Cloich Forest Wind Farm

Volume 1 – EIA Report Text

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An ERM Group Company

CLOICH FOREST WIND FARM

EIA Report – Volume 1 – EIA Report Text

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Chapter 1

Introduction

ARCUS

1 INTRODUCTION

1.1 PURPOSE OF THE EIA REPORT

1. This Environmental Impact Assessment Report ('the EIA Report') has been prepared by Arcus Consultancy Services Ltd (Arcus) to accompany the application by Cloich Windfarm Partnership LLP ('the Applicant'), wholly owned by EDF Energy Renewables Limited, for consent to install and operate Cloich Forest Wind Farm and associated infrastructure with a generation capacity exceeding 50 megawatts (MW) ('the Development'). The Development comprises of up to 12 wind turbines and associated infrastructure, and a Battery Energy Storage System (BESS). The Development is located within Cloich Forest, approximately 5.5 kilometres (km) north-west of Peebles ('the Site'). The Development represents a re-design of the consented Cloich Forest Wind Farm ('the Consented Scheme'), which was granted Section 36 consent and deemed planning permission following a Public Local Inquiry (PLI), on 8 July 2016 (Planning and Environmental Appeals Division (DPEA) Reference: WIN-140-1).

2. As the Development exceeds 50 MW, the Applicant is seeking consent from the Scottish Ministers under Section 36 of the Electricity Act 1989 (as amended)[1], and for planning permission to be deemed to be granted under Section 57(2) of the Town and Country Planning (Scotland) Act 1997[2] ('the Application').

3. Given that the Development requires a Section 36 application, the EIA is required to be undertaken in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[3], referred to hereafter as 'the EIA Regulations'.

4. As required by the EIA Regulations, this EIA Report presents information on the likely significant environmental effects which may occur as a result of the Development. The EIA Report also informs the reader of the nature of the Development and the measures proposed to protect the environment during site preparation, construction, operation, and decommissioning.

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

- Figure 1.1: Site Location;
- Figure 1.2: Site Boundary; and
- Figure 1.3: D17 & D18 Public Roads.

1.2 PURPOSE OF THE EIA REPORT

6. The EIA Regulations implement European Union (EU) Directive 2014/52/EU which amended Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. The EIA Regulations outline the process of an EIA and the criteria that would determine if an EIA is necessary or not, the relevant environmental studies and statements, how the information is evaluated by the Scottish Ministers, Planning Authority and consultative bodies, and how this is implemented through consent under Section 36 of the Electricity Act 1989.

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[1] Electricity Act 1989 [Online] Available at: http://www.legislation.gov.uk/ukpga/1989/29/contents (Accessed 22/06/2021)
[2] Town and Country Planning (Scotland) Act 1997 [Online] Available at: http://www.legislation.gov.uk/ukpga/1997/8/section/57 (Accessed 22/06/2021)
[3] The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 [Online] Available at: https://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 22/06/2021)

7. Schedule 2 of the EIA Regulations lists certain types of developments for which an EIA is required where there are likely to be significant effects on the environment by virtue of factors such as the nature, size, or location of the development proposal.

8. The results of the EIA are presented in this EIA Report which, as prescribed in the EIA Regulations, is required to include a *"description of the likely significant effects"* of the Development; the effects which are not considered to be significant do not need to be described. It is therefore necessary for the scope of the EIA to be appropriately and clearly defined to ensure that any likely significant effects are described and assessed.

1.2.1 Scoping

9. The aim of the Scoping process is to identify key environmental issues at an early stage, to determine which elements of the Development are likely to cause significant environmental effects and identify issues that can be 'scoped out' of the assessment. The request for a Scoping Opinion was submitted to the Scottish Government in October 2019.

10. The Scoping Opinion was issued by the Energy Consents Unit (ECU) and received in December 2019, a copy of which is included as Appendix A4.2. The EIA contained within this EIA Report is based on this Scoping Opinion.

11. The EIA Report has been prepared following a systematic approach to EIA and project design; the structure is outlined in Section 1.8 below.

1.3 SITE CONTEXT

12. The Site Location is shown on Figure 1.1. The Site is situated within Cloich Forest, covering an area of approximately 1,080 hectares (ha), centred on National Grid Reference (NGR) 320648, 647881 (Figure 1.2). The Site and the Development is wholly located within the administrative boundary of Scottish Borders Council ('the Council').

13. The Site includes the operational commercial forest of Cloich Forest, including approximately 12 km of existing forestry tracks which will be shared by the Development. Existing forestry tracks are used where possible to minimise the new infrastructure footprint associated with the Development; new access tracks will branch off existing forestry tracks to proposed turbine locations. Full details of the final Development layout are provided in **Chapter 3: Project Description** of this EIA Report.

14. The topography of the Site, and immediate vicinity, is complex, with elevation ranging from approximately 280 metres (m) Above Ordnance Datum (AOD) in the north-east part of the Site to approximately 476 m AOD at the peak of Crailzie Hill in the south. The Site encompasses the rolling Cloich Hills, including Peat Hill (466 m AOD), Ewe Hill (462 m AOD), White Rig (325 m AOD), and Crailzie Hill (476 m AOD). The hills are dissected by a number of watercourses, including Middle Burn, Flemington Burn, Martyr's Dean, Courhope Burn and Harehope Burn. All watercourses eventually feed into the River Tweed. There are no other waterbodies within the Site.

15. Coniferous plantation, at various stages of the planting, growing and felling cycle, is the primary land use within the Site; however, the area around Courhope in the south consists of improved upland pasture, utilised for sheep grazing, and improved grassland which remains clear of forestry.

16. In addition to the operational commercial forest of Cloich Forest, the Site, and immediate vicinity, consists of further areas of commercial forestry and rural farmland, primarily used for grazing and other farmland activities.

17. The Site contains two public roads, as shown on Figure 1.3, which form the Site access from the A703; these public roads are as follows:

- D17 Whim – Shiplaw; and
- D18 Cloich.

18. There are no residential properties within the Site; however, Cloich Farm is located adjacent to the Site, at approximate NGR 321655, 649105, approximately 1.2 km north-west from the closest turbine (T10). There is a portion of land, around Courhope, within the southern section of the Site which is excluded from the Site Boundary; within this land there is a derelict cottage owned by Forestry and Land Scotland (FLS), at approximate NGR 320316 646455. The property is not occupied, is not in a physical state to be lived in; and owners, FLS, have no intention of returning the building back into use as a dwelling.

19. Further details on the Site and surrounding areas are outlined in **Chapter 2: Site Selection and Design** of this EIA Report.

