,606	12	132	Consented	Existing
E30	Whitelee Extension 1	34,064	36	135	Existing	Existing
E31	West Browncastle	34,165	12	126.5	Existing	Existing
E32	Whitelee	34,413	144	110	Existing	Existing
E33	Low Waterhead	34,620	1	67	N/A	Existing
E34	Tralorg	34,989	8	100	N/A	Existing
C01	South Kyle	241	50	149.5	Application	Consented

Reference	Name	Distance (from Variation Development) (m)	Number of turbines	Height to blade tip (m)	Status in 2017 FEI	Current Status (as of 4 th March 2020)
C02	Pencloe	1,887	19	125	Application	Consented
C03	Benbrack	4,928	18	132/135/149.9	Application	Consented
C04	Over Hill	5,132	10	149.9	N/A	Consented
C05	Windy Rig	7,604	12	125	Application	Consented
C06	Taiglim Farm *	8,441	1	33.6	Consented	Consented
C07	Polquhairn	10,153	9	100	Application	Consented
C08	Sandy Knowe	11,120	24	125	Application	Consented
C09	Lorg	12,297	9	130/149.5	Application	Consented
C10	Lethans	12,510	22	136/152/176	Application	Consented
C11	Knockshinnoch	13,303	2	126.5	Application	Consented
C12	Glenmuckloch	13,884	8	149.9	Consented	Consented
C13	Torrs Hill	17,532	2	100	Consented	Consented
C14	Penbreck	19,825	9	125/145	Consented	Consented
C15	Glenshimmeroch	19,996	10	149.9	N/A	Consented
C16	Twentysilling Hill	20,830	9	125	Consented	Consented
C17	NHS Ailsa Hospital	22,590	1	78	N/A	Consented
C18	Kennoxhead	23,415	19	145	Consented	Consented
C19	Knockman Hill	24,647	5	81	Consented	Consented
C20	Bankend Rig Extension	26,112	3	126.5	Application	Consented
C21	Kirk Hill	29,059	8	110	Scoping	Consented
C22	Cumberhead	29,221	11	126.5	Consented	Consented
C23	Stoneyhill Farm	30,088	1	100	Consented	Consented
C24	Kype Muir Extension	30,508	15	156/176/200/220	Consented	Consented
C25	Hagshaw Hill	31,120	26	55	N/A	Consented
C26	Chapelton Farm	31,223	3	67	Consented	Consented
C27	Penwhapple Reservoir	32,056	1	67	N/A	Consented
C28	Mount Farm	32,561	1	129.8	N/A	Consented
C29	Dalquhandy	32,652	15	131	Consented	Consented

Reference	Name	Distance (from Variation Development) (m)	Number of turbines	Height to blade tip (m)	Status in 2017 FEI	Current Status (as of 4 th March 2020)
C30	Hazelside Farm (T2)	32,892	1	74	Consented	Consented
C31	Douglas West	33,482	13	149.9	Application	Consented
C32	Sneddon Law	33,571	15	130	Consented	Consented
C33	Hallburn Farm	33,607	1	67	Consented	Consented
C34	Mochrum Fell	33,882	8	116.5/126.5	Consented	Consented
C35	Cleughhead Farm	34,576	1	79	Consented	Consented
C36	High Waterhead	34,735	1	67	N/A	Consented
A01	Pencloe Variation	1,887	19	149.9	N/A	Application
A02	Windy Standard Phase III	3,323	20	125/177.5	Scoping	Application
A03	North Kyle	3,784	54	149.9	N/A	Application
A04	Sanquhar II	6,195	50	200 / 149	Scoping	Application
A05	Shepherd's Rig	11,933	19	149.9/125	Scoping	Application
A06	Lethans Variation	12,510	22	176/200/220	N/A	Application
A07	Cornharrow	16,033	8	149.9	N/A	Application
A08	Troston Loch	19,953	14	149.9	N/A	Application
A09	North Lowther	24,438	35	150	Scoping	Application
A10	Fell	26,965	9	180-200	N/A	Application
A11	Hare Craig	27,435	8	149.9-230	N/A	Application
A12	Douglas West Extension	31,767	13	200	N/A	Application
A13	Feoch	31,872	1	67	Application	Application

ZTV and Cumulative ZTV Analysis

9.2.34 The Zone of Theoretical Visibility (ZTV) analysis is used to assist the design and further define the scope of the assessment process. The ZTVs have been calculated using ReSoft © WindFarm computer software to produce an area of potential visibility of any part of the proposed turbines, calculated to turbine blade-tip and hub-height, or selected infrastructure. The ZTV does not however take account of built development and vegetation, which can significantly reduce the area and extent of actual visibility in the field and as such provides the limits of the visual assessment Study Area. As a result, there may be roads, tracks and footpaths in the wider setting which, although shown as falling within the ZTV, have restricted viewing opportunities since they are heavily screened or filtered by banks, walls and vegetation. The ZTVs therefore provide a starting point in the assessment process and accordingly tend towards giving a 'worst-case' or over-estimated scenario of the potential visibility of the turbines.

9.2.35

The ZTV maps indicate the areas from where it may be theoretically possible to view all, or some of, the proposed turbines. Comparative ZTVs have also been used to show the difference in theoretical visibility between the Consented Development, (calculated to the maximum proposed turbine height of up to 130m to blade tip, based on the hub heights of 80m and a rotor diameter of 100m) and the Variation Development (calculated to the maximum proposed turbine height of up to 149.9m to blade tip, based on a hub height of circa 81.9m and a rotor diameter of up to 136m). A number of ZTV maps have been provided as follows:

- **Figure V9.2** illustrates the ZTV calculated to blade tip at 1:300,000 scale across the 35km Landscape and Visual Study Area and provides an overview of the theoretical extent of visibility with viewpoints;
- **Figure V9.3** illustrates the ZTV calculated to hub height at 1:300,000 scale across the 35km Landscape and Visual Study Area and provides an overview of the theoretical extent of visibility with viewpoints;
- **Figure V9.4** illustrates the Detailed ZTV to blade tip (forestry excluded) (10km);
- **Figure V9.5** illustrates the Detailed ZTV to hub height (forestry excluded) (10km);
- **Figure V9.6a** (A0 fold-out) illustrates the ZTV calculated to blade tip at 1:100,000 scale across the Landscape and Visual Study Area. This figure also illustrates the viewpoint locations; and
- **Figure V9.6b** (A0 fold-out) illustrates the central 20km area of the ZTV calculated to blade tip at 1:50,000 scale across the Landscape and Visual Study Area. This figure also illustrates the viewpoint locations.

9.2.36

Further comparative ZTV maps are illustrated in **Figures V9.A-D**, providing a comparison of the extent of theoretical visibility for the Consented Development against the Variation Development as follows:

- **Figure V9.A:** illustrates a comparative ZTV of the Consented Development and the Variation Development calculated to blade tip at 1:300,000 scale across the Landscape and Visual Study Area and provides an overview of the theoretical extent of visibility;
- **Figure V9.B:** illustrates a comparative ZTV of the Consented Development and the Variation Development calculated to hub height at 1:300,000 across the Landscape and Visual Study Area;
- **Figure V9.62c:** illustrates a comparative ZTV of the Consented Development and the Variation Development calculated to blade tip at 1:80,000 scale within 10km; and
- **Figure V9.62d:** illustrates a comparative ZTV of the Consented Development and the Variation Development calculated to hub height at 1:80,000 within 10km; and

9.2.37

Further cumulative ZTV maps are also illustrated in **Figures V9.8 to V9.15**, indicating the extent of theoretical cumulative visibility in relation to the Variation Development, and other existing and consented wind farms, and other wind farm applications.

ZTV Analysis: Variation Development

9.2.38

The ZTV pattern for the Variation Development reflects the underlying landform within the 35km Study Area. The additional blade tip visibility of the Variation Development in comparison with the Consented Development increases by 1% of the Study Area whilst the additional hub height visibility of the Variation Development in comparison to the Consented Development increases by 0.11% of the Study Area.

- 9.2.39 These percentages would be smaller in reality as they do not take account of the screening effects of vegetation such as forestry, buildings and other localised screening elements such as man-made landform.
- 9.2.40 Within 10km the ZTV coverage is largely focused to the north and northeast of the Variation Development (as illustrated in **Figure V9.4**). Much of this theoretical visibility is within the Upland Basin LCT and includes some large areas of active open-cast mining, although it is also present along stretches of the A76 and the outer northern and western edges of the settlement of New Cumnock. There is no theoretical visibility of the Variation Development within the Glen Afton Valley. Although theoretical visibility is present on the western facing slopes of elevated ground to the east of the Glen Afton Valley Sensitive Landscape Character Area; this is an area affected by the existing Hare Hill Wind Farm. Fragmentary theoretical visibility is present to the south of the Variation Development across elevated summits within the Carsphairn Forest.
- 9.2.41 Within 10-20km fragmented theoretical visibility is present on elevated ground to the west of the Doon Valley and along elevated summits of the Glenkens. There is very limited fragmented theoretical visibility to the southeast and east of the Variation Development. Theoretical visibility is more widespread to the north towards the settlements of Cumnock and Mauchline.
- 9.2.42 Within 20-35km there is little or no theoretical visibility in the south and east. There is limited and fragmented theoretical visibility to the west along elevated ground within the Carrick Forest and along the edge of the coast around Ayr, Prestwick and Troon. More areas of theoretical visibility are present to the north of Kilmarnock, around Tarbolton and along the A76 and A77, although in reality visibility from these areas would tend to be restricted by higher levels of intervening vegetation and built form.

Comparative ZTV Analysis: Variation Development v/s Consented Development

- 9.2.43 **Figures V9.A-D** illustrate comparative ZTVs of the Variation Development and the Consented Development within 35km at blade tip height (**Figure V9.A**) and hub height (**Figure V9.B**). It may be noted that there would be very limited additional theoretical visibility, the main areas being beyond 10km to the west of Loch Doon, northeast of Sanquhar, and in the vicinity of Drongan and Auchinleck and Ayr. At these distances there is likely to be very limited actual blade tip visibility due to intervening vegetation and built form. Additional theoretical visibility within 10km is illustrated in **Figures V9.C-D** at 1:80,000 scale. **Figure V9.C** indicates that additional theoretical visibility is very limited, and negligible on **Figure V9.D**.

Cumulative ZTV Analysis

- 9.2.44 Cumulative ZTVs (**Figures V9.8 to V9.15**) have been produced, illustrating the cumulative theoretical visibility of the Variation Development and other selected wind energy development occurring within the 35km Study area. The cumulative developments have been grouped according to their planning status or geographical location.

Cumulative ZTV Analysis: Variation Development with Existing and Consented Wind Farms within 10km

- 9.2.45 The cumulative ZTV pattern for the Variation Development with the existing and consented wind farms within 10km is illustrated in **Figure V9.8**. Cumulative ZTV coverage indicates that there is very limited theoretical visibility introduced by the Variation Development alone. Areas from which all the wind farms are theoretically visible are concentrated mainly to the north of the B741 around Dalgig, areas of higher ground north of Airds Moss, around the settlements of Auchinleck, Catrine, Mauchline, Maybole and Prestwick and to the east and south around New Cumnock, Glen Afton and Carsphairn Forest. Further to the south and to the east there are large areas of fragmented theoretical visibility which indicate that the existing and/or consented wind farms would be

theoretically visible alone and do not include the Variation Development. Areas where the Variation Development increases the area of theoretical visibility are beyond 10km to the north and northwest. There are large areas of theoretical visibility of existing and consented wind farms to the east and parts of the southwest where there is no theoretical visibility of the Variation Development.

Cumulative ZTV Analysis: Variation Development with Windy Standard, Windy Standard Extension, Afton, Windy Rig, Pencloe, South Kyle and Benbrack

9.2.46 The cumulative ZTV pattern for the Variation Development with the existing Windy Standard, Windy Standard Extension, Afton, and consented Windy Rig, Pencloe, South Kyle and Benbrack wind farms is illustrated in **Figure V9.9**. Cumulative ZTV coverage indicates that there is very limited theoretical visibility introduced by the Variation Development alone, particularly accounting for the screening effects of the Carsphairn Forest. Areas from which all the wind farms are theoretically visible are concentrated mainly to the north of the B741, areas of higher ground north of Airds Moss, around the settlements of Auchinleck, Catrine, Mauchline, Maybole, Cumnock and New Cumnock. Further to the south and to the east there are large areas of fragmented theoretical visibility which indicate that the cumulative wind farms would be theoretically visible alone and do not include the Variation Development. Areas where the Variation Development increases the area of theoretical visibility would be in the vicinity of the Development Site, and beyond 10km to the north and northwest.

Cumulative ZTV Analysis: Variation Development with Hare Hill + Extension, High Park Farm, Mansfield Mains, Sanquhar, Whiteside Hill, Sandy Knowe, Lethans and Glenmuckloch

9.2.47 The cumulative ZTV pattern for the Variation Development with the existing Hare Hill and Extension, High Park Farm, Mansfield Mains, Sanquhar, Whiteside Hill, and consented Sandy Knowe, Lethans and Glenmuckloch wind farms is illustrated in **Figure V9.10**. Cumulative ZTV coverage of all wind farms is concentrated mainly to the north of the B741, areas of higher ground north of Airds Moss and the settlements of New Cumnock, Auchinleck, Catrine, Mauchline, Maybole and Prestwick. Further to the east and southeast there are large areas of fragmented theoretical visibility which indicate that all other cumulative wind farms would be theoretically visible and do not include the Variation Development. Areas of 'new' theoretical visibility within 10km of the Variation Development are indicated to the west and south from parts of the B741 and undulating landform associated with Carsphairn Forest.

Cumulative ZTV Analysis: Variation Development with Windy Standard, Windy Standard Extension, Afton, Windy Rig, Pencloe, South Kyle, Benbrack, Hare Hill +Extension and High Park Farm

9.2.48 The cumulative ZTV pattern for the Variation Development with the existing Windy Standard, Windy Standard Extension, Afton, Hare Hill and Extension, High Park Farm and consented Windy Rig, Pencloe, South Kyle and Benbrack wind farms is illustrated in **Figure V9.11**. Cumulative ZTV coverage indicates that there is very limited theoretical visibility introduced by the Variation Development alone. Areas from which all the wind farms are theoretically visible are concentrated mainly to the north of the B741, areas of higher ground north of Airds Moss, around the settlements of Auchinleck, Catrine, Mauchline, Maybole, Cumnock and New Cumnock. Small areas to the south of the B741 and west facing slopes of Blackcraig Hill also indicate theoretical visibility of all the wind farms. Further to the south and to the east there are large areas of fragmented theoretical visibility which indicate that the cumulative wind farms would be theoretically visible alone and do not include the Variation Development. Areas where the Variation Development increases the area of theoretical visibility would be in the vicinity of the Development Site, and beyond 10km to the northwest.

Cumulative ZTV Analysis: Variation Development with Over Hill and Taiglim Farm

9.2.49 The cumulative ZTV pattern for the Variation Development with the consented Over Hill and Taiglim Farm wind farms is illustrated in **Figure V9.12**. Cumulative ZTV coverage of the Variation Development with Over Hill and Taiglim Farm is indicated to the north and northeast of the study area around the parts of the B741, in and around the settlement of New Cumnock, A76 and more distant settlements of Cumnock, Auchinleck, and parts of Catrine and Mauchline. There are also areas to the north of the B741 where the Variation Development is only visible with Over Hill and not Taiglim Farm. Further to the northeast between Cumnock and New Cumnock, there are areas of fragmented theoretical visibility which indicate that both consented wind farms would be theoretically visible and do not include the Variation Development. Areas of 'new' theoretical visibility within 10km of the Variation Development are largely indicated to the west and south from parts of the B741 and more elevated land within the Carsphairn Forest.

Cumulative ZTV Analysis: Variation Development with Application Wind Farms within 10km

9.2.50 The cumulative ZTV pattern for the Variation Development with the application wind farms within 10km is illustrated in **Figure V9.13**. Cumulative ZTV coverage indicates that there is limited theoretical visibility introduced by the Variation Development alone. Areas from which all the wind farms are theoretically visible are concentrated mainly to the north around the B741, areas of higher ground north of Airds Moss, around the settlements of Auchinleck, Catrine, Mauchline, Maybole and Prestwick and to the east and south around New Cumnock, parts of Glen Afton and Carsphairn Forest. Further to the south and to the east there are large areas of theoretical visibility which indicate that the other application wind farms would be theoretically visible alone and do not include the Variation Development. Areas where the Variation Development increases the area of theoretical visibility are limited to parts around the Variation Development, north of Dalmellington and further southwest beyond 10km.

Cumulative ZTV Analysis: Variation Development with Existing and Consented Wind Farms between 10km and 35km

9.2.51 The cumulative ZTV pattern for the Variation Development with existing and consented wind farms between 10km and 35km is illustrated in **Figure V9.14**. Cumulative theoretical visibility of the existing and consented wind farms would be widespread, whilst theoretical visibility of the Variation Development would be more limited. Areas of theoretical visibility of the Variation Development would none-the-less occur as described previously and would affect areas around New Cumnock, with theoretical visibility indicated in the areas around Maybole, Prestwick, Mauchline, Airds Moss and the Carrick and Carsphairn Forests.

Cumulative ZTV Analysis: Variation Development with Application Wind Farms between 10km and 35km

9.2.52 The cumulative ZTV pattern for the Variation Development with application wind farms between 10km and 35km is illustrated in **Figure V9.15**. Cumulative theoretical visibility of the application wind farms would be widespread, in particular in the north, east, south and northwest. The Variation Development and other application wind farms would theoretically affect areas around New Cumnock, and the B741, with more distant visibility indicated in the areas around Maybole, Prestwick, Mauchline, Airds Moss and the Carrick and Carsphairn Forests with more fragmented areas to the north and west.

Viewpoint and Cumulative Viewpoint Analysis

9.2.53 The viewpoint analysis is used to assist the design and further define the scope of the assessment process. In particular, the outer distance from the Variation Development, where significant effects

may be likely, has been identified. This has been used to focus the baseline information and detailed reporting of this assessment.

- 9.2.54 The viewpoint analysis has been conducted from 14 viewpoint locations as illustrated in **Figures V9.27a-d – V9.50a-c** and is reported in **Appendix V9.B**.
- 9.2.55 Cumulative wind farm development that would be visible within the 35km study area has been illustrated in the wirelines. In addition, the Cumulative LVIA (CLVIA) has included a check for any micro-generation turbines (25-50m to blade tip height) that may be located within 10km of the Variation Development and potentially visible in the foreground of the illustrated assessment viewpoints, either appearing in the viewpoint photograph or illustrated on the wireline.

Geographical Extent of Potentially Significant Visual Effects

- 9.2.56 The outer distance from the Variation Development, where significant effects may be likely has been identified by the viewpoint analysis of the Variation Development. Further, cumulative viewpoint analysis has identified a potential threshold for significant cumulative visual effects that would result from the Variation Development, in addition to, or in combination with, other existing and consented wind energy developments and applications.

Potential Threshold for Significant Effects: Variation Development

- 9.2.57 The viewpoint analysis indicates that the significant visual effects would extend out in a north and northeast direction, primarily affecting views from the Upland Basin, including open views from the A76 and the south western edge of New Cumnock within approximately 7km from the nearest turbine locations (the same threshold as the Consented Development) as indicated by Viewpoints 1, 2, 4, 5, 6 and 7 (**Figures V9.27, V9.28 and V9.30-9.33**).

Potential Threshold for Significant Cumulative Effects

- 9.2.58 The Variation Development has also been considered in terms of the combined or cumulative visual effects with other existing and consented wind energy developments and applications. The analysis indicates that further significant visual effects occur across the Study Area in respect of other wind farm development, particularly where a viewpoint is within close proximity to another development (viewpoints 8, 11, 12 and B). However, it is important to note that the Variation Development ceases to make a significant contribution to cumulative visual effects beyond approximately 7km from the nearest turbines as indicated by Viewpoint 7 at Lochside Hotel (the same threshold as the Consented Development). Beyond this distance either other wind farms become more visible, or the cumulative visual effects of other wind farm developments including the Variation Development are not significant. Significant cumulative visual effects where the Variation Development contributes to the views include viewpoints 1, 2, 4, 5, 6 and 7. However, a number of other wind farms including Afton, Windy Standard Extension, Hare Hill + Extension, Sanquhar, Whiteside Hill, Pencloe (& Pencloe Variation), South Kyle, Windy Rig, Over Hill, North Kyle and Sanquhar II also add to significant cumulative visual effects at some of these locations.
- 9.2.59 This initial indication has been tested further as part of the assessment process with the assessment focused on central portion of the Study Area out to approximately 10km radius from the outermost turbines. Importantly these levels of effect are indicative of a visual effect on a particular viewpoint location and they should not be assumed to translate into visual effects on the overall visual experience, as each of the viewpoints have been specifically located where the sensitivity of the receptor and the views of the Variation Development would be greatest. In this sense they are not typical or representative. The baseline inventory and assessment process has also considered those remaining receptors within the wider 35km Study Area that are of national importance.

Interpretation of Viewpoint Analysis Summary Tables

- 9.2.60 The information set out in **Table V9.5** provides a summary of the viewpoint analysis of the effects of the Variation Development on a 'solus' or primary basis. This part of the assessment helps to define the contribution the Variation Development would make to any subsequent cumulative assessments (in addition to, or in combination with, other wind farms). It is also relevant to the latter half of the operational period for the Variation Development, when the consented periods of operation for other wind farms would expire and they would be decommissioned, assuming no extensions to the operating periods or re-powering schemes are granted.
- 9.2.61 The information set out in **Table V9.5** provides a summary of the cumulative viewpoint analysis of the effects of the Variation Development. The cumulative analysis sets out the effects of the Variation Development 'in addition' to and 'in combination' with other existing and consented wind energy developments and applications, assessing two scenarios in accordance with the methodology in **Appendix V9.A** as follows:
- Scenario 1: Existing + Consented + the Variation Development:
The additional and combined cumulative effects of the baseline, including the existing and consented wind energy developments with the Variation Development are reported.
 - Scenario 2: Existing + Consented + Applications + the Variation Development:
The additional and combined cumulative effects of the baseline, including existing and consented wind energy developments and applications, with the Variation Development are reported.
- 9.2.62 The summary tables list the names of the viewpoints and include the following information:
- Viewpoint Analysis:
 - ▶ Distance: Distance of the viewpoint location from the nearest turbine within the Variation Development, **Table V9.5** sets out the distance from the nearest proposed turbine;
 - ▶ Sensitivity: The sensitivity of the viewer at the viewpoint location is recorded (ranging from High, Medium, Low, and Negligible) in accordance with the methodology in **Appendix V9.A**;
 - ▶ Magnitude: The magnitude of change, taking account of the Variation Development only is recorded (ranging from High, Medium, Low, Negligible, and zero) in accordance with the methodology;
 - ▶ Level of Effect: The level of visual effect for the Variation Development only is recorded and takes account of the sensitivity and magnitude in accordance with the methodology.
 - Cumulative Viewpoint Analysis:
 - ▶ Magnitude (Existing and Consented wind farms): The magnitude of change, taking account of other existing and consented / under construction wind farms that may be visible is recorded (ranging from High, Medium, Low, Negligible, and zero) in accordance with the methodology;
 - ▶ Additional Level of Effect: The additional effect of adding the Variation Development to the existing and consented baseline in Cumulative Scenario 1 is provided;
 - ▶ Cumulative Scenario 1: The level of visual effect, taking account of the other existing, consented / under construction wind farms and the Variation Development, is recorded (taking account of the sensitivity and magnitude in accordance with the methodology). Those levels of effect shown in bold relate to significant effects in accordance with the

relevant EIA Regulations and the developments contributing most to the cumulative effects are recorded in brackets;

- ▶ **Magnitude (Other Wind Farm Applications):** The magnitude of change, taking account of other wind farm applications that may be visible on the wireline is recorded (ranging from High, Medium, Low, Negligible, and zero) in accordance with the methodology;
- ▶ **Additional Level of Effect:** The additional effect of adding the Variation Development to the existing and consented baseline in Cumulative Scenario 2 is provided;
- ▶ **Cumulative Scenario 2:** The level of visual effect, taking account of the other existing, consented / under construction, application wind farms and the Variation Development, is recorded (taking account of the sensitivity and magnitude in accordance with the methodology). Those levels of effect shown in bold relate to significant effects in accordance with the relevant EIA Regulations and the developments contributing most to the cumulative effects are recorded in brackets.

Table V9.5 Summary of Viewpoint Analysis

Viewpoint No. and Title	Distance to nearest turbine (m)	Previous Assessment (2017 FEI) ⁴	Viewpoint Analysis: Variation Development (up to 149.9m to blade tip)			Cumulative Viewpoint Analysis: Variation Development (VD) and other wind farms					
		Level of Effect:	Sensitivity	Magnitude	Level of Effect:	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect
1. B741 North East of Dalmellington	2,254	Substantial / Moderate to Moderate	High to Medium	Medium	Substantial / Moderate to Moderate	Medium	Substantial / Moderate to Moderate	Substantial / Moderate to Moderate (VD and Over Hill)	High	Substantial / Moderate to Moderate	Substantial / Moderate to Moderate (VD, Over Hill and North Kyle)
2. B741 South West of New Cumnock	3,205	Substantial to Substantial / Moderate	High to Medium	High to Medium	Substantial to Substantial / Moderate	Low	Substantial to Substantial / Moderate	Substantial to Substantial / Moderate (VD)	Medium	Substantial to Substantial / Moderate	Substantial to Substantial / Moderate (VD and North Kyle)
4. New Cumnock Cemetery	5,878	Substantial / Moderate	High	Medium	Substantial / Moderate	Medium	Substantial / Moderate	Substantial / Moderate (VD and Pencloe)	Medium	Substantial / Moderate	Substantial / Moderate (VD, Pencloe / Pencloe Variation and North Kyle)
5. Highpoint north of site (near Auchinross)	6,479	Substantial / Moderate to Moderate	Medium	High to Medium	Substantial / Moderate to Moderate	Medium to Low	Substantial / Moderate to Moderate	Substantial / Moderate to Moderate (VD and Pencloe)	High-Medium	Substantial / Moderate to Moderate	Substantial / Moderate to Moderate (VD, Pencloe / Pencloe Variation, North Kyle)

⁴ Assessment results from the 2017 FEI, Chapter 9, Table 9.4 and Appendix 9.B (turbines consented at 130m to blade tip).

Viewpoint No. and Title	Distance to nearest turbine (m)	Previous Assessment (2017 FEI) ⁴	Viewpoint Analysis: Variation Development (up to 149.9m to blade tip)			Cumulative Viewpoint Analysis: Variation Development (VD) and other wind farms					
			Sensitivity	Magnitude	Level of Effect:	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect
6. Blackcraig Hill	7,256	Substantial / Moderate	High	Medium	Substantial / Moderate	High to Medium	Moderate	Substantial / Moderate (VD, Afton, Windy Standard Ext., Hare Hill + Ext., Sanquhar, Whiteside Hill, Pencloe, South Kyle and Windy Rig)	High	Moderate	Substantial / Moderate (VD, Afton, Windy Standard Ext., Hare Hill + Ext., Sanquhar, Whiteside Hill, Pencloe, South Kyle, Windy Rig and Sanquhar II)
7. Lochside Hotel	7,187	Substantial / Moderate	High	Medium	Substantial / Moderate	Medium	Substantial / Moderate	Substantial / Moderate (VD and Pencloe)	Medium	Substantial / Moderate	Substantial / Moderate (VD, Pencloe / Pencloe Variation and Sanquhar II)
8. Cairnsmore of Carsphairn	8,727	Moderate	High	Low	Moderate	Medium	Moderate	Substantial / Moderate (Windy Std Ext, Windy Rig, South Kyle and Benbrack)	High to Medium	Moderate	Substantial to Moderate (Windy Std Ext, Windy Rig, South Kyle, Benbrack, Windy Standard Phase III and Sanquhar II)
11. Auchenroy Hill	10,922	Moderate	High	Low	Moderate	High	Moderate	Substantial (Dersalloch)	Low	Moderate	Substantial (Dersalloch and North Kyle)

Viewpoint No. and Title	Distance to nearest turbine (m)	Previous Assessment (2017 FEI) ⁴	Viewpoint Analysis: Variation Development (up to 149.9m to blade tip)			Cumulative Viewpoint Analysis: Variation Development (VD) and other wind farms					
			Level of Effect:	Sensitivity	Magnitude	Level of Effect:	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect	Magnitude (Applications)	Additional Level of Effect
12. Corsencon Hill	11,590	Moderate	High	Low	Moderate	High	Moderate	Substantial (Lethans, Glenmuckloch and Sandy Knowe)	High	Moderate	Substantial (Lethans / Lethans Variation, Glenmuckloch, Sandy Knowe, Sanquhar II)
14. A70 Between Cumnock and Prestwick	14,626	Slight	Medium	Low	Slight	Medium to Low	Slight	Moderate	Medium	Slight / Negligible	Moderate
15. A76 North of Auchinleck	15,720	Slight to Slight / Negligible	Medium	Low to Negligible	Slight to Slight / Negligible	Negligible	Slight to Slight / Negligible	Slight to Slight / Negligible	Low	Slight to Slight / Negligible	Slight
17. A76 Mauchline	19,565	Slight	High (residents) Medium (road users)	Negligible	Slight (residents) Slight / Negligible (road users)	Negligible	Slight to Slight / Negligible	Slight to Slight / Negligible	Low	Slight to Slight / Negligible	Slight
A: Drumbrochan Road, Cumnock	14,127	Slight	High	Low- Negligible	Moderate / Slight	Low	Moderate / Slight	Moderate	Low	Moderate / Slight	Moderate
B: Little Garclaugh, Upper Nith Valley	10,178	Moderate to Slight	High to Medium	Medium to Low	Moderate to Slight	Medium	Moderate to Slight	Substantial / Moderate (Sandy Knowe)	Low	Slight	Substantial / Moderate (Sandy Knowe)

Note: Significant effects are indicated in bold text.

9.3 Baseline

- 9.3.1 Drawing from the Viewpoint Analysis and taking a precautionary approach, the scope and geographical extent of the assessment has been limited to those landscape and visual receptors within 10km of the proposed turbine positions and / or those previously assessed as greater than moderately affected in the 2017 FEI.
- 9.3.2 Apart from the change to the cumulative baseline (described in **Section 9.2** above), there is no other change to the baseline landscape and visual receptors identified in Chapter 9 of the 2017 FEI (and PLI documentation) of the Consented Development which remain valid in this assessment. Section 9.5 of Chapter 9 of the 2017 FEI lists all the baseline receptors considered and assessed in this chapter.
- 9.3.3 It is important to note that the updated EALWCS (2018) and DGWLCS (2017) have been considered as part of the baseline and assessment. The landscape character across the Development Site area has been reviewed again as part of this assessment, and the alternative boundary *between Southern Uplands and Southern Uplands and Forestry: Enoch Hill LCTs* in the 2015 ES and 2017 FEI has remained part of this assessment.

Predicted Future Baseline

- 9.3.4 The lifespan of the Variation Development would cover a period of approximately 31.5 years (including construction, operation and decommissioning) and the assessment takes account of this dimension by considering the duration of the likely landscape, visual and cumulative effects. The approximate time periods associated with the Variation Development, and whether they are long-term or short-term are listed as follows:
- Construction: up to 12 months (short-term);
 - Operation: up to 30 years (long-term and reversible); and
 - Decommissioning: up to 6 months (short-term).
- 9.3.5 During this period, the predicted future baseline of landscape and visual receptors is unlikely to change beyond that described in the current baseline. Future land management, and consequently landscape character, is however, dependent on continued favourable development management and economic conditions, which is not a matter for this assessment. However, changes to this baseline could alter the landscape character as follows:
- An increase, decrease or maintenance of current levels of wind farm development. **Table V9.6** sets out the operational periods for existing and consented wind farm development that can be reasonably predicted during the operational period of the Variation Development;
 - An increase, decrease or maintenance of current levels of forestry. Some of the wind farm developments require localised tree felling or alteration of the existing forestry design plans; and
 - Restoration of areas of open cast mining.
- 9.3.6 The effects of climate change are similarly difficult to predict at a local level in respect of future change to landscape character. It is however likely that mitigation for climate change in the form of renewable energy will continue to have an influence on this area.
- 9.3.7 Taking account of reasonably foreseeable changes to the future baseline of other wind energy development set out in **Table V9.6** the default scenario (absent a further planning application to

extend or repower), would be a gradual decline in the existence of wind energy development, as a result of the existing time limited consents.

Table V9.6 Operational Timescales of Existing and Consented Wind Energy Development within 10km

Name and reference	Year of Commissioning / construction completed	0-5 Yrs	6-10 Yrs	11-15 Yrs	16-20 Yrs	21-25 Yrs	26-30 Yrs
Existing Wind Energy Developments within 10km (excluding micro-generation turbines)							
Variation Development		Proposed operation period of 30 years					
E01. Windy Standard Extension	2017	Operating for 25 years					
E02. Afton	2018	Operating for 25 years					
E03. Windy Standard	1996	Operating for 30 years (Live application for life extension)					
E04. High Park Farm	2014	Operating for 26 years (extended from original 20 years)					
E05. Hare Hill	1999	Operating for 25 years (Live application to align with operating period for Hare Hill Extension)					
E06. Hare Hill Extension	2016	Operating for 25 years					
Consented Wind Energy Developments within 10km (excluding micro-generation turbines)							
C01. South Kyle	2017	Consented to operate for 25 years					
C02. Pencloe	2018	Consented to operate for 27 years					
C03. Benbrack	2019	Consented to operate for 30 years after first generation					
C04. Over Hill	2019	Consented to operate for 25 years					
C05. Windy Rig	2017	Consented to operate for 25 years					

9.3.8 For the first five years of the operational period of the Variation Development the existing baseline of other existing and consented wind energy development (assuming these have been built) within 10km, would remain unchanged. Excluding the possibility for further time extensions to the operating periods of other existing and consented wind energy development; or future applications and consents for repowering; there would be a gradual and sustained reduction in cumulative wind energy development, combined with an increase in decommissioning activity, within 10km of the Variation Development during the latter half of the proposed operational period as follows:

- Proposed Operational Period: Years 6-10:
 - ▶ The operation of Windy Standard and Hare Hill would terminate. This would be followed by decommissioning over an estimated 1-2 year period. However, if both schemes are granted an extension, there would be no change during the operational period of the Variation Development.

- Proposed Operation Period: Year 20:
 - ▶ The operation of High Park Farm would terminate. This would be followed by decommissioning over an estimated 1-2 year period.
- Proposed Operational Period: Years 26-30:
 - ▶ Except for Benbrack, all other existing and consented wind farms would cease to operate and would be decommissioned unless granted an extension. The Variation Development and Benbrack would cease operation at the end of year 30 and undergo decommissioning.

9.4 Landscape Design Statement

9.4.1 The Variation Development comprises up to 16 wind turbines which are in the same locations and layout as the Consented Development. The Variation Development would increase the tip height of all 16 turbines from a maximum 130m to a maximum of 149.9m and the rotor diameters from a maximum of 106m to a maximum of 136m. All other infrastructure elements would remain the same as the Consented Development.

9.4.2 The Design Statement (including the key design constraints) reported in the 2015 ES and 2017 FEI have been reviewed as part of the Variation Development, drawing on the advice of EALWCS. The Design considerations within the Applicant's May 2018 PLI Report (Section 2.3) and further PLI submission on the updated EALWCS (August 2018) has also been reviewed as part of the Variation Development. The Variation Development broadly accords with the Design Objectives contained within the Landscape Design Statement of the 2017 FEI that accompanied the Consented Development. The only change to the Variation Development in comparison to the Consented Development is the increased height and rotor diameter of the proposed turbines.

9.4.3 For ease of reference, the original design objectives for the Consented Development described in section 9.6 of Chapter 9 of the 2017 FEI have been repeated below:

- ▶ *"Achieve a simple, rational, and cohesive design from most viewpoints avoiding turbine stacking, gaps and outlying turbines so the scheme can be accommodated on a stand-alone basis or cumulatively;*
- ▶ *Turbine development should avoid the 'front' north facing hill slopes overlooking settlements, roads and residential receptors within the Upland Basin. The hill tops and visually less sensitive interior hills would be preferable in order to maintain a sense of separation between the lower lying areas and the more elevated Southern Uplands / Southern Uplands with Forestry which are most capable of accommodating wind farm development;*
- ▶ *Ensures that the scale of the Proposed Development is proportionate to the expansive scale of the underlying Southern Uplands with Forestry landscape and in terms of the perceived scale of development when viewed from residential properties, settlements, roads and footpaths within the New Cumnock Upland Basin LCA to the north;*
- ▶ *Achieve a design proposal that would be broadly compatible or co-existent with other existing and consented wind farm development within the LVIA Study Area. In this respect the design should adopt a clustered layout that is broadly similar to neighbouring wind farm developments in terms of perceived turbine height, number, proportion, three bladed turbine design, colour and lighting;*
- ▶ *The Proposed Development has a maximum turbine height of up to 130m, which compares reasonably well with the maximum turbine height consented at nearby schemes such as Sanquhar (130m), Dersaloch (125m) and Afton (120m & 100m);*

- ▶ *Maintain the simple landscape character of the Development Site by siting ground based infrastructure in the least visible locations when viewed from receptor locations to the north and north east including New Cumnock, the B741 and the A76;*
- ▶ *Limit landscape and visual effects on the visual receptors including local residents, roads, recreational routes and visitor / tourist destinations including Glen Afton."*

- 9.4.4 Since the submission of the 2017 FEI and 2018 PLI, further wind farms have been consented in the *Southern Uplands with Forestry* LCT and they include South Kyle (149.5m to blade tip), Benbrack Variation (149.9m to blade tip), Pencloe (125m to blade tip), Lorg (130/149.5m to blade tip) and Sandy Knowe (125m to blade tip).
- 9.4.5 The Variation Development maintains a simple, cohesive and visually balanced layout that is related to the underlying landscape and in particular designed to integrate with or without the South Kyle Wind Farm assuming both developments are constructed. The visual composition remains the same as the Consented Development with minimal gaps and turbine stacking. Although the turbine height and rotor diameter (of 16 turbines) would increase as set out above, the Variation Development would maintain a similar scale and appear as a rational part of the consented South Kyle Wind Farm (149.5m tip height), as illustrated by viewpoints 4-8, 11 and 12 (**Figures V9.30f, V9.31f, V9.32f, V9.33, V9.34f, V9.37e and V9.38e**). The combined developments (South Kyle and the Variation Development) benefit from each other, both infilling gaps in each other's layout, specifically when viewed from the *Upland Basin*.
- 9.4.6 The Variation Development has maintained the threshold of significant landscape and visual effects to within 7km, the same as the Consented Development.

Landscape Design Considerations

- 9.4.7 Both the EALWCS and the DGWLCS provide sensitivity analysis of the *Southern Uplands* and *Southern Uplands with Forestry* LCTs, which may be considered relevant to the Development Site. The two studies have differing definitions of turbines at 149.9m, with EALWCS defining them as 'very large' turbines (over 130m high) and DGWLCS defining them as 'large' turbines ('very large' are considered to be 150m+). Collectively they record a 'high' (East Ayrshire) and 'medium' (Dumfries and Galloway) inherent landscape sensitivity to turbine development at this height, concluding that the perceived landscape capacity for very large scale turbines ranges from 'no scope' within East Ayrshire, with further capacity identified in Dumfries and Galloway. However, neither study refers to the Development Site directly and both refer to other named locations within these LCTs in order to explain and justify their conclusions.
- 9.4.8 Within East Ayrshire, a total of six LCT's were considered for capacity for 'very large' turbines following identification in the previous 2013 EALWCS of 'scope for larger turbines' within these LCT areas. Capacity and sensitivity to turbines over 130m was assessed on a 'repowering' basis (EALCS, Annex D) using selected viewpoints, wirelines and ZTVs. Of the six LCT's considered, none are assessed as below High-Medium sensitivity for turbines over 130m, with half (3 LCTs) considered to have a High sensitivity.
- 9.4.9 Both documents do however refer to the large or expansive scale and simplicity of the landscape character as an opportunity for large scale wind farm development, noting that the general lack of settlement and presence of nearby forestry are factors that indicate some capacity for large scale wind turbines.
- 9.4.10 Particular references to Glen Afton and Loch Doon / Doon Water and Dalmellington as potential constraints are not relevant to the Variation Development, due to the limited visibility of the Variation Development from within these areas. Concerns about visual effects on the views towards the landmark hill summit of Blackcraig Hill and cumulative development close to Hare Hill

Wind Farm are also not relevant in this case as indicated by the viewpoint analysis and visualisations which demonstrate that views of the Variation Development would not interfere with views towards Blackcraig Hill or Craighbraneoch Rig on the eastern edge of Glen Afton.

9.4.11 A general reference to the potential visibility of wind farm development from the *Upland Basin* as a constraint is however a relevant consideration for this Variation Development and one of the reasons for establishing a northern limit or 'turbine exclusion' zone across the north facing hill slopes of the Development Site. The establishment of a northern limit or 'turbine exclusion' zone across the north facing hill slopes of the Development Site was also developed in response to feedback obtained as a result of public consultation and Community Liaison Group meetings during the 2017 FEI process. This turbine 'exclusion area' ensures that turbines would not be positioned on the 'front' north facing hill slopes. This constraint also had the benefit of minimising potential visual effects on the views from the closest receptors, including residential properties located to the north of the Development Site and more general views from New Cumnock and the *Upland Basin* area to the north and northeast.