1.4 PLANNING HISTORY

20. There is an extant consent on the site for 18 wind turbines (115 m to tip) and associated infrastructure. Section 36 consent and deemed planning permission for the 18-turbine Consented Scheme was granted following a Public Local Inquiry (PLI) on 8 July 2016 by the Scottish Ministers, under DPEA reference: WIN-140-1. The PLI held for the Consented Scheme was conjoined with an appeal for Hag Law Wind Farm which was proposed on land adjacent to the Consented Scheme. Hag Law Wind Farm was subsequently refused.

21. Since the time of the initial submission of the Consented Scheme Section 36 application in October 2012, and the submission of Supplementary Environmental Information (SEI) in January 2014, there have been changes in government financial support for renewables, prompting the Applicant to review the Consented Scheme. Technology advances in wind turbine development have resulted in significantly more productive turbines with relatively minor increases in turbine dimensions that are able to produce lower cost renewable electricity.

22. The planning principle for a wind farm development has been established in this location by the Consented Scheme, which was granted following in-depth examination at PLI; the Consented Scheme creates a legal fall-back position should the Development not be consented. Although this EIA will focus solely on the effects of this Development, the design has sought to reflect concerns raised by consultees through the EIA process for the Consented Scheme.

23. In order to highlight any potential changes in the conclusions between the Consented Scheme and the Development, a Project Comparison Report is provided as a supporting document to the Application. This document outlines and highlights any differences in predicted effects, primarily focussed on Landscape and Visual effects, as well as Archaeology and Cultural heritage effects, to ensure any potential changes from those previously assessed effects are clear, and understood in context of the Consented Scheme.

1.5 OVERVIEW OF THE DEVELOPMENT

24. The Development will consist of up to 12 three-bladed horizontal axis turbines with a maximum tip height of 149.9 m and associated infrastructure, as shown on Figure 3.1 of **Chapter 3: Project Description**.

25. The layout of the Development has evolved via the iterative EIA Process with full details of the final Development layout provided in **Chapter 3: Project Description** of this EIA Report.

26. The purpose of the Development is to generate electricity from a renewable source of energy, offsetting the need for power generation from the combustion of fossil fuels. Consequently, the electricity that will be produced results in a saving in emissions of Carbon Dioxide (CO_2) with associated environmental benefits, which is discussed in **Chapter 16: Climate Change and Carbon Balance** of this EIA Report.

1.6 THE APPLICANT

27. The Applicant is Cloich Windfarm Partnership LLP, a wholly owned subsidiary of EDF Energy Renewables Ltd (EDF-ER), part of one of the world's largest electricity companies, whose investment and innovation in the UK is bringing down costs for consumers with significant benefits for communities. The EDF-ER operating portfolio of 36 wind farms and battery storage units (almost 1 GW) are providing some of the much needed new affordable, low carbon electricity to the UK.

28. EDF-ER is operated within the United Kingdom under the brand EDF Renewables.

1.7 PROJECT TEAM AND COMPETENCY

29. The EIA project team is led by Arcus and this EIA Report has been compiled by Arcus on behalf of the Applicant. The full EIA project team is listed in Table 1.1 below.

30. While Arcus have had overall responsibility for the EIA Report, Land Use Consultants Ltd (LUC) and Scottish Woodlands Ltd have prepared specialist assessment chapters and provided input to the EIA as indicated in Table 1.1 below. For each topic, the detailed assessment of likely significant effects has been undertaken by organisations with relevant specialist skills, drawing on their qualifications, and experience of working on other development projects, good practice in EIA and on relevant published information. **Table 1.1** lists the organisations that have been involved in each topic of this EIA Report.

Table 1.1: Project Team

Chapter Number	Title	Organisation Responsible
1	Introduction	**Arcus** Fiona MacGregor BSc (Hons) MSc PGDip (22 years) Stuart Davidson BSc (Hons) IEMA Registered EIA Practitioner (13 years) Dr Della Lansley BSc (Hons) MSc (Disc.) PhD (16 years) Fraser Clarke BSc (Hons) (1 year) David Ballentyne BSc (Hons) (18 years)
2	Site Selection and Design	
3	Project Description	
4	EIA Methodology	
5	Landscape and Visual Impact Assessment	**LUC** Sam Oxely BSc MA CMLI (over 20 years) Laura Cargill BSc MLC CMLI (12 years) Erin Hynes BSc MSc (3 years)
6	Archaeology and Cultural Heritage	**Arcus** Heather Kwiatkowski BA MA MCiFA RPA IEMA Registered EIA Practitioner (24 years) Dr Della Lansley BSc (Hons) MSc (Disc.) PhD (16 years) Stuart Davidson BSc (Hons) IEMA Registered EIA Practitioner (13 years)
7	Ecology	**Arcus** Nicolas Wright BSc (Hons) MRes MCIEEM CEnv (11 years) James Allison BSc (Hons) (8 years)

Chapter Number	Title	Organisation Responsible
8	Ornithology	**Arcus** Nicolas Wright BSc (Hons) MRes MCIEEM CEnv (11 years) James Allison BSc (Hons) (8 years)
9	Geology, Ground Conditions, and Peat	**Arcus** David Ballentyne BSc (Hons) (18 years) Gregor Hirst BSc (Hons) (5 years)
10	Hydrology and Hydrogeology	**Arcus** Liam Nevins BSc (Hons) MCIWEM C.WEM (14 years) Dr Della Lansley BSc (Hons) MSc (Disc.) PhD (16 years)
11	Noise	**Arcus** Alan Moore BA (Hons) MIOA (11 years) Martin Stevenson BSc MIOA (8 years)
12	Access, Traffic, and Transportation	**Arcus** Tomos Ap Tomos BEng (Hons) MIHT (23 years) Frank Ocran BSc (Hons) MSc MCIHT (13 years)
13	Forestry	**Scottish Woodlands** Andrew Crompton BSc (Hons) MRICS (15 years)
14	Aviation & Radar	**WPAC Ltd** Cdr John Taylor RN (Ret) (over 35 years)
		XI Engineering Consultants Ltd Dr M. P. Buckingham BEng (Hons) AMIMechE PhD (20 Years) R. Horton BSc MAAT (18 years) G. Cowie (10 years)
15	Socio-Economics, Land Use, Recreation, and Tourism	**Arcus** Fiona MacGregor BSc (Hons) MSc PGDip (22 years) Stuart Davidson BSc (Hons) IEMA Registered EIA Practitioner (13 years) Dr Della Lansley BSc (Hons) MSc (Disc.) PhD (16 years) Fraser Clarke BSc (Hons) (1 year) Lucy Starling BSc (Hons) (1 year)
16	Climate Change and Carbon Balance	**Arcus** Fiona MacGregor BSc (Hons) MSc PGDip (22 years) Stuart Davidson BSc (Hons) IEMA Registered EIA Practitioner (13 years) Dr Della Lansley BSc (Hons) MSc (Disc.) PhD (16 years) Fraser Clarke BSc (Hons) (1 year) Lucy Starling BSc (Hons) (1 year)

Chapter Number	Title	Organisation Responsible
17	Other Issues (Shadow Flicker, Telecommunications & Utilities, and Health & Safety ((Including: Major Accidents & Disasters))	**Arcus** Fiona MacGregor BSc (Hons) MSc PGDip (22 years) Stuart Davidson BSc (Hons) IEMA Registered EIA Practitioner (13 years) Dr Della Lansley BSc (Hons) MSc (Disc.) PhD (16 years) Sophie Williams BMus (Hons) AMIOA (3 years) Fraser Clarke BSc (Hons) (1 year) Lucy Starling BSc (Hons) (1 year)
18	Summary of Mitigation	**Arcus** Fiona MacGregor BSc (Hons) MSc PGDip (22 years) Dr Della Lansley BSc (Hons) MSc (Disc.) PhD (16 years) Stuart Davidson BSc (Hons) IEMA Registered EIA Practitioner (13 years) Fraser Clarke BSc (Hons) (1 year)

31. Where further specialist advice has been obtained and informed assessment, this is referenced within technical chapters.

1.8 STRUCTURE OF THE EIA REPORT

32. The EIA Report contains the findings of the assessment of likely significant environmental effects of the Development and comprises of the following volumes:

- Volume 1 – EIA Report Text;
- Volume 2 – EIA Report Figures;
  - Volume 2a – Figures excluding LVIA;
  - Volume 2b – LVIA Figures;
  - Volume 2c – LVIA Visualisations;
- Volume 3 – EIA Report Technical Appendices; and
- Volume 4 – EIA Report Non-Technical Summary.

33. An outline of Volume 1 of the EIA Report which is split into 18 separate chapters is presented below:

- **Chapter 1: Introduction** – Provides background information about the Applicant and an overview of the Development and Site;
- **Chapter 2: Site Selection and Design** – Provides details of the site selection exercise and alternative layouts that were considered within the design evolution process;
- **Chapter 3: Project Description** – Provides a detailed description of the Development including details of the construction, operational and decommissioning arrangements;
- **Chapter 4: EIA Methodology** – Provides an overview of the EIA process, its regulatory context and an outline of the methodology used to assess environmental effects and ensure a consistent and transparent approach to assessment. It describes the scoping and consultation process that assisted in the identification of likely significant environmental effects to be given further consideration;
- **Chapters 5 – 17: Technical EIA Chapters –** Each technical chapter as shown in Table 1.1 will provide a description of the baseline environmental conditions specific to the relevant topic and will assess the potential environmental impacts (positive or negative) due to the Development in line with the EIA methodology. This will

include a description of any proposed mitigation or enhancement measures and a statement of predicted residual impacts; and

- **Chapter 18: Summary of Mitigation** – Provides a summary of the findings of the EIA, including a tabular summary of all residual effects and proposed mitigation.

1.9 ADDITIONAL DOCUMENTS

34. A Planning Statement has been prepared to accompany the application. The Planning Statement sets out an assessment of the Development in the context of national planning, energy policy, the local development plan, and emerging planning policies. It also considers the potential benefits and harm which may arise and concludes as to the overall acceptability of the proposal in relation to the planning context.

35. In addition to the Planning Statement, a Pre-Application Consultation Report (PAC Report) and a Project Comparison Report will be submitted to support the Application.

36. These additional documents do not form part of the EIA Report.

1.10 OBTAINING FURTHER INFORMATION

37. The EIA Report will be publicised in accordance with Part 5 of the EIA Regulations and the Electricity (Applications for Consent) Regulations 1990[4] and the Electricity Works (Miscellaneous Temporary Modifications) (Coronavirus) (Scotland) Regulations 2020[5] ('the Coronavirus Regulations').

38. Part 5 of the EIA Regulations requires the EIA Report to be available for public viewing, including hard copies at physical locations; however, as a result of the ongoing COVID-19 pandemic, this would not be in line with current public health guidance from the Scottish Government. Consequently, the Coronavirus Regulations introduces a temporary relaxation of Part 5 of the EIA Regulations during the emergency period; the amended regulations therefore require that the Applicant must:

> *"state that the EIA report is available for inspection free of charge and the means by which, the EIA report is available for inspection;".*

39. The EIA Report and supporting documentation to the application, together with a public notice of the application, can be viewed on the Cloich Forest Wind Farm project website: https://www.edf-re.uk/our-sites/cloich

40. Copies of the Non-Technical Summary and DVD copies of the complete application submission are available free of charge whilst stocks last. Hard copies of the application submission may be obtained for a fee of approximately £600 in line with the cost of printing the documents.

41. To request a copy of the application submission please contact:

Info@arcusconsulting.co.uk	Or	Richard.Fisher@edf-re.uk
Arcus Consultancy Services Ltd		Atria One
144 West George Street		144 Morrison Street
Glasgow		Edinburgh
G2 2HG		EH3 8EX

[4] The Electricity (Applications for Consent) Regulations 1990 [Online] Available at: http://www.legislation.gov.uk/uksi/1990/455/regulation/4/made (Accessed 22/06/2021)
[5] The Electricity Works (Miscellaneous Temporary Modifications) (Coronavirus) (Scotland) Regulations 2020 [Online] Available at: https://www.legislation.gov.uk/ssi/2020/123/made (Accessed 22/06/2021)

CLOICH FOREST WIND FARM

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Chapter 2

Site Selection and Design

2 SITE SELECTION AND DESIGN

2.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment Report ('the EIA Report') contains a description of the land within the site boundary ('the Site'), the consideration of alternatives and site selection process, and the design process and scheme evolution that led to the final design of the Cloich Forest Wind Farm ('the Development').

2. The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[1] ('the EIA Regulations') state in Schedule 4 paragraph 2 that an EIA report must 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 development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.'

3. This Chapter explains why the Site has been selected and summarises the layout options that were considered by the Applicant during the evolution of the Development.

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

   - Figure 2.1: Ecological Designations;
   - Figure 2.2: Main On-Site Constraints; and
   - Figure 2.3a-b: Site Design Evolution.