9.4.12 It is of primary importance that the Variation Development can be accommodated alongside / overlapping with other existing and consented development, with particular consideration given to the consented South Kyle (149.9m to blade tip) and Pencloe (130m to blade tip) wind farms.

9.5 Environmental Measures Embedded into the Development Proposals

9.5.1 As there is no change to the Variation Development footprint (turbine locations and all site infrastructure) compared to the Consented Development, the mitigation measures embedded into the development proposals would be the same as those identified in **Chapter 9** of the 2017 FEI.

9.6 Residual Landscape Effects

9.6.1 Landscape Effects are defined by the Landscape Institute in GLVIA 3, paragraphs 5.1 and 5.2 as follows.

"An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. ... The area of landscape that should be covered in assessing landscape effects should include the site itself and the full extent of the wider landscape around it which the proposed Development may influence in a significant manner."

9.6.2 These effects are assessed by considering the landscape sensitivity (value and susceptibility) against the magnitude of change. The assessment takes account of the cumulative landscape effects, 'in addition' to, and 'in combination' with, other existing and consented wind energy development and current wind farm applications, as set out in **Table V9.4**; and the periods of remaining operation of existing and consented wind energy development as set out in **Table V9.6**. The type of effect may also be described as temporary or permanent, direct or indirect, cumulative and positive, neutral, or negative.

9.6.3 The residual landscape effects assessed here are those effects remaining after all of the embedded design mitigation and enhancement measures have been taken into account.

Direct Effects on Landscape Character: Southern Uplands with Forestry

Overview of the Landscape Character of the Development Site

- 9.6.4 Landscape character and cumulative wind farm development within 10km of the Development Site is illustrated in **Figure V9.17a**.
- 9.6.5 The Development Site is located within an extensive area of the Southern Uplands and bounded to the west, south and east by extensive coniferous forestry and Carsphairn Forest. The *Southern Uplands with Forestry* generally and Carsphairn Forest in particular are noted in both the EALWCS and the DGWLCS to be amongst those landscape character types, generally most able to accommodate wind energy development.
- 9.6.6 The topography is of rounded hills including Benty Cowan Hill (477m AOD), Chang Hill (463m AOD), Ewe Hill (437m AOD) and Enoch Hill (569m AOD), typical of the Southern Uplands LCT split by steep, incised gullies at Dalleagles Burn, Knockburnie Glen and Connel Burn within the northern and western parts of the LCT, with more gentle, although elevated, landform in the southern part of the Development Site (**Figure V9.18**). The landcover is predominantly rough grassland, referred to as 'hill pasture' in the EALWCS with coniferous forestry influencing the southern part of the Development Site and forming the eastern and southern Development Site boundaries. The northern part of this area, along the B741 corridor, is sparsely settled with scattered properties and small groups, whilst there are no residential properties or settlements in the vicinity of the southern part of the Development Site. There are no particular features of interest, core paths or other recreational routes within the Development Site.
- 9.6.7 The proposed turbines are located within the northern edge of the same Southern Uplands unit, just beyond the edge of the wider Carsphairn Forest which forms an extensive area of *Southern Uplands* and *Southern Uplands and / or with Forestry*. The partial 'containment' of the Development Site by landform and forestry to the west, south and east has contributed to the limited ZTV coverage of these areas to the west, south and east as illustrated in the ZTVs, most noticeably in **Figure V9.4**. The most concentrated areas of ZTV is related to the Development Site area and land to the north and northeast, including the *Southern Uplands: Benty Cowan Hill LCA*, the *Southern Uplands with Forestry: Enoch Hill LCA* and the *Upland Basin: New Cumnock LCA*.

Identification of the Landscape Character of the Development Site

- 9.6.8 The area of the Development Site is partly within the *Southern Uplands with Forestry: Enoch Hill LCA* and partly within the *Southern Uplands: Benty Cowan Hill LCA* as classified by the EALWCS. The proposed turbines are located on the un-forested summits and predominantly southern facing slopes of Enoch Hill, Barbeys Hill, High Chang Hill and Benty Cowan Hill, avoiding north facing hill slopes and shoulders, which face on to the low lying and settled landscape of the *Upland Basin*. Considering the boundaries drawn in the EALWCS, at least six of the proposed turbines are located within the *Southern Uplands and Forestry: Enoch Hill LCA* and the remaining 10 turbines are located within the *Southern Uplands: Benty Cowan Hill LCA*.
- 9.6.9 The boundary between different landscape character areas is rarely exact, further site survey and analysis during the previous Enoch Hill assessments led to the drawing of an alternative boundary between the two LCAs as illustrated in **Figure V9.17a**. This assessment confirms that the southern part of the Development Site has more in common with the *Southern Uplands with Forestry LCT* with characteristic attributes relating to landform, nearby coniferous forestry, wind farm development and perceptions of remoteness. Within this area, the landscape is influenced by adjacent areas of coniferous forestry which 'cups' around the area of the proposed turbines to the west, south and southeast and is visible as extensive areas of coniferous forestry, at relatively short distances in the landscape, in comparison to more extensive views of southern uplands to the

north, albeit characterised by the adjacent land uses of the *Upland Basin* which include the sight and sound of opencast coal mining.

- 9.6.10 The PLI Report recognised the fluidity between the Southern Uplands with Forestry: Enoch Hill LCA and the Southern Uplands: Benty Cowan Hill LCA noting that *"this point is recognised by the EALWCS 2013 study which states that "landscape character types often have 'fluid' boundaries where a gradual transition can occur between adjacent landscape character types with similar characteristics ... in this case, there is justification to assess the proposal in the context of the constraints/opportunities for both the southern uplands LCT and the southern uplands with forestry LCT."* Both LCTs have therefore been included in this assessment.

Direct Landscape Effects: Southern Uplands with Forestry: Enoch Hill LCA

- 9.6.11 The sensitivity ratings ascribed to the *Southern Uplands with Forestry* LCT in the EALWCS and the neighbouring *Southern Uplands with Forest: Carsphairn* LCA within the DGWLCS are summarised as follows:
- EALWCS: *Southern Uplands with Forestry: Enoch Hill LCA* - High landscape sensitivity for additional new development of very large and large turbine typology (>70m);
 - EALWCS: *Southern Uplands: Benty Cowan Hill LCA* - High landscape sensitivity for additional new development of very large turbine typology (>130m) and High to Medium sensitivity for additional new development of large scale turbine typology (70-130m); and
 - DGWLCS: *Southern Uplands with Forest: Carsphairn LCA* - Medium landscape sensitivity for new large turbine development (80 – 150m) and High to Medium sensitivity for new very large turbine development (> 150m).
- 9.6.12 The EALWCS describes the sensitivity and capacity of the *Southern Uplands with Forestry* to large and very large turbine development as follows:
- " While the large scale and generally simple landform and land cover of these sparsely settled uplands reduce sensitivity to larger wind turbines, much of the less sensitive more gently rolling hills lying at the core of this landscape will be occupied by the consented South Kyle wind farm. Remaining areas of undeveloped ground are more sensitive as they either comprise more complex landform or lie closer to the Doon Valley and Dalmellington. Cumulative effects with other operational and consented wind farms could also be associated with additional development sited in the eastern parts of this landscape."*
- 9.6.13 It should be noted that all of the key constraints identified above, which serve to increase the sensitivity of this landscape, relate to Loch Doon, the Upper Doon Valley and the settlement of Dalmellington, which would not be significantly affected by the Variation Development and are visually remote from the Development Site. It should be noted that, like the Consented Development, the Variation Development has also been designed to integrate with the turbines of the consented South Kyle Wind Farm.
- 9.6.14 Further to this, the guidance for the development section of the EALWCS considers the repowering of South Kyle from the consented turbine height of 149.9m to 200m and states:
- "Increases in turbine height to 200m were concluded as being likely to significantly exacerbate effects on the setting and views from the Loch Doon area. Turbines of this height would also be likely to incur cumulative effects with the nearby consented Benbrack wind farm (assuming this retains consented turbines of 130m height)."*
- 9.6.15 Much of this advice is of limited relevance and is focused on Loch Doon from which there would be limited or no visibility of the Variation Development. Similarly, the concern about cumulative

effects with Benbrack is also of limited relevance to the cumulative effects of the Variation Development as it would be located on the other side of the South Kyle Wind Farm. The turbine height for the Variation Development would match the height of the consented South Kyle Wind Farm, as illustrated by viewpoints 4-8, 11 and 12 (**Figures V9.30f, V9.31f, V9.32f, V9.33, V9.34f, V9.37e and V9.38e**) and would result in more uniformity of height in this LCT.

- 9.6.16 The Variation Development would, however, be visible from the *Upland Basin* and cumulative effects are noted as a constraint in that respect. A further potential constraint is identified in the EALWCS as the "*Potential 'encirclement' of the settled Upland Basin (15) where the operational Hare Hill wind farm and any other larger turbines sited in this character type and also in the Foothills with Forestry and Opencast Mining (17a) and East Ayrshire Plateau Moorland (18a) would be seen in close proximity on containing skylines.*" This constraint is limited by the overlap of the Variation Development with the South Kyle development when viewed from the *Upland Basin*.

Landscape Susceptibility and Value

- 9.6.17 Landscape susceptibility according to GLVIA 3 means "*the ability of the landscape to accommodate the development without undue consequences for maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies*". Common indicators of landscape susceptibility⁵ to wind farm development are considered in **Table V9.7**, drawing from the broad scale advice from the EALWCS.

- 9.6.18 At a detailed site level, a range of landscape criteria or indicators of sensitivity / susceptibility to wind energy development have been considered as set out in **Table V9.7**. They indicate that the Development Site area has a Medium to Low sensitivity in respect of its physical and perceptual criteria and Medium sensitivity in respect of the visual criteria and landscape value. An overall sensitivity of Medium is concluded, due mainly to the following factors:

- The key characteristics of this LCA (large scale, gently undulating landform, the influence of coniferous forestry, it's uninhabited nature and being visually remote from surrounding valleys, glens and basins) indicate a Medium to Low overall sensitivity and susceptibility to the Variation Development;
- Although the Variation Development is located within the Afton Sensitive Landscape Character Area (SLCA) local landscape designation it would not affect any of the key qualities or integrity identified by EAC when designating this area. The designation however, does indicate a Medium landscape value;
- The condition and management of the landscape is considered to be reasonably good although the landscape quality of this area in terms of its representativeness is considered to be Medium overall with the northern part of the Development Site at least partly transitional into adjacent areas of landscape character which are less representative of the LCT;
- The main landscape element (grass moorland) which covers the Development Site area within this LCA is considered to be of Low landscape sensitivity. The surrounding vegetation type, commercial forestry, is also considered to be of Low landscape sensitivity;
- In terms of settlement, the LCA is largely uninhabited with low levels of settlement occurring around the northern fringes and along the B741 to the north and there are also no particular tourist or recreational receptors, indicating Low sensitivity; and
- In terms of the surrounding landscape context the Development Site is noted to be closely related as a 'backdrop' to the lowland settled landscape of the *Upland Basin* and associated receptors. In this respect, a High - Medium sensitivity is noted.

⁵ Scottish Natural Heritage, A Guide to Commissioning a Landscape Capacity Study, 2015.

Table V9.7 Landscape Susceptibility of the Southern Uplands with Forestry: Enoch Hill LCA

Landscape Attributes	Characteristics that are less susceptible to wind energy development			Characteristics that are more susceptible to wind energy development	
	Low	Medium – Low	Medium	High - Medium	High
Physical Characteristics:					
Scale	Larger scale landscapes and landform which may be more able to accommodate large scale wind turbines			Smaller scale well defined landforms which may become dominated or overwhelmed by wind turbines	
Landform and Topography	Simple upland plateau, gently rolling or flat landscapes as the turbines may be less easily scaled against the landform			Complex landforms with well defined changes in level including ridges, steep sloping hillsides and narrow valleys.	
Land Cover	Large scale simple and homogenous land cover including moorland, grasslands, and large forestry plantations, where the simplicity of the land cover may complement turbines			Complex and diverse land cover including a diversity of arable fields, grassland, trees / hedges / woodland, open water of a small scale that turbines may dominate.	
Pattern	Unenclosed land or rectilinear field patterns which may complement the modern aesthetic of turbines.			Irregular small scale patchwork or medieval field patterns where turbines may overwhelm the scale and landscape pattern.	
Settlement pattern	Sparse or no settlement with relatively few visual receptors and scale indicators.			Populated areas and lowlands with larger numbers of visual receptors and small scale indicators.	
Other Development	Large scale industrial, infrastructure and mineral extraction land uses detracting from the overall landscape sensitivity and value. Landscapes with vertical masts, pylons and turbines			Rural / traditional forms of development including parks and gardens and monuments enhancing the overall landscape sensitivity and value.	
Change and Movement	Busy major roads and other areas of significant mechanised movement where the movement of turbine blades may be in character			No roads or only quiet country lanes where turbine blade movement could be eye catching	
Perceptual Characteristics:					
Wildness and Naturalness	Area not valued for wildness as a key characteristic or special quality.			Area valued for wildness as a key characteristic or special quality.	
Remoteness	Area that feels closer to people and human activities. Conversely, a remote area not valued for wildness or tranquility would have a lower number of visual receptors.			Area that feels remote from people and human activities. Conversely, landscapes that are settled / built up would have a higher number of visual receptors.	
Rational /	Open and exposed landscapes where turbines, though more visible, may be logically located on windswept			Enclosed or sheltered landform likely to be of a smaller scale and limited rational for turbine	

Landscape Attributes	Characteristics that are less susceptible to wind energy development			Characteristics that are more susceptible to wind energy development	
	Low	Medium – Low	Medium	High - Medium	High
Windswept	locations.			locations.	
Visual Characteristics:					
Openness and Enclosure	Enclosed landscape with limited opportunities for long range views.			Open landscapes with opportunities for long range views.	
Skyline	Broad simple skylines lacking in distinctive or 'landmark' topography.			Skylines which are an important and noticeable component in the landscape with 'landmark' topography.	
Landmarks	Landscapes with no sensitive landmark features where turbines might detract from settings			Landscapes with landmarks and features such as church spires and prominent listed buildings where turbines might compete as landscape foci and detract from settings	
Surrounding Context	Self-contained landscape with limited relationship with adjacent areas.			Landscapes that are closely connected to the adjacent / surrounding areas in terms of similar character or visual backdrop.	
Overall Susceptibility			Medium	Upland Basin	

Overall Sensitivity

9.6.19 Drawing from this assessment, the sensitivity of the southern part of the Development Site (*Southern Uplands with Forestry: Enoch Hill LCA*) is assessed as *Medium* and between the 'high' sensitivity identified in the EALWCS and the medium sensitivity identified in the DGWLCS for this landscape typology in this area.

Magnitude and Level of Effect: during Construction

9.6.20 In repeating and reviewing the LVIA there would be no change from the 2017 FEI (Chapter 9, paragraphs 9.7.28 to 9.7.30) which is repeated as follows:

*"The construction phase would result in localised direct landscape effects on the Development Site and its component landscape elements. None of these are particularly sensitive (rough grassland / hill pasture of Low sensitivity). The construction works would affect localised areas, progressing from Zero magnitude of change to High towards the completion of the Variation Development, the likely landscape effects on the fabric and constituent elements of the landscape would range from **Negligible** to **Moderate** and would not be significant.*

In terms of wider effects on landscape character, the magnitude of change and nature of effect would range progressively from Zero to High during the construction phase; primarily as a result of the turbines. Overall, the landscape effects on the Southern Uplands and Forestry: Enoch Hill LCA would

range from **None**, increasing to **Substantial / Moderate** and significant upon completion, due to the height and scale of the proposed turbines. The geographical extent of the significant effects would be limited to the immediate areas of the proposed turbines, within the Development Site itself (and part of the Southern Uplands and Forestry: Enoch Hill LCA) due to the containment of coniferous forestry and landform. Landscape effects (None, increasing to Substantial / Moderate) would also extend north, approximately 2km (affecting the East Ayrshire Southern Uplands: Benty Cowan Hill LCA) due to the height of the northern most turbines appearing beyond the summits of Chang Hill and Benty Cowan Hill. Although this area is considered to be more sensitive (High to Medium) some of the effects would be mitigated with much of the lower parts of the turbines screened by intervening landform and forestry as indicated in Viewpoints 1 and 2. The nature of these effects would be temporary to long-term (reversible) direct and negative due primarily to the height and scale of the turbines."

Magnitude and Level of Effect: during Operation

9.6.21 There would be no change from the 2017 FEI (Chapter 9, paragraphs 9.7.31 to 9.7.35) which is repeated as follows:

"During operation, the completed wind farm would gain a more 'settled' appearance when compared to the same area during the construction period, although the significant landscape effects would continue throughout the operational period as a result of the proposed turbines and the change they would bring to the existing landscape character.

*The landscape effects on the Southern Uplands and Forestry: Enoch Hill LCA would be **Substantial / Moderate** and significant due to the height and scale of the proposed turbines. The geographical extent of the significant effects would be limited to the immediate areas of the proposed turbines, within the Development Site itself (and part of the Southern Uplands and Forestry: Enoch Hill LCA) due to the containment of coniferous forestry and landform. Significant landscape effects (Substantial / Moderate) would also extend north, approximately 2km (affecting the East Ayrshire Southern Uplands: Benty Cowan Hill LCA) due to the upper parts of the turbines appearing beyond the summits of Chang Hill and Benty Cowan Hill. There would be a more limited geographical effect on the East Ayrshire Southern Uplands: Benty Cowan Hill LCA as a result of the Development Site access, access track, potential borrow pits and proposed compounds. The nature of all of these effects would be long-term (reversible, excepting access tracks) direct and negative due primarily to the height and scale of the turbines.*

This effect would not be significant in terms of the wider East Ayrshire Southern Uplands (with or without forestry) including the area of Southern Uplands with Forests: Carsphairn, in Dumfries and Galloway."

9.6.22 The primary and the additional effect of the Variation Development would be **Substantial / Moderate** and Significant, extending up to approximately 2km. The nature of these effects would be long-term (reversible), direct, cumulative and negative.

Southern Uplands with Forestry: Cumulative Landscape Effects on Existing + Consented Sites

9.6.23 Within 10km of the Variation Development, there are six existing and four consented wind farm within the *Southern Uplands with Forestry LCT* and several others located close by that have a notable characterising influence on this LCT as follows:

- Existing Wind Farms:
 - ▶ Windy Standard Wind Farm: 36 turbines, 26 of which are located within the *Southern Uplands with Forest LCT* in Dumfries and Galloway;

- ▶ Windy Standard Extension Wind Farm: 30 turbines, 22 of which are located within the *Southern Uplands with Forest LCT* in Dumfries and Galloway;
 - ▶ Afton Wind Farm: 27 turbines spanning both the *Southern Uplands LCT* and the *Upland Glen LCT*;
 - ▶ Hare Hill Wind Farm: 20 turbines, 17 of which are located within the *Southern Uplands LCT*, the remainder of which are within *Southern Uplands with Forest LCT* in Dumfries and Galloway;
 - ▶ Hare Hill Extension Wind Farm: 35 turbines located in the *Southern Uplands LCT*; and
 - ▶ High Park Farm: One turbine located in the *Southern Uplands LCT*.
- Consented Wind Farms:
 - ▶ South Kyle Wind Farm: 50 turbines, 30 of which are located within the Southern Uplands with Forestry, the remainder of which are within the same character type (*Southern Uplands with Forest LCT*) in Dumfries and Galloway;
 - ▶ Windy Rig Wind Farm: 12 turbines located in the *Southern Uplands LCT*;
 - ▶ Pencloe: 19 turbines located in the *Southern Uplands with Forestry LCT*; and
 - ▶ Benbrack: 18 turbines located within the *Southern Uplands with Forest LCT*.

9.6.24 The addition of other existing and consented wind farms to this area, in particular South Kyle and Pencloe, leads to a larger area of wind farm development or the creation of a 'wind farm landscape' in this area where according to SNH⁶:

"The wind farms appear as a dominant characteristic of the area, seeming to define the character type as a 'wind farm landscape character type."

9.6.25 The additional cumulative effect of adding the Variation Development to the baseline would be tempered by the presence of the existing and consented wind farms where wind farm development is already a defining or key characteristic of the landscape and where the effects of the Variation Development would broadly overlap with the effects of the existing and consented wind farms in this area. The Variation Development would appear as a closely related group or 'extension' to the South Kyle Wind Farm consistent with this pattern of development and the turbines proposed for both groups would be of similar height. As a result, the magnitude of change to the landscape character caused by the additional effect of the Variation Development would be reduced to Medium, resulting in a **Moderate** and Significant effect. The nature of these effects would be cumulative, long-term (reversible), direct and negative to neutral, given the characterising influence of existing and consented wind farm development on this area.

9.6.26 The combined cumulative effect of the existing and consented schemes and the Variation Development would be **Substantial / Moderate** and Significant as a result of all of the large-scale wind farm development in this area. Apart from Windy Standard and Hare Hill (subject to its life extension), High Park Farm and Benbrack, all other existing and consented schemes noted above would be decommissioned ~5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect, although significant effects would remain as a result of the Variation Development and Benbrack. The nature of these effects would be cumulative, long-term (reversible), direct and negative.

⁶ SNH (2017) *Siting and Designing Wind Farms in the Landscape*, Version 3a, (page 29)

Southern Uplands with Forestry: Cumulative Landscape Effects on Existing + Consented + Applications

- 9.6.27 There are two application wind farms within the *Southern Uplands with Forestry LCT* including Pencloe Variation and Windy Standard Phase III. Other nearby applications may also have an influence on this LCT including Sanquhar II and North Kyle. These applications could have a further characterising influence on the *Southern Uplands with Forestry LCT* within 1-2km of each development.
- 9.6.28 The additional magnitude of change would be reduced to Medium (due to the presence of existing, consented and application wind farms), resulting in a **Moderate** and Significant effect. The nature of these effects would be cumulative, long-term (reversible), direct and negative to neutral, given the characterising influence of existing and consented wind farm development on this area.
- 9.6.29 The combined cumulative effect of the existing, consented and application schemes and the Variation Development would be **Substantial / Moderate** and Significant as a result of all of the large-scale wind farm development in this area, which would extend across a large area of this LCT. Apart from Windy Standard and Hare Hill (subject to its life extension), High Park Farm and Benbrack, all other existing and consented schemes noted above would be decommissioned ~5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect, although significant effects would remain as a result of the Variation Development and Benbrack. The nature of these effects would be cumulative, long-term (reversible), direct and negative.

Magnitude and Level of Effect: During Decommissioning

- 9.6.30 There would be no change from the 2017 FEI (Chapter 9, paragraph 9.7.42) which is repeated as follows:

*"During the decommissioning period the Development Site would return to a construction site for a temporary period and as with the construction period, the level of effect would be variable over the Development Site and according to the phase of activity. In overall terms the magnitude would reduce from operational levels to Negligible magnitude with the removal of the turbines and associated above ground infrastructure (excepting on-site access tracks). The residual landscape effect would be **Slight / Negligible** and not significant. The nature of these effects would be permanent, direct, and positive when compared to the pre-existing landscape of the local area."*

Direct Landscape Effects: Southern Uplands: Benty Cowan Hill LCA

- 9.6.31 This assessment allows for the scenario that up to 10 turbines of the Variation Development are located within the *Southern Uplands: Benty Cowan Hill LCA* as defined by the boundaries of the EALWCS and as such provides an alternative assessment of the direct landscape effects.
- 9.6.32 The *Southern Uplands: Benty Cowan Hill LCA* forms part of an extensive area of the East Ayrshire *Southern Uplands LCT* identified within the EALWCS. The key characteristics of this LCT, identified in that document are described as follows:
- *"Within East Ayrshire, the Southern Uplands form steep-sided, rugged open hills strongly containing the Upland Glen (14) of Glen Afton and providing a dramatic backdrop to the low-lying Upland Basin (15);*
 - *Higher and particularly steep-sided and well-defined hills on the eastern edge of Glen Afton form landmark features and include the distinctly rugged Blackcraig Hill and Craighraneoch Rig;*
 - *Lower and relatively narrow ridges occur west of Glen Afton;*
 - *Land cover is simple, dominated by grass moorland;*

- *This landscape is not settled although it is highly visible from settlement and roads within the Upland Basin (15) to the north;*
 - *The peripheral hills of this character type also form prominent skylines seen from Glen Afton;*
 - *The operational Hare Hill wind farm occupies a prominent hill summit seen in views to the north-west; and*
 - *The operational wind farm of Windy Hill and its consented extension are also located within the same character type but within neighbouring Dumfries and Galloway and close to the East Ayrshire boundary."*
- 9.6.33 The EALWCS identifies the level of existing wind farm development as limiting the scope for further development with key constraints identified as the need to reduce intrusion on the adjacent settled *Upland Basin* and the *Upland Glen* LCTs of Glen Afton. Further potential concerns are expressed, relating to the intervisibility of different sized turbines and the potential for wind farm development to encircle the *Upland Basin* due to cumulative wind farm development extending over the skylines of the *Southern Uplands and the Foothills with Forest and Opencast Mining* and the *Plateau Moorlands* LCTs.
- 9.6.34 The EALWCS identifies the *East Ayrshire Southern Uplands* as being of High-Medium landscape sensitivity with no scope for "very large" scale turbine development.

Landscape Susceptibility and Value

- 9.6.35 At a detailed site level, a range of landscape criteria or indicators of sensitivity / susceptibility to wind energy development have been considered as set out in **Table V9.8**. They indicate that the Development Site area has a Medium to Low sensitivity in respect of its physical and perceptual criteria and Medium sensitivity in respect of the visual criteria and landscape value. An overall sensitivity of Medium is concluded, due mainly to the following factors:
- The key characteristics of this LCA (large scale, gently undulating landform) indicate a Medium to Low overall sensitivity and susceptibility to the Variation Development;
 - The presence of the Afton SLCA local landscape designation indicates High-Medium landscape value;
 - The condition and management of the landscape is considered to be reasonably good, although the landscape quality of this area in terms of its representativeness is considered to be Medium overall with the southern and northern edges partly transitional into adjacent areas of landscape character (*Southern Uplands with Forestry and Upland Basin*) which are less well representative of the LCT and further reduce its physical extent;
 - The main landscape element (grass moorland) which covers the Development Site area within this LCA is considered to be of Low landscape sensitivity;
 - In terms of settlement, the LCA is largely uninhabited with low levels of settlement occurring around the northern fringes and along the B741 to the north and there are also no particular tourist or recreational receptors, indicating Low sensitivity; and
 - In terms of the surrounding landscape context, the Development Site is noted to be closely related as a 'backdrop' to the lowland settled landscape of the *Upland Basin* and associated receptors. In this respect a High - Medium sensitivity is noted.

Table V9.8 Landscape Susceptibility of the Southern Uplands: Benty Cowan Hill LCA

Landscape Attributes	Characteristics that are less susceptible to wind energy development			Characteristics that are more susceptible to wind energy development	
	Low	Medium – Low	Medium	High - Medium	High
Physical Characteristics:					
Scale	Larger scale landscapes and landform which may be more able to accommodate large scale wind turbines			Smaller scale well defined landforms which may become dominated or overwhelmed by wind turbines	
Landform and Topography	Simple upland plateau, gently rolling or flat landscapes as the turbines may be less easily scaled against the landform			Complex landforms with well defined changes in level including ridges, steep sloping hillsides and narrow valleys.	
Land Cover	Large scale simple and homogenous land cover including moorland, grasslands, and large forestry plantations, where the simplicity of the land cover may complement turbines			Complex and diverse land cover including a diversity of arable fields, grassland, trees / hedges / woodland, open water of a small scale that turbines may dominate.	
Pattern	Unenclosed land or rectilinear field patterns which may complement the modern aesthetic of turbines.			Irregular small scale patchwork or medieval field patterns where turbines may overwhelm the scale and landscape pattern.	
Settlement pattern	Sparse or no settlement with relatively few visual receptors and scale indicators.			Populated areas and lowlands with larger numbers of visual receptors and small scale indicators.	
Other Development	Large scale industrial, infrastructure and mineral extraction land uses detracting from the overall landscape sensitivity and value. Landscapes with vertical masts, pylons and turbines			Rural / traditional forms of development including parks and gardens and monuments enhancing the overall landscape sensitivity and value.	
Change and Movement	Busy major roads and other areas of significant mechanised movement where the movement of turbine blades may be in character			No roads or only quiet country lanes where turbine blade movement could be eye catching	
Perceptual Characteristics:					
Wildness and Naturalness	Area not valued for wildness as a key characteristic or special quality.			Area valued for wildness as a key characteristic or special quality.	
Remoteness	Area that feels closer to people and human activities. Conversely, a remote area not valued for wildness or tranquility would have a lower number of visual receptors.			Area that feels remote from people and human activities. Conversely, landscapes that are settled / built up would have a higher number of visual receptors.	
Rational /	Open and exposed landscapes where turbines, though more visible, may be logically located on windswept			Enclosed or sheltered landform likely to be of a smaller scale and limited rational for turbine	



Landscape Attributes	Characteristics that are less susceptible to wind energy development			Characteristics that are more susceptible to wind energy development	
	Low	Medium – Low	Medium	High - Medium	High
Windswept	locations.			locations.	
Visual Characteristics:					
Openness and Enclosure	Enclosed landscape with limited opportunities for long range views.			Open landscapes with opportunities for long range views.	
Skyline	Broad simple skylines lacking in distinctive or 'landmark' topography.			Skylines which are an important and noticeable component in the landscape with 'landmark' topography.	
Landmarks	Landscapes with no sensitive landmark features where turbines might detract from settings			Landscapes with landmarks and features such as church spires and prominent listed buildings where turbines might compete as landscape foci and detract from settings	
Surrounding Context	Self-contained landscape with limited relationship with adjacent areas.			Landscapes that are closely connected to the adjacent / surrounding areas in terms of similar character or visual backdrop.	
Overall Susceptibility			Medium	Upland Basin	

9.6.36 Drawing from this assessment, the sensitivity of *Southern Uplands: Benty Cowan Hill* LCA is assessed as *Medium*. In comparison, in the EALWCS, greater weight appears to have been given to the landscape context, landform and landmark topography noted in relation to Glen Afton, Blackcraig Hill (700m AOD in comparison to the 569m AOD at Enoch Hill) and the presence of other existing wind farm development, considered as a limiting factor rather than an opportunity. These factors are not particularly pertinent to the Development Site or this particular area of the *Southern Uplands: Benty Cowan Hill* LCA which is physically remote from Glen Afton and Blackcraig Hill. It should be noted that even if the sensitivity of this landscape was assessed as being High, in line with the EALWCS, any revised assessment would not alter the overall conclusions regarding the identification of a significant effect on this landscape.

Magnitude and Level of Effect: during Construction

9.6.37 There would be no change from the 2017 FEI (Chapter 9, paragraph 9.7.50) which is repeated as follows:

*"Overall, the magnitude of change would range from None to High as construction progresses and the landscape effects on the Southern Uplands: Benty Cowan Hill LCA would range from **None**, increasing to **Substantial / Moderate** and significant upon completion, due to the height and scale of the proposed turbines. The geographical extent of the significant effects would be limited to the immediate areas of the proposed turbines, within the Development Site itself and areas up to*

approximately 2-2.5km mainly to the northeast. Some of these effects would be partly mitigated with much of the lower parts of the proposed turbines screened by intervening landform and forestry as indicated in Viewpoints 1 and 2 (Figures V9.27a-d and V9.28a-d). The nature of these effects would be temporary to long-term (reversible) direct and negative, due primarily to the height and scale of the turbines."

Magnitude and Level of Effect: during Operation

9.6.38 There would be no change from the 2017 FEI (Chapter 9, paragraph 9.7.51) which is repeated as follows:

*"During operation, the magnitude of change would be High and the primary and additional landscape effects on the Southern Uplands: Benty Cowan Hill LCA would be **Substantial / Moderate** and Significant. The geographical extent of the significant effects would extend to areas within approximately 2-2.5km. The nature of these effects would be long-term (reversible), direct, and negative."*

Southern Uplands: Cumulative Landscape Effects on Existing + Consented Sites

9.6.39 There are no existing or consented wind farms within the *Southern Uplands: Benty Cowan Hill LCA*, although the Hare Hill Group, High Park Farm and Afton Wind Farm are located within the wider *East Ayrshire Southern Uplands LCT*. The consented South Kyle and Pencloe wind farms are likely to have a characterising influence on this LCA considering their distance and visibility from this landscape. The existing Windy Standard Wind Farm and Extension, and parts of the consented Windy Rig wind farms are also visible within Dumfries and Galloway (approximately 2.5km distance). The cumulative effect of these wind farms on the *Southern Uplands: Benty Cowan Hill LCA* would not be significant due to the intervening distance and forestry (Low Magnitude) although the wider combined visibility of the Windy Standard Group and Hare Hill Group (including Afton) indicates an increase in the characterising influence of wind farms and their association with the upland areas generally. In that respect the Variation Development would not appear incongruous or create a 'new' landscape characteristic.

9.6.40 The additional effect of adding the Variation Development to the baseline would remain **Substantial / Moderate** and Significant. The combined cumulative effect of the existing and consented schemes and the Variation Development would also be **Substantial / Moderate** and Significant, extending out from the Development Site to approximately 2-2.5km. Apart from Windy Standard and Hare Hill (subject to its life extension), and High Park Farm, all other existing and consented schemes noted above would be decommissioned ~5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be cumulative, long-term (reversible), direct and negative to neutral, given the characterising influence of existing and consented wind farm development on this area.

Southern Uplands: Cumulative Landscape Effects on Existing + Consented + Applications

9.6.41 There are no other application wind farms within the *Southern Uplands: Benty Cowan Hill LCA*, although parts of Sanquhar II are located within the wider *East Ayrshire Southern Uplands LCT*. The nearby application North Kyle Wind Farm is visible from most of this landscape (approximately 1.8km distance). The cumulative effect of Sanquhar II on the *Southern Uplands: Benty Cowan Hill LCA* would not be significant due to the intervening distance and forestry (Low Magnitude), however, there could be significant effects due to North Kyle (High-Medium magnitude).

9.6.42 The additional effect of adding the Variation Development to the baseline would remain **Substantial / Moderate** and Significant. The combined cumulative effect of the existing, consented and application schemes and the Variation Development would also be **Substantial / Moderate**

and Significant, extending out from the Development Site to approximately 2-2.5km. Apart from Windy Standard and Hare Hill (subject to its life extension), and High Park Farm, all other existing and consented schemes noted above would be decommissioned ~5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be cumulative, long-term (reversible), direct and negative to neutral, given the characterising influence of existing and consented wind farm development on this area.

Magnitude and Level of Effect: During Decommissioning

9.6.43 There would be no change from the 2017 FEI (Chapter 9, paragraph 9.7.56) which is repeated as follows:

"There would be no change from the ES assessment described previously (Chapter 9) in relation to the Southern Uplands with Forestry: Enoch Hill LCA."

Indirect Effects on the Surrounding Landscape Character

9.6.44 Effects on the *Upland Basin: New Cumnock LCA* is assessed in **Table V9.9**. The remaining LCTs within 10km were either assessed as experiencing less than Moderate and not significant effects in the 2015 ES and 2017 FEI, or are out with the ZTV and have therefore been excluded from this assessment on the basis that the potential effects on these LCTs are not likely to be significant.

9.6.45 In summary, there would be no significant indirect effects on the surrounding landscape character as a result of the Variation Development. This is due mainly to the size and scale of the host LCT which acts as a buffer around the Variation Development, separating it from adjacent areas of more sensitive landscape character. Whilst there would be significant visual effects on the views from the *Upland Basin: New Cumnock LCA* to the north, views of the Variation Development would not be so widespread or sufficiently influential as to significantly change or affect the existing landscape character which includes existing wind farm development.

Table V9.9 Indirect Effects on Surrounding Landscape Character within 10km

Landscape Character Type	Assessment
Upland Basin: New Cumnock LCA	<p>The <i>Upland Basin: New Cumnock LCA</i> forms a low-lying, small-scale landscape, at the head of the upper Nith Valley, which is encircled by surrounding hills with the Southern Uplands to the south, the Foothills with Forest and Opencast Mining to the west, and the East Ayrshire Plateau Moorlands to the north. The <i>Upland Basin</i> is a contemporary rural landscape with a strong mining heritage, the character of which is also influenced by wind farm development. Figure V9.17a indicates a large area of the <i>Upland Basin</i> which contains substantial areas of open-cast mining which has changed the topography and landscape character of this area.</p> <p>The landscape sensitivity of the <i>Upland Basin</i> to wind farm development located within it is considered to be <i>High</i> (turbines >70m) by the EALWCS. However, the western areas have been strongly influenced by open-cast mining, reducing the landscape sensitivity to wind farm development due to its unsettled nature and the extent of large-scale earthworks changing the topography and character of this part of the LCA. Other areas of this landscape include areas of recovered mining and have higher levels of intervening vegetation screening as at Knockshinnoch Lagoons, or include built up areas and woodland in the form of roadside trees, shelter belts, riverside woodland and copses that provide some screening of wider views from the lower lying areas of the <i>Upland Basin</i>. Wider and more open views are available from more elevated areas of the <i>Upland Basin</i> particularly along the edges, being viewed at longer distances, with wide panoramas across the Upland Basin towards the enclosing hills.</p> <p>A small part of this LCT is locally designated as Afton SLCA, indicating High-Medium value. The susceptibility to change due to the introduction of the Variation Development is considered to be Medium as the effects would be indirect and due to the nature of the larger scale views with greater intervening distances, the screening levels from more lowland areas, and the effects of existing and past open cast mining. The</p>

Landscape Character Type	Assessment
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sensitivity is therefore assessed as *Medium*.

Assessment: Variation Development

The Variation Development would be located approximately 2-3km distance to the south of the LCA with the most distant part of the Upland Basin extending to 9-9.5km distance in the north. The ZTV coverage within this area is widespread, although within approximately 2-3km distance, visibility of the Variation Development would be limited by intervening topography and, from elsewhere within the LCA, theoretical visibility would often be reduced by intervening vegetation screening.

Viewpoints 2, 4, 5, and 7 (**Figures V9.28, Figure V9.30-31 and Figure V9.33**) are located within this LCA, although 2, 4, and 5 are not particularly representative and illustrate the views from locations of maximum visibility, ranging from 3-7km distance. Much of this area and the associated southern views are already partly characterised by views of Hare Hill, Afton, High Park Farm and Windy Standard wind farms and the Variation Development would not appear incongruous in that respect, or otherwise significantly affect the overall rural character of this area. The Variation Development would however, be clearly visible in the southern views of the Southern Uplands from this area, where there are clear and open views in that direction. Views in other directions approaching from the south and southwest would not be affected.

The magnitude of change would range from Medium reducing to Negligible and the addition of the Variation Development would lead to a **Moderate** and Not Significant effect. The Variation Development would not add a 'new' characteristic feature to the southern horizon in terms of landscape character or otherwise significantly change or affect the landscape character of this area, although there would be significant visual effects on views from some locations. The nature of these effects would be long-term (reversible) indirect and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites

There are no other existing or consented wind farms within this LCA. Other wind farm development including the existing Hare Hill and Extension (Low magnitude), Afton and Windy Standard (Negligible magnitude), High Park Farm (Medium magnitude), and the consented Pencloe, South Kyle and Taiglim Farm (Medium magnitude) would be, or are visible from this area and have a characterising influence on the southern horizons, the effect of which is Slight and Not Significant. To the west, the consented Over Hill Wind Farm (Low magnitude) would also have a characterising influence on the western parts of the LCA. The Variation Development would overlap with South Kyle and thus mitigate the potential for encirclement as a result of the Variation Development. The additional effect of the Variation Development would be **Moderate** and Not Significant. The combined effect would also be the same at **Moderate** and Not Significant. The nature of these effects would be long-term (reversible), cumulative, indirect and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented + Applications

North Kyle (High magnitude) would be partly located within the *Upland Basin: New Cumnock LCA* and would have a significant effect on the western area of the LCA within 2km of the turbines. Other wind farm applications (Windy Standard Phase III and Sanquhar II) would be visible from the Upland Basin and further reinforce the appearance of wind farm development on the surrounding horizons (ranging from Medium to Low magnitude). The Variation Development would overlap with South Kyle and thus mitigate the potential for encirclement as a result of the Variation Development. The additional effect of the Variation Development would be **Moderate** and Not Significant with the Variation Development overlapping with South Kyle. The combined effect would be **Substantial / Moderate** and Significant (due to North Kyle). The nature of these effects would be long-term (reversible), cumulative, indirect and negative to neutral.

Landscape Designations

- 9.6.46 The only landscape designation within 10km that has been included in this assessment is the locally designated Afton Sensitive Landscape Character Area (SLCA). The remaining landscape designations were either assessed as experiencing less than Moderate and Not Significant effects in the 2015 ES and 2017 FEI, or are outwith the ZTV and have therefore been excluded from further assessment on the basis that the potential effects on these designations are not likely to be significant.

9.6.47 With regard to the special qualities and value of the SLCA, SNH⁷ note that landscapes may be locally valued for many reasons and advise that:

"A wind farm will not necessarily be incompatible with valued qualities of a landscape, this will depend on the nature of the development and the nature of the landscape qualities."

9.6.48 In the same document SNH advise further:

"The key test applied in relation to NSAs, but often employed for other valued landscapes too, is whether impacts would affect the integrity of a valued landscape."

9.6.49 Within their Spatial Planning for On-Shore Wind Turbines Guidance, page 20, SNH also advise that 'landscape accommodation' may be an appropriate approach for wind farms sites in Spatial Planning Group 2 and 3 areas:

"Within local landscape designations and Wild Land Areas, the degree of landscape protection will be less than for National Scenic Areas. In these areas, an appropriate objective may be to accommodate wind farms, rather than seek landscape protection."

And:

"The aim of landscape accommodation is to retain the overall character of the landscape, yet accepting that development may be allowed which will have an impact on the landscape at the local scale. Development fits within the landscape and does not change its character to a significant extent."

9.6.50 The Reporter in the PLI Report (para 2.31) concluded that *"Within the LDP Map 12: Spatial Framework for Wind Energy Development over 50m in height shows the application site as primarily within group 3 (areas with potential for wind energy development) with a small area of class 2 carbon and peatland within the application site but to the east of the proposed turbines – this area would be considered as group 2 (areas of significant protection). Furthermore, part of the north-eastern edge of the application site is within two kilometres of the small settlement of Burnside so falls within the group 2 classification."*

9.6.51 The Landscape Institute (GLVIA 3, paragraphs 5.46-47) further advises as follows:

- *"An internationally, nationally or locally valued landscape does not automatically or by definition have high susceptibility to all types of change."*
- *"It is possible for an internationally, nationally or locally important landscape to have relatively low susceptibility to change resulting from the particular type of development in question, by virtue of both the characteristics of the landscape and the nature of the proposal."*
- *"The particular type of change or development proposed may not compromise the specific basis for the value attached to the landscape."*

Afton SLCA

9.6.52 The vast majority of the Development Site, including all of the proposed turbines, would be located within the Afton SLCA, a local designation. The SLCA area covers the entire Afton Valley as well as the Muirkirk Uplands area to the north of the A76. Viewpoints 1, 4, 6, 12 and B are all located within the SLCA.

9.6.53 SLCA are designated within the Ayrshire Joint Structure Plan (2007) to *"provide protection for high quality landscapes"*. The Development Site and south western edge of the SLCA, is noted from the site surveys to be within sight and sound of open cast mining and overlooks the varied, settled

⁷ Siting and Design Wind Farms in the Landscape, Version 3a, Scottish Natural Heritage (2017).

- landscape of the Upland Basin which includes a mix of agricultural, forestry, mining, wind farm development and settlement, appearing as a 'working rural landscape'.
- 9.6.54 EAC undertook a review of SLCAs in East Ayrshire formalised in the *Background Paper: Sensitive Landscape Areas* (March 2015). Page 3 of this document reflects the SNH guidance noted above, and notes that local landscape designations are not intended to prevent wind energy development.
- "Instead it requires development proposals to fully consider the qualities that make the landscape valuable and to seek sites and design solutions that respect these qualities and minimise adverse impacts."*
- 9.6.55 Originally the designation was based on a sensitivity assessment of landscape character, undertaken as part of the Ayrshire Joint Structure Plan in 1999 and 'whole' landscape character areas were included. That assessment jointly assessed the *Southern Uplands and Southern Uplands with Forestry* as of inherently *Medium / High and Low / Medium* sensitivity respectively, in terms of their landscape resource; scenic quality; unspoilt character; sense of place; and conservation interest.
- 9.6.56 Table 1 of the EAC Background Paper describes the "*Characteristics and Sensitivities of the Landscape Character Areas included within the Sensitive Landscape Area*" describing the key characteristics and why the area is sensitive. The document notes the increased presence of wind farm development and re-confirms the local landscape designation.
- 9.6.57 The document defines the key qualities of the *Southern Uplands LCT* and the *Southern Uplands with Forestry LCT* (in East Ayrshire) which warranted their inclusion within the SLCA as follows:
- the "*well defined, steep-sided hills on the eastern edge of Glen Afton, Blackcraig and Craighbraneoch*" are "*important landmark features*" which provide "*spectacular views*" and which include the area of Southern Uplands to the east of Glen Afton as an important area for recreation and hillwalking.
 - "*the steep sided, rugged open hills of the Southern Uplands form a dramatic backdrop to the adjacent low-lying upland basin, and form an important part of East Ayrshire's southern skyline*".
 - The eastern edge of the Southern Uplands with Forestry however is included to provide "*an important buffer between Glen Afton and the non-forested section of the Southern Uplands, and helps provide a logical boundary to the Sensitive Landscape Area*"

Afton SLCA: Landscape Sensitivity

- 9.6.58 As a local landscape designation, not of the highest or national level, the value of the Afton SLCA is assessed as High to Medium. The susceptibility of this landscape to change is considered to range from High to Medium in reference to the range of LCTs that are located within the SLCA boundary and previously assessed. Taking account of these factors, the overall sensitivity of the Afton SLCA is assessed as *High*.

Primary Assessment of the Variation Development

- 9.6.59 ZTV coverage within the SLCA remains almost constant within 2km of the Variation Development with fragments where there is no theoretical visibility beyond Maneight Hill, Strandlud Hill, Ewe Hill, Hillend Hill and Stony Knowes Hill. Thereafter, theoretical visibility becomes increasingly more fragmentary and is present along the west-facing slopes of the *Southern Uplands LCT* to the east of the Development Site such as those of The Knipe (575m) and Blackcraig Hill (700m), and on the southern slopes of Muirkirk Uplands to the north of the A76. Elsewhere in the SLCA there is fragmented theoretical visibility on west facing slopes and hill summits at higher elevations.

9.6.60 An assessment of the special qualities, drawn from EAC's Background Paper (Table 5), the consultation responses in the 2015 ES, 2017 FEI and 2019 PLI, and further site survey observations, has been used to provide an assessment of the SLCA and the effects of the Variation Development on its special qualities and integrity in accordance with GLVIA3 (page 84). This assessment is set out in **Table V9.10** and paragraphs **9.6.60-63** below.

Table V9.10 Effects on the special qualities of the Afton SLCA

Special Qualities	Assessment
Southern Uplands / Southern Uplands with Forestry: Enoch Hill the Variation Development Site	
<u>Landscape Quality / Condition /and Representativeness:</u>	
Enoch Hill is a relatively well maintained and representative area of <i>Southern Uplands / Southern Uplands with Forestry</i> although it lacks any dramatic or rugged topography and is not a 'landmark hill' or feature. Areas of poorer quality are associated with views of open cast mining and unsympathetic forestry operations.	The value and quality of this attribute is weak and although representative of its character type, the quality and condition of the landscape is not indicative of SLA designation. The Variation Development would have no effect on these physical aspects and would appear as a 'clean' and well-designed scheme with no ground level clutter.
<u>Scenic Quality:</u>	
The landscape of Enoch Hill forms an unremarkable part of an extensive backdrop to the <i>Upland Basin</i> . It is not frequented by hill walkers.	The value and quality of this attribute is weak and not indicative of SLA designation. The Variation Development would have a Moderate effect on the overall backdrop of hills, avoiding the main foci at Afton Glen and the landmark hills are Blackcraig.
<u>Rarity:</u>	
The <i>Southern Uplands / Southern Uplands with Forestry</i> are part of wider landscape character type that extends into Dumfries and Galloway and across much of Southern Scotland. Enoch Hill is unremarkable as part of this wider resource.	The landscape is not 'rare' and the Variation Development would have no effect on this attribute, which is not representative of special quality.
<u>Conservation Interests:</u>	
There are no particular conservation interests at Enoch Hill.	The Variation Development would have no effect on this attribute, which is not representative of special quality.
<u>Recreation Value:</u>	
There are no or limited recreational interests at Enoch Hill (one, unmarked right of way to the north).	The Variation Development would have no effect on this attribute, which is not representative of special quality.
<u>Perceptual Aspects:</u>	
Although an extensive and large scale landscape, Enoch Hill is not particularly remote due to the presence of the <i>Upland Basin</i> , adjacent forestry / wind farm development and the audible and visual presence of mineral development. Perceptual aspects such as a sense of wildness, seclusion or naturalness are limited or not present.	The Variation Development would have no effect on this attribute, which is not representative of special quality.
<u>Historic, Artistic or Cultural Associations:</u>	
Enoch Hill is not noted or 'celebrated' for these associations.	The Variation Development would have no effect on this attribute, which is not representative of special quality.

9.6.61 Much of the sensitivity of the Afton SLCA, is determined by potential effects on the Glen Afton valley. ZTV analysis has determined that the Variation Development would have little to no effect

- on the Glen Afton valley landscape due to the lack of visibility of the proposed turbines. Whilst there would be some views from the summits of landmark hills (Blackcraig Hill) there are no particular opportunities to view the Variation Development against these landmark features and so the qualities of these, which are described as, "*well defined, steep-sided hills*" would not be affected.
- 9.6.62 Similarly, whilst limited sequential views of the Variation Development may be available to the west of the summits of Blackcraig Hill, Hare Hill and Laglass Hill, there would be no visibility to the east of these summits within the wider area of this part of the *Southern Uplands LCT*. It is not considered that the extent of available views would affect the overall experience of walking in the landscape.
- 9.6.63 Although there would be a significant effect on part of the landscape character within the Afton SLCA, the Development Site area and adjacent landscape is not noted in the document as part of the special qualities of the SLCA. The landscape has weakened perceptions of tranquillity and wildness as a result of open cast mining and wind farm development. Whilst certain views available from the "*adjacent low-lying upland basin*" towards the "*backdrop of the Southern Uplands*" would be significantly affected (for example, Viewpoint 4: New Cumnock Cemetery (**Figure V9.30a-e**) and Viewpoint 7 Lochside Hotel [**Figure V9.33a-e**]) field surveys have confirmed that the Variation Development, where visible, would be experienced in a wide visual context or panorama and coinciding with western 'buffer' areas that are less 'dramatic' than the Afton Glen.
- 9.6.64 Although there would be a significant effect on part of the landscape character within the Afton SLCA, it is not considered that the special qualities of the SLCA, its integrity or the reasons for its designation would be significantly affected, and there would be little or no visibility from within the Glen Afton valley, which forms the focus of the SLCA in this area. The Development Site is not well representative of the special qualities and attributes expected for SLCA designation and in many ways this part of the SLCA is unremarkable in landscape designation terms. The magnitude of change is assessed as Low and the level of effect would be **Moderate** and Not Significant. The nature of these effects would be indirect, long-term (reversible), and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites

- 9.6.65 There are a number of wind farms within the Afton SLCA and some on the boundary to the south, east and northeast. These include Hare Hill, Hare Hill Extension, Afton, Pencloe, High Park Farm and Mansfield Mains within the SLCA and Windy Standard, Windy Standard Extension, Sanquhar and Nutberry to the south, east and northeast as well as the consented Windy Rig to the south, South Kyle to the west and Sandy Knowe, Lethans, Glenmuckloch, Penbreck and Kennoxhead to the east. The magnitude of change due to the existing and consented wind farms within and close to the Afton SLCA would range from Medium to Negligible. The additional effects of the Variation Development would remain **Moderate** and Not Significant. The combined cumulative effect would be **Substantial / Moderate** and Significant (due to Afton, Hare Hill and Extension and Pencloe and not the Variation Development). Apart from Hare Hill (subject to its life extension), Afton and Pencloe would be decommissioned ~5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be long-term (reversible), cumulative, and negative.

Cumulative Assessment: Variation Development + Existing + Consented + Applications

- 9.6.66 There are a number of application wind farms within the SLCA. These include Pencloe Variation and Sanquhar II (both Medium magnitude). North Kyle is also located close to the SLCA (Low magnitude). The additional effects of the Variation Development would remain **Moderate** and Not Significant. The combined cumulative effect would be **Substantial / Moderate** and Significant (due to Afton, Hare Hill and Extension, Pencloe / Pencloe Variation and Sanquhar II and not the Variation Development). Apart from Hare Hill (subject to its life extension), Afton and Pencloe would be decommissioned ~5 years prior to the end of the operation of the Variation Development, reducing

this cumulative effect. The nature of these effects would be long-term (reversible), cumulative, and negative.

9.7 Residual Visual Effects

9.7.1 Visual effects are assessed by considering the sensitivity of the receptor (people in the landscape) and the magnitude of change that would affect the view or overall visual amenity. They are defined by the Landscape Institute in GLVIA 3, paragraphs 6.2 as follows:

“An assessment of visual effects deals with the effects of change and development on the views available to people and their visual amenity. The concern here is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the landscape and/or introduction of new elements.”

9.7.2 The type of effect may also be described as temporary or permanent, direct or indirect, cumulative and positive, neutral, or negative. The assessment methodology is set out in **Appendix V9.A**.

9.7.3 The residual visual effects assessed here are those effects remaining after all of the embedded design mitigation and enhancement measures have been taken into account.

9.7.4 The visual assessment has been set out as follows:

- Overview of Visual Effects during Construction, Operation and Decommissioning;
- Visual Effects on Views from Settlements and Residential Properties;
- Visual Effects on Views from Transport Routes;
- Visual Effects on Views from Recreational Routes; and
- Visual Effects on Views from Recreational and Tourist Destinations.

9.7.5 Visualisations of the Variation Development are provided from 14 viewpoint locations and illustrated in **Figures V9.27a-d to V9.50a-c**. Each of the viewpoints are assessed in a separate appendix (**Appendix V9.B**).

9.7.6 The ZTV and viewpoint analysis indicate that the significant visual effects would extend out in a north and northeast direction, primarily affecting views from the Upland Basin, including open views from the A76 and the south western edge of New Cumnock within approximately 7km from the nearest turbine locations (the same threshold as the Consented Development) as indicated by Viewpoints 1, 2, 4, 5, 6 and 7 (**Figures V9.27-28, V9.30-9.33**). Taking a precautionary approach, and drawing from best practice guidance, the visual assessment has therefore been focused on receptors within 10km (the same detailed study area as the Consented Development).

Overview of Visual Effects during Construction, Operation and Decommissioning

9.7.7 The majority of the significant visual effects would be experienced as a result of the proposed turbines, during the operational period and this forms the main focus of the assessment. However, the visual effects associated with the construction and decommissioning phases of the Variation Development and the infrastructure components also have the potential to be significant. The layout of the Variation Development is shown in **Figure V3.3** and is the same as illustrated in the 2017 FEI. In general terms, visual effects associated with the construction phase would increase from Zero at the start of construction, and progressively increase, until they are at the same levels as that predicated for the operational effects once the turbines are constructed.

- 9.7.8 Post construction and during operation, the appearance of the Variation Development would recover a 'calmer' visual character with negligible levels of maintenance activity visible on-site from the nearest visual receptors. It is during this period however, that the majority of significant visual effect would be experienced as a result of the proposed turbines. This is discussed in detail in relation to each of the visual receptor groups within the remainder of this chapter.
- 9.7.9 During decommissioning the Development Site would return to a construction site for a temporary period and as with the construction period, the level of visual effect would be variable according to the location and phase of activity. In overall terms the magnitude would reduce to Negligible with the removal of the turbines and associated above ground infrastructure (including turbines, transformers, mast, control building and substation) thus rendering the visual effects of the Variation Development as predominantly reversible. Those parts of the Variation Development remaining as permanently visible, above ground features within the landscape may include internal wind farm tracks and the Development Site access (that may be used for farming and recreation access). In overall terms the level of visual effect would reduce to Not Significant (Negligible magnitude). The nature of these effects would be permanent, direct, and neutral when compared to the pre-existing baseline landscape of the local area.

Visual Effects on Views from Settlements and Residential Properties

- 9.7.10 Settlements, defined in the EAC and DGC Local Development Plans, within 10km of the Variation Development are identified on **Figure V9.22**. The visual effects likely to be experienced from settlements include consideration of residential areas, the public realm and public open spaces within the settlement boundaries that would be frequented by people.
- 9.7.11 A residential visual amenity assessment (RVAA) has been included for those properties within 2km and the adjacent area as illustrated in **Figure V9.23a** and this is detailed in **Appendix V9.C**.
- 9.7.12 The sensitivity of each of these receptors (people) at settlements and residential properties has been assessed as High.

Visual Effects on Views from Settlements within 10km

- 9.7.13 The visual effects on settlements within 10km including Burnside, Bankglen, Connel Park, Leggate and New Cumnock is described in **Table V9.11**.
- 9.7.14 In summary there would be a significant cumulative visual effect on the views from parts of Burnside and New Cumnock as a result of the Variation Development and other cumulative development. There would be no significant visual effects on any other settlements.
- 9.7.15 ZTV and viewpoint analysis (**Figure V9.22**), and site visits indicate that there would be very limited or no visibility of the Variation Development from the settlements of Dalmellington, Burnside and Skares. Visibility from the settlement of Cumnock (located beyond 10km) would also be limited as illustrated by Viewpoint A (**Figure V9.49a-c**). These settlements were also assessed as Negligible to Zero magnitude in the 2017 FEI and initial assessments reveal that the effect of the Variation Development would be no different. There are therefore excluded from detailed assessment on the basis that effects would be Negligible.

Table V9.11 Visual Effects on Settlements within 10km

Settlement	Assessment
Burnside	Burnside is a collection of approximately 15 houses to the southwest of New Cumnock along the B741 at approximately 3.2km distance to the northeast of the Variation Development. The settlement could be

Settlement**Assessment**

described as having a north-facing aspect, located as it is to the 'foot' of the Southern Uplands further to the south.

Assessment: Variation Development

The blade tip ZTV indicates that residents would potentially view between 13 and 16 turbines, although in practice visibility from the settlement would be restricted to the areas of south-western views up-hill, towards the slopes of the Southern Uplands and the Variation Development, which are not otherwise obstructed by buildings, local landform and vegetation. Where visible, the Variation Development would affect approximately 28° of the horizontal Field of View (FoV) on the background skyline, adding to other wind farm development. Viewpoint 2 (**Figure V9.28a-d**), located near the settlements, indicates that up to 14 turbines (12 hubs) would be partially visible on the horizon with landform screening the lower parts of the turbines, thereby reducing their apparent height. Field survey confirmed that a number of intervening telegraph poles and lamp posts would be visible from the settlement at close range and would appear 'larger' in comparison to the turbines due to the effects of perspective. The magnitude of visual change experienced by residents would be High to Medium. The effect of the Variation Development on views from Burnside would be **Substantial to Substantial / Moderate** and Significant and the nature of these effects would be long-term (reversible), indirect, and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites

There would be simultaneous views with the consented South Kyle Wind Farm (Low to Negligible magnitude) at approximately 4.9km distance. The consented Over Hill Wind Farm would also be visible to the northwest as hubs and blades and the consented Pencloe would be visible as blades to the southeast (both Negligible magnitude). The existing High Park Farm, Hare Hill and its Extension (all Negligible magnitude) would also be visible to the southeast at over 5km distance. Lethans and Glenmuckloch (both Negligible magnitude) would be visible over 10km distance to the northeast. The magnitude of change of existing and consented wind farms would be Low to Negligible. The additional effect of the Variation Development would be **Substantial to Substantial / Moderate** and Significant. The combined cumulative effect would be **Substantial to Substantial / Moderate** and Significant (due to the Variation Development). The nature of these effects would be long-term (reversible), cumulative, and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications

The hubs and blades of North Kyle would be visible to the west (Medium magnitude) at approximately 3.5km distance. Pencloe Variation and blade tips of Sanquhar II would be visible to the southeast (both Negligible magnitude). Lethans Variation (Negligible magnitude) would be visible over 10km distance to the northeast. The magnitude of change of application wind farms would be Medium. The additional effect of the Variation Development would be **Substantial to Substantial / Moderate** and Significant. The combined cumulative effect would be **Substantial to Substantial / Moderate** and Significant (due to the Variation Development and North Kyle). The nature of these effects would be long-term (reversible), cumulative, and negative to neutral.

Bankglen

Bankglen is a small settlement located to the southwest of New Cumnock along the B741 at approximately 4.8km distance to the northeast of the Variation Development.

Assessment: Variation Development

The blade tip ZTV indicates that residents would potentially view between 13 and 16 turbines, although in practice, visibility from the settlement would be restricted to the areas where views towards the Variation Development are not obstructed by buildings, localised landform and vegetation, such as Glen Park. Wirelines indicate that the Variation Development would be theoretically visible with approximately 16 hubs visible affecting a relatively narrow, horizontal FoV on the background skyline, adding to other wind farm development. Field surveys confirmed that roadside and garden vegetation would screen the majority of views from this settlement. The magnitude of visual change experienced by residents would range from Low to Zero. The effect of the Variation Development on views from Bankglen would range from **Moderate to No View** and Not Significant and the nature of these effects would be long-term (reversible), indirect, and negative to neutral. The effect would not be significant due to the overall limited extent of affected settlement as a result of screening by buildings, landform and vegetation.

Cumulative Assessment: Variation Development + Existing + Consented Sites

There will be simultaneous views with the existing Windy Standard and Extension and consented South Kyle wind farms to the south and southwest (all Negligible magnitude) at between 6-9km distance. The consented Pencloe Wind Farm (Low magnitude) would be visible to the south at approximately 5.3km distance. Existing wind farms more visible in other directions include Afton, High Park Farm and Hare Hill

Settlement**Assessment**

(all Low magnitude). Consented wind farms that would be visible to the west and northeast include Over Hill, Lethans and Glenmuckloch (all Low to Negligible magnitude). The magnitude of change of existing and consented wind farms would be Low. The additional effect of the Variation Development would be **Moderate to No View** and Not Significant. The combined cumulative effect would also be **Moderate to No View** and Not Significant. The nature of these effects would be long-term (reversible), cumulative, and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications

Pencloe Variation (Low magnitude) would be visible to the south at approximately 5.3km distance. Sanquhar II (Low magnitude) would be theoretically visible to the southeast at approximately 8km distance. North Kyle would be visible to the west at approximately 5km distance (Low to Negligible magnitude). The magnitude of change of application wind farms would be Low. The additional effect of the Variation Development would be **Moderate to No View** and Not Significant. The combined cumulative effect would also be **Moderate to No View** and Not Significant. The nature of these effects would be long-term (reversible), cumulative, and negative to neutral.

Connel Park

Connel Park is a small settlement located to the southwest of New Cumnock on the B741 at approximately 5.1km distance to the northeast of the Variation Development.

Assessment: Variation Development

The blade tip ZTV indicates that residents would potentially view between 13 and 16 turbines, although in practice visibility from the settlement would be restricted to the areas where views towards the Variation Development are not obstructed by buildings, local landform and vegetation. Sequential Viewpoint 21 (**Figure V9.24I**), indicates that the visibility of the Variation Development would be limited. Where visible, the Variation Development would affect a relatively narrow, horizontal FoV on the background skyline, adding to other wind farm development. The magnitude of visual change experienced by residents would range from Low to Zero. The effect of the Variation Development on views from Connel Park would range from **Moderate to No View** and Not Significant and the nature of these effects would be long-term (reversible), indirect, and negative to neutral. The effect would not be significant due to the overall limited extent of affected settlement as a result of screening by buildings, landform and vegetation.

Cumulative Assessment: Variation Development + Existing + Consented Sites

The consented South Kyle Wind Farm (Low to Negligible magnitude) would be visible behind the Variation Development at approximately 7km distance. The consented Pencloe and existing Afton wind farms would be visible to the south at over 5.6km distance (both Low magnitude). The existing High Park Farm (Low magnitude) and Hare Hill (Negligible magnitude) would also be visible to the southeast at approximately 2.2km and 4km distance respectively, although the contribution would not be significant due largely to the screening of intervening landform. The consented Over Hill Wind Farm would be visible to the west at approximately 7.5km distance (Low to Negligible magnitude). The magnitude of change of existing and consented wind farms would be Low. The additional effect of the Variation Development would be **Moderate to No View** and Not Significant. The combined cumulative effect would also be **Moderate to No View** and Not Significant. The nature of these effects would be long-term (reversible), cumulative, and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications

Sanquhar II (Low magnitude) would be visible to the southeast at approximately 7km distance. Pencloe Variation (Low magnitude) would be visible to the southeast at approximately 5.6km distance. North Kyle would be visible to the west at approximately 6km distance (Negligible magnitude). The magnitude of change of application wind farms would be Low. The additional effect of the Variation Development would be **Moderate to No View** and Not Significant. The combined cumulative effect would also be **Moderate to No View** and Not Significant. The nature of these effects would be long-term (reversible), cumulative, and negative to neutral.

Leggate

Leggate is a small settlement located immediately to the northeast of Connel Park on the B741 at approximately 5.5km distance to the northeast of the Variation Development.

Assessment: Variation Development

The blade tip ZTV indicates that residents would potentially view between 13 and 16 turbines, although in practice visibility from the settlement would be restricted to the areas where views towards the Variation Development are not obstructed by buildings, local landform and vegetation. Wirelines indicate that the Variation Development would be visible with approximately 15 hubs visible affecting a relatively narrow, horizontal FoV on the background skyline, adding to other wind farm development. Field survey confirms

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that built form, roadside vegetation and blocks of mature woodland south and west of Knockshinnoch Farm would screen the majority of views. The magnitude of visual change experienced by residents would range from Zero to Low. The effect of the Variation Development on views from Leggate would range from **Moderate to No View** and Not Significant and the nature of these effects would be long-term (reversible), indirect, and negative to neutral. The effect would not be significant due to the overall limited extent of affected settlement as a result of screening by buildings, landform and vegetation.

Cumulative Assessment: Variation Development + Existing + Consented Sites

The consented South Kyle Wind Farm (Low to Negligible magnitude) would be visible behind the Variation Development at approximately 7km distance. The consented Pencloe and existing Afton wind farms would be visible to the south at over 5.6km distance (both Low magnitude). The existing High Park Farm (Low magnitude) and Hare Hill (Negligible magnitude) would also be visible to the southeast at approximately 2.2km and 4km distance respectively, although the contribution would not be significant due largely to the screening of intervening landform. The consented Over Hill Wind Farm would be visible to the west at approximately 7.5km distance (Low to Negligible magnitude). The magnitude of change of existing and consented wind farms would be Low. The additional effect of the Variation Development would be **Moderate to No View** and Not Significant. The combined cumulative effect would also be **Moderate to No View** and Not Significant. The nature of these effects would be long-term (reversible), cumulative, and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications

Sanquhar II (Low magnitude) would be visible to the southeast at approximately 7km distance. Pencloe Variation (Low magnitude) would be visible to the southeast at approximately 5.6km distance. North Kyle would be visible to the west at approximately 6km distance (Negligible magnitude). The magnitude of change of application wind farms would be Low. The additional effect of the Variation Development would be **Moderate to No View** and Not Significant. The combined cumulative effect would also be **Moderate to No View** and Not Significant. The nature of these effects would be long-term (reversible), cumulative, and negative to neutral.

New Cumnock

New Cumnock is a small town located along the A76 trunk road south of Cumnock at approximately 6.2km distance to the northeast of the Variation Development. The settlement is located at the 'foot' of the Southern Uplands with a north facing aspect, viewing across the Upland Basin to the north.

Assessment: Variation Development

Viewpoint 4: New Cumnock Cemetery (**Figure V9.30a-e**) is located close to the settlement boundary of New Cumnock at approximately 6.2km distance from the nearest turbine. The effect is assessed (**Appendix V9.B**) as **Substantial / Moderate to Moderate** and Significant.

The blade tip ZTV for New Cumnock indicates that residents would potentially view between Zero and 16 turbines although in practice visibility from the settlement would be restricted to the areas on the south western edges of the settlement, viewing across the lower slopes of the Southern Uplands where views towards the Variation Development are not obstructed by buildings, local landform and vegetation. Wirelines indicate that the Variation Development would be visible across the horizon. Where visible, the Variation Development would affect a relatively narrow, horizontal FoV on the background skyline, adding to other wind farm development. The overall magnitude of change experienced by residents would be Low to Zero, however, areas of greatest visibility would be from Connel View and the Cemetery (Medium magnitude). The effect of the Variation Development on views from New Cumnock would range from **Moderate to No View** and Not Significant. There would however be significant visual effects on the views from Connel View and the Cemetery (**Substantial / Moderate** and Significant). The nature of these effects would be long-term (reversible), indirect, and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites

The consented South Kyle Wind Farm (Low magnitude) would be visible behind the Variation Development at approximately 7.5km distance. There would also be simultaneous views with the consented Pencloe Wind Farm at approximately 5km distance (Medium-Low magnitude), the existing Afton (Low-Negligible magnitude of change) and Windy Standard and Extension (both Negligible magnitude). Mansfield Mains (Negligible magnitude) would be visible at approximately 3km distance to the northeast. The consented Over Hill (Low magnitude) would be visible at approximately 9km distance to the west and the consented Lethans and Glenmuckloch (both Negligible magnitude) wind farms would be visible over 8km distance to the northeast. The magnitude of change of existing and consented wind farms would be Medium. The additional effect of the Variation Development would be **Moderate to No View** and Not Significant, with significant visual effects (**Substantial / Moderate**) from Connel View and the Cemetery. The combined cumulative effect would be **Substantial / Moderate** and Significant (due to the Variation Development and

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Pencloe) to **No View** and Not Significant. The nature of these effects would be long-term (reversible), cumulative, and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications

Pencloe Variation (Medium-Low magnitude) would be visible at approximately 5km distance to the southwest. North Kyle (Medium magnitude) would be visible at approximately 4km distance to the west. Sanquhar II (Negligible magnitude) would be theoretically visible as blade tips to the southeast. The magnitude of change of application wind farms would be Medium. The additional effect of the Variation Development would be **Moderate to No View** and Not Significant, with significant visual effects (**Substantial / Moderate**) from Connel View and the Cemetery. The combined cumulative effect would be **Substantial / Moderate** and Significant (due to the Variation Development, Pencloe / Pencloe Variation and North Kyle) to **No View** and Not Significant. The nature of these effects would be long-term (reversible), cumulative, and negative to neutral.

Residential Visual Amenity Assessment

- 9.7.1 Of the 24 properties included in the assessment, **none** would be significantly affected by the Variation Development, and **none** would be unacceptably affected in terms of their residential visual amenity.
- 9.7.2 The assessment is reported in **Appendix V9.C** and summarised as follows:
- There are no residential properties within 2km of the proposed turbines;
 - Of the 24 properties included in the assessment, six would be experience a Moderate and Not Significant effect, one would experience a Moderate / Slight and Not Significant effect whilst 11 would experience a Slight and Not Significant effect, and four would have **no view** of the Variation Development; and
 - Within the wider vicinity there are two further residential properties just beyond 3km, but these would not be significantly affected.
- 9.7.3 The experience of a significant view of the Variation Development is not the same as an unacceptable effect or indicative of a failure in terms of maintaining residential amenity. In terms of residential visual amenity, the RVAA concludes that the Variation Development would not have an overbearing effect or otherwise affect the living standards of individual properties such that any of these would become an unattractive place to live (as opposed to less attractive) when judged objectively, and in the public interest. This is due largely to the intervening distance, topographical or vegetation screening and use / orientation of the property, such that the living standards would not be affected and the property would not be adversely affected by 'visual dominance' that it would become an unattractive place to live when judged objectively and in the public interest, on a solus basis or cumulatively.

Visual Effects on Views from Transport Routes

- 9.7.4 This section of the assessment considers the visual effects on views from the transport routes within 10km. Those routes which are overlapped by the ZTV and included in the assessment are listed as follows:
- A76 between Cumnock and east of New Cumnock;
 - A713 Galloway Tourist Route between Waterside and Dalmellington (the road is outwith ZTV further south);
 - B741 between Auchenroy and New Cumnock; and

- Glasgow to Carlisle railway line near New Cumnock.
- 9.7.5 The views from these routes would be experienced transiently by road users (mainly drivers and where appropriate cyclists and walkers) who would experience the Variation Development as part of the changing sequence of views experienced from the road. Each of these routes were driven or travelled in both directions in order to assess the potential effects and each assessment has been assisted on site with the use of sequential wirelines transects, ZTV maps and True View Visuals 3D augmented reality software. The assessment has also taken account of other wind farms visible from these routes.
- 9.7.6 The Afton Road between New Cumnock and Burns Cairn has been included in the assessment of recreational routes as it is overlapped by Core Path C10: Coalfield Cycle Route, a Heritage Path and a Scottish Hill Track.
- 9.7.7 Two minor roads in the vicinity of the Variation Development, namely the part of the C36 Road between Cumnock and New Cumnock and the minor road between B741 at Littlemark and Garallan Bridge on Skares Road (B7046) are no longer accessible due to the open cast mining operations now occupying the road area. Restoration plans for the open cast mining operations were available. However, the detail of how the roads will be reinstated and the timeframe for reinstatement are unknown. They have therefore been excluded from the assessment.
- 9.7.8 In summary, there would be significant visual effects on the views from one road, the B741 within approximately 4.5km distance of the Variation Development, affecting the views intermittently over approximately 2km in total.
- 9.7.9 None of the other transport routes would be significantly affected by views of the Variation Development. The Variation Development would be visible from the A76 and railway line when approaching New Cumnock from the north and east within the 10km study area. These views would be experienced intermittently and transiently, from a moving position, experienced as part of a much wider context, with the views restricted to southbound users and for these reasons the visual effects are not assessed as significant.

Table V9.12 Visual Effects on Views from Transport Routes

Transport Route	Assessment
A76 between Cumnock and east of New Cumnock (overlaps with the Burns Heritage Trail)	<p>The A76 runs northwest-southeast from Kilmarnock to Dumfries in the wider study area, and forms part of the Burns Heritage Trail. The section of the route within 10km of the Variation Development has been sequentially assessed between Cumnock and east of New Cumnock as illustrated in Figures V9.25a-f. The route passes to the northeast of the Variation Development at approximately 6.4km distance at its closest point at New Cumnock.</p> <p>Although the route forms part of the Burns Heritage Trail, there are no heritage features of interest along this part of the route. The route also passes through the Afton SLCA to the east of New Cumnock indicating a High to Medium value. Most of the road users would experience the landscape transiently whilst driving or cycling and experiencing a sequence of views, often in one direction focused on the direction of travel and often experienced at speed (Medium susceptibility). As a result, the overall sensitivity of this route is assessed as <i>Medium</i>.</p> <p><u>Assessment: Variation Development</u></p> <p>This section of the route within 10km is approximately 8.8km in length and whilst there would be widespread theoretical visibility of the Variation Development as illustrated by the ZTV, in reality, intervening vegetation, roadside cuttings and built form would reduce this as described below. Any potential views of the Variation Development would be experienced obliquely when travelling southeast and south from Cumnock towards New Cumnock at between approximately 6.4 and 10km distances from the Variation Development. Where visible, the Variation Development would affect a relatively narrow, horizontal FoV on the background skyline, adding to other wind farm development. Each of the sequential viewpoints illustrated in Figures V9.25a-f are described as part of the assessment as follows:</p>

Transport Route**Assessment****Sequential Viewpoints 1 and 2: Burnton and East Polquhirter, east of New Cumnock (Figure V9.25b)**

Travelling west from the edge of the 10km study area, there would be theoretical visibility between Burnton and West Polquhirter, although this would amount to blade tip visibility which would in practice be screened by roadside vegetation and dry-stone walls. There would be no theoretical visibility between West Polquhirter and the eastern edge of New Cumnock. The magnitude of would be Negligible to Zero.

Sequential Viewpoints 3 and 4: New Cumnock (Figure V9.25c)

There would be widespread theoretical visibility along the A76 through most of New Cumnock, however, the vast majority of views from the route within New Cumnock would be entirely screened by the built form and garden vegetation (Viewpoint 3). Glimpses of the Variation Development may be available from the section of the route near New Cumnock train station (Viewpoint 4). The magnitude of would range from Low to Zero.

The remainder of the route within 10km would experience views of the Variation Development, where available, but only when travelling southeast from Cumnock towards New Cumnock.

Sequential Viewpoint 10: south of Cumnock (Figure V9.25f)

Travelling southeast from Cumnock, the Variation Development would be theoretically visible for approximately 1.2km distance from the southern edges of Cumnock (near the minor road to Logan) to Borland by the reservoirs. There would be occasional screening by roadside vegetation and built form, but in general clear or partial views of the Variation Development would be available across the horizon at a between approximately 9.6-10km distances. The magnitude of change would range from Low to Zero.

Sequential Viewpoints 5 to 9: Borland to northwest of New Cumnock (Figures V9.25d-f)

From Borland there is no visibility for approximately 300m. Beyond this, the Variation Development would theoretically be visible for approximately 5.8km distance up to where it reaches New Cumnock. Within that stretch of road, intermittent, clear views, of the Variation Development would be available when not screened by the roadside vegetation, cuttings and built form at between approximately 6.4-9.1km distances. The magnitude of change would range from Medium to Zero.

In summary, the overall magnitude of change would range from Medium to Zero and the effect would range from **Moderate to No View** and Not Significant. The effect would not be significant due to a number of factors including the transient nature of the views, intermittent screening by roadside vegetation, landform and / or built form, presence of other wind farms and the overall limited extent of visibility of the Variation Development within 10km. The nature of these effects would be long-term (reversible), indirect, and negative to neutral.

Cumulative Assessment: Existing + Consented Sites

A number of existing wind farms would be visible in the same view as the Variation Development including High Park Farm (Medium to Low magnitude), Afton (Low to Negligible magnitude), and Windy Standard and Extension (both Negligible magnitude). The consented South Kyle Wind Farm would be visible in conjunction with the Variation Development along most of the route such that the Variation Development would be seen as an extension to the fore of South Kyle (Medium to Low magnitude). The consented Pencloe (Medium to Low magnitude) and Windy Rig (Negligible magnitude) would also often be seen in the same views as the Variation Development. Other wind farms visible include the existing Hare Hill Wind Farm and Extension (Low to Negligible magnitude) and the consented Glenmuckloch, Lethans, Over Hill, Mansfield Mains and Taiglim Farm (all Negligible magnitude).

The additional effect of the Variation Development would remain **Moderate to No View** and Not Significant. The combined effect would also be **Moderate to No View** and Not Significant. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.

Cumulative Assessment: + Existing + Consented Sites + Applications

Parts of Sanquhar II and all of Pencloe Variation (both Medium to Low magnitude) would be visible in the same views as the Variation Development. North Kyle would occasionally be visible in views to the southwest (Low magnitude). The blade tips of Windy Standard Phase III and Lethans Variation (both Negligible magnitude) would be visible to the southwest and east. The additional effect of the Variation Development would remain **Moderate to No View** and Not Significant. The combined effect would also be **Moderate to No View** and Not Significant. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.

A713 Galloway Tourist Route between

The A713 forms part of the Galloway Tourist Route (148km in length) which is routed between Ayr and Gretna. Within the 10km study area, the A713 is routed between south of Waterside and Brockloch, at a

Transport Route**Assessment****Waterside and Dalmellington**

distance of approximately 6.8km at its closest point to the Variation Development.

As a nationally promoted tourist route, the value of the route is assessed as High. The route also passes through the Doon Valley SLCA and Galloway Hills RSA indicating a high value. The susceptibility to change from the introduction of the Variation Development is considered to be High to Medium and the sensitivity of this route is therefore assessed as *High*.

Assessment: Variation Development

There would be theoretical visibility of the Variation Development between 8.5-10km distances affecting views between south of Waterside and Dalmellington. Site survey confirms that roadside vegetation and forestry to the east would screen the majority of these views. There would be no visibility of the Variation Development south from Dalmellington as illustrated in the ZTV. The magnitude of change would range from Low to Zero and the effect would range from **Moderate to No View** and Not Significant. The effect would not be significant due to a number of factors including the transient nature of the views, intermittent screening by roadside vegetation and forestry, landform and / or built form and the overall limited extent of visibility of the Variation Development within 10km. The nature of these effects would be long-term (reversible), indirect and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites

The existing Dersalloch Wind Farm (Low to Zero magnitude) would be visible from part of the Doon Valley, north of Dalmellington. The consented South Kyle Wind Farm would be visible in the same view as the Variation Development (Low to Zero magnitude). The consented Benbrack Wind Farm would be visible as blades and tips near Dalmellington, however, it would be most visible near Lamford to the south of Dalmellington (where the Variation Development would not be visible) (High to Medium to Zero magnitude). The additional effect of the Variation Development would remain **Moderate to No View** and Not Significant. The combined effect would be **Substantial to Substantial / Moderate** and Significant (due to Benbrack and not the Variation Development) to **No View** and Not Significant. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications

North Kyle would be theoretically visible to the northeast as blades and tips, subject to roadside and intervening vegetation. Blades / tips from Windy Standard Phase III would be theoretically visible to the southeast (both Negligible to Zero magnitude). The additional effect of the Variation Development would remain **Moderate to No View** and Not Significant. The combined effect would be **Substantial to Substantial / Moderate** and Significant (due to Benbrack and not the Variation Development) to **No View** and Not Significant. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.