2.2 SITE DESCRIPTION

2.2.1 Location

5. The Development represents a re-design of the consented Cloich Forest Wind Farm ('the Consented Scheme'), which was granted S36 consent and deemed planning permission following a Public Local Inquiry (PLI), on 8 July 2016 (Planning and Environmental Appeals Division (DPEA) Reference: WIN-140-1).

6. As a redesigned wind farm development, the Site Boundary remains largely the same as the Consented Scheme, and is shown on Figure 1.1 of **Chapter 1: Introduction**; slight amendments to the widen the Site Boundary were made along the access road. The Site, which covers an area of 1,080 hectares (ha), is located approximately 5.5 kilometres (km) north-west of Peebles in the Scottish Borders, centred on National Grid Reference (NGR) 320648, 647881. The Site lies wholly within the administrative boundary of Scottish Borders Council ('the Council').

7. The topography of the Site, and the immediate vicinity, is complex, with elevation ranging from approximately 280 metres (m) Above Ordnance Datum (AOD) in the north-east part of the Site to approximately 476 m AOD at the peak of Crailzie Hill in the south. There are several other hill tops within the Site which make up the Cloich Hills, these include: White Rig (approx. 325 m AOD); Peat Hill (approx. 466 m AOD); Whaup Law (approx. 460 m AOD); and Ewe Hill (approx. 462 m AOD).

[1] The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 [Online] Available at: https://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 22/06/2021)

8. The hills within the Site are dissected by several watercourses including:

- Middle Burn;
- Early Burn;
- Flemington Burn;
- Martyr's Dean;
- Gibb's Cloich;
- Courhope Burn;
- Courhope Glen; and
- Harehope Burn.

9. Access to the Site is currently afforded from the A703 public road to the east of the Site, along the 'D17 Whim – Shiplaw' and 'D18 Cloich' public roads which connect to the proposed main access tracks, and existing forestry tracks.

10. There are several settlements surrounding the Site, including (but not limited to):

- Eddleston, located approx. 3.2 km east of the nearest turbine (T5);
- Romannobridge, located approx. 3.7 km west of the nearest turbine (T1);
- Damside, located approx. 3.7 km west of the nearest turbine (T11)
- West Linton, located approx. 5.8 km north-west of the nearest turbine (T12); and
- Peebles, located approx. 6.4 km south-east of the nearest turbine (T3).

11. Additionally, there are several larger settlements greater than 10 km away from the nearest turbines, including (but not limited to):

- Penicuik (located north of the Site);
- Galashiels (located south-east of the Site);
- Livingston (located north-west of the Site); and
- Edinburgh (located north of the Site).

12. A number of scattered individual dwellings lie within 3 km of the Site Boundary. Residential properties include Cloich Farm, which stands alone and is located approximately 1.2 km north-east of the nearest turbine (T10) and Upper Stewarton which lies approximately 0.9 km south-east of T4.

13. The Cross Borders Drove Road (a Waymarked Trail) is located within the southern portion of the Site, passing approximately 180 m north of the nearest turbine (T3) at its closest point. The Cross Borders Drove Road enters the Site in the west at approximately NGR 318926 646104 and exits the Site in the east at approximately NGR 321597 646128.

14. There are other public rights of way and Council 'Promoted Paths' within the Site; however, there are no other Core Paths within the Site. A full list, and assessment, of recreational routes is provided within **Chapter 15: Socio-Economic, Land Use, Recreation and Tourism** of this EIA Report.

2.2.2 Land Use

15. Active felling operations are taking place throughout the Site, which comprises predominantly of commercial coniferous plantation at varying degrees of maturity, including substantial areas of clear felling. This is owned and managed by Forestry and Land Scotland (FLS).

16. There are a number of existing forestry tracks used for the commercial woodland management. The Site is currently accessible on foot to the public for walking and recreation, though there are health and safety restrictions in place during periods of harvesting and other forestry operations which means the network of paths and tracks is not always fully accessible to the public. Additionally, there is currently one active quarry on Site, located at approximate NGR 320456, 649061 which is utilised periodically by FLS

to obtain rock to maintain the forestry tracks, and is otherwise not in use. Public access is not permitted within the quarry at any time.

2.2.3 Designations

17. There are no ecological designations within the Site; however, at the access junction from the A703 connecting to the 'D17 Whim – Shiplaw' public road there is a well-established bridge crossing the Eddleston Water, part of the River Tweed Special Area of Conservation (SAC), as noted on Figure 2.1. No works are proposed to the bridge crossing the River Tweed SAC.

18. In addition, there are a number of ecological designations located within 10 km of the Site Boundary, as detailed in Table 2.1 below. Figure 2.1 illustrates all ecological designations identified within 10 km of the Site Boundary.

19. Where appropriate, **Chapter 7: Ecology** and **Chapter 8: Ornithology** of this EIA Report discuss the ecological designations which are of relevance to the Development.

Table 2.1: Further Ecological Designations within 10 km of the Site Boundary

Designation	Designation Title	Approximate Distance from the Site Boundary	Approximate Distance from the Nearest Turbine Location
Ramsar	Gladhouse Reservoir	6.2 km NE	9.6 km NE (T10)
Ramsar	Westwater	8.4 km NW	8.8 km NW (T12)
Special Site of Scientific Importance (SSSI)	Whim Bog	2 km N	4.3 km N (T12)
SSSI	Dundreich Plateau	3.3 km E	6.8 km E (T5)
SSSI	Auchencorth Moss	3.5 km N	5.4 km N (T12)
SSSI	River Tweed	5 km S	6 km S (T2)
SSSI	Gladhouse Reservoir	6.2 km NE	9.6 km NE (T10)
SSSI	Moorfoot Hills	6.2 km E	9.2 km E (T5)
SSSI	Black Burn	6.3 km N	9.7 km N (T12)
SSSI	Dolphinton – West Linton Fens and Grassland	6.4 km W	6.9 km W (T11)
SSSI	Peeswit Moss	6.9 km NE	10 km NE (T10)
SSSI	Carlops Meltwater Channels	7 km NW	7.5 km NW (T12)
SSSI	North Esk Valley	7.6 km NW	8.4 km NW (T12)
SSSI	Westwater Reservoir	8.4 km NW	8.9 km NW (T12)
SSSI	Mount Bog	8.7 km SW	10 km SW (T2)
SSSI	Lynslie Burn	9.9 km NW	10.3 km NW (T12)
SAC	Moorfoot Hills	6.2 km E	9.2 km E (T5)
SAC	Peeswit Moss	6.9 km NE	10 km NE (T10)

Designation	Designation Title	Approximate Distance from the Site Boundary	Approximate Distance from the Nearest Turbine Location
Special Protection Area (SPA)	Gladhouse Reservoir	6.2 km NE	9.6 km NE (T10)
SPA	Westwater	8.4 km NW	8.8 km NW (T12)

20. The Site is not located within any designated landscapes; however, there are a number of landscape designations within 40 km of the outermost turbine locations, including National Scenic Areas (NSAs), Special Landscape Areas (SLAs) and a Regional Scenic Area (RSA).