B741 between Auchenroy and New Cumnock

The B741 connects New Cumnock to Girvan. The section of the route within 10km of the Variation Development has been sequentially assessed between Auchenroy and New Cumnock as illustrated in **Figures V9.24a-I**. The route passes to the north of the Variation Development at approximately 2km distance at its closest point at Maneigh. Viewpoints 1 and 2 (**Figures V9.27a-d and V9.28a-d**) are located along this route.

The route passes through the Doon Valley SLCA and the edge of the Afton SLCA indicating a High to Medium value. Most of the road users would experience the landscape transiently whilst driving or cycling and experiencing a sequence of views, often in one direction focused on the direction of travel and often experienced at speed (Medium susceptibility). A number of pedestrians have been noted along the route at New Cumnock and Dalmellington during site visits, however, outside the settlements and for the majority of the route no walkers have been noted. As a result, the overall sensitivity of this route is assessed as *High to Medium*.

Assessment: Variation Development

Visibility of the Variation Development along this route would tend to be limited to the upper parts of the turbines, experienced intermittently and obliquely from a moving position along the road and subject to further intermittent screening from vegetation and built form at between approximately 2-10km distance. Each of the sequential viewpoints illustrated in **Figures V9.24a-I** are described as part of the assessment as follows:

Sequential Viewpoints 1 to 4: Auchenroy to Dalmellington (Figures V9.24b-c)

Travelling east from Auchenroy towards Dalmellington, the route would be within ZTV coverage for approximately 2km. All of the proposed turbines would be theoretically visible for approximately 550m along the road at between approximately 9.5-10km distance, although roadside vegetation and / or forestry would screen most of these views. The magnitude of change would range from Low to Negligible.

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At Dalmellington for about 650m, the B741 follows the route of the A713 Galloway Tourist Route (assessed above) (Negligible to Zero magnitude).

Sequential Viewpoints 5 to 10: Dalmellington to the new Electrical Substation (Figures V9.24d-f)

There would be very limited visibility (blade tips) of the Variation Development from this section of the route due to the screening effects of landform and roadside vegetation and / or forestry. The magnitude of change would range from Negligible to Zero.

Sequential Viewpoints 11 to 12: from the new Electrical Substation Meiklehill (Figure V9.24g)

There would be very limited / no visibility of the Variation Development from this section of the route due to the screening effects of forestry (Negligible to Zero magnitude). However, in the event of forestry felling the Variation Development would be theoretically visible, with up to 16 of the upper parts of the turbines visible at approximately 2-3km distance (Medium to Negligible magnitude).

Sequential Viewpoints 13 to 14: Meiklehill to Polmathburn Bridge (Figure V9.24h)

The route of the B741 would be outwith the ZTV between Nith Lodge and Maneight Farm for approximately 830m distance (Zero magnitude). From Maneight Farm there would be theoretical visibility of the Variation Development (Low to Negligible magnitude) reducing further as the forestry matures.

Viewpoint 1 (Figure V9.27a-d) is located beyond this point near Polmathburn Bridge where up to 13 turbines would be visible to the southeast at approximately 2.2km distance (Medium magnitude). Beyond this point the turbines would gradually disappear behind the intervening Peat Hill (Zero magnitude). The overall magnitude of change would range from Medium to Zero.

Sequential Viewpoints 15 to 16: west of Knockburnie to Marshallmark (Figure V9.24i)

The road would be outwith the ZTV for approximately 1.1km distance with some partial visibility as illustrated at Viewpoint 15 and visibility at Viewpoint 16. Apart from the built form and associated roadside vegetation at Knockburnie there would be relatively open views. The magnitude of change would range from Medium-Low to Zero.

Sequential Viewpoints 17 to 20: Marshallmark to Bankglen (Figures V9.24j-k)

Riparian woodland along Dalleagles Burn, Straid Burn and Redhall Burn, as well as built form at Dalleagles and Straid Farm, with associated vegetation, would screen most views of the Variation Development allowing only brief and occasional glimpses of the upper parts of turbines.

Travelling southwest, clear views would be available from a short stretch of the road southwest of Burnside. Viewpoint 2 (Figure V9.28a-d) is located at this point where up to the upper parts of 15 turbines would be visible at approximately 3.2km distance. Built form would screen most views from Burnside, however clear open views at mid-range (4km) would be available from the elevated section of the road northeast of Burnside around Cascaya and south of Bankglen for approximately 2km distance when travelling southwest. The magnitude of change would be High-Medium to Zero.

Sequential Viewpoints 21 to 22: Bankglen to New Cumnock (Figure V9.24l)

There would be theoretical visibility of the turbines between New Cumnock and Bankglen when travelling southwest. Views from the outskirts of New Cumnock and the settlements of Leggate, Connel Park and Bankglen would be limited to occasional glimpses of the turbines at between approximately 5-6.4km distance due to intervening built form and vegetation. In between the settlements, clear and open views of the Variation Development would be available at between approximately 5-6.4km distance. The magnitude of change would range from Medium / Medium-Low to Zero.

In summary, the overall magnitude of change would range from High-Medium to Zero and the effect would range from **Substantial to Substantial / Moderate** and Significant (for approximately 2km where there are clear views from at approximately 4.5km distance, largely only affecting the areas around Burnside and New Cumnock) to **No View** and Not Significant. The nature of these effects would be long-term (reversible), indirect, and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites

A number of existing and consented wind farms are visible from parts of this route. The existing Windy Standard and Extension and Afton wind farms are occasionally visible to the southwest of New Cumnock (Low to Negligible magnitude). The consented South Kyle Wind Farm would be frequently visible in the same views as the Variation Development. From most sections, this neighbouring scheme (Medium to Zero magnitude) is visible in front of, or behind, as well as to the side of the Variation Development additionally extending the horizontal angle of view. The consented Pencloe Wind Farm would occasionally be visible in

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the same views as the Variation Development (Medium to Zero magnitude). The consented Over Hill Wind Farm would be visible to the northwest (Medium to Zero magnitude). Other visible wind farms include the existing High Park Farm, Hare Hill and Extension, Dersaloch, Mansfield Mains and Bankend Rig (all Low to Zero magnitude). The consented Polquhairn, Penbreck, Lethans and Taiglim wind farms (all Negligible to Zero magnitude) would also be theoretically visible from parts of this route within 10km. The additional effect of the Variation Development would remain **Substantial to Substantial / Moderate** and Significant to **No View** and Not Significant. The combined effect would be **Substantial to Substantial / Moderate** and Significant (due to the Variation Development, South Kyle, Pencloe and Over Hill) to **No View** and Not Significant. South Kyle, Pencloe and Over Hill would be decommissioned approximately 5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications

North Kyle would be visible to the northwest at close proximity to the route (High to Zero magnitude). Pencloe Variation and Sanquhar II would occasionally be visible in the same views as the Variation Development (both Medium to Zero magnitude). Lethans Variation (Negligible to Zero magnitude) would also be theoretically visible to the northeast from parts of this route towards New Cumnock. The additional effect of the Variation Development would remain **Substantial to Substantial / Moderate** and Significant to **No View** and Not Significant. The combined effect would be **Substantial** and Significant (due to the Variation Development, South Kyle, Pencloe, Over Hill, North Kyle, Pencloe Variation and Sanquhar II) to **No View** and Not Significant. South Kyle, Pencloe and Over Hill would be decommissioned approximately 5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.

Glasgow to Carlisle Railway Line

The Glasgow to Carlisle railway line is located to the northeast of the Variation Development at approximately 7.2km distance at its closest point. The route passes through the Afton SLCA to the east of New Cumnock indicating a High to Medium value. Rail users would experience the landscape transiently, experiencing a sequence of views, often in the direction of travel and often experienced at speed (Medium susceptibility). As a result, the overall sensitivity of this route within 10km is assessed as *Medium*.

Assessment: Variation Development

ZTV coverage indicates that up to 16 turbines would be theoretically visible from the majority of the route within 10km. Clear, open views of the turbines would be available from much of this part of the route. In practice, the turbines would only be viewed by passengers viewing from sections of the railway line that would be broadly perpendicular to the Variation Development and not subject to intervening screening of landform, cuttings, vegetation and built form. Where visible, the Variation Development would affect a relatively narrow, horizontal FoV on the background skyline, adding to other wind farm development. The magnitude of change would range from Medium to Zero and the effect would be **Moderate to No View** and Not Significant. The effect would not be significant due to a number of factors including the transient nature of the views, intermittent screening by vegetation, cutting, landform and / or built form, presence of other wind farms and the overall limited extent of visibility of the Variation Development within 10km. The nature of these effects would be long-term (reversible), indirect, and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites

A number of existing wind farms would be visible in the same view as the Variation Development including High Park Farm (Medium to Low magnitude), Afton (Low to Negligible magnitude), and Windy Standard and Extension (both Negligible magnitude). The consented South Kyle Wind Farm would be visible in conjunction with the Variation Development along most of the route such that the Variation Development would be seen as an extension to the fore of South Kyle (Medium to Low magnitude). The consented Pencloe (Medium to Low magnitude) and Windy Rig (Negligible magnitude) would also often be seen in the same views as the Variation Development. Other wind farms visible include the existing Hare Hill Wind Farm and Extension (Low to Negligible magnitude) and the consented Glenmuckloch, Lethans, Over Hill, Mansfield Mains and Taiglim Farm (all Negligible magnitude).

The additional effect of the Variation Development would remain **Moderate to No View** and Not Significant. The combined effect would also be **Moderate to No View** and Not Significant. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications

Parts of Sanquhar II and all of Pencloe Variation (both Medium to Low magnitude) would be visible in the same views as the Variation Development. North Kyle would occasionally be visible in views to the southwest (Low magnitude). The blade tips of Windy Standard Phase III and Lethans Variation (both

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Negligible magnitude) would be visible to the southwest and east. The additional effect of the Variation Development would remain **Moderate to No View** and Not Significant. The combined effect would also be **Moderate to No View** and Not Significant. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.

Visual Effects on Views from Recreational Routes

- 9.7.10 The visual assessment has considered the potential visual effects likely to be experienced by people (walkers / cyclists / horse riders / joggers / others) on recreational routes within the Study Area. It has been split into local routes on the Core Path Network (rights of way and core paths) within 10km, sourced from DGC and EAC, and recorded Scottish Hill Tracks and Heritage Paths within 10km, promoted by the ScotWays. National or regional long-distance routes and Sustrans cycle routes have been assessed within 35km.
- 9.7.11 Each of these routes were walked and / or visited and walked in sections according to the ZTV coverage and the assessment has been assisted on site with the use of sequential wirelines and True View Visuals 3D software.
- 9.7.12 All of the routes have been assessed as of *High* sensitivity on account of their High to Medium value as recreational routes, often routed through locally designated landscapes and the High susceptibility of the people using these routes, mostly walkers and cyclists, whose attention would be focused on the landscape around them.
- 9.7.13 The routes are illustrated in **Figures V9.20-21**, assessed in **Table V9.13** and listed as follows:
- Core Paths and Rights of Way included in the assessment:
 - ▶ EAC Core Path No. C12: New Cumnock Circular;
 - ▶ EAC Core Path No. C10: Coalfield Cycle Route;
 - ▶ EAC Core Path No. C11: Knockshinnoch Lagoons (part of Knockshinnoch Lagoons);
 - ▶ Rights of Way (numbered 'a-g' on **Figure V9.21**) d and e. Routes a, b, c, f and g are scoped out as described below; and
 - ▶ Additional Rights of Way around New Cumnock and Lochside Hotel.
 - Heritage Paths and Scottish Hill Tracks:
 - ▶ Heritage Path and Scottish Hill Track 84: Afton Road (also part Core Path C10: Coalfield Cycle Route).
- 9.7.14 The Burns Heritage Trail and A713 Galloway Tourist Route are assessed in **Table V9.12** above.
- 9.7.15 In summary, significant visual effects would affect views from parts of the following recreational routes:
- EAC Core Path No. C12: New Cumnock Circular;
 - EAC Core Path No. C10: Coalfield Cycle Route (partly overlapped by Scottish Hill Track 84: Afton Road, part of the New Cumnock Path Network);
 - Right of Way 'd': which accesses the Development Site;
 - Right of Way 'e' between Afton Road and EAC Core Path No. 12; and
 - A small number of additional Rights of Way around New Cumnock and Lochside Hotel.

9.7.16

A number of routes on **Figures V9.20-21** have been excluded from the assessment as follows:

- DGC Core Path No. 667: Water of Deugh Trail – located largely outside the ZTV with any views of the Variation Development beyond the consented South Kyle Wind Farm;
- EAC Core Path No. C13: Castle Path - follows the wooded River Afton with very limited to no visibility of the Variation Development;
- EAC Core Path No. C14: Glen Afton - coincides with the New Cumnock Community Paths (Afton Water Route) and has no visibility of the Variation Development due to a combination of vegetation, landform and / or built form;
- All recreational routes (Core Paths, Rights of Way, Scottish Hill Tracks and Heritage Paths) around Dalmellington and Bellsbank located largely outside the ZTV with any views of the Variation Development beyond the consented South Kyle Wind Farm;
- Rights of Way are otherwise compromised by opencast mining or routed partly through forestry (Routes a, b and c) or existing wind farm development (Routes f and g) and as a consequence would not be significantly affected by the Variation Development; and
- Other long-distance recreational routes such as the River Ayr Way, Southern Upland Way, Ayrshire Coastal Path, Sustrans Cycle Routes and other regional routes - located largely outside the ZTV with any views of the Variation Development over 14km and, where visible, in the same view as existing and consented wind farms.

Table V9.13 Visual Effects on Views Recreational Routes

Receptor	Description of Effects
EAC Core Path No. C12: New Cumnock Circular	<p>The EAC Core Path No. 12 is located at approximately 3.9km distance at its closest point to the Variation Development. The route starts at the junction of the B741 with Boig Road west of New Cumnock and follows a loop round the southern edges of Bankglen, then through Cascaya, Lanemark, Hungry Hill before re-joining the B741 back at Bankglen.</p> <p><u>Assessment: Variation Development</u> ZTV coverage indicates that views of the Variation Development would be available from the majority of this route except from Bankglen where built form and vegetation would screen views of the turbines. The B741 sequential viewpoint 20 (Figure V9.24k) is located close to this route where it crosses the B741 which illustrates that the upper parts of all 16 turbines would be visible, affecting a relatively narrow, horizontal FoV on the background skyline, adding to other wind farm development. The magnitude of change would range from Medium to Zero and the effect would be Substantial / Moderate and Significant to No View and Not Significant. The nature of these effects would be long-term (reversible) indirect and negative to neutral.</p> <p><u>Cumulative Assessment: Variation Development + Existing + Consented Sites</u> The existing Windy Standard and Extension wind farms would be visible in the same view to the south (both Low-Negligible to Zero magnitude) at approximately between 7-8.2km distance. Afton would also be visible to the south at approximately 6km distance (Low to Zero magnitude). The consented South Kyle and Pencloe wind farms (both Medium to Zero magnitude) would be visible in the same view to the south and southwest at approximately between 4-5.4km distance. The consented Over Hill (Medium to Zero magnitude) would be visible to the west at approximately 4km distance. The existing High Park Farm (Low to Zero magnitude) and the existing Hare Hill and Extension wind farms (both Low-Negligible to Zero magnitude) would be visible to the southeast at approximately between 2.8-5km distance. Other wind farms visible including Mansfield Mains, Taiglim Farm, Lethans and Glenmuckloch would be of Negligible magnitude due to intervening landform, built form and / or vegetation. The additional effect of the Variation Development would remain Substantial / Moderate and Significant to No View and Not Significant. The combined effect would be Substantial / Moderate and Significant (due to the Variation Development, South Kyle, Pencloe and Over Hill) to No View and Not Significant. South Kyle, Pencloe and Over Hill would be decommissioned approximately 5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be long-term</p>

Receptor

Description of Effects

(reversible), indirect, cumulative and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications

North Kyle would be visible to the west at approximately 3.5km distance to the route (High-Medium to Zero magnitude). Pencloe Variation and Sanquhar II would occasionally be visible to the south and southeast (both Medium to Zero magnitude). Lethans Variation (Negligible to Zero magnitude) would also be theoretically visible from parts of this route. The additional effect of the Variation Development would remain **Substantial / Moderate** and Significant to **No View** and Not Significant. The combined effect would be **Substantial to Substantial / Moderate** and Significant (due to the Variation Development, South Kyle, Pencloe, Over Hill, North Kyle, Pencloe Variation and Sanquhar II) to **No View** and Not Significant. South Kyle, Pencloe and Over Hill would be decommissioned approximately 5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.

EAC Core Path No. C10: Coalfield Cycle Route (partly overlaps with and Scottish Hill Track 84: Afton Road, part of the New Cumnock Path Network)

The EAC Core Path No. 10 is located at approximately 4.2km distance at its closest point to the Variation Development. It is a long 22km route within 10km, following a C road north of Glaisnock Moss to Connel Park, after which it passes through the south western edge of New Cumnock and follows Afton Road until Afton Reservoir. Heritage Path and Scottish Hill Track 84: Afton Road overlaps with this route along Afton Road. A section of the New Cumnock Path Network also overlaps with this route along Afton Road near the cemetery.

Assessment: Variation Development

The majority of the route south of New Cumnock along Afton Road is outwith the ZTV. However, a short stretch near New Cumnock Cemetery overlaps with the ZTV where the Variation Development would be visible as illustrated by Viewpoint 4 (**Figure V9.30a-d**) (Medium magnitude). Between New Cumnock and Connel Park, visibility would be limited due to intervening screening by landform, vegetation and / or built-form (Low to Zero magnitude). From north of Connel Park, visibility would be limited due to rising landform of Hungry Hill, and intermittent vegetation along the route. However, where visible, the turbines would be seen on the horizon beyond the opencast workings (Medium to Zero magnitude). The Variation Development would affect a relatively narrow, horizontal FoV on the background skyline, adding to other wind farm development. The magnitude of change would range from Medium to Zero and the effect would be **Substantial / Moderate** and Significant to **No View** and Not Significant. The nature of these effects would be long-term (reversible) indirect and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites

The existing Windy Standard and Extension wind farms would be visible to the south and west from parts of the route (both Low-Negligible to Zero magnitude). Afton would also be visible to the south, most prominent along southern parts of Afton Road and as it passes through the wind farm (High to Zero magnitude). The consented South Kyle and Pencloe wind farms (both Medium to Zero magnitude) would be visible in the same view to the south and southwest. The consented Over Hill (Medium to Zero magnitude) would be visible to the west. The existing High Park Farm (Low to Zero magnitude) and the existing Hare Hill and Extension wind farms (both Low-Negligible to Zero magnitude) would be visible to the southeast and east. Other wind farms visible including Mansfield Mains, Taiglim Farm, Lethans and Glenmuckloch would be of Negligible magnitude due to intervening landform, built form and / or vegetation. The additional effect of the Variation Development would remain **Substantial / Moderate** and Significant to **No View** and Not Significant. The combined effect would be **Substantial / Moderate** and Significant (due to the Variation Development, Afton, South Kyle, Pencloe and Over Hill) to **No View** and Not Significant. South Kyle, Pencloe and Over Hill would be decommissioned approximately 5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications

North Kyle would be visible to the west from northern sections of the route (High-Medium to Zero magnitude). Pencloe Variation would occasionally be visible to the south and west (Medium to Zero magnitude). Sanquhar II would be visible from most sections of this route, most prominent along the southern parts of Afton Road (High to Zero magnitude). Lethans Variation (Negligible to Zero magnitude) would also be theoretically visible from parts of this route. The additional effect of the Variation Development would remain **Substantial / Moderate** and Significant to **No View** and Not Significant. The combined effect would be **Substantial** and Significant (due to the Variation Development, Afton, South Kyle, Pencloe, Over Hill, North Kyle, Pencloe Variation and Sanquhar II) to **No View** and Not Significant. South Kyle, Pencloe and Over Hill would be decommissioned approximately 5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects

Receptor	Description of Effects
EAC Core Path No. C11: Knockshinnoch Lagoons	This route is assessed as part of Knockshinnoch Lagoons visitor attraction in Table V9.14 .
Right of Way 'd'	<p>Right of Way 'd' is partially within the Development Site and is located within 1km distance of the nearest proposed turbine of the Variation Development. The route is not signposted from its starting point on the B741 near Dalleagles School House and is routed south along a farm track and the valley of the Dalleagles Burn, continuing south through unenclosed land along the Trough Burn.</p> <p><u>Assessment: Variation Development</u> The Variation Development would be clearly visible along the majority of this route for southbound users. For northbound users, the Variation Development would be behind the direction of travel. The magnitude of change would be High and the effect would be Substantial and Significant. The nature of these effects would be long-term (reversible) indirect and negative.</p> <p><u>Cumulative Assessment: Variation Development + Existing + Consented Sites</u> The existing High Park Farm and Hare Hill and Extension wind farms (both Low-Negligible to Zero magnitude) would be visible to the east at approximately 7km distance. Parts of the consented South Kyle Wind Farm (Medium to Zero magnitude) would be visible behind the Variation Development. The consented Over Hill (Low to Zero magnitude) would be visible to the northwest at approximately 4km distance. Other wind farms visible including Mansfield Mains, Taiglim Farm, Lethans and Glenmuckloch would be of Low to Negligible magnitude due to intervening landform, built form and / or vegetation. The additional effect of the Variation Development would remain Substantial and Significant. The combined effect would be Substantial and Significant (due to the Variation Development and South Kyle). South Kyle would be decommissioned approximately 5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be long-term (reversible), indirect, cumulative and negative.</p> <p><u>Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications</u> North Kyle would be visible to the northwest at approximately 2.5km distance to the route (High-Medium to Zero magnitude). Lethans Variation (Negligible to Zero magnitude) would also be theoretically visible from parts of this route. The additional effect of the Variation Development would remain Substantial and Significant. The combined effect would be Substantial and Significant (due to the Variation Development, South Kyle and North Kyle). South Kyle would be decommissioned approximately 5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be long-term (reversible), indirect, cumulative and negative.</p>
Right of Way 'e'	<p>Right of Way 'e' connects Afton Road with Core Path No. C12 but is not signposted and does not appear to be well used. It is located approximately 4km distance northeast of the Variation Development.</p> <p><u>Assessment: Variation Development</u> The Variation Development would be visible for about half of the route between Cascava and the cross-track junction of Laight Farm where the upper parts of all 16 turbines would be visible, affecting a relatively narrow, horizontal FoV on the background skyline, adding to other wind farm development. There would be very limited to no visibility from the eastern part of the route due to intervening landform and / or vegetation. The magnitude of change would range from Medium to Zero and the effect would be Substantial / Moderate and Significant to No View and Not Significant. The nature of these effects would be long-term (reversible) indirect and negative to neutral.</p> <p><u>Cumulative Assessment: Variation Development + Existing + Consented Sites</u> The existing Afton would also be visible to the southeast at approximately 4.5km distance (Low to Zero magnitude). The consented South Kyle (Low to Zero magnitude) and Pencloe (Medium to Zero magnitude) wind farms would be visible in the same view to the south and southwest over 3.5km distance. The consented Over Hill (Low to Zero magnitude) would be visible to the west at approximately 6km distance. The existing High Park Farm and Hare Hill and Extension wind farms (all Low to Zero magnitude) would be visible to the east at approximately between 2-3km distance. Other wind farms visible including Mansfield Mains, Taiglim Farm, Lethans and Glenmuckloch would be of Negligible magnitude due to intervening landform, built form and / or vegetation. The additional effect of the Variation Development would remain Substantial / Moderate and Significant to No View and Not Significant. The combined effect would be Substantial / Moderate and Significant (due to the Variation Development and Pencloe) to No View and</p>

Receptor	Description of Effects
	<p>Not Significant. Pencloe would be decommissioned approximately 5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.</p> <p><u>Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications</u> North Kyle would be visible to the west at approximately 5km distance to the route (High-Medium to Medium to Zero magnitude). Pencloe Variation and Sanquhar II would occasionally be visible to the south and southeast (both Medium to Zero magnitude). Lethans Variation (Negligible to Zero magnitude) would also be theoretically visible from parts of this route. The additional effect of the Variation Development would remain Substantial / Moderate and Significant to No View and Not Significant. The combined effect would be Substantial / Moderate and Significant (due to the Variation Development, Pencloe / Pencloe Variation, North Kyle and Sanquhar II) to No View and Not Significant. Pencloe would be decommissioned approximately 5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.</p>
<p>Additional Rights of Way around New Cumnock and Lochside Hotel</p>	<p>These routes include three routes to the southeast and northeast of New Cumnock, and one route near Lochside Hotel in the north. These routes are located between 6-10km distance (and beyond) from the Variation Development.</p> <p><u>Assessment: Variation Development</u> Whilst the ZTV indicates theoretical visibility of the Variation Development from most parts of these routes, visibility would be vary depending on the location of the user. Where visible, all turbines would be seen on the horizon, affecting a relatively narrow, horizontal FoV on the background skyline, adding to other wind farm development. Elsewhere visibility would be limited due to intervening screening by landform, vegetation and / or built form. The magnitude of change would range from Medium to Zero and the effect would be Substantial / Moderate and Significant to No View and Not Significant. The nature of these effects would be long-term (reversible) indirect and negative to neutral.</p> <p><u>Cumulative Assessment: Variation Development + Existing + Consented Sites</u> A number of existing and consented wind farms would be visible from these routes, the most notable being High Park Farm and Mansfield Mains (High to Zero magnitude), Hare Hill and Extension (Medium to Zero magnitude), Pencloe (Medium to Zero magnitude) and South Kyle (Medium-Low to Zero magnitude). The additional effect of the Variation Development would remain Substantial / Moderate and Significant to No View and Not Significant. The combined effect would be Substantial to Substantial / Moderate and Significant (due to the Variation Development, High Park Farm, Mansfield Mains, Hare Hill and Extension and Pencloe) to No View and Not Significant. High Park Farm, Hare Hill and Pencloe would be decommissioned approximately 5-10 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.</p> <p><u>Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications</u> A number of wind farm applications are visible from these routes, the most notable being Pencloe Variation and Sanquhar II (Medium to Zero magnitude) and North Kyle (Low to Zero magnitude). The additional effect of the Variation Development would remain Substantial / Moderate and Significant to No View and Not Significant. The combined effect would be Substantial to Substantial / Moderate and Significant (due to the Variation Development, High Park Farm, Mansfield Mains, Hare Hill and Extension, Pencloe / Pencloe Variation and Sanquhar II) to No View and Not Significant. High Park Farm, Hare Hill and Pencloe would be decommissioned approximately 5-10 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.</p>
<p>Heritage Path and Scottish Hill Track 84: Afton Road</p>	<p>These routes are assessed as part of Core Path No. 10: Coalfield Cycle Route above.</p>

Visual Effects on Views from Recreational and Tourist Destinations

- 9.7.17 The visual assessment has considered the potential visual effects likely to be experienced by people at recreational / visitor or tourist destinations, or attractions within 10km of the Variation Development, as follows:

- Knockshinnoch Lagoons - local nature reserve; and
 - Craigengillan GDL.
- 9.7.18 The Burns Memorial, the Galloway Forest Dark Sky Park and Loch Doon have been excluded from this assessment due to the very limited to no visibility of the Variation Development. The level of effect would be the same as those assessed in the 2017 FEI as Slight (Low magnitude) to No View and Not Significant. The EAC non-inventory gardens at Camlarg (No.147) and Glaisnock (No.83) are not open to the public and have therefore been excluded from the assessment.
- 9.7.19 The following hill summits overlapped by the ZTV are located within 10km:
- Cairnsmore of Carsphairn 797m Above Ordnance Datum (AOD) (Corbett);
 - Blackcraig Hill 700m AOD (Graham); and
 - Windy Standard 698m AOD (Graham).
- 9.7.20 In summary, the Variation Development would be significantly visible from part of the Knockshinnoch Lagoons Local Nature Reserve (and associated recreational routes) (although views from the north/north-eastern parts would benefit from increased screening during the summer), and the summits of Blackcraig Hill and Windy Standard, both of which are already close to the Hare Hill and Windy Standard and Afton wind farm groups.

Table V9.14 Visual Effects on Views from Recreational and Tourist Destinations within 10km

Receptor	Description of Effects
Knockshinnoch Lagoons Local Nature Reserve	<p>Knockshinnoch Lagoons is a former coal mining / lagoon area which has been allowed to re-vegetate. The lagoons and birch woodland provide wetland habitat for breeding and wintering birds and woodland wildlife habitats. The area is open to the public throughout the year and can be accessed from both the B741 close to Connel Park and from Castlehill Road off the A76 and via the New Cumnock Community Paths network and EAC Core Path No. C11. It is located approximately 6km distance northeast of the Variation Development.</p> <p>The sensitivity of the destination is assessed as High due to the High susceptibility visitors, whose attention is likely to be focused on the landscape and the High value of the reserve.</p> <p><u>Assessment: Variation Development</u></p> <p>The blade tip ZTV indicates theoretical visibility of the Variation Development throughout the Development Site. However, some of the potential views (especially in the north and north eastern parts of the reserve) would be screened, particularly in the summer months, by intervening woodland. Built form at New Cumnock and Connell Park would also provide some further screening. Where visible, the Variation Development would affect a relatively narrow, horizontal FoV on the background skyline, adding to other wind farm development. The magnitude of change would range from Medium to Zero and the effect would be Substantial / Moderate and Significant to No View and Not Significant. The nature of these effects would be long-term (reversible), indirect and negative to neutral.</p> <p><u>Cumulative Assessment: Variation Development + Existing + Consented Sites</u></p> <p>The existing Afton Wind Farm (Low to Negligible magnitude) and the existing Windy Standard and Extension wind farms (both Negligible magnitude) would be visible to the south at approximately between 7-10km distance. There would be successive views of the consented Mansfield Mains Wind Turbine (Negligible magnitude) at a distance of approximately 3km. The consented Pencloe (Medium magnitude) and South Kyle (Low magnitude) would be visible to the south / southwest in the same views as the Variation Development. The consented Over Hill Wind Farm would be visible further to the west (Low magnitude). Other wind farms visible would be of Negligible magnitude due to intervening landform, vegetation and / or built-form. The additional effect of the Variation Development would remain Substantial / Moderate and Significant to No View and Not Significant. The combined effect would be Substantial / Moderate and Significant (due to the Variation Development and Pencloe) to No View and Not Significant. Pencloe would be decommissioned approximately 5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.</p>

Receptor

Description of Effects

Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications

North Kyle would be visible to the west at approximately 6km distance to the route (Low magnitude). Pencloe Variation and Sanquhar II would occasionally be visible to the south and southeast (both Medium magnitude). The additional effect of the Variation Development would remain **Substantial / Moderate** and Significant to **No View** and Not Significant. The combined effect would be **Substantial / Moderate** and Significant (due to the Variation Development, Pencloe / Pencloe Variation and Sanquhar II) to **No View** and Not Significant. Pencloe would be decommissioned approximately 5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.

Craigengillan GDL

The GDL is recorded in the Scottish Inventory for Gardens and Designed Landscapes and it assessed Craigengillan GDL as outstanding for all seven categories. The estate extends over 3,000 acres and is set amidst the hills of the Southern Uplands and comprises a Designed Landscape, woodlands, wetlands, pasture, rugged hills and heath, lochs, glens and two Sites of Special Scientific Interest (SSSI). Gardens with herbaceous borders, specimen trees, a Japanese water garden and a walled garden surround the main mansion house and adjacent stable block. There are also two holiday cottages and Craigengillan Home Farm also set within the estate boundary. It was first established as an estate in 1580 and was owned for 400 years by the McAdam family. The current owner embarked on a restoration programme to encourage public access and to protect and enhance the landscape and the nature conservation interest. The sensitivity of the GDL is assessed as High due to the High susceptibility visitors, whose attention is likely to be focused on the landscape and the High value of the GDL. It is located approximately 8km distance west of the Variation Development.

Assessment: Variation Development

The main house within the GDL is located at approximately 9.7km distance from the Variation Development and would be outwith the ZTV, indicating **No View**. There would also be no visibility from the Observatory, Ness Glen and Dalcairney Falls, and very limited visibility from Bogton Loch. Other potential views would be heavily screened by mature broadleaf trees and woodland within the estate. Views of the Variation Development would be visible (up to 13-16 turbines) from the east facing slopes and summits of hills rising to the western edge of the estate at Auchenroy Hill (**Viewpoint 11: Figure V9.37a-d**) and Little Shalloch. Where visible, the Variation Development would affect a relatively narrow, horizontal FoV on the background skyline, adding to other wind farm development. The magnitude of change would range from Low to Zero and the effect would be **Moderate to No View** and Not Significant. Although assessed as Moderate, these effects are not considered to be significant because of the intervening distance and the narrow horizontal FoV affected by the Variation Development, viewed in the context of the 360° wide panoramic views, and the larger scale landscape both at the viewpoint and within the view. The nature of these effects would be long-term (reversible), indirect and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites

No existing or consented wind farms would be visible from the lower lying and wooded areas of the estate. From the slopes and summits of the hills behind the main house, and in particular from Auchenroy Hill, a number of existing and consented wind farms are, or would be, visible. The main ones include Windy Standard Extension (Low to Negligible magnitude), Dersalloch (High magnitude), South Kyle and Benbrack (both Low magnitude) and Windy Rig (Low to Negligible magnitude). The remaining visible wind farms would be of Negligible magnitude. The additional effect of the Variation Development would be **Moderate to No View** and Not Significant. The combined effect would range from **Substantial** and Significant (due to Dersalloch and not the Variation Development) to **No View** and Not Significant. The nature of these effects would be long-term (reversible), indirect, cumulative, and negative to neutral.

Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications

Other wind farm applications visible from the summit of Auchenroy Hill include North Kyle (Medium magnitude) and Windy Standard Phase III (Low magnitude). The additional effect of the Variation Development would be **Moderate to No View** and Not Significant. The combined effect would range from **Substantial** and Significant (due to Dersalloch and North Kyle and not the Variation Development) to **No View** and Not Significant. The nature of these effects would be long-term (reversible), indirect, cumulative, and negative to neutral.

Hill Walking Summits within 10km

Cairnsmore of Carsphairn (Corbett)

Assessed in **Appendix V9.B** and illustrated in Viewpoint 8 (**Figure V9.34a-d**). In summary, the effect would be **Substantial / Moderate** and Significant. The nature of these effects would be long-term (reversible), indirect, cumulative and negative to neutral.

Receptor	Description of Effects
Blackcraig Hill (Graham)	Assessed in Appendix V9.B and illustrated in Viewpoint 6 (Figures V9.32a-d and V9.55). In summary, the level of effect due to the Variation Development would be Moderate and Not Significant due to the wide panoramic nature of the views and the presence of other wind farm development within this sector of the view. The nature of these effects would be long-term (reversible), indirect, cumulative and neutral to negative.
Windy Standard (Graham)	<p>Windy Standard is a remote hill to the northeast of Cairnsmore of Carsphairn. The summit and much of its slopes to the northwest are occupied by the existing Windy Standard Wind Farm. The hill is not located within an area designated for its scenic value and the value is therefore considered to be Medium. The view would be experienced by walkers whose attention or interest is likely to be focused on the landscape. Therefore, susceptibility to change is considered to be High and the overall sensitivity is considered to be <i>High</i>.</p> <p><u>Assessment: Variation Development</u> The Variation Development is located at approximately 7km distance from the hill summit and would be viewed behind the existing Windy Standard and Windy Standard Extension wind farms in wide panoramic views. All of the 16 proposed turbines would be visible and would appear as a simple and cohesive design with minimal overlapping. The magnitude of change would be Medium and the effect would be Substantial / Moderate and Significant. The nature of these effects would be long-term (reversible), indirect, and negative to neutral.</p> <p><u>Cumulative Assessment: Variation Development + Existing + Consented Sites</u> A number of existing and consented wind farms are visible, the main ones being Windy Standard and Extension visible at >1km (both High magnitude), Afton (High to Medium magnitude), South Kyle and Pencloe (both Medium magnitude) and Benbrack (Low magnitude). Other visible wind farms would be of Negligible magnitude. The additional effect of the Variation Development would be Moderate and Not Significant (reduced due to the presence of other wind farms). The combined effect would be Substantial and Significant (due to the Variation Development, Windy Standard, Windy Standard Extension, Afton, Pencloe and South Kyle). Windy Standard Extension, Pencloe, Afton and South Kyle would be decommissioned ~5 years prior to the end of the operation of the Variation Development, reducing this cumulative effect, although significant effects would remain as a result of Windy Standard subject to its life extension. The nature of these effects would be long-term (reversible), indirect, cumulative, and negative to neutral.</p> <p><u>Cumulative Assessment: Variation Development + Existing + Consented Sites + Applications</u> A number of application wind farms are visible, the main ones being Windy Standard III (Medium to Low magnitude), Sanquhar II (Medium magnitude) and Over Hill (Negligible magnitude). Other visible wind farms would be of Low to Negligible magnitude. The additional effect of the Variation Development would be Moderate and Not Significant (reduced due to the presence of other wind farms). The combined effect would be Substantial and Significant (due to the Variation Development, Windy Standard, Windy Standard Extension, Afton, Pencloe / Pencloe Variation, South Kyle, Windy Standard Phase III and Sanquhar II).</p>

9.8 Summary of Landscape, Visual and Cumulative Effects

- 9.8.1 A summary of the landscape and visual effects are provided in **Tables V9.15** and **V9.16**.
- 9.8.2 The information set out in the tables lists the main receptors included in this assessment and provides a summary of the landscape and visual effects of the Variation Development as well as the cumulative effects as follows:
- Level of Effect recorded from the 2017 FEI assessment of the Consented Development.
 - Level of Effect: Variation Development:
 - ▶ Sensitivity: The sensitivity of the receptor is recorded (ranging from high, medium, low, to negligible) in accordance with the methodology in **Appendix V9.A**;
 - ▶ Magnitude (Variation Development only): The magnitude of change for the Variation Development is recorded;

- ▶ Level of Effect (Variation Development only): The level of effect resulting from the Variation Development is recorded (taking account of the sensitivity and magnitude in accordance with the methodology). Those levels of effect shown in bold relate to significant effects in accordance with the relevant EIA Regulations.
- Cumulative Level of Effect (including the Variation Development):
 - ▶ Magnitude (Existing and Consented Wind Farms): The magnitude of change, taking account of other existing and consented wind farms is recorded (ranging from high, medium, low, negligible, and zero) in accordance with the methodology;
 - ▶ Additional Level of Effect: Adding the Variation Development to the baseline of existing and consented wind farms;
 - ▶ Scenario 1 / Cumulative Level of Effect 1: The level of effect, taking account of the other existing, consented / under construction wind farms and the Variation Development, is recorded (taking account of the sensitivity and magnitude in accordance with the methodology). Those levels of effect shown in bold relate to significant effects in accordance with the relevant EIA Regulations and the wind farm contributing most to the cumulative effects is recorded in brackets;
 - ▶ Magnitude (Other Application Wind Farms): The magnitude of change, taking account of other wind applications is recorded (ranging from high, medium, low, negligible, and zero) in accordance with the methodology;
 - ▶ Additional Level of Effect: Adding the Variation Development to the baseline of existing and consented wind farms and other wind farm applications;
 - ▶ Scenario 2 / Cumulative Level of Effect 2: The level of effect, taking account of the other existing, consented / under construction, application wind farms and the Variation Development, is recorded (taking account of the sensitivity and magnitude in accordance with the methodology). Those levels of effect shown in bold relate to significant effects in accordance with the relevant EIA Regulations and the wind farm contributing most to the cumulative effects is recorded in brackets.

Table V9.15 Summary of Landscape and Cumulative Landscape Effects

Receptor	Previous Assessment (2017 FEI) ⁸	Primary Assessment: Variation Development only			Cumulative Assessment: Variation Development (VD) and other wind farms					
	Level of Effect:	Sensitivity	Magnitude	Level of Effect:	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect
Landscape Effects on the host Southern Uplands and Forestry: Enoch Hill LCA										
Southern Uplands with Forestry: Enoch Hill LCA during Construction	None, increasing to Substantial / Moderate	Medium	High to Zero	None, increasing to Substantial / Moderate	Cumulative effects would increase from None at the start of construction to the operational levels of Substantial / Moderate (due to the Variation Development and other wind farms within this landscape character).					
Southern Uplands with Forestry: Enoch Hill LCA during Operation	Substantial / Moderate (up to 2km)	Medium	High	Substantial / Moderate (up to 2km)	High	Moderate	Substantial / Moderate (VD, Windy Standard + Ext, Afton, Hare Hill +Ext, High Park, South Kyle, Windy Rig, Pencloe, Benbrack)	High	Moderate	Substantial / Moderate (VD, Windy Standard + Ext, Afton, Hare Hill +Ext, High Park, South Kyle, Windy Rig, Pencloe / Pencloe Variation, Benbrack, Windy Standard Phase III)
Southern Uplands and Forestry: Enoch Hill LCA during Decommissioning	Slight / Negligible	Medium	Negligible	Slight / Negligible	All other wind farm operation would have ceased under the existing consents and the residual cumulative effects post decommissioning would be Slight / Negligible.					

Landscape Effects on the East Ayrshire Southern Uplands: Benty Cowan Hill LCA

⁸ Assessment results from the 2017 FEI, Chapter 9, Table 9.16 (turbines consented at 130m to blade tip).



Receptor	Previous Assessment (2017 FEI) ⁸	Primary Assessment: Variation Development only			Cumulative Assessment: Variation Development (VD) and other wind farms					
	Level of Effect:	Sensitivity	Magnitude	Level of Effect:	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect
Southern Uplands: Benty Cowan Hill LCA during Construction	None, increasing to Substantial / Moderate	High to Medium	High to Zero	None, increasing to Substantial / Moderate	Cumulative effects would increase from None at the start of construction to the operational levels of Substantial / Moderate (due to the Variation Development, South Kyle and Pencloe).					
Southern Uplands: Benty Cowan Hill LCA during Operation	Substantial / Moderate (2-2.5km, mainly to the northeast)	High to Medium	High	Substantial / Moderate (2-2.5km, mainly to the northeast)	High-Medium	Substantial / Moderate	Substantial / Moderate (VD, South Kyle, Pencloe)	High-Medium	Substantial / Moderate	Substantial / Moderate (VD, South Kyle, Pencloe, North Kyle)
Southern Uplands: Benty Cowan Hill LCA during Decommissioning	Slight / Negligible	High to Medium	Negligible	Slight / Negligible	All other wind farm operation would have ceased under the existing consents and the residual cumulative effects post decommissioning would be Slight / Negligible.					
Indirect Landscape Effects on the surrounding Landscape Character within 10km										
Upland Basin: New Cumnock LCA	Moderate	Medium	Medium	Moderate	Medium	Moderate	Moderate	High	Moderate	Substantial / Moderate (North Kyle)
Landscape Effects on Landscape Designations within 10km										
Afton SLCA	Moderate	High	Low	Moderate	Medium	Moderate	Substantial / Moderate (Afton, Hare Hill + Ext, Pencloe)	Medium	Moderate	Substantial / Moderate (Afton, Hare Hill + Ext, Pencloe / Pencloe Variation, Sanquhar II)



Table V9.16 Summary of Visual and Cumulative Visual Effects

Receptor	Previous Assessment (2017 FEI) ⁹	Primary Assessment: Variation Development only			Cumulative Assessment: Variation Development (VD) and other wind farms					
	Level of Effect:	Sensitivity	Magnitude	Level of Effect:	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect
Visual Effects on Settlements										
Burnside	Substantial to Substantial / Moderate	High	High to Medium	Substantial to Substantial / Moderate	Low to Negligible	Substantial to Substantial / Moderate	Substantial to Substantial / Moderate (VD)	Medium	Substantial to Substantial / Moderate	Substantial to Substantial / Moderate (VD and North Kyle)
Bankglen	Moderate to No View	High	Low to Zero	Moderate to No View	Low to Zero	Moderate to No View	Moderate to No View	Low to Zero	Moderate to No View	Moderate to No View
Connel Park	Moderate to No View	High	Low to Zero	Moderate to No View	Low to Zero	Moderate to No View	Moderate to No View	Low to Zero	Moderate to No View	Moderate to No View
Leggate	Moderate to No View	High	Low to Zero	Moderate to No View	Low to Zero	Moderate to No View	Moderate to No View	Low to Zero	Moderate to No View	Moderate to No View
New Cumnock	Substantial / Moderate to No View (Connel View and Cemetery)	High	Medium to Zero	Substantial / Moderate to No View (Connel View and Cemetery)	Medium to Zero	Substantial / Moderate to No View (Connel View and Cemetery)	Substantial / Moderate to No View (Connel View and Cemetery) (VD and Pencloe)	Medium to Zero	Substantial / Moderate to No View (Connel View and Cemetery)	Substantial / Moderate to No View (Connel View and Cemetery) (VD, Pencloe / Pencloe Variation and North Kyle)

Visual Effects on Transport Routes

⁹ Assessment results from the 2017 FEI, Chapter 9, Table 9.17 (turbines consented at 130m to blade tip).



Receptor	Previous Assessment (2017 FEI) ⁹	Primary Assessment: Variation Development only			Cumulative Assessment: Variation Development (VD) and other wind farms					
	Level of Effect:	Sensitivity	Magnitude	Level of Effect:	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect
A76 between Cumnock and east of New Cumnock (overlaps with the Burns Heritage Trail)	Moderate to No View	Medium	Medium to Zero	Moderate to No View	Medium to Zero	Moderate to No View	Moderate to No View	Medium to Zero	Moderate to No View	Moderate to No View
A713 Galloway Tourist Route between Waterside and Dalmellington	Moderate to No View	High	Low to Zero	Moderate to No View	High-Medium to Zero	Moderate to No View	Substantial to Substantial / Moderate (Benbrack) to No View	Negligible to Zero	Moderate to No View	Substantial to Substantial / Moderate (Benbrack) to No View
B741 Auchenroy to New Cumnock	Substantial / Moderate to No View	Medium	High-Medium to Zero	Substantial to Substantial / Moderate (2km between parts of Burnside and New Cumnock) to No View	Medium to Zero	Substantial to Substantial / Moderate to No View	Substantial to Substantial / Moderate to No View (VD, South Kyle, Pencloe, Over Hill)	High to Zero	Substantial to Substantial / Moderate to No View	Substantial to No View (VD, South Kyle, Pencloe / Pencloe Variation, Over Hill, North Kyle, Sanquhar II)
Glasgow to Carlisle Railway Line	Moderate to No View	Medium	Medium to Zero	Moderate to No View	Medium to Zero	Moderate to No View	Moderate to No View	Medium to Zero	Moderate to No View	Moderate to No View
Visual Effects on Recreational Routes										
EAC Core Path No. C12: New Cumnock Circular	Substantial / Moderate to No View	High	Medium to Zero	Substantial / Moderate to No View	Medium to Zero	Substantial / Moderate to No View	Substantial / Moderate to No View (VD, South Kyle, Pencloe, Over Hill)	High-Medium to Zero	Substantial / Moderate to No View	Substantial / Moderate to No View (VD, South Kyle, Pencloe / Pencloe Variation, Over Hill, North Kyle, Sanquhar II)



Receptor	Previous Assessment (2017 FEI) ⁹	Primary Assessment: Variation Development only			Cumulative Assessment: Variation Development (VD) and other wind farms					
	Level of Effect:	Sensitivity	Magnitude	Level of Effect:	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect
EAC Core Path No. C10: Coalfield Cycle Route (partly overlaps with and Scottish Hill Track 84: Afton Road, part of the New Cumnock Path Network)	Substantial / Moderate to No View	High	Medium to Zero	Substantial / Moderate to No View	High to Zero	Substantial / Moderate to No View	Substantial / Moderate to No View (VD, Afton, South Kyle, Pencloe, Over Hill)	High to Zero	Substantial / Moderate to No View	Substantial to No View (VD, Afton, South Kyle, Pencloe / Pencloe Variation, Over Hill, North Kyle, Sanquhar II)
EAC Core Path No. C11: Knockshinnoch Lagoons	See assessment under Recreational and Tourist Destinations: 'Knockshinnoch Lagoons' later in this table.									
Right of Way 'd'	Substantial	High	High	Substantial	Medium to Zero	Substantial to No View	Substantial to No View (VD, South Kyle)	High-Medium to Zero	Substantial to No View	Substantial to No View (VD, South Kyle, North Kyle)
Right of Way 'e'	Substantial / Moderate to No View	High	Medium to Zero	Substantial / Moderate to No View	Medium to Zero	Substantial / Moderate to No View	Substantial / Moderate to No View (VD, Pencloe)	High-Medium to Zero	Substantial / Moderate to No View	Substantial / Moderate to No View (VD, Pencloe / Pencloe Variation, North Kyle, Sanquhar II)
Additional Rights of Way around New Cumnock and Lochside Hotel	Not assessed (beyond 5km)	High	Medium to Zero	Substantial / Moderate to No View	High to Zero	Substantial / Moderate to No View	Substantial to Substantial / Moderate to No View (VD, High Park, Mansfield Mains, Hare Hill + Ext, Pencloe)	Medium to Zero	Substantial / Moderate to No View	Substantial to Substantial / Moderate to No View (VD, High Park, Mansfield Mains, Hare Hill + Ext, Pencloe / Pencloe Variation, Sanquhar II)
Heritage Path and Scottish Hill Track 84: Afton Road	See assessment of EAC Core Path No. C10: Coalfield Cycle Route above.									



Receptor	Previous Assessment (2017 FEI) ⁹	Primary Assessment: Variation Development only			Cumulative Assessment: Variation Development (VD) and other wind farms					
	Level of Effect:	Sensitivity	Magnitude	Level of Effect:	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect

Visual Effects on Recreational and Tourist Destinations

Knockshinnoch Lagoons Local Nature Reserve	Substantial / Moderate to No View	High	Medium to Zero	Substantial / Moderate to No View	Medium to Zero	Substantial / Moderate to No View	Substantial / Moderate to No View (VD, Pencloe)	Medium to Zero	Substantial / Moderate to No View	Substantial / Moderate to No View (VD, Pencloe / Pencloe Variation, Sanquhar II)
Craigengillan GDL	Moderate to No View	High	Low to Zero	Moderate to No View	High to Zero	Moderate to No View	Substantial to No View (Dersalloch)	Medium to Zero	Moderate to No View	Substantial to No View (Dersalloch, North Kyle)

Hill Walking:

Cairnsmore of Carsphairn (Corbett)	Moderate	High	Low	Moderate	Medium	Moderate	Substantial / Moderate (Windy Std Ext, Windy Rig, South Kyle, Benbrack)	High to Medium	Moderate	Substantial / Moderate (Windy Std Ext, Windy Rig, South Kyle, Benbrack, Windy Standard Phase III, Sanquhar II)
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Receptor	Previous Assessment (2017 FEI) ⁹	Primary Assessment: Variation Development only			Cumulative Assessment: Variation Development (VD) and other wind farms					
	Level of Effect:	Sensitivity	Magnitude	Level of Effect:	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect (Applications)	Magnitude	Additional Level of Effect	Scenario 2: Combined Level of Effect
Blackcraig Hill (Graham)	Substantial / Moderate	High	Medium	Substantial / Moderate	High to Medium	Moderate	Substantial / Moderate (VD, Afton, Windy Standard Ext., Hare Hill + Ext., Sanquhar, Whiteside Hill, Pencloe, South Kyle, Windy Rig)	High	Moderate	Substantial / Moderate (VD, Afton, Windy Standard Ext., Hare Hill + Ext., Sanquhar, Whiteside Hill, Pencloe, South Kyle, Windy Rig, Sanquhar II)
Windy Standard (Graham)	Substantial / Moderate	High	Medium	Substantial / Moderate	High	Moderate	Substantial (VD, Windy Standard + Extension, Afton + South Kyle + Pencloe)	Medium	Moderate	Substantial (VD, Windy Standard + Extension, Afton + South Kyle + Pencloe / Pencloe Variation, Windy Standard Phase III, Sanquhar II)



9.9 Summary and Conclusions

- 9.9.1 The LVIA for the Variation Development has been revised as part of the Section 36C Variation application to take account of a proposed change in turbine dimensions and operational period to the Consented Development.
- 9.9.2 The Variation Development comprises 16 wind turbines which are in the same location and layout as the Consented Development. The Variation Development would increase the tip height of all of the turbines from 130m to up to 149.9m and rotor diameter from up to 106m to up to 136m. All other infrastructure elements would remain the same as the Consented Development.
- 9.9.3 The LVIA conforms to the *Guidelines for Landscape and Visual Impact Assessment*, Third Edition (GLVIA) and has been undertaken by chartered landscape architects at Wood Environment and Infrastructure Solutions UK. The assessment process has encompassed the construction, operation, and decommissioning phases of the Variation Development and has included a re-assessment of all landscape and visual receptors with the potential for likely significant effects.

Consultation

- 9.9.4 Consultation relevant to the landscape, visual and cumulative assessment was undertaken with SNH, EAC, DGC, SAC, and NCCC. SNH and EAC commented on aspects of methodology, sources of information, scope of assessment, viewpoint assessment and cumulative development. DGC and SAC confirmed their response in relation to scoping out a number of viewpoints from the assessment. NCCC provided a response in relation to viewpoint assessment.

Landscape Design Statement

- 9.9.5 The design of the Variation Development has maintained the geographical footprint of the Consented Development. The Design Statement (including the key design constraints) reported in the 2017 FEI has been reviewed as part of the Variation Development, drawing on the advice of EAWLCS and SNH guidance¹⁰, and the Variation Development broadly accords with the original design objectives for the Consented Development which are described in section 9.6 (paragraph 9.7.4) of Chapter 9 of the 2017 FEI.
- 9.9.6 The Variation Development maintains a simple, cohesive and visually balanced layout that is related to the underlying landscape. The visual composition remains the same as the Consented Development with minimal gaps and turbine stacking. Although the turbine height (of 16 turbines) and rotor diameters would increase as set out above, the Variation Development would maintain a similar scale and appear as a rational part of the consented South Kyle Wind Farm (149.5m tip height). The combined developments (South Kyle and the Variation Development) benefit from each other, both infilling gaps in each other's layout, specifically when viewed from the *Upland Basin*.
- 9.9.7 The Variation Development has maintained the threshold of significant landscape effects to the same areas of landscape character and maintained the visual effects to within 7km, the same as the Consented Development.

East Ayrshire Landscape Wind Capacity Study

- 9.9.8 The LVIA has taken account of national and local planning policy in relation to wind farm development within the 35km study area. In particular, reference has been made to the *East*

¹⁰ Siting and Designing Wind Farms in the Landscape, Version 3a, SNH (2017).

Ayrshire Council Local Development Plan, Supplementary Guidance: Planning for Windy Energy December 2017 and the *East Ayrshire Council Local Development Plan, Non-Statutory Planning Guidance: East Ayrshire Landscape Wind Capacity Study (EALWCS)* (June 2018).

- 9.9.9 The EALWCS concludes (on the summary page) that there *"is some scope to site additional wind farm development with turbines above 70m height within upland areas of East Ayrshire although this will be limited by potential cumulative and other landscape and visual constraints including effects on adjacent smaller scale settled valleys and lowland landscapes."* In particular, page 12 of the EALWCS advises that this *"is because the generally less sensitive parts of these uplands are already occupied by wind farms with remaining undeveloped areas either lying on the periphery of these uplands close to more sensitive settled landscapes or contain more diverse landscape features. Cumulative effects are also more likely to occur affecting surrounding more sensitive landscapes and views."*
- 9.9.10 However, the EALWCS is of limited relevance to the Variation Development which is neither 'new' development or one of the repowering options considered as part of the EALWCS study in Annex D. As far as possible the Variation Development has taken account of this guidance and the relevant broad scale constraints and opportunities contained within the EAWLCS and in particular, the landscape, visual and cumulative effects on the *Upland Basin* area.

Cumulative Landscape Effects

- 9.9.11 The area of the Development Site is partly within the *Southern Uplands and Forestry: Enoch Hill LCA* and partly within the *Southern Uplands: Benty Cowan Hill LCA* as classified by the EALWCS. All of the proposed turbines would be located within 1km of forestry and at least 11 turbines within 500m of forestry and detailed site analysis indicates that the Development Site area is strongly influenced by the *Southern Uplands and Forestry: Enoch Hill LCA* and is partly transitional between the two landscape character types.
- 9.9.12 As is the case with all wind farm development, there would be a localised significant effect on the host LCTs, and the addition of the Variation Development would lead to a **Substantial / Moderate** and Significant effect on a part of the *Southern Uplands and Forestry: Enoch Hill LCA* and / or part of the *East Ayrshire Southern Uplands: Benty Cowan Hill LCA*, extending out to approximately 2-2.5km from the proposed turbine locations. The nature of these effects would be long-term (reversible), direct, and negative during the operational period.
- 9.9.13 Cumulatively the combined effect of other existing and consented wind farms, other wind farm applications and the Variation Development would lead to a **Substantial / Moderate** and Significant effect on part of the *host LCTs* within 2-2.5km of the proposed turbines. The Variation Development would appear as a closely related group or 'extension' to the South Kyle Wind Farm, consistent with the existing and consented pattern of wind farm development and the turbines proposed for both developments would be of comparable height (149.5m to blade tip for South Kyle, up to 149.9m to blade tip for the Variation Development).
- 9.9.14 There would be no significant landscape effects on any other LCTs within 10km of the Variation Development.
- 9.9.15 The Development Site is designated at a local level as part of the Afton SLCA. The peripheral location of the Variation Development in relation to the SLCA underlines that this area is of limited value to the Special Qualities of the SLCA. Although there would be a significant effect on a peripheral part of the landscape character within the East Ayrshire SLCA, it is not considered that the Special Qualities of the SLCA, its integrity, or the reasons for its designation would be significantly affected. In particular, there would be little or no visibility from within the Afton Glen area itself, which forms the main focus of this part of the SLCA.

- 9.9.16 In comparison to the previous assessment of the Consented Development, there would be no change to the number of significantly affected landscape receptors as a result of the Variation Development. Additional significant cumulative landscape effects are assessed for some landscape receptors as a result of other cumulative wind farms and not the Variation Development.

Cumulative Visual Assessment

- 9.9.17 ZTV and viewpoint analysis of 14 illustrated viewpoints, selected through consultation was undertaken on site, to support the assessment (**Appendix V9.B**). The viewpoint analysis indicates that the significant visual effects would extend out in a north and northeast direction, primarily affecting views from the Upland Basin, including open views from the A76 and the south western edge of New Cumnock within approximately 7km from the nearest turbine locations (the same threshold as the Consented Development) as indicated by Viewpoints 1, 2, 4, 5, 6 and 7 (**Figures V9.27, V9.28 and V9.30-9.33**).
- 1.1.1 The cumulative assessment indicates that further significant visual effects occur across the Study Area in respect of other wind farm development, particularly where a viewpoint is within close proximity to another development (viewpoints 8, 11, 12 and B). However, it is important to note that the Variation Development ceases to make a significant contribution to cumulative visual effects beyond approximately 7km from the nearest turbines as indicated by Viewpoint 7 at Lochside Hotel. Beyond this distance either other wind farms become more visible, or the cumulative visual effects of other wind farm developments including Variation Development are not significant. Significant cumulative visual effects where the Variation Development contributes to the views include viewpoints 1, 2, 4, 5, 6 and 7. However, a number of other wind farms including Afton, Windy Standard Extension, Hare Hill + Extension, Sanquhar, Whiteside Hill, Pencloe (& Pencloe Variation), South Kyle, Windy Rig, Over Hill, North Kyle and Sanquhar II also add to significant cumulative visual effects at some of these locations.
- 1.1.2 In comparison to the previous assessment of the Consented Development, there would be no notable change to the number of significantly affected visual receptors as a result of the Variation Development. Additional significant cumulative visual effects are assessed for some visual receptors as a result of other cumulative wind farms and not the Variation Development.

Visual Effects on Settlements and Residential Properties

- 9.9.18 Significant visual effects would be experienced from the small settlement at Burnside and from the south western edge of New Cumnock, along Connel View and at the Cemetery. There would be no significant visual effects on the views from Bankglen, Connel Park, Leggate and the majority of New Cumnock.

Residential Visual Amenity Assessment

- 9.9.19 A residential visual amenity assessment (RVAA), for those properties within 2-3km is reported in **Appendix V9.C**. The RVAA reports that none of the 24 residential properties included in that assessment would be unacceptably affected by the Variation Development in terms of their residential visual amenity.

Visual Effects on Transport Routes

- 9.9.20 Significant visual effects, would be experienced from part of the B741 for approximately 2km where there are clear views of the Variation Development, appearing in the background hills towards the southwest, from approximately 4.5km distance, largely only affecting the areas around Burnside and New Cumnock. Although significant, depending on the activities of the receptor, the views from this road would primarily be experienced by drivers and their passengers, who would

experience the views as a sequence of views, whilst travelling at various speeds through the landscape, the experience often 'broken' or intermittent due to the intervening screening of roadside trees / cuttings and other foreground interest. Closer views of the Variation Development from the B741 would be partly mitigated with the lower parts or the turbines screened by landform and both the Variation Development and other nearby cumulative wind farms set within a large scale landscape.

9.9.21 There would be no significant visual effects on the A76, A713 and the Glasgow to Carlisle railway line.

Visual Effects on Recreational Routes

9.9.22 Significant visual effects, would be experienced from parts of five local routes as follows:

- EAC Core Path No. C12: New Cumnock Circular;
- EAC Core Path No. C10: Coalfield Cycle Route (partly overlaps with and Scottish Hill Track 84: Afton Road, part of the New Cumnock Path Network);
- Rights of Way 'd' and 'e'; and
- Three additional rights of way near New Cumnock and Lochside Hotel.

9.9.23 The Variation Development would not adversely affect the foreground interest experienced whilst walking or the changing nature of views (elevation / gradient, orientation, wooded / open and so on) from these local routes.

9.9.24 There would be no significant effects on any of Scotland's Great Trails or the Sustrans National Cycle Network.

Visual Effects on Recreational and Tourist Destinations

9.9.25 Significant visual effects would be experienced from part of Knockshinnoch Local Nature Reserve. Although significant, mainly around the edges of the site, the vast majority of this area is wooded, and as such the overall visual experience would be of *no view* of the Variation Development.

9.9.26 Significant visual effects would also be experienced from the hill summits of Blackcraig Hill and Windy Standard. However, significant combined cumulative effects on these hill tops result primarily from other development, in particular Windy Standard and Extension, Pencloe and Afton.

9.9.27 There would be no significant visual effects on the views from the Craigengillan Garden and Designed Landscape, including the Ness Glen, the Riding Stables, Fort Carrick, the summit of Auchenroy Hill and the Scottish Dark Sky Observatory.

9.9.28 No significant visual effects would be experienced from the summit of Cairnmore of Carsphairn.

Conclusions

9.9.29 The Variation Development would be located within part of the *Southern Uplands / Southern Uplands with Forestry*, which is an evolving area of upland moorland and forestry that contains a number of large scale existing and consented wind farms. Large wind turbines are an established characteristic of this area, and the landscape also demonstrates many of the attributes indicative of an ability to accommodate large scale wind farm development.

9.9.30 The Variation Development has taken account of the EALWCS and the relevant broad scale constraints and opportunities contained within this non-statutory guidance in order to mitigate potential effects on views from the New Cumnock Upland Basin area.

- 9.9.31 Although the turbine height would increase from up to 130m to up to 149.9m to blade tip, this turbine height is comparable to the consented turbines at South Kyle (149.5m to blade tip) and in many views the Variation Development would appear as closely related or appear as an 'extension' to the adjacent South Kyle Wind Farm. The combined developments (South Kyle and the Variation Development) would benefit from each other, both infilling gaps in each other's layout, specifically when viewed from the *Upland Basin*. Indeed, the addition of South Kyle to the baseline ensures that the design and location of the Variation Development will overlap with the effects of South Kyle in terms of landscape, visual and cumulative effects, leading to a reduction in the overall effects of the Variation Development.
- 9.9.32 The design of the Variation Development has maintained the geographical footprint of the Consented Development and has maintained accordance with the original design objectives limiting the number of significant landscape and visual effects. The Variation Development has also maintained the threshold of significant landscape and visual effects to within 7km, the same as the Consented Development, therefore limiting the effects on the surrounding landscape and visual receptors.
- 9.9.33 The additional theoretical visibility of the Variation Development would be limited to less than 1% of the 35km study area in comparison to the Consented Development and reduce from 60% to 37% within 10km where forestry screening has been taken into account. For this reason, the Variation Development would not be visually prominent, in comparison to a more widespread ZTV footprint. There would be no significant effects on nationally designated landscapes or Wild Land Areas, 'A' roads or any of Scotland's Great Trails. There would be no effects on nationally designated landscapes or Wild Land Areas.
- 9.9.34 Other than an unmarked right of way in the southern part of the Development Site, there would be no visual receptors within 2km of any of the proposed turbines. Visibility of the Variation Development would be largely restricted a low-lying *Upland Basin* to the north. This area is undesignated and has a strong mining heritage. Where visible, the Variation Development would be seen in the context of a contemporary, rural landscape where wind turbines are already visible along the southern skyline.
- 9.9.35 The proposed turbines are located remote from residential properties to the north, within a less sensitive part of the Development Site, providing a generous 'set-back' from the adjacent B741 minor road and thus increasing the level of mitigation afforded to landscape and visual receptors in the *Upland Basin* to the north along the B741 and around the New Cumnock area.
- 9.9.36 Significant landscape, visual and cumulative effects would affect part of the *Southern Uplands / Southern Uplands with Forestry* and particular views from settlements (Burnside and south western edge of new Cumnock), parts of the B741 and parts of recreational receptors (local footpath network, Knockshinnoch Lagoons, and the summits of Blackcraig Hill and Windy Standard), within the wider areas of the *Upland Basin*.
- 9.9.37 In comparison to the previous assessment of the Consented Development, there would be no notable change to the number of significantly affected landscape and visual receptors. To conclude, the Variation Development has taken account of the guidance set out in the EALWCS and the requirements of the EAC's LDP policies RE1 and RE3 in respect of landscape, visual and cumulative effects.

9.10 References

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University of Sheffield and Land Use Consultants, 2002, Landscape Character Assessment: Guidance for England and Scotland, Countryside Agency and Scottish Natural Heritage publication.

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10. Historic Environment

- 10.1.1 The amendments proposed by the Variation Development compared to the Consented Development relate to the increase in rotor diameter of all 16 turbines from 106m to up to 136m; the tip height from up to 130m to up to 149.9m; and the operational period from 25 to 30 years. All other infrastructure elements remain unchanged.
- 10.1.2 As such, it was stated in the Scoping Report for the Variation Development, that direct effects on the Historic Environment could be scoped out as these would not change from the Consented Development, for which no significant residual adverse effect was anticipated; no change to the footprint of the Consented Development is proposed and a programme of archaeological works and agreed scheme of archaeological mitigation would be applied for the Variation Development in the same way as for the Consented Development. This approach was agreed by the consultees, i.e. East Ayrshire Council (EAC) and Historic Environment Scotland (HES), see Chapter 4 for a summary of consultee comments and Appendix V4B for the complete scoping opinion.
- 10.1.3 In respect of indirect effects, the increase of turbine rotor diameter and blade tip height would generally present a minor change in the appearance of the Variation Development, and it is not anticipated that this would discernibly affect understanding or experience of the relevant assets, and would therefore not present any increase in the magnitude of change to setting from the consented layout as reported in the 2015 ES and 2017 FEI. As a result no significant adverse effects are anticipated in relation to Variation Development on the historic environment. This was largely agreed (subject to the comment made in the paragraph below) with consultees (EAC and HES) for all heritage assets.
- 10.1.4 Further information was requested by HES in their formal scoping response in relation to just one heritage asset - Dumfries House Garden and Designed Landscape, which was consulted upon further with HES. Screengrabs showing the Zone of Theoretical Visibility (ZTV) were provided to HES, supporting the conclusion that while there may be a slight increase in visibility from the asset as a result of the increase in turbine dimensions, this would not take the level of effect (assessed as Negligible in the 2015 ES) above a Low magnitude of change. The effect would therefore remain as not significant. It was subsequently agreed by HES that Dumfries House could be also be scoped out of the detailed assessment of the Variation Development.
- 10.1.5 As was the case in the 2015 and 2017 FEI, no significant effects are anticipated on the historic environment as a result of the Variation Development, and accordingly no further assessment is required.



11. Ecology

11.1 Introduction

- 11.1.1 This chapter of the EIA Report assesses the potentially significant effects of the Variation Development with respect to ecology. The chapter should be read in conjunction with the development description provided in Chapter 3.
- 11.1.2 This approach of scoping out all Important Ecological Features (IEFs) other than bat populations and basing the assessment of the Variation Development on the survey data used to inform the 2015 ES and 2017 FEI was outlined in the scoping report and has been agreed by consultees in the scoping opinion. Comments received from Scottish Natural Heritage (SNH) and East Ayrshire Council (EAC) in relation to the Variation Development are provided within this Chapter.
- 11.1.3 As the variation to the Consented Development primarily relates to increasing the rotor diameter and height to blade tip of all 16 turbines, with an increase in the operational period from 25 to 30 years, with all ground level infrastructure and construction/ decommissioning methods unchanged from the 2017 assessment, the only potential change relating to ecology is considered to be a change in potential collision risk and risk of barotrauma during the operational phase, rather than any changes resulting from increased land take, for example. As such the only IEF scoped into the detailed assessment within this chapter are bat populations. Potential effects of change in collision risk on bird populations are assessed separately in Chapter 12: Ornithology. Effects on all other terrestrial ecology IEFs would be predicted to remain non-significant and unchanged from the 2017 FEI and thus are excluded from further consideration.

11.2 Limitations of this Assessment

- 11.2.1 The IEFs present in the predicted future baseline are based on assumptions made according to the current baseline survey results and professional judgement.
- 11.2.2 In respect of bat populations, the assessment has been based on results of field surveys for this IEF undertaken in 2012, 2013 and 2014 and reported in the 2015 ES. Given the habitats within the Development Site have not significantly changed and remain of low suitability to bat populations (confirmed during a site visit undertaken on 10 May 2019 for the ornithology assessment¹), and the site boundary covers the same habitat albeit a slightly smaller part of it (see Figure V3.2), as that for the Consented Development, this is not considered to be a significant limitation to the assessment.

11.3 Relevant Legislation, Planning Policy, Technical Guidance

- 11.3.1 In preparing this ecology assessment, account has been taken of the following relevant legislation and regulations, which remain unchanged since the completion of the 2015 ES and 2017 FEI:
- *The Conservation (Natural Habitats, &c.) Regulations, 1994;*
 - *Wildlife and Countryside Act 1981* (as amended including *The Countryside and Rights of Way Act 2000*);
 - *Nature Conservation (Scotland) Act 2004;*

¹ The surveyor had relevant expertise to confirm the habitat had not changed substantially in terms of suitability for bats.

- *Wildlife and Natural Environment (Scotland) Act 2011*; and
 - *Protection of Badgers Act 1992*.
- 11.3.2 Chapter 5 – Planning Policy Context provides a review of all changes to applicable planning policies, advice and guidance of relevance to the Variation Development since the completion of the 2015 ES and 2017 FEI, with Chapter 6 providing a review of updates to renewable energy policy.
- 11.3.3 Best practice Ecological Impact Assessment (EclA) guidance from the Chartered Institute of Ecology and Environmental Management (CIEEM) has also been updated since the 2015 ES and 2017 FEI were completed. CIEEM's 2018 Guidelines for Ecological Impact Assessment (EclA) in the UK and Ireland Version 1.1 Updated September 2019 have therefore been taken into account for this assessment.

11.4 Data Gathering Methodology

Study Area

- 11.4.1 The Study Area is defined as the Development Site boundary (**Figure 1.2**), which covers the same habitat, albeit a slightly smaller part of it, as the Consented Development, plus up to a 10km search area for updated bat records².

Desk Study

- 11.4.2 A data gathering exercise was carried out to obtain information relating to bat populations within the Study Area. South West Scotland Environmental Information Centre (SWSEIC) supplied all bat records within 5km of the Development Site and records of more mobile bat species (*Nyctalus* species and *Nathusius' pipistrelle*) within 10km of it (26/03/20).
- 11.4.3 An updated literature search of relevant bat related publications released since the 2015 ES was completed was also carried out in March 2020. The relevant publications reviewed comprise:
- Newson et al., 2017: A survey of high-risk bat species across southern Scotland. Scottish Natural Heritage Commissioned Report No. 1008;
 - Slack and Tinsley, 2015: Linking bat surveys with meteorological data: a way to target operational wind farm mitigation. CIEEM In Practice, Issue 87, pp 34-38;
 - Matthews et al., 2016: Understanding the risk of European Protected Species (bats) at onshore wind turbine sites to inform risk management; and
 - Scottish Natural Heritage et al., 2019: Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.

Survey Work

- 11.4.4 A suite of bat surveys was undertaken between 2012 and 2014, based on the prevailing Bat Conservation Trust (BCT) Guidelines (Hundt, 2012). Survey effort was based upon the level of survey effort required for a proposed wind farm site assessed as being of low risk to bat populations. This assessment was based on a number of factors including that no bat roosting opportunities are present within the Development Site and that habitats present are of low suitability to foraging bats, given they are dominated by open, upland acid grassland modified bog which are managed

² 10km for more mobile bat species comprising noctule, Leisler's bat and *Nathusius' pipistrelle* and 5km for all other bat species.

- predominantly for sheep grazing, with conifer plantation woodland to the south of the Development Site and minor watercourses providing minimal opportunities for foraging and commuting only.
- 11.4.5 Methodologies of surveys undertaken in 2012, 2013 and 2014 are detailed within Section 11.3 and Appendices 11.C, 11.D and 11.E of the 2015 ES, and are summarised below:
- Due to the known presence of bat hibernation site at Craigdullyear Mine (approximately 10km east north east of the Development Site), SNH requested that static detector monitoring was carried out within the Development Site in October and November 2012. As such, this monitoring was undertaken for six nights per month, at ten locations across the site, in line with earlier monitoring which had been carried out by Aecom. Static detector monitoring at the mine itself was also undertaken for a two-week period in October and November 2012. The purpose of these surveys was to investigate the potential importance of the Development Site to bats and in particular those species which may pass through the site during autumn migration;
 - In 2013, three transect routes were walked once per season (spring, summer and autumn) and static detector monitoring was undertaken for a minimum of five nights per season to provide data on the species present and activity levels of foraging and commuting bats during the main bat activity period, in line with prevailing BCT guidelines for a low risk site;
 - Higher than anticipated levels of Leisler's bat activity were recorded during surveys in 2013. As such, further studies into bat activity within the Development Site were undertaken in 2014 to further inform the assessment, particularly in relation to the risk to this species. This comprised bat roost assessments undertaken in four areas adjacent to the Development Site and the B741 Dalmellington-New Cumnock road, comprising buildings and trees and static detector monitoring on two anemometry masts (met masts). Detectors on met masts were set to record continuously between July and December and were fitted with an "at height" microphone at approximately 50m height and a "ground level" microphone at below 10m. In order to provide comparison data to the data collected from met masts, static detectors were also installed in three locations close to glen level (~270m altitude, compared to 440m and 540m for the met masts respectively). These static detectors were set to collect data over an eight-night period in September 2014.
- 11.4.6 Section 2.6.3 (pages 20 and 21) of the current BCT Good Practice Guidelines (BCT, 2016) states that *"the length of time [bat] survey data remains valid should be decided on a case-by-case basis and is dependent upon a number of questions"* (these questions being provided in the BCT guidance). These questions were therefore considered in relation to the EclA for the Variation Development, the focus of which being to determine whether the proposed increase in turbine rotor diameter and blade tip height would alter the predicted effects on bat populations.
- 11.4.7 The surveys that informed the 2015 ES and 2017 FEI were carried out according to good practice guidelines, the results obtained were not constrained and supported the original initial assessment of the value of the Development Site for bat populations (i.e. low). Furthermore, the nature of the Development Site and surrounding area has not changed (other than a slightly smaller red line boundary) since the original surveys were undertaken (confirmed through visits to the Development Site in relation to other EIA topics) and it was therefore concluded that additional surveys were unlikely to provide further information that would be material to a decision (i.e. planning consent).
- 11.4.8 This approach has been agreed with SNH (see Table 11.2 below).

11.5 Overall Baseline

Current Baseline

- 11.5.1 Field surveys undertaken in 2012, 2013 and 2014 to inform the 2015 ES and 2017 FEI, supplemented by the updated desk study data, represent the current baseline with respect to bat populations, as agreed with SNH (see Table 11.2).
- 11.5.2 The field surveys undertaken between 2012 and 2014 recorded the following bat species/species groups within the Study Area:
- Common pipistrelle;
 - Soprano pipistrelle;
 - *Pipistrellus* species;
 - Leisler's bat;
 - *Nyctalus* species;
 - Daubenton's bat;
 - Natterer's bat;
 - *Myotis* species; and
 - Brown long-eared bat.
- 11.5.3 Full detailed survey results from the field surveys undertaken are presented in Appendices 11.C, 11.D and 11.E of the 2015 ES.
- 11.5.4 All bat records less than 10 years old from within the Study Area provided by the SWSEIC in March 2020 are summarised in Table 11.1.

Table 11.1 Summary of Bat Records Provided by SWSEIC in March 2020

Species	Number of Records	Date of Most Recent Record	Distance and Orientation of Nearest Record to Development Site	Notes
Daubenton's bat	1	2016	1.8km east of Site Boundary 4.6km northeast from proposed turbine locations	Single flight record only, from Glenafton Caravan Park, south of New Cumnock
Myotis species	1	2016	1.8km east of Site Boundary 4.6km northeast from proposed turbine locations	Single flight record only, from Glenafton Caravan Park, south of New Cumnock
Leisler's bat	4	2016	2.5km east of Site Boundary 4.9km northeast from proposed turbine locations	Flight records only, from track between Glenafton Caravan Park and Craigdarroch.

Common pipistrelle	1	2016	1.8km east of Site Boundary 4.6km northeast from proposed turbine locations	Single flight record only, from Glenafton Caravan Park, south of New Cumnock
Soprano pipistrelle	1	2016	1.8km east of Site Boundary 4.6km northeast from proposed turbine locations	Single flight record only, from Glenafton Caravan Park, south of New Cumnock
Pipistrelle species	1	2016	1.8km east of Site Boundary 4.6km northeast from proposed turbine locations	Single flight record only, from Glenafton Caravan Park, south of New Cumnock

Review of Post-2015 Publications Relating to Bat/Wind Farm Interactions and/or Local Bat Populations

- 11.5.5 A summary of the key findings of a review of recent publications relating to bat populations in South West Scotland and/or the potential effects of wind turbines on them is provided below:
- Newson et al., 2017: A survey of high risk bat species across southern Scotland. Scottish Natural Heritage Commissioned Report No. 1008:
 - ▶ This was a large-scale survey carried out across southern Scotland, with the aim of collecting baseline data for all species of bats within this area to identify any noteworthy local assemblages. Analysis focused on noctule, Leisler's bat and Nathusius' pipistrelle to identify hotspots for these to inform future wind energy development, produce revised population estimates for each species and consider these in relation to wind farms;
 - ▶ The study identified a clear east-west split between the two *Nyctalus* species, with Leisler's bat found predominantly in the west. Nathusius' pipistrelle was only recorded at a small number of sites. It was estimated that between 16 and 24% of the population of the three high risk bat species in southern Scotland are exposed to existing and approved wind farms, with 50% of this exposure at just 10% of wind farms. Wind farms tended to be at higher elevations than the altitudes the three high-risk bat species most commonly occurred, although there was a significant spatial overlap. Finally, it was considered that true population estimates of high risk species are likely to far exceed the current published estimates.
 - Slack and Tinsley, 2015: Linking bat surveys with meteorological data: a way to target operational wind farm mitigation. CIEEM In Practice, Issue 87, pp 34-38:
 - ▶ This study recorded bat data from wind farm sites, including two in the Scottish borders, linked bat surveys with meteorological data and compared bat activity at ground level (3m) and at height (50m). The study found that across the sites, 84% of bat activity was recorded at the 3m height, although in *Nyctalus* species, 50% of activity was recorded at each height.
 - Matthews et al., 2016: Understanding the risk to European Protected Species (bats) at onshore wind turbine sites to inform risk management:
 - ▶ A major study into the risk to bat populations at onshore wind turbine sites, which found that the majority of casualties (relating to direct collision and barotrauma³) recorded at wind

³ Internal haemorrhaging in the lungs resulting from rapid changes in air pressure behind moving turbine blades.

farm sites were common pipistrelle, soprano pipistrelle and noctule bats, with single carcasses of brown long-eared bat, Nathusius' pipistrelle and Natterer's bat also recorded;

- ▶ The relative abundance of soprano pipistrelle and noctule was also found to vary between ground level and at height data recorded simultaneously, highlighting the need for acoustic monitoring at height. This study also found that larger rotor sizes posed an increasing risk to bats, with each metre increase in blade length associated with an increase of approximately 18% in the probability of a casualty of any species occurring. The total casualty rates were not influenced by other turbine characteristics studied, including hub height.
- Scottish Natural Heritage et al., 2019: Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation:
 - ▶ Updated guidance which draws on the findings of Matthews et al., 2016 to assist planners, developers and ecological consultants to consider the potential effects of onshore wind energy developments on bats, with an emphasis on direct impacts such as collision mortality. This document replaces previous guidance relating to bat surveys to inform wind farm developments, notably that published in TIN051 (Natural England, 2014) and in the second edition of the Bat Conservation Trust Good Practice Guidelines (Hundt, 2012);
 - ▶ The guidance provides updated advice on survey work, assessment methodologies and mitigation recommendations in relation to proposed new wind farm developments but does not specifically reference variation applications. Changes made to perceived relative vulnerability of different UK bat species populations to direct mortality associated with onshore wind farms since the 2015 ES and 2017 FEI assessments are summarised in section 11.10.13.

Future Baseline

- 11.5.6 There have been no changes to the land use within the Development Site since the 2015 ES and 2017 FEI and it is unlikely that this land use and the associated land management will be altered in the foreseeable future. As such, the predicted future baseline detailed in the 2015 ES and 2017 FEI remain valid with the future baseline unlikely to change significantly from the present baseline conditions reported.