21. There are two NSAs located within 40 km of the outermost turbine locations: Upper Tweeddale NSA, and Eildon and Leaderfoot NSA. The Upper Tweeddale NSA is located approximately 2.3 km to the south of the Site, at its closest point, and the Eildon and Leaderfoot NSA is approximately 33 km to the south-east of the Site.

22. The Tweed Valley SLA lies 2.4 km south of the outermost turbine; Tweedsmuir Uplands SLA is 4.5 km south-west of the outermost turbines; Pentland Hills SLA is located within 40 km of the outermost turbine locations, to the north-west of the Site, and Moffat Hills RSA is located within 40 km of the outermost turbine locations, to the south-west of the Site.

23. There are three Scheduled Monuments within the Site Boundary, with a further 95 Scheduled Monuments within 10 km of the Site Boundary. The three Scheduled Monuments within the Site Boundary include:

- Whaup Law, cairn (SM2755), located approx. 231 m from the nearest turbine (T8);
- Courhope, ring enclosures 750m NE of Greenside (SM2756) located approx. 270 m from the nearest turbine (T9); and
- Nether Stewarton, settlement 850m W of (SM3998) located approx. 734 m from the nearest turbine (T3).

24. The above designations are discussed as necessary within the relevant technical chapters.

2.3 SITE POLICY CONTEXT

25. Scottish Planning Policy (SPP) (Revised December 2020)[2] provides support for wind development in principle and encourages local authorities to guide developments towards appropriate locations. Paragraph 161 highlights the requirement for planning authorities to define a '*spatial framework identifying those areas that are likely to be most appropriate for onshore wind farms'* whilst stating that spatial frameworks must be based on the following criteria (set out in SPP Table 1, Page 39):

- Group 1: Areas where wind farms will not be acceptable:
  - National Parks and National Scenic Areas.
- Group 2: Areas of significant protection:
  - Recognising the need for significant protection, in these areas wind farms may be appropriate in some circumstances. Further consideration will be required to demonstrate that any significant effects on the qualities of these areas can be substantially overcome by siting, design or other mitigation.

[2] Scottish Government (2020) Scottish Planning Policy [Online] Available at: https://www.gov.scot/publications/scottishplanning-policy/ (Accessed 22/06/2021)

  - Group 2 areas include World Heritage Sites; Natura 2000 and Ramsar sites; Sites of Special Scientific Interest; National Nature Reserves; Sites identified in the Inventory of Gardens and Designed Landscapes; Sites identified in the Inventory of Historic Battlefields; areas of wild land as shown on the 2014 Nature Scot (formerly Scottish Nature Heritage, SNH) map of wild land areas; carbon rich soils, deep peat and priority peatland habitat; and an area not exceeding 2km around cities, towns and villages identified on the local development plan.
- Group 3: Areas with potential for wind farm development:
  - Beyond groups 1 and 2, wind farms are likely to be acceptable, subject to detailed consideration against identified policy criteria.

26. The vast majority of the Site lies within a Group 3 area, which notes the Site has the potential for wind farm development[3]; as the Site Boundary includes access from the A703, there is a small portion of the Site within a Group 2 area, associated with the settlement of Eddleston. It is important to note that works associated with the Development within this Group 2 portion of the Site will be limited to public road widening works. The Development's wind turbines and associated infrastructure are located wholly within a Group 3 area. The Site does not lie within a 'Group 1' area as it is not covered by any national or international designation in respect of landscape, ecology, ornithology or cultural heritage; and lies outside of any Wild Land Area, defined within Group 2 as a 'nationally important mapped environmental interest'. Additionally, the Site is largely free from high quality carbon rich soils. The NatureScot Carbon and Peatland Map (2016)[4] shows that the Site does not occupy land designated as Class 1 or Class 2, which identify land as Carbon Rich Soil, Deep Peat and Priority Peatland Habitat.

27. In 2017, the Scottish Government published the Onshore Wind Policy Statement (OWPS) (2017) and Scottish Energy Strategy (2017) (2017 SES) which recognise that increased efficiency and power output in wind turbine technology, has resulted in increases in the size and scale of wind turbines (e.g. increased turbine blade length and resultant increases in overall tip heights). For example, paragraph 23 of the OWPS states that '*we acknowledge that onshore wind technology and equipment manufacturers in the market are moving towards larger and more powerful (i.e. higher capacity) turbines, and that these – by necessity – will mean taller towers and blade tip heights*'.

28. Whilst the ministerial foreword of the OWPS (page 3) and the 2017 SES (page 43) also state that 'increasingly – the extension and replacement of existing sites, where acceptable, with new and larger turbines, based on an appropriate, case by case assessment of their effects and impacts' as onshore wind continues to play an important role in meeting Scotland's energy generation and climate change goals.

29. In March 2021 the Scottish Government published 'Scotland's Energy Strategy Position Statement' (2021 SES) which builds on the support for onshore wind outlined in the 2017 SES. The 2021 SES notes that:

30. "The Scottish Government is committed to supporting the increase of onshore wind in the right places to help meet the target of Net Zero. In 2019, onshore wind investment in Scotland generated over £2 billion in turnover and directly supported approximately 2,900 full-time equivalent jobs across the country."

31. The 2021 SES also identifies the Scottish Government's key priorities for energy, which amongst others includes a refresh of the OWPS.

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[3] Scottish Borders Council Supplementary Guidance Renewable Energy July 2018 [Online] Available at: https://www.scotborders.gov.uk/downloads/file/2757/renewable_energy_supplementary_guidance (Accessed 22/06/2021)
[4] NatureScot (2016) Carbon and Peatland Map 2016 [Online] Available at: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/soils/carbon-and-peatland-2016-map (Accessed 16/06/2021)

2.4 SITE SELECTION

32. The selection of an appropriate site which has the potential to support a commercial wind farm development is a complex and lengthy process. It involves examining and balancing a number of environmental, technical, planning and economic issues. Only when it has been determined that a site is not subject to major known environmental, technical, planning or economic constraints is the decision made to invest further resources in developing the proposal and conducting an EIA.

2.4.1 Extant Consent

33. There is an extant consent on the site for 18 wind turbines (115 m to tip) and associated infrastructure. The Section 36 consent and deemed planning permission for Cloich Forest Wind Farm was granted by Scottish Ministers following a Public Local Inquiry (PLI) on the 8th July 2016 (Planning and Environmental Appeals Division (DPEA) Reference: WIN-140-1), under reference number EC00003108 ('the Consented Scheme').

2.4.2 Site Selection

34. In accordance with the EIA Regulations the design alternatives need to be studied with key reasoning, taking into account the potential environmental effects. The Site was selected as a suitable site for wind farm development by Cloich Windfarm Partnership LLP ('the Applicant') because it met the following criteria:

- Existing consent at the Site for the Consented Scheme demonstrates an established planning principle for an onshore wind farm in this location, and a legal fall-back position should consent not be granted for the Development;
- A sufficiently high annual mean wind speed across the Site;
- Viable grid connection;
- Suitable road access;
- The revised wind farm layout is able to maintain sufficient distance from residential properties to ensure and maintain compliance with ETSU-R-97 noise limits, as well as to avoid or reduce the potential for adverse effects on residential visual amenity and shadow flicker effects; and
- The Site does not support any international or national ecological or landscape designations, and Scheduled Monuments within the Site can be safeguarded, including:
  - Whaup Law, cairn (SM2755), located approx. 231 m from the nearest turbine (T8);
  - Courhope, ring enclosures 750m NE of Greenside (SM2756) located approx. 270 m from the nearest turbine (T9); and
  - Nether Stewarton, settlement 850m W of (SM3998) located approx. 734 m from the nearest turbine (T3).

2.5 SITE DESIGN

35. The purpose of a wind farm development is to harness the wind to generate electricity. From a yield perspective, the optimum design would locate wind farms in areas exposed to the highest wind speeds, with turbines placed in the most exposed locations. However, this may not account for the potential environmental effects of a wind farm. The design of a wind farm must therefore balance environment effects and energy yield. In addition to these factors, the technical limitations of constructing a wind farm must also be considered in the design stage.

36. The layout of a wind farm draws upon on a range of technical criteria. A minimum distance must be maintained between wind turbines to reduce the effects of turbulence and associated increased turbine fatigue and reduction in energy yield. This separation

distance is usually a function of rotor diameter and prevailing wind direction, with turbine manufacturers requiring turbines to be located typically between three and seven times the rotor diameter apart depending on wind and site conditions. Once established, this separation distance is used for turbine spacing in the ongoing design.

37. The following criteria must also be considered in the design of a wind farm:

- Wind speed;
- Prevailing wind direction;
- Existing infrastructure;
- Topography;
- Ground conditions;
- Local environmental sensitivities; and
- Landscape and visual considerations.

38. The design process is iterative and develops in tandem with environmental surveying that identifies environmental sensitivities which are considered and taken into account within the design process. As environmental effects and sensitivities have been identified, the layout of the Development has undergone a series of modifications to avoid or reduce potential environmental effects through careful design. This process has resulted in the layout of the Development presented in this EIA Report. This layout represents the optimum fit within the technical and environmental parameters of the Site and its surroundings.

39. In addition to the turbines, the other elements of the Development which have been designed to minimise environmental effects include: the access tracks, proposed borrow pits, crane hardstanding areas, temporary construction compound, and the substation compound (including the Battery Energy Storage System (BESS)). The effects of these have been minimised through use of existing track infrastructure where possible, careful design, siting, routeing, and construction methods.

40. The key constraints to onshore wind farm site design which need to be taken into account during the design process include:

- Visibility from sensitive receptors, including nearby properties, settlements and designated landscapes;
- Presence of sensitive habitats and protected species;
- Presence of sensitive ornithological species;
- Presence of watercourses, private water supplies and related infrastructure;
- Presence of cultural heritage features;
- Proximity to noise sensitive receptors;
- Presence of peat;
- Ground conditions and topography; and
- Key recreational and tourist routes.

41. The principle of the design strategy was to maximise the number of turbines and wind energy capture, whilst minimising significant adverse environmental effects. Therefore, some of these constraints were given a 'hard' constraint value in the design that was not breached and others were assigned a 'soft' constraint value that could be impinged with sufficient justification that effects were still acceptable. This led to a comprehensive process of constraints mapping. This EIA Report and its conclusions constitute the outcome of the application of the design strategy and design objectives adopted for the Development.

42. Embedded mitigation (avoiding the potential for impacts to arise through Development design) was used to minimise any predicted environmental effects and, where applicable to a specific technical assessment, this mitigation is detailed in the relevant chapter within this EIA Report. Additionally, embedded mitigation relating to design changes are detailed

below in Section 2.6 of this Chapter. This was particularly relevant to the avoidance of direct effects, *e.g.* on known protected species. By employing an iterative design process, undertaken in conjunction with the EIA process, a number of potential effects were avoided completely.

43. The design strategy has been informed by a number of general and site-specific design objectives relating to the siting and design of the turbines in the first instance, whilst acknowledging that the feasibility and appropriateness of other ancillary infrastructure locations (including access tracks) should also be considered throughout the design process.

2.5.1 Site Specific Environmental Constraints and Design

44. The specific environmental factors considered in the design of the Development are set out below, with their influence on the design discussed.

2.5.1.1 Landscape and Visual

45. Best practice guidance, including Siting and Designing Wind Farms in the Landscape, Version 3[5] was considered throughout the design process.

46. Residential properties in proximity to the Site were a key consideration in the design of the Development, which sought to utilise existing topography and forestry so that it will screen the turbines where possible. Where open views towards the Site are available, in particular in views from the north-east, the aim was to create a compact layout with evenly spaced turbines and minimal stacking.

47. During the design process the Development layout was examined from a number of key design viewpoints including several locations within the Upper Tweeddale NSA, including Black Meldon and Cademuir Hill Fort. As it was not possible to remove visibility of the Development from elevated locations within the NSA, the design objective was to create a compact layout with evenly spaced turbines and minimal stacking, that was broadly in keeping with the Consented Scheme. Turbine scale in relation to the underlying landscape was also a consideration, with the large-scale landscape considered able to accommodate turbines of the maximum height proposed (149.9 m). Avoiding the need for visible aviation lighting was a key consideration in choosing this turbine height.