11.6 Consultation

- 11.6.1 Table 11.2 provides a summary of the responses received from consultees in relation to the Variation Development.
- 11.6.2 Consultation with the local Wildlife Trust was not carried out in this case, given the statutory consultees (SNH and EAC) have approved the approach taken and have not highlighted any substantial constraints to the assessment.

Table 11.2 Summary of Consultation Regarding Ecology

Consultee(s)	Response and where considered in this chapter
SNH (response to Scoping Report, 06 March 2020).	Protected Species General: <i>"We note that no update ecological surveys are proposed to be undertaken for the variation application as the turbine and infrastructure layout of the proposal will remain the same. We agree with this approach."</i>

Consultee(s)

Response and where considered in this chapter

Section 11.1 details the rationale as to why no further ecological surveys are proposed in relation to the Variation Development. This comment illustrates that SNH are satisfied with this approach.

"We recommend that pre-construction surveys for legally protected species should be carried out at an appropriate time of year for the species, no more than eight months preceding commencement of construction, and that a watching brief is then implemented by the ECoW during construction. The species that should be surveyed for include, but are not limited to, breeding birds, otter, water vole, badger and pine marten."

Section 11.8 details the mitigation measures prescribed in the 2015 ES and 2017 FEI, which include implementation of pre-construction surveys and appointment of an ECoW for the whole of the construction period. Details of the pre-construction surveys have been clarified within Section 11.8 to demonstrate that they will meet with SNH's recommendations.

Bats:

"As the variation application relates to increasing the rotor diameter and blade tip height of turbines in the scoping report the applicant proposes to update the collision risk assessment for bats. However, at present there is no requirement for this in the current "Bats and onshore wind turbines – survey, assessment and mitigation" guidance. Therefore we advise that provided that the mitigation measures previously proposed in the ES and FEI are adhered to, the impact on bats from the proposed variation is likely to remain not significant."

For completeness, an update of the assessment of risk to bat populations is provided in Section 11.10 and assessment of cumulative effects is provided in Section 11.11 (as per the request from EAC below), which conclude that the effects on bat populations as a result of the Variation Development are likely to remain not significant. All mitigation measures previously proposed in the 2015 ES and 2017 FEI would be adhered to, as confirmed in Section 11.8. This comment illustrates that SNH are satisfied with this approach.

**EAC
(response to Scoping Report,
24 March 2020).**

"On the basis that all infrastructure, construction/decommissioning methodologies and programming remain the same as those of the consented scheme, the Planning Authority would agree that such matters could be scoped out with the exception of bats as per the Scoping Report."

An update of the assessment of risk to bat populations is provided in Section 11.10 which concludes that the effects on bat populations as a result of the Variation Development are likely to remain not significant.

"The Planning Authority also agrees that updated cumulative impacts shall be provided given the increased number of wind farm applications throughout this area."

An update of the assessment of cumulative effects is provided in Section 11.11.

11.7 Scope of the Assessment

- 11.7.1 The scope of the assessment in relation to ecology for the Consented Development was established broadly following the assessment methodology set out in Chapter 2 – EIA Process of the 2015 ES, with regard to specific methods and criteria, including the CIEEM Guidelines (IEEM, 2006). This assessment was based on the desk study, National Vegetation Classification (NVC) and river habitat survey as well as further feature-specific survey work detailed in Appendices 11.A to 11.I of the 2015 ES. Following consideration of the above factors, a number of IEFs were scoped in for detailed assessment, comprising a number of NVC habitat communities, running water, otter, water vole, bat populations (common pipistrelle, soprano pipistrelle, *Myotis* bat species, *Nyctalus* bat species and *Plecotus* bat species), badger, herpetofauna, salmonids and freshwater pearl mussel.

- 11.7.2 No significant effects on any of these IEFs were predicted to occur within the assessment for the 2015 ES or the 2017 FEI for the Consented Development. In light of this, the scope of the Variation Development assessment has been established by assessing whether the proposed changes from the Consented Development have the potential to result in a change to the conclusions previously made. As the variation relates to increasing rotor diameter, blade tip heights, and the operational period of the 16 turbines, with all ground level infrastructure, and construction/decommissioning methods remaining unchanged, the only change considered to potentially arise is to direct mortality of bats, due to increased collision risk and risk of barotrauma. As such, all effects on IEFs other than bat populations, and all other effects to bat populations other than direct mortality as a result of collisions with turbine blades and barotrauma during the operational phase are predicted to remain non-significant and unchanged from those reported in the 2015 ES and 2017 FEI. Therefore, they have been excluded from further consideration.

Spatial Scope

- 11.7.3 The spatial scope of the assessment of ecology covers the same area as that detailed within the 2015 ES and 2017 FEI - the Development Site boundary (albeit that this is reduced slightly in area) and up to 5km for all bat species other than *Nyctalus* species and *Nathusius' pipistrelle* (10km).

Temporal Scope

- 11.7.4 The temporal scope of the assessment covers the 30 year (assuming the increase from 25-30 years is granted) operational phase of the Variation Development only, given direct mortality resulting from increased collision risk and risk of barotrauma on bat populations during operation is the only effect which remains scoped into the assessment.

Potentially Important Ecological Features

- 11.7.5 As detailed above in Section 11.7.1 – 11.7.5, the only IEF which remains scoped in for detailed assessment is bat populations. Effects on all other IEFs are considered to remain non-significant and unchanged from the assessment of the Consented Development.

Likely Significant Effects

- 11.7.6 The only IEF considered in the 2015 ES and 2017 FEI for which the variation to the Consented Development may change the outcome of the assessment is bat populations, as direct mortality resulting from collisions with turbine blades and barotrauma during the operational period may be more likely as a result of increased rotor diameter and overall turbine height.

11.8 Environmental Measures Embedded into the Development Proposals

All environmental measures detailed in the 2015 ES and 2017 FEI would be provided as part of the Variation Development.

No additional measures will be required in relation to ecology in addition to those outlined in the 2015 ES and 2017 FEI. The bat specific mitigation measures outlined in the 2015 ES and 2017 FEI comprise:

- Permanent lighting on turbines would be infrared and any directional security lighting used (for example at the construction compound) would conform with the Institute of Lighting Professionals guidance for Zone E1 and would use a shielded downwards pointing installation,

so as to not result in the illumination of roosts, river corridors, woodland edges or other key foraging features;

- Any maintenance works required during operation of the wind farm would take place during daylight hours to minimise potential for disturbance to bats as well as other nocturnal protected species;
- Turbines T1, T3, T4 and T16 would be curtailed between June and August inclusive for three hours after sunset, when wind speeds are below 6m/s, or such other parameters agreed in writing by the planning authority, to minimise risk of direct collision and barotrauma to high vulnerability bat species including Leisler's bat;
- A post construction bat monitoring strategy would be developed in line with prevailing BCT or SNH guidance. It is anticipated this would include ground level static detector surveys utilising areas below turbines, coupled with control sites away from the turbines as a minimum. Use of permanent met masts for at height monitoring would also be made if feasible; and
- The need for mitigation in terms of protected species presence during ongoing and operational work will be determined through pre-construction surveys and through the advice provided by an ECoW. If European Protected Species (EPS) or other development licences are subsequently required, these will be discussed with SNH and applied for as necessary.

Further to this, all other ecological mitigation proposed within the 2015 ES and 2017 FEI would also be applied to the Variation Development for other IEFs. This comprises the following:

- Reinstatement of habitats subject to temporary disturbance or degradation would be carried out;
- A Construction Environmental Management Plan (CEMP) would be produced and adhered to, which would include species protection plans for otter and water vole and details of aquatic monitoring and protection measures, pollution control and contingency procedures;
- Working areas would be clearly defined during construction, operation and decommissioning phases;
- Pre-construction surveys for protected species would be carried out, with relevant method statements and licences produced as necessary. Further to comments received from SNH in response to the scoping report, it is proposed that pre-construction surveys would be carried out no more than eight months preceding commencement of construction at an appropriate time of year for the respective species and will include surveys for breeding birds, otter, water vole, badger and pine marten as a minimum;
- A suitably experienced Ecological Clerk of Works would be appointed for the duration of the construction works and would be responsible for ensuring that all construction phase surveys, checks, mitigation and monitoring would be adhered to in accordance with the CEMP;
- The ECoW would implement a watching brief during construction to provide supervision of any vegetation removal or movement of spoil/brush piles and to provide advice in the event of any expected or unforeseen protected species issues that arise during the construction period;
- Further consideration would be given to deer prior to commencement of construction and a deer management statement produced, if required;
- Works would adhere to pollution prevention guidelines, as fully detailed in Chapter 13 of the 2015 ES;

- Water quality protection measures would be put in place during construction, operation and decommissioning phases;
- Water crossing construction works would follow SEPA and Scottish Government culvert design requirements and avoid sensitive time periods for salmonids (spawning, egg deposition and fry emergence); and
- A restoration and decommissioning plan would be prepared and adhered to.

11.9 Assessment Methodology

11.9.1 The project-wide approach to the assessment methodology is set out in Chapter 4, and specifically in Sections 4.5 to 4.8. This has informed the approach that has been used in this ecology assessment, notwithstanding it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this ecology assessment. In this respect, the assessment has been aligned with the standard industry guidance provided by CIEEM (2018).

Significance Evaluation Methodology

Negative Effects

- 11.9.2 For habitat areas and species, an effect is assessed as being significant if the favourable conservation status (FCS) of an IEF would be compromised by the proposed development. Conservation status is defined by the CIEEM guidelines (CIEEM, 2018) as follows:
- *“For habitats, conservation status is determined by the sum of the influences acting on the habitat and its typical species, that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area; and*
 - *For species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area”.*
- 11.9.3 The decision as to whether the conservation status of each specified IEF has been compromised has been made using professional judgement, drawing upon the results of the assessment of how each IEF is likely to be affected by the proposed development.

Positive Effects

- 11.9.4 A positive effect is assessed as being significant if development activities are predicted to cause:
- An improvement in the condition of a habitat/species population from unfavourable to unfavourable recovering or favourable (noting that condition data are only available for Sites of Special Scientific Interest (SSSIs) but that professional judgement has been used to apply the same principle to habitats/species elsewhere); or
 - Partial or total restoration of a site’s favourable condition.
- 11.9.5 If a species population, habitat or site is already in favourable condition, it is still possible for there to be a significant positive effect. There is, however, no simple formula for determining when such effects are significant and decisions about significance are therefore made on a case by case basis using professional judgement.

11.10 Assessment of Effects: Bat Populations

Baseline Conditions

- 11.10.1 The suite of bat surveys undertaken during 2012, 2013 and 2014 within and around the Development Site recorded bats from the genera *Pipistrellus*, *Myotis*, *Nyctalus* and *Plecotus*, with overall activity levels considered to be low⁴ (detailed results of all surveys are provided within Appendices 11.C, 11.D and 11.E of the 2015 ES). All bat passes recorded from the *Pipistrellus* genus were either common or soprano pipistrelle, or pipistrelle bats calls which had peak frequencies of around 50kHz where it could not be determined if calls could be attributed to common or soprano pipistrelle. No Nathusius' pipistrelle calls were recorded.
- 11.10.2 Static monitoring surveys in October and November 2012 recorded four bat passes only. Two bat passes were recorded at each of monitoring locations 4 and 9, with all four being recorded in October. No bat activity was recorded in November. The four passes comprised one common pipistrelle pass and three *Myotis* species passes. The timing of the common pipistrelle pass was consistent with a bat emerging from a roost relatively close to site and using the edge of the site for foraging or commuting. The three *Myotis* species passes were all in isolation and were detected between 2.5 and 4.5 hours after sunset. This may be indicative of bats travelling towards a swarming site, however the number of bats involved does not indicate that the Development Site is an important strategic location for bats travelling to hibernation or swarming sites.
- 11.10.3 Surveys at Craigdullyear Mine in 2012 recorded 316 bat passes between four monitoring locations. At least five species were recorded during the 17-night monitoring period, comprising Daubenton's bat, Natterer's bat, brown long-eared bat, common pipistrelle and soprano pipistrelle. The *Myotis* species made up the largest volume of bat activity, comprising 161 bat passes. Bat activity typically commenced between 30 minutes and 1 hour after sunset, but there was a marked peak in activity at around 3 hours 30 mins after sunset, indicating use as a swarming location. Activity gradually dropped off towards dawn, with minimal activity post sunrise, suggesting that a small number of bats may have been roosting within the mine. The mine lies approximately 10km east north east of the Development Site, therefore this activity was not considered to be a constraint on the Consented Development.
- 11.10.4 Bat activity transects in 2013 recorded common and soprano pipsitrelles in low numbers only, with very low levels of activity recorded across all three of the transect routes. Static detector monitoring in 2013 recorded 1,372 bat passes between the six detector locations over the three survey periods. The highest proportion of passes was attributed to Leisler's bat (57.9% of calls) with a further 4.2% of calls identified as *Nyctalus* species. The remaining activity comprised soprano pipistrelle (21.1%), common pipistrelle (12.5%), *Myotis* species (2.9%), Daubenton's bats (0.4%) and unidentified pipistrelle sp. (0.6%). The highest level of activity was recorded at monitoring location 1 – Blood Moss (56.7%), with 22.4% recorded at Logan Hill (location 4) and 11.4% recorded at Polga Burn (location 6). The remaining three locations accounted for less than 10% of bat activity collectively. Leisler's bat activity dominated at locations 1 and 4 and was predominantly recorded in July. The timing of bat activity recorded at the Development Site was indicative of roosts being distant from the site, with bats using the site for foraging.
- 11.10.5 Leisler's bat activity on site was scrutinised further as part of the 2013 bat report (Appendix 11.D of the 2015 ES). The results of this indicated that small numbers of this species were utilising the western side of the Development Site for foraging, particularly in the summer, but did not indicate commuting behaviour. The level of Leisler's bat activity was considered high when compared to

⁴ Using professional best judgement based on extensive experience of bat surveys at other proposed development sites, including those within south west Scotland.

- other similar sites in Dumfries and Galloway and Ayrshire, although it was concluded that this was from a small number of individual Leisler's bats who were exploiting the habitats within the Development Site on route to more productive feeding areas.
- 11.10.6 Common pipistrelle, soprano pipistrelle, Leisler's bat and Daubenton's bat passes were recorded at met masts in 2014. Additionally, passes which could only be attributed to genus level were recorded comprising *Pipistrellus*, *Nyctalus* and *Myotis* species. Very low levels of bat activity were recorded at met masts comprising a total of 255 bat passes, 149 of which were at Littlechang Met Mast and 106 of which were at High Chang Hill met mast. 159 passes were recorded at ground level, whilst 96 were recorded at height. This included 78 passes at height at Littlechang, all of which were recorded in July. Common and soprano pipistrelle accounted for 88.9% of activity, with Leisler's bat and *Nyctalus* species accounting for 3.1% and 2.7% respectively. The remaining activity was made up of Daubenton's bats (6%), *Myotis* species (1.6%) and unidentified bats (1.1%).
- 11.10.7 A total of 2,545 bat passes was recorded between the three glen level control detectors. Activity was dominated by soprano pipistrelle, common pipistrelle, and pipistrelle species. Daubenton's bat, Leisler's bat, brown long-eared bat, *Nyctalus* species and *Myotis* species were also recorded. Overall, higher levels of activity were recorded at glen level than at met masts, given the higher suitability habitats present at glen level.
- 11.10.8 No bat roosts were identified during surveys in 2012 or 2013, and no suitable roosting habitat was identified within the Development Site. Limited roosting suitability exists immediately to the west, east and south of the Development Site. During surveys in 2014, individual trees within the area of mature broad-leaved woodland adjacent to the B741 at Dalleagles were found to contain potential roost features which were suitable to support roosting bats. The result of these bat roost assessment surveys identified 22 trees with suitability to support roosting bats, including one found to support a bat roost (on the basis of a bat dropping being recorded), 19 high suitability trees and two low suitability trees. All of these trees are located over 1.5km from the proposed turbine locations.
- 11.10.9 Building surveys completed in 2014 recorded a bat roost at Marshallmark (Afton Boarding Kennels), assumed to support pipistrelle species (common or soprano pipistrelle), based on the size and location of the droppings recorded. Anecdotal records of bats roosting in a house at Dalleagles Terrace were also recorded.
- 11.10.10 Overall, the level of bat activity recorded during transect surveys was considered to be very low. The overall activity levels recorded through static monitoring were also low for the genera *Pipistrellus*, *Myotis* and *Plecotus*, although twice as much activity was recorded for Leisler's bat/*Nyctalus* when compared with pipistrelles. This was considered to be high in comparison to other similar sites in south-west Scotland. Very low levels of bat activity were recorded at the met masts in 2014.
- 11.10.11 The desk study in 2020 has returned low numbers of bat records from within the search area. This includes single records of each of common and soprano pipistrelle, and an additional single record of Pipistrelle species, confirmed to be either common or soprano pipistrelle, as well as a single record of Daubenton's bat and single record of *Myotis* species bats, which were not identified to species level. Four Leisler's bat records were also returned. All records were recorded at least 1.8km from the Development Site and over 4.6km from any turbine location and were recorded either at Glenafton Caravan Park, south of New Cumnock, or between Glenafton Caravan Park and Craigdarroch, to the east of the Development Site. Assessment of aerial photography and Ordnance Survey mapping of these areas indicate that they provide suitable foraging and commuting habitats, including woodland, watercourses and waterbodies.

Predicted Effects and their Significance

Mortality as a result of direct collision with turbine blades and barotrauma

11.10.12 Direct collision and barotrauma resulting in mortality has been identified as the main potential operational effect of wind turbines on bats and bat populations. A great level of uncertainty still exists on this subject as a whole, as it is unclear why bats are attracted to wind turbines and patterns of mortality are variable. It is however, broadly accepted that different bat species are at different levels of risk from collision with turbine blades and barotrauma. Considering these risk levels against the relative abundance of bat species can be used to form an assessment of the relative vulnerabilities of their populations. The assessment of the relative collision risk (and hence population vulnerabilities) of British bat species was recently updated in the Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation guidelines (Scottish Natural Heritage et al., 2019). Table 11.3 (adapted from Scottish Natural Heritage et al., 2019) summarises the perceived levels of potential vulnerability of bat species found in Scotland.

Table 11.3 Levels of Potential Vulnerability of Populations of British Bat Species (Scotland)

	Scotland	Collision Risk		
		Low collision risk	Medium collision risk	High collision risk
Relative Abundance	Common species			Common pipistrelle Soprano pipistrelle
	Rarer species	Brown long-eared bat Daubenton's bat Natterer's bat		
	Rarest species	Whiskered bat Brandt's bat		Nathusius' pipistrelle Noctule bat Leisler's bat

Yellow = low population vulnerability, Orange = medium population vulnerability, Red = high population vulnerability. Bold text indicates those taxa from which individuals have been identified as being present/potentially present within 5km of the Development Site through field surveys or updated desk study.

11.10.13 The 2015 ES and 2017 FEI assessments were based on an earlier version of the above table, taken from Natural England's Technical Information Note TIN051 (Natural England, 2014). The notable differences between this earlier version and the current best practice version (SNH et al., 2019) are:

- Common and soprano pipistrelles are now classed as being of high collision risk and medium population vulnerability, whereas they were previously perceived to be at low risk of impacts from collisions with wind turbines at the population level, and medium risk at the individual level; and

- Whiskered and Brandt's bats are now classed as being of medium population vulnerability but were previously perceived to be of low risk of impacts from collisions with wind turbines at both the population and individual levels.
- 11.10.14 The 2015 ES concluded that given the low numbers of high vulnerability species recorded (Leisler's bat and *Nyctalus* species⁵), the operation of the wind farm would not result in a significant effect on bat populations of these species as a result of direct collision with turbine blades or barotrauma. Similarly, given the overall low level of bat activity recorded on site, the operation was not considered to result in a significant effect on bat populations of low vulnerability species (common pipistrelle, soprano pipistrelle and *Myotis* species). At the time of the 2015 ES assessment, no bat species found in Scotland were considered to be of medium vulnerability.
- 11.10.15 It is not considered that the recent updates to Table 11.3 above would have affected the conclusions drawn in the 2015 ES or 2017 FEI, given no whiskered or Brandt's bats have been confirmed as present on site, and although common and soprano pipistrelle are now considered to be of medium population vulnerability, the low level of activity recorded on site indicates that operation of the Variation Development would not result in a significant effect.
- 11.10.16 Following receipt of comments from SNH on the 2015 ES raising concerns relating to the presence of relatively high numbers of *Nyctalus* species bat passes recorded during the July 2013 static monitoring, further analysis was undertaken of bat activity at met masts compared to wind speeds. This indicated that bat activity tended to drop off in wind speeds higher than 6 m/s, and that Leisler's bat activity reduced at even lower wind speeds. With Leisler's bat/*Nyctalus* activity being comparatively higher on the western edge of the Development Site, the risks posed to this species group during the summer months were potentially high. Although the 2015 ES concluded that the Consented Development would have a non-significant effect on bat populations, an analysis of possible curtailment options was carried out and the 2017 FEI proposed that turbines T1, T3, T4 and T16 (those closest to the western edge of the Development Site) would be curtailed between June and August inclusive for three hours after sunset, when wind speeds are below 6m/s in order to further reduce the risks to high vulnerability species. This curtailment regime would also be implemented as part of the Variation Development. It was also proposed that a post-construction bat monitoring programme would be designed and implemented, which would also be carried out as part of the Variation Development.
- 11.10.17 The Variation Development comprises an increase in blade tip height of up to 19.9m to accommodate an increase in rotor diameter by up to 30m at all 16 turbine locations. An increase in rotor diameter was reported in Matthews et al. (2016) to result in an increase in the probability of bat fatalities of any species as a result of collision and barotrauma, by an increase in 18% per metre increase in blade length, suggesting a higher risk of collision and barotrauma associated with the Variation Development than the Consented Development. However, the level of bat activity recorded within the Development Site is low for the majority of species, and curtailment measures described above would further reduce the potential for effects as a result of direct collision and barotrauma on high vulnerability species, including Leisler's bats.
- 11.10.18 Data from Newson et al. 2017 suggests that the Development Site is situated in an area with low "predicted occurrence probability" for all three high vulnerability bat species and low "predicted activity levels" for noctule and Leisler's bat⁶, indicating a low likelihood of these species regularly being present in the area in large numbers. The elevation of the proposed turbine locations, ~420 - 550m, is also linked to low expected levels of activity within the Development Site by species of

⁵ This conclusion was drawn as the relatively high level of activity of Leisler's bat recorded in 2013 was considered to relate to a small number of foraging individual bats only.

⁶ The predicted activity level for Nathusius' pipistrelle was found to be below 0.5 passes per night for the whole of southern Scotland, therefore this was not mapped in detail within the study.

high population vulnerability, with typically less than 2% of activity by these species being recorded at these elevations (Newson et al., 2017). This is supported by previous studies, which indicate that habitats at elevations above 350m are less likely to be of significance to bats (West Yorkshire Ecology Service, 2014).

- 11.10.19 Overall, the data from met masts also indicates a lower level of activity on site than at the more sheltered control locations and a lower level of activity at height (38% of bat passes) than at ground level (62%). Although a higher proportion of the activity took place at height than in similar studies such as Slack and Tinsley (2015), which recorded 84% of bat activity at ground level when compared with at height data, the results suggest low bat activity on the Development Site at heights which are likely to be affected by the turbine rotor sweep, especially of high vulnerability species. The updated desk study supports the findings of the field surveys, with low numbers of records of primarily low and medium vulnerability species (common pipistrelle, soprano pipistrelle, Daubenton's bat and *Myotis* species) received and four records of a high vulnerability species (Leisler's bat).
- 11.10.20 All records were from over 1.8km from the Development Site (and over 4.6km from any turbine location) and were recorded from lower lying areas with higher suitability bat foraging and commuting habitats than those found within the Development Site.
- 11.10.21 The proposed increase in rotor diameter may therefore represent a higher risk of collision to individual bats overall, however a low level of bat activity was recorded during 2012-2014 surveys, and although a potentially higher risk to Leisler's bats using the Development Site for foraging in the summer was indicated in 2013, the curtailment programme to be implemented would reduce this risk even further. These findings are supported by the updated desk study and review of recent literature. It is therefore considered that the increased risk of mortality as a result of the Variation Development, when compared to the Consented Development, will have no significant adverse effects on the favourable conservation status of any bat species or populations.

11.11 Assessment of Cumulative Effects

- 11.11.1 The cumulative assessment presented in the 2015 ES and 2017 FEI concluded that no significant cumulative effects to IEFs would arise in relation to the Consented Development. Since the 2017 assessment was completed, the following changes have occurred in relation to proposed wind farm developments (either within the planning consent process, consented but not yet constructed or operational) within the 5km search area used to determine the cumulative effects presented within the 2015 ES and 2017 FEI:
- South Kyle (0.2km south), Pencloe (1.9km east) and Benbrack (4.9km south) have changed from application stage to consented;
 - New applications have been submitted for North Kyle (3.8km north west) and Greenburn (3.9km north) and Windy Standard III (3.3km south) has changed from scoping to application;
 - Afton Wind Farm was not described in the 2015 ES or 2017 FEI but is noted as an existing wind farm (4.3km south east); and
 - Windy Standard (4.9km south east) and Windy Standard Extension (2.4km south east) remain as existing wind farms, which were also existing when the 2017 FEI assessment was made.
- 11.11.2 Due to mitigation embedded into the Consented Development (which would similarly apply to the Variation Development) and each of the eight other existing, consented or proposed developments (Windy Standard, Windy Standard Extension, Afton, South Kyle, Pencloe, Benbrack, Windy Standard Phase III and North Kyle), no significant effects on bat species are considered likely. As such, for

species which do not regularly range over long distances (*Myotis* species, brown long-eared bats and common and soprano pipistrelle bats), no further cumulative effects are deemed likely, as these species are unlikely to range into other nearby development sites on a regular basis. However, this is not necessarily the case for more mobile species such as *Nyctalus* species and Nathusius' pipistrelle, considered to be species of high vulnerability to collisions and barotrauma associated with wind turbines at the population level. The cumulative effects on these species are discussed in more detail immediately below.

- 11.11.3 The 2015 ES concluded that significant cumulative effects were unlikely in relation to Windy Standard, Windy Standard Extension, South Kyle, Pencloe and Benbrack wind farms. It is considered that this remains the case in relation to the Variation Development. The increase in rotor diameter may represent a higher risk of collision to individual bats, however no Nathusius' pipistrelle and only very low numbers of Leisler's bat and *Nyctalus* species bat passes have been recorded at South Kyle or Benbrack. Equally, no Nathusius' pipistrelle have been recorded at the Development Site and although higher than expected numbers of Leisler's bats were recorded, the proposed curtailment programme is considered suitable to further minimise risk to this species (and other high vulnerability species) on the Development Site. Surveys in support of the Pencloe application were carried out in line with the first edition of the Bat Conservation Trust guidelines (BCT, 2007), therefore did not provide data on the species assemblage and activity levels on site. Equally, detailed survey information is not readily available for Windy Standard or Windy Standard Extension. In all three of these cases it is considered that bat activity on these sites would be similar to the aforementioned developments, given their geographic location. Although Afton Wind Farm was not considered within the 2015 ES or 2017 FEI, the assessment for this scheme again indicates that no Nathusius' pipistrelle were recorded within the site, and very low numbers of *Nyctalus* species (Leisler's bat only) were recorded during survey work carried out in 2010. The proposed development at Afton Wind Farm was not considered to result in significant effects on bat populations, and it not considered to contribute to cumulative effects. It is therefore considered that an increased collision risk at any of these sites would only occur if presence of turbines significantly alters the distribution or flight characteristics of these bat populations, which is very unlikely. Although Cryan et al (2014) indicated that bats passing close by (within 50m) of wind turbines may be attracted to the turbines (thought to be caused by bats seeking roost locations, foraging opportunities or social interaction), this attraction effect on flight characteristics has a weaker impact on collision risk than home range and dispersal rate of bat populations (Thaxter et al, 2017). It is therefore unlikely that significant numbers of high vulnerability bats from outside of the 5km search area utilised for this cumulative assessment would be attracted into the area occupied by these wind farms, given the core sustenance zones (CSZ)⁷ for Nathusius' pipistrelle, Leisler's bat and noctule are 3km, 3km and 4km respectively. Given the migratory nature of some Nathusius' pipistrelle bats, this species is known to travel beyond this CSZ, however there is currently no evidence to support the theory that bats' migration routes are altered by the presence of wind farms and given that this species has not been recorded at any of the sites assessed in this document, and has been recorded infrequently across south-west Scotland as a whole (Newson et al, 2017), it is not considered that significant numbers of fatalities of this species resulting from the presence of these sites will occur.
- 11.11.4 It is reported in the Windy Standard Phase III ES that a suite of bat surveys was undertaken during the period April to September 2012, including a walkover survey, seasonal static detector monitoring at ground level in ten locations, and seasonal transect surveys comprising three transect routes. No suitable bat roosting locations were identified. Only four species of bats were recorded

⁷ A core sustenance zone is the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost and can be used to determine the area surrounding a roost within which development work may impact the commuting and foraging habitats of bats using the roost (Collins, J. (ed.) 2016).

- during the static monitoring, all of which were low vulnerability species, recorded at very low levels within the Development Site. Transect surveys also recorded very low levels of bat activity, with common and soprano pipistrelle, *Myotis* species bats and Daubenton's bat being the only recorded species.
- 11.11.5 Within the North Kyle Wind Farm ES, it is noted that a range of bat surveys were completed in 2017 and 2018, including a preliminary bat roost assessment, point count and transect surveys and static detector monitoring. The ES indicates the presence of Nathusius' pipistrelle on site, as well as relatively high activity levels of noctule and Leisler's bat, with the assessment concluding that, without mitigation, operation of the North Kyle Wind Farm would likely have a moderate to major adverse effect on *Nyctalus* species and a moderate adverse effect on common and soprano pipistrelle as a result of collisions and barotrauma, both of which are considered significant in EIA terms. A minor adverse effect on Nathusius' pipistrelle was also predicted, although considered to be non-significant. It was therefore proposed to implement a species protection plan to protect any bats and bat roosts which may be present during construction of the site and a Bat Mitigation and Monitoring Plan which will be established to reduce the effects on bat populations to a non-significant level. This Plan will include a range of measures including reduction of rotation speed whilst idling, a minimum of three years of post-construction monitoring, including carcass searching, and monitoring of bat activity and weather conditions to inform a detailed curtailment programme, if deemed necessary. Curtailment would be put into place from Year 2 of operation, if required. With the inclusion of these measures, the assessment of residual effects concluded that no significant effects on bat populations would occur as a result of the development.
- 11.11.6 The Greenburn Wind Farm ES notes that bat surveys were undertaken in 2017 and 2018, including assessment of buildings and trees for roosting bats, transect surveys and static detector monitoring, including monitoring "at height" on a temporary mast during spring and summer 2018. Surveys recorded presence of Leisler's bat and noctule, and very low numbers of Nathusius' pipistrelle passes. No confirmed bat roosts or features suitable for roosting bats were found within the site. Mortality risk to bats, particularly *Nyctalus* species, through direct collision or barotrauma was assessed as likely to result in a significant effect, without mitigation. As such, an operational bat protection plan has been proposed, comprising retention of a 50m unplanted buffer around each turbine location, pre- and post-construction monitoring surveys, feathering, implementation of curtailment at high-risk times and bat carcass searching. With these measures in place, the assessment of residual effects concluded that no significant effects on bat populations would occur as a result of the development.
- 11.11.7 Given the very low level of bat activity recorded at Windy Standard Phase III, none of which was associated with high vulnerability bat species, and the mitigation measures proposed to be incorporated at North Kyle, Greenburn and the Development Site to minimise risk to bat populations, it is considered that, for the Variation Development in combination with Windy Standard Phase III, North Kyle and Greenburn, high vulnerability bat species would only be at an increased risk of collision with turbines if the presence of wind farms at any of these locations significantly altered their distribution or flight characteristics, causing them to fly more regularly at rotor-swept height. As outlined above, this is considered very unlikely to be the case, and as such no significant cumulative effects are predicted.

11.12 Conclusions of Significance Evaluation

- 11.12.1 The 2015 ES and 2017 FEI concluded that the Consented Development would not have a significant effect on bat species or populations. As per the 2015 ES and 2017 FEI, inbuilt environmental measures would reduce the residual risk of harm/disturbance to roosting bats, damage/alteration or loss of bat roosts and alteration of bats' behaviour due to increased lighting to a level, which

would not affect their favourable conservation status and would avoid contravention of relevant legislation. No changes are proposed to the location of turbines and lighting within the Variation Development, therefore conclusions presented in the 2015 ES and 2017 FEI remain valid for the Variation Development in relation to these aspects.

- 11.12.2 The change in rotor diameter proposed for the Variation Development has been assessed with regard to bat populations. While the increased rotor diameters, compared to the Consented Development, are considered to increase the risk of individual bat mortality through direct collision and barotrauma, due to the low bat activity levels recorded for the majority of species, inbuilt mitigation measures proposed and limited records obtained through the updated desk study, this is unlikely to affect the favourable conservation status of bat populations. As such, it is considered unlikely that the Variation Development would result in significant adverse effects on bat species and populations.
- 11.12.3 Overall, there is no change to the conclusion from the 2015 ES and 2017 FEI, with all residual effects considered to be not significant in EIA terms.

11.13 References

Journal Articles

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Books

Bat Conservation Trust (2007) Bat Surveys: Good Practice Guidelines, 1st edition. The Bat Conservation Trust, London.

Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

Hundt, L. (2012) Bat Surveys: Good Practice Guidelines, 2nd Edition, Bat Conservation Trust, London.



12. Ornithology

12.1 Introduction

- 12.1.1 This chapter of the EIA Report assesses the potentially significant effects of the Variation Development with respect to ornithology. The chapter should be read in conjunction with the development description provided in **Chapter 3**.
- 12.1.2 The key variations that are proposed to the Consented Development are:
- to extend the operational period from 25 to 30 years; and
 - an increase in the rotor diameter of all 16 wind turbines and amendments to all hub heights, with an increase to the rotor diameter of all 16 turbines from up to 106m to up to 136m and the tip height from up to 130m to up to 149.9m.
- 12.1.3 All turbine locations and other infrastructure elements would remain unchanged.
- 12.1.4 The results of the ornithological impact assessment for the Consented Development are presented in Chapters 12 of the 2015 ES and the 2017 FEI, with results from the programme of ornithological surveys undertaken to inform the assessment of effects on birds detailed within the 2015 ES. No significant effects or significant cumulative effects on any ornithological receptors were predicted to occur.
- 12.1.5 As the Variation Development primarily relates to increasing rotor diameter and blade tip height of turbines, with all ground level infrastructure, construction/decommissioning methods and programme remaining unchanged (and therefore, no changes in respect of disturbance and habitat loss etc.), the only receptor scoped into the assessment is golden plover, which may be at risk of collisions with turbines. This receptor was also identified as being at risk in the 2015 ES and 2017 FEI. Effects on all other ornithological receptors would be predicted to remain non-significant and unchanged from the 2015 ES and 2017 FEI and are thus excluded from further consideration. Due to the very limited bird interest recorded previously and the limited potential for additional impacts on birds resulting from the proposed variation to the Consented Development, the assessment is based on the bird flight data presented in the 2015 ES. These surveys recorded flight activity above 130m to more than 150m and are therefore suitable to inform this assessment. This approach also allows the difference between the collision risk associated with the Consented Development and the Variation Development to be assessed.
- 12.1.6 This approach was set out in the scoping request for the Variation Development and Scottish Natural Heritage (SNH) responded noting that it was satisfied with the proposals.

12.2 Limitations of this Assessment

- 12.2.1 No limitations have been identified that affect the robustness of the assessment of effects of the Variation Development with respect to golden plover collision risk.

12.3 Relevant Legislation, Planning Policy, Technical Guidance

Changes to Policy and Legislative Context

- 12.3.1 **Chapter 5** – Planning Policy Context, provides a review of all changes to applicable planning policies, advice and guidance of relevance to the Variation Development since the 2017 FEI was completed.
- 12.3.2 As noted in Chapter 5, East Ayrshire Council (EAC) adopted the East Ayrshire Local Development Plan (LDP)¹ in 2017 (shortly after the submission of the 2017 FEI). Policies OP1 “Overarching Policy”, RE3 “Wind Energy Proposals”, ENV6 “Nature Conservation”, ENV8 “Protecting and Enhancing the Landscape” and ENV9 “Trees, Woodland and Forestry” have elements relating to the natural environment and biodiversity, further details of which are presented in Chapter 5 of this EIA Report.
- 12.3.3 None of the changes noted in Chapter 5 and Chapter 11 of this EIA Report are specifically relevant to the assessment of collision risk on birds.

Technical Guidance

- 12.3.4 At a national level, the key SNH guidance documents referred to within the 2017 FEI remain unchanged (i.e. SNH 2006² and 2013³). The 2006 guidance was updated in 2018; and the 2013 guidance was refreshed in 2014 and updated with minor changes in 2017, but with no substantive changes that would require a different approach to this assessment.
- 12.3.5 Technical guidance that has been used to define the survey methods employed to inform this assessment is referenced in **Section 12.4** and Appendices 12.A-E of the 2015 ES (i.e. the baseline reports).
- 12.3.6 Publications that provide guidance that are relevant to the assessment of potentially significant effects on ornithology included in this EIA Report chapter, are listed below:
- Chartered Institute of Ecology and Environmental Management (CIEEM 2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester (updated since the 2015 ES and 2017 FEI were completed);
 - Scottish Natural Heritage. (2000). Windfarms and Birds: Calculating a theoretical collision risk assuming no avoiding action. SNH Guidance Note. Scottish Natural Heritage; and
 - Scottish Natural Heritage (2017). Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model. SNH guidance. July 2017.

12.4 Data Gathering Methodology

Desk Study

- 12.4.1 A search was undertaken using <https://magic.defra.gov.uk/MagicMap.aspx> and the Joint Nature Conservation Committee (JNCC) website (<http://jncc.defra.gov.uk>), accessed in August 2019, for any

¹ Available at: <https://www.east-ayrshire.gov.uk/PlanningAndTheEnvironment/Development-plans/LocalAndStatutoryDevelopmentPlans/East-Ayrshire-Local-Development-Plan-2017.aspx> (Accessed 18/03/20)

² Assessing significance of impacts from onshore windfarms on birds outwith designated areas.

³ Recommended bird survey methods to inform impact assessment of onshore wind farms.

statutory designated sites of national or international ornithological importance within 20 km of the Development Site that had been designated since the 2017 FEI. No new sites were identified.

Survey Work

12.4.2 The methodology of all of the surveys undertaken between 2011-14 is detailed within Appendices 12.A-E of the 2015 ES; but those used to inform the assessment of collision risk are summarised below:

- Vantage Point (VP) Surveys: a total of 42 hours per VP (from each of five VPs) from September 2013 to March 2014 inclusive⁴.

12.4.3 The proposed changes in the turbine parameters have not resulted in any changes to the selection of flight lines for golden plover included in the Collision Risk Modelling (CRM) for this assessment. Details of how the updated CRM has accounted for the changes in rotor diameter and height to blade tip in terms of the recording flight height bands used during the VP surveys are provided in **Appendix V12A**.

12.5 Overall Baseline

Current Baseline

12.5.1 As there has been no substantive change to the habitats within the Development Site and immediately surrounding it, based on a site visit undertaken in the autumn of 2019, the current and future baseline are considered to be unchanged from that reported in the 2015 ES and 2017 FEI. An overview of the baseline for golden plover as presented in the 2015 ES and 2017 FEI is provided in the sections below (all target species flight maps are provided in Appendices 12.A-E of the 2015 ES).

Golden Plover

12.5.2 A total of 25 flights of golden plover (totalling 702 birds) were recorded during the VP surveys undertaken from September 2013 to March 2014, as follows:

- September 2013: Two flocks of 22 and two birds, recorded from VP5, spent 13 seconds and six seconds of flight time in height band 0-30m on 12 September. Two flocks of 18 birds (probably the same flock), both recorded from VP3, spent 14 seconds of flight time at height band 30-150m and three seconds of flight time at height band 0-30m.
- October 2013: One bird recorded from VP5 on 02 October, spent seven seconds of flight time at 0-30m height. One flock of four birds recorded from VP2 on 11 October, spent 15 seconds of flight time at 0-30m and 35 seconds of flight time at 30-150m.
- November 2013: On 14 November, one flock of 19 birds recorded from VP3 spent eight seconds of flight time in height band 0-30m. On 26 November, two birds recorded from VP3 spent five seconds of flight time at 0-30m height. On 27 November, a flock of seven birds recorded from VP5 spent four seconds of flight time at 0-30m height.
- January 2014: On 09 January, three, eight and one bird recorded from VP5, spent three, five and three seconds of flight time, respectively, within the 0-30m height band. On the 11 January, a flock of five birds recorded from VP2, spent five seconds of flight time at 0-30m height. On 20

⁴ Collision risk was informed by the 2013/14 winter season only, because it was the season with the highest level of golden plover flight activity in terms of peak flock size and the cumulative flight time across the five seasons surveyed.