48. In addition to the position of the turbines, consideration was given to reducing landscape and visual effects relating to ancillary infrastructure including access tracks, onsite substation and BESS. These elements are generally located within areas of forestry which provide screening from nearby receptors. In addition, keyhole felling will be used to minimise the total area and visibility of forestry felled.

49. Further information about landscape and visual effects is provided in **Chapter 5: Landscape and Visual Impact Assessment**.

2.5.1.2 Archaeological and Cultural Heritage Features

50. The design of the Development has taken into account the consultation responses received from Historic Environment Scotland (HES) and the Council Archaeologist and has sought to reduce the impact upon heritage assets through mitigation by design, where possible.

51. Minimising and avoiding changes to setting that may affect the cultural significance of designated heritage assets was an important driver in the design process. Specifically, the layout has sought to maintain views between Scheduled Monuments, where this contributes to setting, as well as the potential impact on Portmore House (LB2037) and

[5] Scottish Natural Heritage (now NatureScot) (2017) Siting and Designing Wind Farms in the Landscape Version 3 [Online] Available at: https://www.nature.scot/siting-and-designing-wind-farms-landscape-version-3a (Accessed 22/06/2021)

its associated Inventory Garden & Designed Landscape (GDL00318). Most notably the reduction in turbines from the 18-turbine Consented Scheme (up to 115 m to tip) to a 14 turbine Scoping layout, which was further reduced to a 12-turbine scheme (albeit with slightly taller turbines of up to 149.9 m to tip), creates a more compact, evenly spaced layout in order to limit views of turbines towards or from hillforts, most notably those on the southern side of the Tweed Valley which look northwards towards the Meldons. Although this could not be completely avoided due to the nature of the surrounding topography and density of hillforts. The design has sought, where possible, to not introduce any new effects upon heritage assets as the result of the Development beyond those identified for the Consented Scheme.

52. In addition, the design of the layout has sought to avoid archaeological sites recorded within the Site, in order to avoid direct impacts upon known archaeological features and securing preservation in situ.

53. Further information about heritage assets is provided in **Chapter 6: Archaeology and Cultural Heritage**.

2.5.1.3 Ecological Features

54. Desk-based surveys and Site visits were undertaken as part of the ecology baseline studies which were used to inform the final design of the Development. Site surveys included the following:

- Extended Phase 1 habitat survey;
- National Vegetation Classification (NVC) Survey;
- Badger survey;
- Otter survey;
- Pine marten survey;
- Red squirrel survey;
- Great crested newt survey;
- Bat habitat suitability survey;
- Bat activity survey; and
- Fish fauna survey.

55. The purpose of these surveys was to identify sensitive habitats and species within and close to the Site to ensure that the Development's design would take them into account.

56. Although protected species were recorded, including moderate levels of bat activity and the presence of badger, pine marten and otter, no notable ecological sensitivities that cannot be avoided or appropriately mitigated have been recorded.

57. Risk to bats as a result of collision with operational turbines has been minimised by the implementation of a 50 m separation distance between blade tips and high-value bat habitats, such as woodland, riparian habitats, and forest edges, in accordance with NatureScot (formerly SNH) published guidance.

58. The NVC survey identified habitats with the potential to be groundwater dependent. Most of these have been assessed from a hydrological perspective to be ombrotrophic, and therefore not groundwater dependent.

59. Given the relatively small area that these ecological sensitivities covered compared to the overall development area, the ecological constraints did not pose significant design limitations, and ensuring these areas were avoided through design with a suitable distance from development was achieved.

60. Best practice, as detailed within **Chapter 7: Ecology**, has been adopted to avoid disturbance to protected species or direct effects on sensitive habitats; this largely relates to embedded mitigation including measures outlined in a Construction Environmental

Management Plan (CEMP). The final layout was informed by the aforementioned surveys, which ensured that the Development avoided the most sensitive habitats.

61. Ecology effects are assessed within **Chapter 7: Ecology**.

2.5.1.4 Ornithological Features

62. Ornithology surveys were undertaken between March 2019 and February 2020 (inclusive) over the Site and appropriate survey areas. In consultation with NatureScot it was agreed that the aforementioned ornithology surveys could be used to update the historical 2011/12 surveys undertaken for the Consented Scheme.

63. The surveys recorded flights from a number of priority species including: pink-footed goose, greylag goose, goshawk, osprey, and curlew.

64. Ornithological features have been considered at all stages of the Development design, from initial feasibility to final layout. Standard best practice measures will also be implemented during construction (including timing felling works outwith the breeding season) to ensure compliance with relevant legislation protecting all breeding wild birds. This has helped to avoid or greatly reduce impacts on ornithological features.

65. Ornithology effects are assessed within **Chapter 8: Ornithology**.

2.5.1.5 Peat

66. Peat depth surveys were undertaken across the Site, through which it was established that the majority of the Site was not underlain with peat. Isolated, and limited, pockets of peat and deep peat were identified across the Site. Areas of peat that are greater than 1.0 m in depth were considered as a hard constraint for new infrastructure as a result of the Development. Areas of peat less than 1.0 m in depth were considered as a soft constraint and avoided as far as possible.

67. Further information on peat and other ground conditions of the Site is contained within **Chapter 9: Geology, Ground Conditions, and Peat**.

2.5.1.6 Water Environment

68. During the EIA process desktop and site surveys were carried out to inspect and identify all water features including private water supplies within the area with potential to be impacted by the Development.

69. The hills within the Site are dissected by several watercourses including:

- Middle Burn;
- Early Burn;
- Flemington Burn;
- Martyr's Dean;
- Gibb's Cloich;
- Courhope Burn;
- Courhope Glen; and
- Harehope Burn.

70. The aim of the design process was to achieve a layout that avoids effects on sensitive hydrological receptors including private water supplies, discussed below. All turbines and associated infrastructure, with the exception of access tracks, have been located a minimum of 50 m from any watercourse or waterbody.

71. The arrangement of access tracks has been designed to limit the number of watercourse crossings where possible or to re-use existing crossing points. The Development layout will require potential upgrades to up to 11 existing watercourse crossings and two new watercourse crossings.

72. Effects upon hydrology are assessed within **Chapter 10: Hydrology and Hydrogeology**.

2.5.1.7 Private Water Supplies

73. During the EIA process, desktop and Site surveys were carried out to inspect and identify properties served by a Private Water Supply (PWS).

74. The aim of the iterative EIA design process was to achieve a layout that avoids potential effects on the sources of PWS by locating infrastructure outwith of the catchments of identified sources or maximising the distance between Site infrastructure and the supply. Turbines, compounds and borrow pits have been located outwith PWS catchments.