January, a single bird recorded from VP3 spent three seconds of flight time at 0-30m height. On 27 January, a single bird and a flock of eight birds, recorded from VP5, spent four seconds and two seconds of flight time at the 0-30m height band.

- February 2014: On 07 February, two birds recorded from VP4, spent four seconds of flight time at 0-30m height. On 19 February three flights recorded from VP2 comprised two birds and a flock of ten, spent four seconds and three seconds of flight time at 0-30m height, while a flock of 110 spent 600 seconds of a 30 minute flight at 30-150m height. On 27 February a flock of 35 individuals recorded from VP3, spent four seconds of flight time at 0-30m height.
- March 2014: On 01 March, two birds recorded from VP1 spent six seconds of flight time at 0-30m height. On 23 March, a flock of 220 birds recorded from VP3, spent 360 seconds of flight time at 30-150m height. On 24 March, a single bird recorded from VP2 spent six seconds of flight time at 0-30m height. On the same day, a flock of 200 birds also recorded from VP2, spent 1500 seconds of flight time at 0-30m height.

12.5.3 To conclude, there were a total of five flights (totalling 370 birds) attributed to golden plover within the 30-150m height band. A further 20 flights (totalling 332 birds) were recorded in the 0-30m height band. As the proposed minimum lower sweep height for the variation turbines is 13.9m, then a portion of the flight time of flights at 0-30m would therefore be considered to be within the collision risk volume (CRV). This approach is unchanged from the 2017 FEI, with the increased height to blade tip and larger rotor diameter not resulting in any additional flights falling within the revised CRV (which is slightly increased in the vertical and horizontal plane in comparison to the Consented Development [lower sweep of 24m and upper sweep of 130m]).

12.6 Consultation

12.6.1 **Table 12.1** provides a summary of the ornithology comments about the Variation Development that have been raised by SNH and the responses provided. No response to the Scoping Report for the Variation Development was received from the Royal Society for the Protection of Birds (RSPB).

Table 12.1 Summary of Issues Raised during Consultation regarding Ornithology

Consultee(s)	Issue raised	Response and where considered in this chapter
SNH (Response to Scoping Report – 06/03/2020)	<p>“In our view, it is unlikely that the proposal will have a significant effect on the qualifying interests of Muirkirk and North Lowther Uplands SPA either directly or indirectly. An appropriate assessment is therefore not required, and we consider that Muirkirk and North Lowther Uplands SPA can be scoped out of the proposed S36C variation application.”</p> <p>“We are satisfied that further bird survey work is not required to support the variation application. The collision risk modelling presented in the 2015 ES and 2017 FEI was limited to golden plover and we support the proposals to update the collision risk calculations for golden plover as detailed in Section 11.1.5 of the variation application scoping report.”</p> <p>“We recommend that no ground clearance or other operational activity should be undertaken during the main bird breeding season March to August inclusive.”</p>	This response confirms that SNH are satisfied with the approach to this chapter set out in the scoping report.

12.7 Scope of the Assessment

- 12.7.1 The Variation Development primarily relates to an increased rotor diameter (from a maximum of 106m to a maximum 136m) and the turbine blade tip height (from a maximum of 130m to a maximum 149.9m), with all ground level infrastructure, construction and decommissioning methods/programme remaining unchanged and also an extension to the proposed operational life of the wind farm from 25 to 30 years. The only aspect scoped into this assessment is, therefore, the risk of certain bird species colliding with turbine blades. Effects in relation to all other ornithological aspects (for example, the loss of foraging/nesting habitat due to disturbance from the presence of the turbines), would be predicted to remain non-significant and unchanged from the 2015 ES and 2017 FEI and are thus scoped out of the assessment.
- 12.7.2 The Variation Development has the potential to increase the risk of collision mortality for certain birds, primarily as a result of the increased rotor diameter which increases the area of airspace swept by rotating blades. The collision risk modelling reported in the 2017 FEI has therefore been updated using the proposed turbine dimensions for the Variation Development and the survey data reported in the 2015 ES to assess the difference between the level of risk between the Variation Development and the Consented Development⁵.

Spatial Scope

- 12.7.3 The spatial scope of the assessment for ornithology covers the same area as that described within the 2017 FEI.

Temporal Scope

- 12.7.4 As the only aspect scoped into this assessment is the risk of birds colliding with turbine blades, the temporal scope of the assessment for ornithology covers the operational period only. This is proposed to be extended from 25 years to 30 years and will be accounted for within the collision risk assessment.

Potential Receptors

- 12.7.5 Target species flight activity has been reviewed in relation to the revised turbine parameters, and where there is potential for a material increase in the collision rate, collision risk modelling based on the revised parameters has been undertaken.
- 12.7.6 A single target species (golden plover) was identified in the 2015 ES and 2017 FEI as being potentially at risk of collision with turbines, and it is this receptor that is again taken forward for consideration in this assessment for the Variation Development.
- 12.7.7 For all other target species recorded during the VP surveys in 2011-14, the level of flight activity at potential collision-risk height for the revised turbine dimensions (13.9-149.9m) within the Development Site was very low, and as such, the risk of collision is also likely to be very low and predicted not to have any significant effect on the populations of those species at any geographic scale.

⁵ As noted in Section 12.1, the assessment is based on the bird flight data presented in the 2015 ES and 2017 FEI due to the very limited bird interest recorded previously and the limited potential for additional ornithological impacts resulting from the proposed variation to the Consented Development. This approach also allows direct comparison of collision risk associated with the Consented Development and the Variation Development.

Likely Significant Effects

12.7.8 The ornithology receptors that have been taken forward for assessment in this EIA Report chapter are summarised in **Table 12.2**.

Table 12.2 Ornithology Receptors Scoped in for further Assessment

Receptor	Relevant assessment criteria	Potential effects
Golden plover	Assessment of effects at a regional (East Ayrshire) geographic scale.	Collision with turbines resulting in mortality and regional population decline.

12.8 Environmental Measures Embedded into the Development Proposals

12.8.1 A range of environmental measures have been embedded into the Consented Development and are detailed in Section 12.11 of the 2015 ES. No further embedded measures have been identified that will influence the ornithology assessment detailed in this EIA Report chapter for the Variation Development.

12.9 Assessment Methodology

12.9.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 4**, and specifically in **Sections 4.5 to 4.7**. However, whilst this has informed the approach that has been used in this ornithology assessment, it is necessary to set out how this methodology has been applied and adapted as appropriate, to address the specific needs of this ornithology assessment and to align it with the standard industry guidance provided by CIEEM (2018).

12.9.2 The assessment is based upon not only the results of the desk study and field surveys presented in the 2015 ES, but also relevant published information (on the status, distribution, sensitivity to environmental changes and ecology of the features scoped in to the assessment, where this information is available), and professional knowledge of ornithological processes and functions.

12.9.3 For each ornithological feature taken forward for detailed assessment in **Section 12.10** of this EIA Report chapter (in this case, the effects of potential collisions with turbines of golden plover populations), effects were assessed against the predicted future baseline conditions for it during construction and operation of the Variation Development. This future baseline was defined using information about the likely future use and management of the Development Site in the absence of development; known species' population trends; and any other proposed developments (consented or otherwise) that may act cumulatively with the Variation Development to affect the ornithological features being assessed.

Significance Evaluation Methodology

12.9.4 CIEEM (2018) defines a significant effect as one *"that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general"*.

12.9.5 When considering potential negative or positive significant effects on ornithological features, the following characteristics are taken into account:

- Extent – the spatial or geographical area over which the effect may occur;
- Magnitude – the size, amount, intensity or volume of the potential effect being considered;

- Duration – the length of time over which the potential effect may occur;
- Frequency – the number of times an activity may occur resulting in a potential effect;
- Timing – the periods when activities may occur and during which a potential effect may be considered; and
- Reversibility – whether the potential effect on a biodiversity feature can be reversed through restoration actions.

Negative Effects

12.9.6 An effect is assessed as being significant if the favourable conservation status of an ornithological feature would be compromised by a change (from the baseline) that results from the Variation Development.

12.9.7 Conservation status is defined as follows:

"For habitats, conservation status is determined by the sum of the influences acting on the habitat and its typical species, that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area; and for species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area".

12.9.8 The decision as to whether the conservation status of an ornithological feature has been compromised has been made using professional judgement, drawing upon the results of the assessment of how each feature is likely to be affected by the Variation Development.

Positive Effects

12.9.9 A development may result in positive effects where there is a resulting change from the baseline that improves the quality of the environment (e.g. increases species diversity, increases the extent of a particular habitat etc., or halts or slows down an existing decline). For a positive effect to be considered significant, the level of importance of an ornithological feature determined at the baseline state would need to increase by one or more geographical levels (e.g. where an ecological feature of local importance becomes of county/regional importance following delivery of the proposed development). Further, if a positive effect across a range of habitats and associated species occurs, delivering an overall biodiversity net gain, then a significant effect results.

12.10 Assessment of Ornithology Effects: Golden Plover

Baseline Conditions

Current Baseline

12.10.1 Golden plover is listed in the Muirkirk and North Lowther Uplands Special Protection Area (SPA) citation, with a total of 154 breeding pairs at the site. Golden plover is a Birds Directive Annex 1 listed species and is listed on the Scottish Biodiversity List. The species was downgraded from Amber to Green on the Birds of Conservation Concern lists (Eaton *et al.*, 2015). The British breeding population was estimated at 32,500-50,500 pairs and the wintering population at 400,000 individuals (Woodward *et al.*, 2020). Forrester *et al.*, (2007) cites that the Scottish breeding population is 15,000 pairs, with 25-35,000 overwintering individuals, 10-30,000 during the spring passage and 20-60,000 during the autumn passage period.

- 12.10.2 A total of 72 golden plover flights, with a peak count of 220 individuals, were recorded across the entire survey period (five seasons from 2011-2014). A total of 25 golden plover flights were recorded during the VP surveys carried out to inform the 2017 FEI CRM, all of which had periods within the CRV (accounting for the new turbine parameters). There was no evidence of breeding on, or in the vicinity of, the Development Site. While golden plover were regularly recorded, they were not present on every survey visit, suggesting that other suitable habitat is available in the surrounding area. Nonetheless, it is considered that this level of activity indicates that the Development Site is of medium importance for this species during the non-breeding season.

Predicted Future Baseline

- 12.10.3 There are no known plans to alter the current land management practices at the Development Site, which could in turn affect use of the area by golden plover, as characterised by the baseline surveys in the 2015 ES. In the absence of the Variation Development, it is therefore assumed that the value of the Development Site to golden plover would remain unchanged.
- 12.10.4 The future baseline is, however, likely to alter due to the effects of climate change on bird productivity, survival rates and breeding ranges, with substantial changes in species ranges predicted during the coming decades. Survey work represents a snapshot of the bird community at the time of the survey and cannot be extrapolated to predict future population trends in the wake of agricultural or climatic change.

Predicted Effects and their Significance

- 12.10.5 There is the potential for golden plover to collide with turbine blades and mortality from collision has the potential to lead to a decline in the regional population of this species. In view of this, and the potential sensitivity of the species' population to collision with turbines, CRM was undertaken to inform the assessment of effects on the species for the original 19 turbine layout in the 2015 ES and the now Consented Development in the 2017 FEI.
- 12.10.6 The CRM within the 2015 ES was undertaken for the season with the highest number of golden plover flights (2013/14 non-breeding season; and is therefore likely to be a precautionary estimate) and predicted an annual collision rate of 4.4 birds.
- 12.10.7 For the 2017 FEI, the reduction in the number of turbines from a maximum of 19 (the Original Layout) to a maximum of 16 (the Consented Development), including the deletion of turbines from the eastern edge of the array, resulted in a slight reduction in the risk of golden plover collisions, as there are fewer rotors, including in areas of suitability for this species. The updated CRM presented in the 2017 FEI yielded a predicted annual collision rate of 3.7 individuals, 0.7 individuals per annum less than predicted based on the Original Layout. The updated CRA for the Consented Development is presented in FEI Appendix 12.A.
- 12.10.8 This rate of collision was considered precautionary given that the CRM was undertaken for the season with the highest number of golden plover flights. At this low level of activity and modelled collision rate, collision impacts were predicted to be negligible in the context of the UK wintering population of 400,000 individuals or even the lowest predicted Scottish wintering population of 25,000 birds. Coupled with the Development Site being assessed as of medium nature conservation importance for golden plover, the level of effect was also considered to be slight and therefore not significant.
- 12.10.9 CRM was revisited for golden plover based on the turbine dimensions proposed for the Variation Development using the same VP survey data presented in the 2015 ES and 2017 FEI. No additional flights had to be included in the collision risk model as a result of the changes in the turbine dimensions. The modelling for golden plover was carried out using an avoidance rate of 98% as per

SNH guidance (SNH, 2017). The avoidance rate was also the same in the 2015 ES and 2017 FEI. The methods, working and results of the collision risk modelling for golden plover are provided in **Appendix V12A** of this EIA Report chapter.

- 12.10.10 Results from the CRM for the Variation Development predict that the theoretical annual rate of collisions for golden plover (based on 75% operational time as assumed in the 2015 ES and 2017 FEI and 98% avoidance) would be an average of 8.2 birds based on the 2013/14 non-breeding season data; a total of 246 birds over the anticipated life-span of the Variation Development of 30 years.
- 12.10.11 The effect of the loss of individual birds on a population is influenced by several characteristics of the affected population, notably its size, density, recruitment rate (additions to the population through reproduction and immigration), mortality rate (the natural rate of losses due to death) and emigration. In general, the effect of an individual lost from the population will be greater for species that occur at low density, are relatively long-lived and reproduce at a low rate. The golden plover (in common with most species of wader) has a relatively high reproductive rate (four eggs are laid each year) and occurs at relatively high densities on its wintering grounds.
- 12.10.12 The annual mortality rate for adult golden plover is 27%⁶ which represents 6,750 birds each year based on the lowest estimate of the Scottish wintering population estimate of 25,000 individuals. The additional mortality predicted from the CRM (8.2 birds/year) represents an increase of 0.12% on the background mortality for the regional population, and therefore can be considered as having a negligible magnitude at a regional level.
- 12.10.13 To conclude, the effects of collision due to the Variation Development would be of negligible magnitude and therefore there would be no significant effects on the regional population of golden plover.

12.11 Assessment of Cumulative Effects

- 12.11.1 As outlined in **Section 4.8** of **Chapter 4**, consideration has been given as to whether any of the ornithology receptors that have been taken forward for assessment in this chapter are likely to be subject to cumulative effects in combination with other wind farm developments.
- 12.11.2 The combined effects of multiple developments within the home range of birds could include an increased risk of collisions with proposed turbines or their displacement from a relatively large area of habitat. This cumulative assessment has taken account of SNH guidance (SNH, 2018).

Target Species

- 12.11.3 The effects of collision on the regional populations of golden plover as a result of the Variation Development alone are not predicted to be significant (see **Section 12.10**). However, there is the potential that the cumulative effects of collision due to the Variation Development combined with other developments in the area could have a significant effect on these species. The cumulative effects on this species have therefore been considered further within this EIA Report.

Search Area

- 12.11.4 As for the 2015 ES assessment, wind farms that have been built/consented or are in the planning process and that fall within a 10 km radius of the Development Site have been considered, where the relevant environmental information can be accessed. Single proposed turbine schemes are not

⁶ <http://www.bto.org/about-birds/birdfacts>. Accessed on 19 March 2020.

considered, as they are unlikely to have a significant adverse effect on birds and rarely have detailed supporting ornithological information upon which to base the assessment.

Methods

- 12.11.5 All submitted, consented, under construction and operational wind farms within 10 km of the Development Site presented in **Chapter 9: LVIA** were considered, with the exception of single turbine schemes. The relevant local authority planning websites were searched for details of environmental assessments relating to the identified wind farm developments.

Results

- 12.11.6 A total of 16 wind farm schemes (built, consented or in the planning system) were identified within 10 km of the Development Site (Polquhairn Wind Farm lies 10.1 km from the Site but was included in the assessment as it was in the 2015 ES). Of these, five schemes were not in the planning system in 2015 and therefore not included in the cumulative assessment in the 2015 ES (references C04, CO5 and A01-A04). The consented Pencloe Wind Farm has a variation to the scheme in the application process and is therefore also considered in the assessment. Three schemes that were considered previously in the cumulative assessment for the 2015 ES have now been withdrawn/refused, and therefore are no longer relevant, and not considered within the cumulative assessment for the Variation Development (High Park Farm, High Cumnock, and Garleffan wind farm schemes respectively).
- 12.11.7 **Table 12.3** provides details of those wind farm schemes present within the search area and related ornithological information that has been identified during the desk study noted above. The locations of the schemes in relation to the Development Site are shown in **Figure V9.8** of this EIA Report (**Chapter 9**).

Table 12.3 Cumulative Assessment Search Results – Wind Farms within 10 km of the radius of the Site

ID *	Scheme Name	Stage	Distance to nearest turbines (km)	Number (and max upper sweep) of Turbines	Conclusions of effects on golden plover (where provided)
E01	Windy Standard Extension	Existing	2.4	30 (120m)	Unknown. Effect on golden plover unknown.
E02	Afton	Existing	4.3	27 (100-120m)	Five golden plover territories on-Site from 2010 surveys. No breeding pairs in 2004 or 2005. A single overwintering flock of 20 recorded in ES surveys. Effects of minor significance during the construction and operation phases resulting from some disturbance to wintering birds. No residual effects on golden plover predicted.
E03	Windy Standard	Existing	4.9	36 (52m)	Unknown. Effect on golden plover unknown.
E05	Hare Hill	Existing	7.1	20 (63.5m)	Unknown. Effect on golden plover unknown.
E06	Hare Hill Extension	Existing	8	35 (70-91m)	ES unavailable. Effect on golden plover unknown.
C01	South Kyle	Consented	0.2	50 (149.5m)	No breeding on-Site (unsuitable habitat). Low number of flights during a single winter season. A minor to negligible residual adverse effect on golden plover.
C02	Pencloe	Consented	1.9	19 (125m)	Negligible number on in-flight records. No residual effects on golden plover predicted.
C03	Benbrack	Consented	4.9	18 (132-149.9m)	No records of breeding at the Site and only two records during the surveys. No residual effects on golden plover predicted.
C04	Over Hill	Consented	5.1	10 (149.9m)	Unknown. Effect on golden plover unknown.
C05	Windy Rig	Consented	7.6	12 (125m)	No golden plover recorded during VP surveys or distribution and abundance surveys at the Site. No residual effects therefore predicted on golden plover.
C07	Polquhairn	Consented	10.1	9 (100m)	No breeding records. Low level of Site usage during passage periods. CRA output of 1.83 collisions / year. No residual effects predicted on golden plover.

ID *	Scheme Name	Stage	Distance to nearest turbines (km)	Number (and max upper sweep) of Turbines	Conclusions of effects on golden plover (where provided)
A01	Pencloe Variation	Application	1.9	19 (149.9m)	Negligible number on in-flight records. No residual effects on golden plover predicted.
A02	Windy Standard Phase III	Application	3.3	20 (125-177.5m)	The bird survey work and assessments identified no significant effects of the proposed development on ornithological interests. No residual effects predicted on golden plover.
A03	North Kyle	Application	3.8	54 (149.9m)	No breeding on-Site (unsuitable habitat). Low number of flights (31 of 3-58 individuals) during two non-breeding seasons, and following collision risk modelling, a mean non-breeding collision risk of 2.57 collisions per annum was predicted for golden plover (equivalent to one bird every 0.39 years or 64.21 birds across the lifespan of the proposed development). No residual effects predicted on golden plover.
A04	Sanquhar II	Application	6.2	50 (149-200m)	Flocks of overwintering golden plover use the site for roosting and a total of 766 flights were recorded from VP surveys. The risk of collision was considered to be negligible. No breeding was confirmed. The cumulative impact is considered to be, at most, of low magnitude and minor significance or possibly negligible. Residual effects as follows: winter roost flocks to be monitored by Ecological Clerk of Works (ECoW) and disturbance minimised; low magnitude, short term and of minor significance for construction; and operation effects negligible for collision, displacement low magnitude and of minor significance.
S01	Greenburn	Scoping	5.2	16 (149.9m)	Unknown. Effect on golden plover unknown.

Information collected from local planning authority and developer sources in February 2020. Single turbine schemes are not assessed within this cumulative assessment. * ID numbering system relates to the LVIA cumulative assessment.

- 12.11.8 Of 16 wind farm schemes identified within 10km of the Development Site, some information on collision risk to birds were available for ten. No significant effects due to collision were recorded for golden plover at any of these schemes, and where CRM was undertaken, the predicted collision rates were very low. In view of this, the cumulative effects of collision on the regional populations of golden plover are considered to be not significant.

12.12 Conclusions of Significance Evaluation

- 12.12.1 The Variation Development has been assessed with regard to potential impacts on ornithological receptors. The results of the updated CRM suggest that the increased rotor diameters increase the theoretical risk of bird collision mortality. However due to the low activity levels recorded within the Development Site, supported by results from the CRM, collision mortality is not considered to result in any significant adverse effects on the regional population of golden plover. Overall, there is no change to the conclusion from the 2015 ES and 2017 FEI, with all residual effects considered to be not significant.

12.13 References

CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. Chartered Institute of Ecology and Environmental Management, Winchester.

Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D. and Gregory R.D. (2015). 'Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man.' In: *British Birds* 108, pp708-746.

Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D. and Noble, D. (2013). Population estimates of birds in Great Britain and the United Kingdom. *British Birds*, 113, pp 69-104.

Scottish Natural Heritage (2006, updated 2018). Assessing significance of impacts from onshore windfarms on birds outwith designated areas. SNH, Inverness.

Scottish Natural Heritage (2013, updated 2017). Recommended bird survey methods to inform impact assessment of onshore wind farms.

Scottish Natural Heritage (2016). Avoidance rates for the onshore SNH Wind Farm Collision Risk Model. SNH guidance. October 2016.



13. Geology, Hydrology and Hydrogeology

- 13.1.1 As stated in the Scoping Report, the assessment of the likely significant effects of the Variation Development with respect to Geology, Hydrology and Hydrogeology have been scoped out as the increase in turbine rotor diameter, tip height and operational period proposed will not result in any additional impacts and effects to those already considered in the 2015 ES and 2017 FEI. East Ayrshire Council agreed with this approach (see Chapter 4, Table 4.1 of this EIA Report).
- 13.1.2 The assessment outlined in the 2017 FEI (Chapter 13) identified that although two turbines (T2 and T5) lie within the precautionary 100 m buffer originally assigned across the whole of the River Nith catchment, the improved baseline fisheries knowledge for the nearby watercourses (Catloch Burn and LittleChang Burn) demonstrated that they are of lower sensitivity due to the lack of salmonid habitat. Whilst downstream watercourses do contain salmonid populations, the mitigation measures that will be put in place provide an appropriate level of protection alongside a 50 m buffer. On this basis, the moderate level of change with respect to water quality was reduced to low, leading to a moderate level of residual effect which is 'not significant'.
- 13.1.3 As the location of all infrastructure would remain unchanged under the Variation Development, the pre-mitigation and residual effects predicted in the 2017 FEI would also remain unchanged; none of which were predicted to be significant. In addition, the mitigation measures defined for each element of the on-site development in the 2017 FEI, most of which involve work being undertaken in accordance with current good practice, will also be implemented for the Variation Development. Residual effects for all relevant receptors during all phases of the Variation Development are therefore concluded to be not significant.
- 13.1.4 Although there is an inherent risk of sediment loading and pollution occurring on all construction sites, the implementation of the mitigation measures, along with compliance with Controlled Activity Regulations (CAR) licensing requirements, reduces the residual magnitude of any potential impact to negligible or low. This has been shown within the 2015 ES and 2017 FEI to result in a residual level of effect that is negligible and not significant for all water environment interests.
- 13.1.5 In its response to the Variation Development Scoping Report, Marine Scotland recommended that planning condition 32 (outlining an integrated aquatic biota and water quality monitoring programme) for the Consented Development is carried forward to the Variation Development as a means of protecting the water quality and fish populations within and downstream of the Variation Development area and that pre-construction water and fish population surveys are carried out. It also recommended that the developer considers all adjacent wind farms (operational and consented) in the future design of the proposed monitoring programmes particularly in the selection of control sites. The Applicant is agreeable that planning condition 32 be carried forward to the Variation Development. It should also be noted that mitigation against incidents impacting watercourse water quality will be ensured through the planning conditions requirement for submission of a Construction Environmental Management / Pollution Prevention Plan (CEMP/ PPP) and appropriate monitoring of watercourses and Private Water Supplies (PWSs) (as required by the planning condition 10 for the Consented Development).
- 13.1.6 In its response to the Scoping Report, Scottish Water stated that the Variation Development falls partly within a drinking water catchment where a Scottish Water abstraction is located. This supplies the Lochinvar Water Treatment Works and it is essential that water quality and water quantity are protected and that it should be notified in the event of an incident occurring. Water quality would be protected by the measures outlined in paragraph 13.1.5 above, whilst water abstraction associated with the Variation Development may be required to be licenced by SEPA,

which would protect water quantity. The Applicant can confirm that Scottish Water would be notified should such an incident occur.

13.1.7

In summary, as the proposed changes relate to above ground infrastructure only, and that all the mitigation measures previously defined for the Consented Development for each element of the on-site development will be implemented (most of which involve work being undertaken in accordance with current good practice), it is concluded that there would be no significant effects on geological, hydrological or hydrogeological receptors as a result of the Variation Development. Assessment of receptors related to geology, hydrology and hydrogeology have therefore been scoped out of this EIA.

14. Traffic and Transport

- 14.1.1 The proposed variation to the Consented Development relates to the increase in the size of turbine components and operational period and all other infrastructure elements (and therefore construction traffic movements) remain unchanged. As such, it was stated in the Scoping Report that apart from updating Swept Paths Analysis (SPA) figures based on the longest blade length of the revised maximum turbine parameters, all other traffic and transport related environmental effects would be scoped out of the assessment and this was agreed with consultees (East Ayrshire Council and Transport Scotland).
- 14.1.2 The updated SPA figures demonstrate that the larger turbine blades of the Variation Development can be transported to the Development Site with the provision of similar accommodation works to those identified within the 2015 ES and 2017 FEI for the consented wind turbine parameters. A summary of these is provided in a Technical Note and the updated SPA figures at Appendix V14A.
- 14.1.3 As was reported in the 2015 ES and 2017 FEI, it is considered that there would be no significant effects in relation to traffic and transport and this would be unchanged as a result of the Variation Development.



15. Socio-Economics

15.1 Introduction

- 15.1.1 This chapter of the EIA Report (EIAR) assesses the likely significant effects of the Variation Development with respect to socio-economics. The chapter should be read in conjunction with the development description provided in **Chapter 3 – Project Description** and with respect to relevant parts of other chapters (**Chapter 9 – Landscape and Visual Impact** and **Chapter 10 - Historic Environment**) where common receptors have been considered and where there is an overlap or relationship between the assessment of effects.

15.2 Limitations of this Assessment

- 15.2.1 No limitations relating to socio-economics that affect the robustness of the assessment of the likely significant effects of the Variation Development have been identified.

15.3 Relevant Legislation, Planning Policy, Technical Guidance

- 15.3.1 **Chapter 5 – Planning Policy Context** provides a review of all changes to applicable planning policies, advice and guidance of relevance to the Variation Development since the submission of the 2015 ES and 2017 FEI.
- 15.3.2 The East Ayrshire Local Development Plan¹ (LDP) 2017 (the Local Plan) was adopted by East Ayrshire Council (EAC) in February 2017. The LDP 2017 contains a number of policies of relevance along with a proposed wind energy spatial framework. Of note, Policy OP1: Overarching Policy sets out a number of criteria relating to general environmental and amenity issues which should be considered in the determination of all development proposals. Policy TOUR4: The Dark Sky Park sets out assessment criteria for development proposals located within the Galloway Forest Dark Sky Park, including the Transition Area, which extends for a 10km radius from the Park, and which the Development Site lies on the edge of.
- 15.3.3 LDP Schedule 1: Renewable Energy Assessment Criteria sets out a number of assessment criteria for renewable energy developments, including:
- Impacts on tourism and recreation;
 - Public access including impact on long distance walking and cycling routes and scenic routes identified in National Planning Framework 3; and
 - Net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities.
- 15.3.4 Although the Variation Development is located within the EAC area, the Dumfries and Galloway Development Plan has been considered in view of the proximity of the Development Site to its administrative boundary. The Dumfries & Galloway Local Development Plan 2² Policies of relevance include Policy: IN1 Renewable Energy and Policy IN2: Wind Energy Development (Part 1 Assessment of Windfarm Proposals only). The relevant sections of Policy IN1 seeks to protect

¹ Available at: <https://www.east-ayrshire.gov.uk/PlanningAndTheEnvironment/Development-plans/LocalAndStatutoryDevelopmentPlans/East-Ayrshire-Local-Development-Plan-2017.aspx> (Accessed 18/03/20)

² Available at: <https://www.dumgal.gov.uk/ldp2> (Accessed 19/03/20)

environmental receptors including the landscape, cultural and natural heritage, water and fishing interests, air quality and general amenity from unacceptable significant adverse impact. Part 1 of Policy IN2 provides additional relevant assessment criteria including:

Socio-economic benefits:

- *Net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities.*

15.4 Data Gathering Methodology

15.4.1 The data gathering methodology is set out in the 2015 ES. No additional data gathering has been necessary to inform the socio-economic assessment of the Variation Development. For the LVIA there was a search undertaken for any new tourism and recreation receptors within the study area (which also informed this chapter) and none were found.

15.5 Overall Baseline

Current Baseline

15.5.1 The current baseline is the same as that detailed in the 2015 ES and 2017 FEI.

Future Baseline

15.5.2 The 2015 ES noted in Tables 15.11 and 15.12 that the populations of both Dumfries and Galloway and East Ayrshire are predicted to decrease in the future with a larger proportion of the population being made up of people aged 65 and over. However, there was no indication from the information acquired in 2015 that the baseline is in the process of any significant transition that will affect the evaluation of the Variation Development. The future baseline is therefore predicted to be the same as that detailed in the 2015 ES; although the Consented Development would form part of the future baseline.

15.6 Consultation

15.6.1 Table 15.1 below provides a summary of the issues about the Variation Development that have been raised by consultees and the responses given.

Table 15.1 Summary of Issues Raised during Consultation Regarding Socio-economics

Consultee(s)	Issue Raised	Response and Where Considered in this Chapter
EAC	<p>Whilst it is noted within the Scoping Report that the Variation Development would result in similar economic and employment effects, it would be worthwhile to include additional details regarding the proposed community benefits given the expected increase in output of the proposed larger turbines, and how these will be delivered.</p> <p>Public access and recreation on site are not proposed to change, the variations sought would not alter the location of the infrastructure so it is considered reasonable that these matters, specific to on-site access and recreation could be scoped out.</p> <p>The Scoping Report proposes to include a further analysis of tourism and recreational impacts where the Landscape and Visual chapter of the variation EIA Report indicates the variation is likely to result in a significant increase in the magnitude of change expected by tourism and recreational receptors. The LVIA chapter in the Scoping Report notes that the Galloway Forest Dark Sky Park and Gardens and Designed Landscapes will be assessed as recreational and tourist receptors, therefore these must be scoped in to the EIA and visualisations will require to be submitted where necessary to help assess impacts on those receptors, if these are not to be dealt with in the LVIA (although paragraph 8.3.19 of the Scoping Report notes that recreational and tourist receptors would be assessed as listed in that paragraph).</p>	<p>The community benefit would substantially increase from £6,800,000 (54.4MW x £5,000 x 25) to up to a maximum of £12,000,000 depending on the final installed capacity (80MW x £5,000 x 30). It should be noted that community benefits are not a material planning consideration.</p> <p>Comments noted.</p> <p>Impacts on tourism and recreation, deriving from the LVIA findings, are considered and assessed in this chapter in Section 15.10.</p> <p>Visualisations are included in the LVIA, see Figure V9.37a-d Viewpoint 11 Auchenroy Hill which is representative of Craigengillan Garden and Designed Landscape (GDL) and Appendix V9D, Viewpoint 10 Fort Carrick which is representative of the Dark Sky Park and Observatory.</p>
Visit Scotland	<p>Visit Scotland would suggest that full consideration is also given to the Scottish Government's 2008 research on the impact of wind farms on the tourism industry.</p>	<p>The 2015 ES found that no environmental or economic effects would occur which would significantly affect tourism and recreation and it is not considered that the Variation Development would result in a change to those findings as the number and location of turbines and infrastructure remain unchanged. The Reporter agreed with the conclusions of the 2015 ES that there would be no significant impact on socio-economics, tourism or recreation (paragraph 4.32, PLI Report to Scottish Ministers, 14 March 2019).</p> <p>Impacts on tourism and recreation, deriving from the LVIA findings, are however considered and assessed in this chapter in Section 15.10.</p>

15.7 Scope of the Assessment

- 15.7.1 The Variation Development relates to
- Increasing the maximum height to blade tip of all turbines from 130m to 149.9m (the number of turbines overall would remain as 16 as per the Consented Development);
 - Increasing the rotor diameter of all 16 turbines from up to 106m to up to 136m (all turbines); and
 - An increase in the overall operational period from 25 to 30 years.
- 15.7.2 All ground level infrastructure, construction and decommissioning methods/ programme remain unchanged. The only aspect scoped into this assessment is impacts on tourism and recreation in relation to the increase in rotor diameter and blade tip height as well as the increase in operational period.
- 15.7.3 The following receptors have been scoped out from further assessment because potential effects are unlikely to be significantly different to those set out in the 2015 ES and 2017 FEI:
- Economic effects (including job creation). The increase in turbine height is not expected to result in significantly different economic effects to those of the Consented Development;
 - Demographics. The increase in turbine height will not result in any additional job creation and therefore there will not be any increase in long term workers into East Ayrshire; and
 - Land use and public access: The increase in turbine height will not result in any changes in the effects previously assessed in the 2015 ES and 2017 FEI.
- 15.7.4 Effects in relation to all other socio-economic aspects, would be unchanged from the 2015 ES and 2017 FEI and are thus scoped out of the assessment.

Spatial Scope

- 15.7.5 The spatial scope of the assessment for socio-economics covers the same area as that outlined in the 2015 ES and 2017 FEI (i.e. 10km). Furthermore, the LVIA assessment has considered the same study area as that for the Consented Development – i.e. 35km.

Temporal Scope

- 15.7.6 The temporal scope of the assessment of socio-economics covers only the operational stage of the Variation Development as only the assessment of impacts on tourism and recreation in relation to the increase in rotor diameter and blade tip height are considered in this chapter. The operational period for the Variation Development has increased when compared to the Consented Development – 30 years compared to 25 years, and this has been taken account of in the assessment.
- 15.7.7 Details of the proposed construction programme are unchanged from the 2015 ES, refer to the 2015 ES Chapter 4, Sections 4.4.1 to 4.4.4 for details.

Potential Receptors

- 15.7.8 The scope of the assessment in relation to socio-economics for the Consented Development was established in the 2015 ES and 2017 FEI. The potential tourism and recreation receptors are the

same as those identified in the 2015 ES and in Chapter 9 of the 2017 FEI (and Public Local Inquiry (PLI) documentation) of the Consented Development.

Likely Significant Effects

- 15.7.9 The socio-economic receptors that have been taken forward for assessment are summarised as follows:
- Tourism (and effects on tourist attractions); and
 - Recreation.

15.8 Environmental Measures Embedded into the Development Proposals

- 15.8.1 A range of environmental measures have been embedded into the Consented Development, which are also proposed for the Variation Development, and are detailed in Section 15.13 of the 2015 ES. No further embedded measures that will influence the socio-economic assessment detailed in this EIA chapter are proposed.

15.9 Assessment Methodology

- 15.9.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 4 - EIA Approach**, and specifically in Sections 4.5 to 4.7. There have been no changes to the socio-economic assessment methodology outlined in the 2015 ES and 2017 FEI.

15.10 Assessment of Effects: [Tourism and Recreation]

Baseline Conditions

- 15.10.1 As noted in sections 15.5, the baseline for tourism and recreation is taken to be the same as that detailed in the 2015 ES and 2017 FEI.

Predicted Effects and their Significance

- 15.10.2 This section considers the predicted effects on tourism and recreation that could arise from the operation of the Variation Development.

Significance Evaluation Methodology

- 15.10.3 The significance evaluation methodology is the same as that set out in Tables 15.2, 15.3, 15.4, 15.5 and 15.6 of the 2015 ES.

Predicted Tourism and Recreation Effects: Operation

Direct Effects on Tourism

- 15.10.4 The 2015 ES and 2017 FEI concluded that given that the Development Site is not a recognised tourism destination and is not actively used for specific land based recreational purposes other than for general walking activities, the operation of the Consented Development would not result in

direct effects upon tourism or recreational activities. The Variation Development will not generate any additional direct effects on tourism during operation and so the conclusion from the 2015 ES and 2017 FEI remains the same: i.e. not significant.

Direct Effects on Recreation

- 15.10.5 The 2015 ES and 2017 FEI concluded that as appropriate Development Site drainage and pollution prevention measures are inherent components in the project's design, the operation of the Consented Development would not be expected to affect water quality within any of the waterbodies within or outwith the Development Site which are used for angling and water related recreational activities (e.g. canoeing, kayaking, etc.), therefore the operation of the Consented Development would have no effect upon water related recreational pursuits. The Variation Development would not generate any additional direct operational effects on recreation and so the conclusion from the 2015 ES and 2017 FEI remains the same: i.e. not significant.

Indirect Effects: Tourism and Recreation

- 15.10.6 The Variation Development has the potential to indirectly affect tourism and recreational activities outwith the Development Site boundary through generating landscape and visual effects at tourism destinations, at areas/routes where recreational pursuits are undertaken, and transport links regularly frequented by visitors. This includes potential effects upon the Galloway Forest Park which includes the Certified International Dark Sky Park, Loch Doon and Castle, the Scottish Dark Sky Observatory and the Galloway and Southern Ayrshire Biosphere Reserve (UNESCO).
- 15.10.7 Predicted landscape and visual impacts from all phases of the Variation Development are identified and assessed in detail in **Chapter 9 – Landscape and Visual Impact** of this EIAR. Key tourist and recreational receptors located within 35km of the Development Site are shown on Figure V9.20.
- 15.10.8 Key tourist and recreational receptors located within the 10km study area and within the detailed 35km Zone of Theoretical Visibility (ZTV) are listed in the 2015 ES and 2017 FEI and remain the same for the Variation Development. Detailed assessments of potential landscape and visual and cultural heritage effects were summarised in the 2015 ES and 2017 FEI and are not repeated here. However, it is important to note that no significant effects were identified. Updated assessments have been undertaken as appropriate for the Variation Development, as detailed in **Chapter 9 – Landscape and Visual Impact** and **Chapter 10 – Historic Environment**.
- 15.10.9 As the ZTV demonstrates (see **Figures 9.3 to 9.6**) that the Variation Development would not be more visible from the majority of the receptors identified in the Landscape and Visual study area, it is concluded that the operation of the Variation Development would generate no additional effects on the key tourist and recreational receptors detailed in the 2015 ES and 2017 FEI except that the Variation Development would affect views from parts of the following recreational routes:
- EAC Core Path No. C12: New Cumnock Circular which was assessed in the 2017 FEI;
 - EAC Core Path No. C10: Coalfield Cycle Route (partly overlapped by Scottish Hill Track 84: Afton Road, part of the New Cumnock Path Network) which was scoped out of the 2017 FEI;
 - Right of Way 'd': which accesses the Development Site which was assessed in the 2017 FEI;
 - Right of Way 'e' between Afton Road and EAC Core Path No. 12 which was assessed in the 2017 FEI; and
 - A small number of additional Rights of Way around New Cumnock and the Lochside Hotel which was scoped out of the 2017 FEI.

- 15.10.10 The visual assessment has considered the potential visual effects likely to be experienced by people at recreational / visitor or tourist destinations, or attractions within 10km of the Variation Development, as follows:
- Knockshinnoch Lagoons - Local Nature Reserve (LNR); and
 - Craigengillan Garden and Designed Landscape (GDL).
- 15.10.11 Given the limited visibility of the Variation Development from the Burns Memorial, the Galloway Forest Dark Sky Park and Loch Doon, the indirect effects on the tourism and recreational activities were briefly considered, but were then excluded from this assessment on the basis of the very limited to no visibility. The level of effect would be the same as those assessed in the 2017 FEI as Slight (Low magnitude) to No View and Not Significant. Appendix V9.D Viewpoints 9 & 10 (Wireframes) support this conclusion. The EAC non-inventory gardens at Camlarg (No.147) and Glaisnock (No.83) are not open to the public and have therefore been excluded from the assessment.
- 15.10.12 The following hill summits overlapped by the ZTV are located within 10km:
- Cairnsmore of Carsphairn 797m Above Ordnance Datum (AOD) (Corbett);
 - Blackcraig Hill 700m AOD (Graham); and
 - Windy Standard 698m AOD (Graham).
- 15.10.13 In summary, the Variation Development would be significantly visible from part of the Knockshinnoch Lagoons LNR (and associated recreational routes) (although views from the north/north-eastern parts would benefit from increased screening during the summer), and the summits of Blackcraig Hill and Windy Standard, both of which are already close to the Hare Hill and Windy Standard and Afton wind farm groups.
- 15.10.14 **Chapter 10 – Historic Environment** has considered effects from the Variation Development and has concluded that, as was the case in the 2015 and 2017 FEI, no significant effects are anticipated on the historic environment as a result of the Variation Development, and accordingly no further assessment is required. Effects on heritage assets are therefore not considered any further in this chapter.
- 15.10.15 In the absence of any other potential effects, it is concluded that the operation of the Variation Development would generate no significant change for tourism and recreational receptors when compared with the Consented Development. Furthermore, there is no substantiated evidence to indicate that landscape and visual effects would affect either visitor numbers or visitor spending at individual tourist and recreational receptors within the surrounding area. This conclusion is supported by the findings of a number of public attitude surveys on wind farms as set out in Sections 15.4.47 – 15.4.63 of the 2015 ES. Furthermore, the PLI report for the Consented Development noted that no convincing evidence had been found that the mere visibility of wind turbines would have any significant impact on tourism and recreation, and that the overall impact on tourism and recreation would be acceptable. Specifically in relation to Loch Doon the Reporter noted that EAC had no details of the current number of visitors to Loch Doon but accepted at the PLI tourism hearing session that visitor numbers are relatively low.
- 15.10.16 From a socio-economic perspective it is therefore considered that the operation of the Variation Development would not result in significant effects to tourist and recreational receptors.

15.11 Assessment of Cumulative Effects

- 15.11.1 There is the potential for cumulative landscape and visual related effects on tourism and recreation receptors. Predicted landscape and visual impacts on tourism and recreation receptors from all phases of the Variation Development are identified and assessed in detail in **Chapter 9 – Landscape and Visual Impact** of this EAIR. A summary of the cumulative visual effects on recreational routes and tourism and recreation receptors is set out below.

Cumulative Visual Effects on Recreational Routes

- 15.11.2 In relation to visual effects on recreation routes **Chapter 9 – Landscape and Visual Impact** concludes that significant visual effects, would be experienced from parts of five local recreational routes as follows:
- EAC Core Path No. C12: New Cumnock Circular;
 - EAC Core Path No. C10: Coalfield Cycle Route (partly overlaps with Scottish Hill Track 84: Afton Road, part of the New Cumnock Path Network);
 - Rights of Way 'd' and 'e'; and
 - Three additional rights of way near New Cumnock and the Lochside Hotel.
- 15.11.3 The Variation Development would not adversely affect the foreground interest experienced whilst walking or the changing nature of views (elevation / gradient, orientation, wooded / open so on) from these local routes.
- 15.11.4 There would be no significant effects on any of Scotland's Great Trails or the Sustrans National Cycle Network.

Cumulative Visual Effects on Tourism and Recreation Receptors

- 15.11.5 **Chapter 9 – Landscape and Visual Impact** concludes that with regards to tourism and recreation receptors significant visual effects would be experienced from part of Knockshinnoch Lagoons LNR. Although significant, mainly around the edges of the site, the vast majority of this area is wooded, and as such the overall visual experience would be of *no view* of the Variation Development.
- 15.11.6 Significant visual effects would also be experienced from the hill summits of Blackcraig Hill and Windy Standard. However, significant combined cumulative effects on these hill tops result primarily from other development, in particular Windy Standard and Extension, Pencloe and Afton.
- 15.11.7 There would be no significant visual effects on the views from the Craigengillan GDL, including the Ness Glen, the Riding Stables, Fort Carrick, the summit of Auchenroy Hill and the Scottish Dark Sky Observatory.
- 15.11.8 No significant visual effects would be experienced from the summit of Cairnsmore of Carsphairn.

15.12 Conclusions of Significance Evaluation

- 15.12.1 The Variation Development has been assessed in relation to tourism and recreation effects. **Chapter 9 - Landscape and Visual Impact** concludes that significant visual effects would be limited mainly to the views from one road, the B741, and views from the following recreational routes:
- EAC Core Path No. C12: New Cumnock Circular which was assessed in the 2017 FEI;

- EAC Core Path No. C10: Coalfield Cycle Route (partly overlapped by Scottish Hill Track 84: Afton Road, part of the New Cumnock Path Network) which was scoped out of the 2017 FEI;
 - Right of Way 'd': which accesses the Development Site which was assessed in the 2017 FEI;
 - Right of Way 'e' between Afton Road and EAC Core Path No. 12 which was assessed in the 2017 FEI; and
 - A small number of additional Rights of Way around New Cumnock and Lochside Hotel which was scoped out of the 2017 FEI.
- 15.12.2 There would also be significant visual effects from Knockshinnoch Lagoons LNR (and associated recreational routes) (although views from the north/north-eastern parts would benefit from increased screening during the summer), and the summits of Blackcraig Hill and Windy Standard.
- It is important to note that any adverse effects identified within Chapters 9 and 10 relate only to those specific assessments rather than necessarily to potential effects on visitor attractiveness and tourism. In comparison to the previous assessment of the Consented Development, there are some increases in the magnitude of visual effects which could affect tourism and recreational receptors, but not to a degree that overall significant tourism or recreational effects on these receptors would result.
- 15.12.3 Overall, it is considered that the Variation Development would result in no residual, adverse significant effects on tourism or recreation.

15.13 Implementation of Environmental Measures

- 15.13.1 All environmental measures detailed in relation to the Consented Development will be implemented for the Variation Development in line with Table 11.12 of the 2015 ES.
- 15.13.2 In addition to these, the community benefit would substantially increase from £6,800,000 (54.4MW x £5,000 x 25) to up to a maximum of £12,000,000 depending on the final installed capacity (80MW x £5,000 x 30). Note community benefits are not a material planning consideration.

15.14 References

PLI Report to the Scottish Ministers, Enoch Hill, 14 March 2019.



16. Infrastructure and Other Issues

16.1 Introduction

- 16.1.1 This chapter of the EIA Report assesses the likely significant effects of the Variation Development with respect to Infrastructure and other issues (i.e. telecommunications, safety, population and human health and major accidents and disasters).
- 16.1.2 When considering infrastructure, telecommunications and safety, appropriate design and management of a wind farm can avoid potential impacts in respect of these interests. With regard to safety related issues, the Variation Development will be constructed and operated in accordance with all relevant UK health and safety legislation, guidance and best practice as noted in the 2015 ES and 2017 FEI to ensure the risk to public safety is appropriately managed. No updates have been made to this legislation or guidance since the 2015 ES or 2017 FEI that would require a change to the assessment methodology. The Development Site will be appropriately signed to indicate the presence of construction work; therefore no significant effects are expected.
- 16.1.3 In respect of infrastructure and telecommunications, the incorporation of suitable buffer and separation distances from these assets (as specified by the operators) into the layout design is often sufficient to mitigate any possible effects. Alternatively, where siting of turbines or associated infrastructure to avoid potential impacts is not feasible, a range of technical solutions can be implemented to mitigate effects.
- 16.1.4 As noted in the 2015 ES and 2017 FEI, a number of telecommunications and infrastructure consultees indicated that they operate telecommunications links or plant in the vicinity of the Development Site. However none of these would be directly affected by the Variation Development.

16.2 Limitations of this Assessment

- 16.2.1 There are no limitations relating to Infrastructure and other issues that affect the robustness of the assessment of the likely significant effects of the Variation Development.
- 16.2.2 Ofcom was consulted under the EIA reported in the 2015 ES and the three microwave links it identified were taken account of in the design process. Ofcom responded to the 2020 consultation exercise by directing the Applicant to its Spectrum Information System, and the results of this assessment are set out at Section 16.11 below. Other bodies dealing with communication links were consulted in 2020 (and no issues were identified -see Section 16.6).

16.3 Relevant Legislation, Planning Policy, Technical Guidance

- 16.3.1 Chapter 5 – Planning Policy Context provides a review of all changes to applicable planning policies, advice and guidance of relevance to the Variation Development since the completion of the 2015 ES and 2017 FEI.
- 16.3.2 There have been no changes to policy and legislation of relevance to this chapter.

16.4 Data Gathering Methodology

16.4.1 Other than undertaking further consultation as reported in Section 16.6, it has not been necessary to gather any data beyond that presented in the 2015 ES and 2017 FEI.

16.5 Overall Baseline

16.5.1 The current and future baseline is unchanged from that reported in the 2015 ES and 2017 FEI.

16.6 Consultation

16.6.1 In addition to the consultation reported in the 2015 ES and 2017 FEI, an exercise has been undertaken to reconsult with relevant consultees as summarised in Table 16.1.

Table 16.1 Summary of Issues Raised during Consultation Regarding Infrastructure

Issue raised	Consultee(s)	Response and where considered in this chapter
Communication Links	Airwave Solutions (April 2020)	Airwave Solutions were contacted with the updated layout but to date have yet to respond.
Communication Links	Arqiva (April 2020)	Responded stating <i>"have considered whether this development is likely to have an adverse effect on our operations and have concluded that we have no objection to this application."</i>
Communication Links	BT (Response to Scoping Report April 2020)	Responded stating the <i>"Project indicated should not cause interference to BT's current and presently planned radio network."</i>
Communication Links	Cable and Wireless Communications (April 2020)	Cable and Wireless were contacted with the updated layout but to date have yet to respond.
Communication Links	CSS Spectrum Management Services Ltd (April 2020)	Responded stating that the <i>"application has now been examined in relation to UHF Radio Scanning Telemetry communications used by our Client in that region and we are happy to inform you that we have NO OBJECTION to your proposal."</i>
Communication Links	Joint Radio Company (JRC) (Response to Scoping Report April 2020)	No response was received to the Scoping Report.
Communication Links	Ofcom	Ofcom responded directing the Applicant to its Spectrum Information System – the results of this assessment are set out at 16.11 below.
Communication Links	O2	O2 were contacted with the updated layout but to date have yet to respond.
Communication Links	Tech Services-Tx (Ericsson, everythingeverywhere, t-mobile) (April 2020)	Responded stating <i>"I can confirm MBNL/EE have no microwave link within 100m and no mast within 250m of your proposed wind turbine location and therefore have no objections to your proposal."</i>
Communication Links	Vodafone (April 2020)	Vodafone were contacted with the updated layout but to date have yet to respond.

Issue raised	Consultee(s)	Response and where considered in this chapter
Existing Infrastructure	LineSearchBeforeUDig	<p>A search was undertaken for the turbine locations which showed that SGN may have infrastructure within the site search area. The search area covers the whole site boundary plus an additional area.</p> <p>However more detailed consultation with SGN during the 2015 ES showed that it had no infrastructure that would be affected by the now Consented Development (and therefore the Variation Development as ground level infrastructure remains unchanged), and no SGN infrastructure has been added to the Development Site since the 2015 ES.</p>
Existing Infrastructure	Scottish Water (April 2020)	<p>Responded stating <i>"A review of our records indicates that the proposed activity falls partly within a drinking water catchment where a Scottish Water abstraction is located. Scottish Water abstractions are designated as Drinking Water Protected Areas (DWPA) under Article 7 of the Water Framework Directive. Carsfad supplies Lochinvar Water Treatment Works (WTW) and it is essential that water quality and water quantity in the area are protected. In the event of an incident occurring that could affect Scottish Water we should be notified without delay using the Customer Helpline number 0800 0778 778.</i></p> <p><i>It is a relatively large catchment and the activity is in the upper reaches of the catchment therefore the activity is likely to be low risk.</i></p> <p><i>Scottish Water have produced a list of precautions for a range of activities. This details protection measures to be taken within a DWPA, the wider drinking water catchment and if there are assets in the area. Please note that site specific risks and mitigation measures will require to be assessed and implemented. These documents and other supporting information can be found on the activities within our catchments page of our website at www.scottishwater.co.uk/slm.</i></p> <p><i>We welcome that reference has been made to the Scottish Water drinking water catchment.</i></p> <p><i>The fact that this area is located within a drinking water catchment should be noted in future documentation. Also anyone working on site should be made aware of this during site inductions."</i></p>
Existing Infrastructure	Scottish Power (April 2020)	<p>Responded providing maps of its infrastructure within the area. This indicates that in addition to the low voltage (LV), 11kV (under and over ground) and 33kV power lines in the area surrounding and just within the site boundary (but well away from any infrastructure) reported in the 2015 ES and 2017 FEI, there is a 132 kV power line that runs to the south of the Development Site.</p>
Existing Infrastructure	SGN (April 2020)	<p>Responded providing a map indicating that they had no infrastructure within the area concerned.</p>
Health & Safety	Health & Safety Executive (HSE)	<p>Responded stating that the <i>"proposed site location does not lie within the HSE consultation distance of several major hazard sites and major accident hazard pipelines, therefore HSE has no comments to make on this planning application."</i></p>

16.7 Scope of the Assessment

16.7.1 Other than an assessment of population and human health and the vulnerability of the Variation Development to major accidents and disasters as required by the 2017 EIA Regulations, the scope

of the assessment is unchanged from the 2015 ES and 2017 FEI. Effects on public safety were considered in chapter 16 of the 2015 ES.

Potential Receptors

- 16.7.2 The methodology used in this chapter includes evaluating:
- ▶ Potential effects on utility infrastructure;
 - ▶ Potential effects on telecommunications; and
 - ▶ Potential effects on people.
- 16.7.3 In regards to potential receptors, consultation with the operators confirmed that there are no utility infrastructure receptors identified which would be affected by the Variation Development.
- 16.7.4 During the reconsultation process, link operators confirmed that the Variation Development would not affect any microwave links (see Table 16.1).

Likely Significant Effects

- 16.7.5 Like any large structure, turbines have the potential to interfere with electromagnetic signals, a process which can impact communication networks, television reception and the telemetry systems used by utilities providers. As noted in Section 16.6 (Table 16.1) however, no potential effects on telecommunication links during construction, operation or decommissioning have been identified. Telecommunication links are therefore not considered further in this assessment.
- 16.7.6 Digital television signals are transmitted using Ultra High Frequencies (UHF) and there are two main mechanisms whereby a wind farm could potentially interfere with television reception; 'shadowing' effects and 'reflection'/'scattering' effects. The Variation Development could interfere with television signals during operation, although, this is less likely to occur with digital receivers which are more robust. There is no potential for such effects during construction and decommissioning and effects during these phases of the Variation Development are not considered further in this assessment.
- 16.7.7 The Variation Development could affect people, for example as a result of health and safety risks to those on the Development Site during construction, operation and decommissioning. Each of these potential effects remains unchanged from those considered in the 2015 ES and 2017 FEI.
- 16.7.8 In addition, the Electricity Works (Environmental Impact Assessment (Scotland) 2017 Regulations (the 2017 EIA Regs) state that the potential for Proposed Developments to result in, or to be affected by, major accidents or disasters, either as a result of the location of the Development Site or from the project itself should be assessed. Major accidents or disasters are therefore considered in this chapter.

16.8 Environmental Measures Embedded into the Development Proposals

- 16.8.1 The environmental measures embedded into the Variation Development are unchanged from those described in the 2015 ES and 2017 FEI; see Chapter 16 section 16.6.

16.9 Assessment Methodology

- 16.9.1 Other than the addition of the consideration of population and human health and major accidents and disasters (further to the 2017 EIA Regs, as these were not previously considered as specific issues) the assessment methodology is unchanged from that described in the 2015 ES, see Chapter 16 section 16.6.
- 16.9.2 Major accidents or disasters would be scoped in for assessment where there is a high risk of occurrence as a result of the Variation Development. A high risk is considered to be where there is reasonable likelihood of the accident or disaster occurring, or where the effect of the accident or disaster would lead to mitigation requirements beyond the usual scope of construction or operational activities. The effects of this assessment are summarised in Table 16.3 below. Effects on population and human health are considered under the methodology in the relevant chapters of this EIA Report, notably relating to noise and visual effects (including shadow flicker) and are summarised in Table 16.2 below.

16.10 Assessment of Effects on Infrastructure

- 16.10.1 For the Variation Development, the location of all infrastructure will remain unchanged from the Consented Development; and the proposed increase in turbine rotor diameter, tip height and operational period would not affect existing infrastructure or therefore change the conclusion of the 2015 ES and 2017 FEI. As reported in the 2015 ES, it remains the case that by providing appropriate clearances and following best practice during construction, there would be no significant effects on infrastructure operated by microwave or utility operators.

16.11 Assessment of Effects on Telecommunications

- 16.11.1 As reported in the 2015 ES and 2017 FEI for the Consented Development, it remains the case that no microwave links have been identified (which includes checking the Spectrum Information System as identified by Ofcom) that have the potential to be affected by the Variation Development.
- 16.11.2 By utilising the techniques outlined in the 2015 ES, it is anticipated that any television reception issues resulting as a result of the Variation Development should be fully mitigated (see 2015 ES Chapter 16, Section 16.8).

16.12 Assessment of Effects on Public Safety

- 16.12.1 As reported in the 2015 ES, it remains the case that there would be no significant effects on public safety as a result of the mitigation measures reported in 2015 ES Chapter 16, Section 16.8

16.13 Population and Human Health

- 16.13.1 The potential for significant effects in relation to population and human health has been considered in those technical chapters where changes may affect people (Chapter 7 - Noise, Chapter 9 - landscape and visual (residential amenity) and Chapter 8 – Shadow Flicker. The results are summarised in Table 16.2, and no significant effects in relation to population and human health are predicted.

Table 16.2 Population and Human Health Effects

Technical Assessment	Effects	Effect on Population and Human Health	Rationale
Noise - Chapter 7	Not Significant	Not Significant	With embedded mitigation there are no exceedances of the ETSU-R-97 criteria and it is therefore considered that there would be no significant effects in relation to noise on residential receptors.
Shadow Flicker - Chapter 8	Not Significant	Not Significant	No residential properties lie within the study area where shadow flicker is predicted to occur. As such, shadow flicker is not predicted, and as per the 2015 ES and 2017 FEI, there would be no significant effects or mitigation required.
Residential Visual Amenity Assessment (RVAA) – Appendix V9C	<p>Of the 24 properties included in the RVAA, none would be significantly affected by the Variation Development, and none would be unacceptably affected in terms of their residential visual amenity. The assessment may be further summarised as follows:</p> <ul style="list-style-type: none"> • There are no residential properties within 2km of the proposed turbines; • Of the 24 properties included in the assessment, six would experience a Moderate and Not Significant effect, one would experience a Moderate / Slight and Not Significant effect whilst 11 would experience a Slight and Not Significant effect, and four would have no view of the Variation Development; and • Within the wider vicinity there are two further residential properties just beyond 3km, but these would not be significantly affected. 	Not Significant	The experience of a significant view of the Variation Development is not the same as an unacceptable effect or indicative of a failure in terms of maintaining residential amenity. In terms of residential visual amenity, the RVAA concludes that the Variation Development would not have an overbearing effect or otherwise affect the living standards of individual properties such that any of these would become an unattractive place to live (as opposed to less attractive) when judged objectively, and in the public interest. This is due largely to the intervening distance, topographical or vegetation screening and use / orientation of the property, such that the living standards would not be affected and the property would not be adversely affected by 'visual dominance' that it would become an unattractive place to live when judged objectively and in the public interest, on a solus basis or cumulatively.

16.14 Major Accidents and Disasters

16.14.1 The potential for major accidents and disasters linked to the Variation Development and its location has been considered for a range of topics and, as shown in Table 16.3, it is not considered that there would be any significant effects.

Table 16.3 Effects in Relation to Major Accidents and Disasters

Major Accident or Disaster	Risk due to location	Risk due to project	Significant Effect	Rationale
Biological hazards: epidemics	Low	Very Low	No	The probability of epidemics which would affect the construction, operation or decommissioning of the Variation Development is considered to be low. If necessary government guidance in relation to social distancing would be followed to enable safe construction and operation of the Variation Development.
Biological hazards: animal and insect infestation	Very low	Very low	No	The probability of animal and insect infestations which would affect the construction, operation or decommissioning of the Variation Development is considered to be very low.
Earthquakes	No	No	No	Due to its location, any earthquakes in the vicinity of the Variation Development would be of a very small magnitude and the design of turbine foundations etc. is adequate to withstand such low magnitude events.
Tsunamis / tidal waves / storm surges	No	No	No	The location of the Variation Development and its distance from the coast means there is no risk of these phenomena affecting it.
Volcanic eruptions	No	No	No	There are no active volcanos in the vicinity of the Variation Development.
Famine / food insecurity	Very low	Very low	No	The probability of famine / food insecurity affecting the construction, operation or decommissioning of the Variation Development is considered to be very low.
Displaced populations	Very low	Very low	No	The probability of displaced populations affecting the construction, operation or decommissioning of the Variation Development is considered to be very low.
Landslide / subsidence	Low	Low to moderate	No	The peatslide risk assessment presented as Appendix 6.B of the 2015 ES and updated for the 2017 FEI concluded that there would be a low to moderate risk of peatslide as result of the Consented Development. As the location in infrastructure would remain unchanged under the Variation Development, peatslide risk remains unchanged.
Severe weather: storms	Medium	No	No	Turbines are equipped with lightning conductors and automatically shut down when wind speeds are at a level which could damage internal components. Turbines are located more than topple distance from public rights of way.
Severe weather: droughts	Very Low	No	No	The probability of severe drought occurring in the vicinity of the Variation Development is considered to be very low. Furthermore, turbines would be

Major Accident or Disaster	Risk due to location	Risk due to project	Significant Effect	Rationale
				unaffected by drought conditions.
Severe weather: extreme temperatures	Low	Very Low	No	In cold weather, ice can build up on blade surfaces when operating. The turbine can continue to operate with a very thin accumulation of snow or ice, but will shut down automatically as soon as there is a sufficient build up to cause aerodynamic or physical imbalance of the rotor assembly. Once the ice has thawed and the turbine re-starts in circumstances such as this, there is a slight possibility that fragments of ice or snow will be released from the rotor and will drop within close vicinity of the turbine. The risk to public safety is considered to be extremely low due to the initial slow rotational speed of the rotor and because such fragments are sufficiently small and lightweight to allow the rotor assembly to rebalance before restarting. Furthermore turbines are located more than topple distance from public rights of way.
Floods	Low	Very Low	No	<p>Embedded mitigation measures in the design of watercourse crossings and drainage around infrastructure would ensure that there is no increase in flood risk as a result of the Variation Development.</p> <p>The only areas in the vicinity of the Development Site for which a localised flood risk is indicated on SEPA's online flood mapping is on the River Nith tributary floodplain areas, on and beyond the northern site boundary. This area is classed as having a >0.5% Annual Exceedance Probability (AEP) of flooding. The topography and distance from infrastructure means there is a very low risk of the Variation Development being vulnerable to flooding.</p>
Terrorist incidents	No	No	No	The probability of terrorist incidents in the vicinity of the Variation Development is considered to be very low.
Cyber attacks	No	No	No	The software that would control the operation of the Variation Development is protected by security measures which are considered to reduce the risk of successful cyber-attacks.
Disruptive industrial action	No	No	No	A relatively small number of workers would be required for the construction, operation and decommissioning of the Variation Development.
Public disorder	No	No	No	The Variation Development is located in a relatively remote area.
Wildfires	Very Low	No	No	Due to the location of the Variation Development, the probability of wildfires occurring in the vicinity of it is considered to be very low.
Poor air quality events	No	No	No	The construction, operation or decommissioning of the Variation Development would not be affected by poor air quality events.

Major Accident or Disaster	Risk due to location	Risk due to project	Significant Effect	Rationale
Transport accidents	No	Low	No	<p>Abnormal loads or an increase in traffic could lead to an increased risk of accidents. However the 2015 ES and 2017 FEI concluded that this effect would not be significant. As the ground level infrastructure would be unchanged for the Variation Development, there would be no increase in traffic numbers and the only additional effect would be an increase in oversail from longer blades which is not expected to increase the risk of accidents.</p> <p>A Traffic Management Plan would further reduce risks by including measures such as wheel washing to reduce the occurrence of debris on the carriageway.</p>
Industrial accidents	No	Low	No	<p>Manual labour, working at height and use of specialist plant all bring risk of industrial accidents.</p> <p>All relevant UK health and safety legislation will be adhered to; site construction management practices will include, but are not limited to, temporary diversions of public rights of way, relevant signage and fencing at potential hazardous construction areas where appropriate.</p>
Electricity, gas, water supply or sewerage system failures	No	Low	No	<p>Construction activities or turbine collapse could damage utility infrastructure. However, no such infrastructure is located within topple distance of turbines.</p>
Urban fires	No	No	No	<p>The Variation Development is not in close proximity to any large urban areas.</p>

Assessment of Cumulative Effects

16.14.2 All potential effects in respect of telecommunications, infrastructure, utilities, television reception and public safety have been mitigated therefore no cumulative effects will arise. This is the same conclusion which was reached in the 2015 ES and 2017 FEI.

16.15 Consideration of Optional Additional Mitigation

16.15.1 In the unlikely event that a reduction in television reception quality occurs in residential properties in the area surrounding the Variation Development, it is most likely to be noticed when it becomes operational. However, a number of fully effective mitigation solutions are available (see Table 16.4) and the Applicant will accept a planning condition to mitigate post-development where effects are attributable to the Variation Development.

16.15.2 The Variation Development will be constructed and operated in accordance with all appropriate UK health and safety legislation, guidance and standards to ensure the risk to public safety is minimised and kept within acceptable levels.

16.16 Conclusions of Significance Evaluation

16.16.1 It remains the case for the Variation Development that, as reported in the 2015 ES and 2017 FEI, there would be no significant effects in respect of Infrastructure and other issues.

16.17 Implementation of Environmental Measures

16.17.1 Table 16.4 describes the environmental measures embedded within the Variation Development and the means by which they will be implemented.

Table 16.4 Summary of Environmental Measures to be Implemented

Effect	Incorporated mitigation / enhancement measure	Extent to which effect mitigated ¹	Monitoring requirements (if any)	Means by which mitigation, or enhancement measure may be secured
Construction				
Safety	All relevant UK Health Safety Security Environment (HSSE), legislation, guidelines and best practice will be adhered to; site construction management practices will include, but are not limited to, temporary diversions of public rights of way, relevant signage and fencing at potential hazardous construction areas where appropriate.	Fully	None	Standard Site Management practices incorporated into construction contracts.
Infrastructure	All relevant UK HSSE legislation guidelines and best practice will be adhered to, and industry best practice guidance adhered to.	Fully	None	All relevant UK HSSE guidance and best practice will be followed at all times.
Operation				
Possible interference to television reception to scattered properties near to the Variation Development	A mixed solution is likely to be required if television reception is affected by the Variation Development which may include: - Re-tuning some TVs to an alternative transmitter, which may overcome possible interference for some; and - A transposer system could overcome possible reception difficulties.	Fully	None	Planning Condition
Operational Safety	Turbines installed at the Development Site would comply with the BS EN 61400 series and relevant UK health and safety legislation. Safety measures also include the incorporation of a buffer zone between public rights of ways and the turbines and installation of appropriate warning signage where necessary on-site.	Fully	On-going maintenance	Site design and On-going maintenance.

¹ Key to predicted success of mitigation:

Fully - Effect fully mitigated and no effects predicted.

Substantially - Mitigation would be largely successful at reducing effect. Some effects possible.

Partially - Mitigation would be successful at reducing effects, but some effects likely.

17. Aviation

17.1 Introduction

- 17.1.1 As reported in the 2017 FEI, it was concluded that with the mitigation measures outlined, there would be no significant effects in respect of Aviation as a result of the construction and operation of the Consented Development.
- 17.1.2 This chapter reviews the potential effects that the Variation Development may have on identified aviation interests and air safeguarding, and reviews mitigation measures to be implemented to prevent, reduce or offset these where required.
- 17.1.3 The potential effects on aviation interests resulting from wind turbines have been widely publicised and there are two dominant scenarios:
- ▶ Physical obstruction: turbines can present a physical obstruction at, or close to, an aerodrome or other aviation activity area; and
 - ▶ Radar / Air Traffic Services: turbine clutter appearing on a radar display can affect the safe provision of air traffic services (ATS) as it can mask unidentified aircraft from the air traffic controller and / or prevent them from accurately identifying, or maintaining identity of aircraft under their control. In some cases, radar reflections from the turbines can affect the performance of the radar itself.
- 17.1.4 These scenarios were considered in the 2015 ES and 2017 FEI; and this EIA Report Chapter considers the implications of the proposed increase in turbine heights under the Variation Development.

17.2 Limitations of this Assessment

- 17.2.1 There are no limitations relating to Aviation that affect the robustness of the assessment of the likely significant effects of the Variation Development.

17.3 Relevant Legislation, Planning Policy, Technical Guidance

- 17.3.1 Chapter 5 – Planning Policy Context provides a review of all changes to applicable planning policies, advice and guidance of relevance to the Variation Development since the completion of the 2017 FEI.
- 17.3.2 The location of the Development Site is unchanged, albeit that the red line boundary has been slightly reduced (see Figure V3.2) ; therefore, the original data describing the aviation environment remains valid for the Variation Development in terms of spatial coverage. CAA guidance documents have been updated since the original analysis was completed, but the updates have not altered the aviation baseline to an extent that additional receptors to those considered in the 2017 FEI are required to be considered. Therefore, the aviation data previously collected for the EIA reported in the 2017 FEI is considered sufficient to effectively characterise the current baseline conditions within the Zone of Influence of the Variation Development. Due to the increase in blade tip height, terrain shielding may not be apparent between aviation radar systems not considered previously therefore, two additional receptors have been assessed: NATS Cumbernauld Primary Surveillance Radar (PSR); and Glasgow Airport PSR.

17.4 Data Gathering Methodology

17.4.1 Other than undertaking further consultation as reported in Section 17.6, and re-running the Line of Sight Analysis (LoS) it has not been necessary to gather any data beyond that presented in the 2017 FEI.

17.5 Overall Baseline

17.5.1 The current and predicted future baseline is unchanged from that reported in the 2017 FEI.

17.6 Consultation

17.6.1 In addition to the consultation reported in the 2017 FEI, an exercise has been undertaken to re-consult with relevant stakeholders. Table 17.1 provides a summary of the issues that have been raised by consultees in respect of the Variation Development and the responses given.

Table 17.1 Summary of Issues Raised during Consultation

Consultee(s)	Response provided in this chapter
Defence Infrastructure Organisation (DIO) – MoD (Ministry of Defence) (Response to Scoping Report, March 2020)	<p>The DIO stated that the Variation Development would cause a potential obstruction hazard to military low flying training activities. To address these effects it stated that the Variation Development should be fitted with MoD accredited aviation safety lighting. Perimeter turbines should be fitted with 25 candela omnidirectional red lighting or infrared lighting with an optimised flash pattern of 60 flashes per minute of 200ms to 500ms duration at the highest practicable point.</p> <p>It stated that MoD Safeguarding wishes to be consulted and notified of the progression of planning applications and submissions relating to this proposal to verify that it will not adversely affect defence interests.</p>
Glasgow Prestwick Airport (GPA) (Response to Scoping Report, March 2020)	<p>State that its Line of Sight Analysis (LoS) indicates all turbines will be visible to its Primary Radar – and therefore generate unacceptable clutter on its Air Traffic Radar Displays. The Terma Scantec 4002 a newly installed radar may be able to mitigate the Variation Development but requires a Baseline Flight Trial and a Technical Feasibility Assessment to confirm this. It is in discussion with the Applicant to agree a Radar Mitigation Agreement.</p>
National Air Traffic Services (NATS) (Response to Scoping Report, March 2020)	<p>Stated that it has no objection to the variation on the assumption that the planning condition (condition 24) imposed on the original consent remains in place.</p>
NATS (February 2020)	<p>State that the NATS Safeguarding Team have reviewed the increase in tip heights and have confirmed the taller turbines of the Variation Development are not visible to Cumbernauld PSR.</p>

17.7 Scope of the Assessment

17.7.1 The scope of the assessment is largely unchanged from the 2017 FEI, however two additional receptors are considered, namely NATS Cumbernauld PSR and Glasgow Airport PSR.

Potential Receptors

- 17.7.2 The methodology used in this chapter includes evaluating:
- ▶ Potential effects on MoD Low Flying activities;
 - ▶ Potential effects on NATS Lowther Hill PSR and NATS Cumbernauld PSR;
 - ▶ Potential effects on Glasgow Airport PSR; and
 - ▶ Potential effects on Glasgow Prestwick Airport (GPA) PSR.

Likely Significant Effects

- 17.7.3 There is the potential for direct effects from operation on MoD Low Flying activities (a physical obstruction and effect on operations of Military Low Flying aircraft), NATS Lowther Hill PSR; and GPA PSR as described in the 2017 FEI. In addition there is potential for significant effects on NATS Cumbernauld PSR and Glasgow Airport PSR.
- 17.7.4 Where turbines are detectable by a PSR system, they may appear as aircraft targets and could mask genuine aircraft responses. The radar may also be de-sensitised by clutter processing within the sector containing turbines, meaning that real aircraft targets are not detected by the radar system.

17.8 Environmental Measures Embedded into the Development Proposals

- 17.8.1 The environmental measures embedded into the Variation Development are unchanged from those described in the 2017 FEI.
- 17.8.2 A preliminary agreement has been reached between GPA and the Applicant to work together to identify a mitigation solution, As part of this process, GPA has assessed and identified a number of potential solutions likely to mitigate the effects of wind farm development in proximity to the airport as part of a 'regional solution'. In light of progress made in these works, GPA and RWE have entered into an agreement to secure radar mitigation in relation to the Proposed Development. GPA will ultimately select the most appropriate mitigation scheme for the Proposed Development; however, the solution is expected to be predicated on the removal/suppression or prevention of the unwanted radar returns on the GPA PSR, associated with the turbines. GPA have asked that the Applicant accept the planning condition as outlined below to replace Condition 23 of the Consented Development.
1. *No blade shall be fitted to any turbine or turbines forming part of the development and no such turbine shall operate, save as provided for and in accordance with the Testing Protocol, unless and until such time as the Scottish Ministers receive confirmation from the Airport Operator that: (a) all measures required by the Radar Mitigation Scheme prior to operation of any turbine have been implemented; and (b) the Civil Aviation Authority has evidenced its approval to the Airport Operator that the Radar Mitigation Scheme is acceptable mitigation for the development and has been satisfactorily implemented by the Airport Operator.*
 2. *No turbine shall operate other than in accordance with the terms of the Radar Mitigation Scheme.*

Reason: In the interests of aviation safety.

Definitions:

- "Airport Operator" means Glasgow Prestwick Airport Limited or any successor as holder of a licence under the Air Navigation Order 2000 from the Civil Aviation Authority to operate Glasgow Prestwick Airport.
 - "Radar Mitigation Scheme" means such equipment, procedural or technological measures, as the Airport Operator identifies as necessary and sufficient to prevent the operation of the development or of any turbines forming part of the development impacting adversely on radar performance or on the performance of other navigational aids at Glasgow Prestwick Airport or on maintaining safe and efficient air traffic control services or procedures or airspace and which the Airport Operator is willing and able to implement and maintain for the lifetime of the development or for such shorter period as may be agreed in consultation with the Airport Operator as necessary to mitigate any such adverse impact.
 - "Testing Protocol" means the protocol to control the operation of any turbine or turbines forming part of the development for the purposes of testing of the Radar Mitigation Solution.
- 17.8.3 The Applicant confirms agreement to this planning condition in replacement of Condition 23 of the Consented Development.
- 17.8.4 A Statement of Common Understanding in regards to a potential Primary Radar Mitigation Scheme has been agreed between the Applicant and NATS which would be enforced by planning condition 24 which applies to the Consented Development This would mitigate any potential negative effects on the Lowther Hill PSR.
- 17.8.5 In order to safeguard general use of the area by military aircraft during operation, the Applicant confirms that the Variation Development will be fitted with MoD accredited aviation safety lighting. Perimeter turbines will be fitted with 25 candela omni-directional infrared lighting with an optimised flash pattern of 60 flashes per minute of 200ms to 500ms duration at the highest practicable point. Condition 22 which applies to the Consented Development requires that aviation lighting be agreed with the MoD. The Applicant confirms it is agreeable to this condition being retained for the Variation Development.

17.9 Assessment Methodology

- 17.9.1 The assessment methodology is unchanged from that described in the 2017 FEI, see Chapter 17 Section 17.4.

17.10 Assessment of Effects on MoD Low Flying Activities

- 17.10.1 With the MoD accredited aviation safety lighting fitted as outlined in Section 17.8, it is considered that the operation of Variation Development would have no significant effects in respect of MoD Low Flying Activities.
- 17.10.2 During decommissioning, the Applicant will adhere to the DIO's notification requirements to ensure there are no significant effects as a result of the Variation Development.
- 17.10.3 With the above measures in place, it is considered that the Variation Development would have no significant effects on MoD Low Flying Activities.

17.11 Assessment of Effects on GPA PSR

- 17.11.1 The 2017 FEI stated that all turbines would be theoretically detectable by the GPA PSR; and this would be unchanged in respect of the Variation Development as shown by the updated Radar Line of Sight Analysis (Appendix V17A). As such, unmitigated effects remain significant. However with the implementation of the Radar Mitigation Scheme outlined in Section 17.8, it is considered that effects on the GPA PSR as a result of the Variation Development would not be significant.

17.12 Assessment of Effects on NATS Lowther Hill PSR

- 17.12.1 The 2017 FEI concluded that 15 of the 16 turbines would be theoretically detectable by the NATS Lowther Hill PSR. As a result of the larger turbines proposed for the Variation Development, the updated Radar Line of Sight Analysis (Appendix V17A) indicates that all 16 turbines would be theoretically visible; and therefore the unmitigated effects would remain significant. However with the mitigation measures outlined in Section 17.8, it is considered that there would be no significant effects on the NATS Lowther Hill PSR.

17.13 Assessment of Effects on NATS Cumbernauld PSR

- 17.13.1 The updated Radar Line of Sight Analysis (Appendix V17A) indicates (qualitatively) that Turbines 9 and 10 are "likely" (as defined in the LoS report) to be detectable intermittently by the NATS Cumbernauld PSR and occasional detection of a further six turbines is "unlikely" (as defined in the LoS Report) but cannot be ruled out. However, this LoS is a qualitative and conservative assessment and consultation with NATS (see Table 17.1) has confirmed that the Variation Development turbines are not visible to Cumbernauld PSR. It is considered therefore that no mitigation measures are required and there would be no significant effects.

17.14 Assessment of Effects on Glasgow Airport PSR

- 17.14.1 The updated Radar Line of Sight Analysis (Appendix V17A) indicates that no turbines of the Variation Development would be theoretically detected by the Glasgow Airport PSR. No mitigation would therefore be required and there would be no significant effects.

17.15 Conclusions of Significance Evaluation

- 17.15.1 It remains the case that as reported in the 2017 FEI, and with the mitigation measures outlined in that document, within this EIA Report and based on the progress of discussions and agreements made to date with stakeholders, post-mitigation effects as a result of the Variation Development would remain non-significant for all aviation stakeholders.

17.16 Implementation of Mitigation Measures

- 17.16.1 Table 17.2 describes the environmental measures embedded within the Variation Development and the means by which they will be implemented.

Table 17.2 Summary of Mitigation Measures to be Implemented

Effect	Incorporated mitigation / enhancement measure	Extent to which effect mitigated ¹	Monitoring requirements (if any)	Means by which mitigation, or enhancement measure may be secured
Operation				
MoD Low Flying Activities	In order to safeguard general use of the area by military traffic during operation, the Applicant can confirm that the Variation Development will be fitted with MoD accredited aviation safety lighting. Perimeter turbines will be fitted with 25 candela omni-directional infrared lighting with an optimised flash pattern of 60 flashes per minute of 200ms to 500ms duration at the highest practicable point.	Fully	None	Planning Condition 22 which applies to the Consented Development and requires that aviation lighting be agreed with the MoD would also apply to the Variation Development.
GPA PSR	Primary Radar Mitigation Scheme	Fully	None	Planning Condition. GPA have asked that the Applicant accept the wording outlined in Section 17.8.2 of this chapter to replace Condition 23 of the Consented Development. The Applicant confirms agreement to this replacement wording being used.
NATS Lowther Hill PSR	Primary Radar Mitigation Scheme	Fully	None	Planning Condition 24 which applies to the Consented Development and requires that a mitigation solution for the Lowther Hill PSR be agreed with NATS would also apply to the Variation Development.

¹ Key to predicted success of mitigation:

Fully - Effect fully mitigated and no effects predicted.

Substantially - Mitigation would be largely successful at reducing effect. Some effects possible.

Partially - Mitigation would be successful at reducing effects, but some effects likely.

18. Summary of Additional Mitigation and Residual Effects for the Variation Development

18.1 Introduction

- 18.1.1 The mitigation measures identified for the Consented Development as described in the 2015 ES and 2017 FEI (Chapter 18) would also apply to the Variation Development.
- 18.1.2 Some additional mitigation has been identified in relation to the Variation Development and this is summarised below.
- 18.1.3 To ensure compliance with the relevant ETSU derived noise limits (see Chapter 7), embedded mitigation includes the operation of the following candidate turbines as follows:
- Nordex N133 – reduced Mode 6 using serrated edge blade technology; and
 - Siemens 120 DD – reduced mode 2.
- 18.1.4 All other candidate turbines can meet the noise limits when unconstrained.