75. Where new access tracks or upgrades to existing tracks are required, within 100 m of supplies, mitigation measures are proposed. Potential effects and mitigation measures are all discussed in detail within **Chapter 10: Hydrology and Hydrogeology** and associated technical appendices.

2.5.1.8 Noise Sensitive Receptors

76. The potential for noise effects to arise at residential properties located in the surrounding area of the Site was an important consideration in the design process. The nearest noise sensitive receptor to the Development is approximately 900 m south-east of the nearest turbine location (T4).

77. Each layout iteration was modelled to determine its noise impact on nearby receptors. Through the iterative EIA design process, turbines were moved away from noise sensitive receptors. As these receptors, and their associated noise buffers, were considered as a hard constraint throughout the design process, the Development does not breach the consented noise limits established for the Consented Scheme.

78. A noise assessment is presented in **Chapter 11: Noise**.

2.5.1.9 Socio-Economics, Land Use, Recreation and Tourism

79. A desk-based study of local socio-economics, land use, recreation and tourism receptors was undertaken at an early stage to establish the socio-economics and land use of the local area, and gain a full understanding of the recreation and tourism receptors within the wider area.

80. The desk-based study established that the wider area is host to various tourism and recreation receptors, largely based around the natural environment and notable man-made structures, such as historic buildings. These receptors were considered throughout the design process. Furthermore, the desk-based study identified several core paths and local recreational routes of importance; these were considered in full.

81. Effects upon the socio-economic, land use, recreation & tourism resources are assessed within **Chapter 15: Socio-Economics, Land Use, Recreation & Tourism**. Additionally, **Chapter 5: Landscape and Visual Impact Assessment** also assesses the visual impact of the Development on key receptors which relate to tourism and recreational assets.

2.5.1.10 Telecommunications

82. A desk-based study and external consultation with telecommunication providers was carried out to understand the existing infrastructure within the Site, and within nearby areas.

83. The desk-based study and consultations identified telecommunication infrastructure, and these were avoided throughout the EIA design process.

84. Effects upon telecommunications are assessed within **Chapter 17: Other Issues**.

2.5.2 Design Considerations

2.5.2.1 Wind Resource

85. Wind resource can be affected by various site characteristics, such as the prevailing wind direction, and local topography. The wind resource was modelled across the Site and fed into the design process. As a rule, the more elevated areas of Site have the greatest wind resource, and this must be balanced against the landscape and visual effects that may arise at higher elevations.

2.5.2.2 Turbine Spacing

86. The spacing of the turbines is a key consideration in wind farm layout design; turbines need to be arranged a suitable distance apart such that turbulence from a specific turbine does not unduly affect the operation of a turbine which is downwind from it. The spacing for turbines needs to be larger in the prevailing wind direction and will vary from site to site and between different turbine models. The spacing is proportional to the size of the wind turbine rotor, whereby the larger the rotor, the larger the spacing must be between turbines. Consequently, this affects how many turbines can be accommodated within a site.

2.5.2.3 Topography and Ground Conditions

87. The suitability of ground conditions was considered during the design of the Development, which principally considered areas of steep slope, peat, and proximity to hydrological features.

88. The Site has complex topography, and substantial areas of steep hillside. Where gradients greater than 20% were identified, these areas were not considered suitable for the siting of wind turbines. Additionally, as far as possible gradients greater than 14% were similarly avoided for tracks. This restricted large parts of the Site in the central and southern parts of the Site where steep slopes are prevalent. The presence of steep slopes also presented a key element to the design of the Site infrastructure, including access tracks and hardstanding areas.

89. The presence of peat has been assessed both from an environmental and technical perspective. Peat greater than 1.0 m depth was minimal and localised, generally on land which was more flat in comparison to the hill tops of the Cloich Hills. Identified peat deposits, greater than 1.0 m in depth, were scattered along a central band within the middle of the Site. In addition, there is an area of peat greater than 1.0 m in depth to the east of the centre of the Site, where one of the main site access tracks is located – however, this access track is an already existing forestry track and impacts upon the area of peat can be minimised by the implementation of suitable construction practices. Areas with peat deeper than 1.0 m, and areas with a peat depth of 0.5 m – 1.0 m, were avoided as far as possible. No turbines, or immediate associated infrastructure is located within peat. Existing forestry tracks are the only elements of the Development Site infrastructure which are located in areas of peat. However, it is important to note that instances in which this occurs are minimal and avoided as far as possible. Upgrades to existing forestry tracks are likely to be localised and minimised as far as possible. This is fully assessed within **Chapter 9: Geology, Ground Conditions and Peat**.

2.6 DESIGN EVOLUTION

90. The final layout presented in this EIA Report has been chosen following a number of iterations and refinements which sought to avoid or minimise predicted adverse effects via design embedded mitigation. The resultant proposal balances the environmental and technical constraints, whilst producing an economically viable project. Design changes made as a consequence of the key constraints are considered to be mitigation which is 'embedded' within the design of the scheme.

91. Whilst the Development went through numerous design iterations, a selection of the key turbine layout design iterations are described below and shown in Figure 2.3a-b which demonstrates how the layouts have evolved during the EIA process. The key design iterations presented are:

- Consented Scheme Layout (July 2016);
- Scoping Layout (October 2019);
- January Design Day Layout (January 2020);
- April Design Day Layout (April 2020);
- Final Draft Layout (September 2020); and
- Turbine Freeze Layout (January 2021).

92. As an understanding of Site constraints developed, turbine layout iterations were increasingly informed by the following technical parameters and constraints detailed below:

- Minimum turbine spacing/separation of approximately 5 x rotor diameter downwind and 3 x rotor diameter crosswind and a south-westerly prevailing wind direction (approximately 240 degrees);
- Avoidance of slopes of 20% or greater; and avoidance of slopes of 14% or greater where possible (Figure 2.2);
- A hard constraint of 50 m buffers around the banks of watercourses for turbine locations and associated crane hardstanding (Figure 2.2);
- A hard constraint to avoid all known archaeological records (Figure 2.2);
- A hard constraint of a minimum 250 m buffer around sensitive Groundwater Dependent Terrestrial Ecosystems (GWDTE) (Figure 10.6);
- A hard constraint to avoid locating turbines within 800 m of a residential property;
- A hard constraint to avoid locating turbines within 160 m of the Cross Borders Drove Road (Figure 2.2);
- A hard constraint to avoid locating turbines in peat (>0.5 m) (Figure 2.2);
- A soft constraint to avoid locating turbines inside surface water catchments serving Private Water Supply catchments;
- A soft constraint to balance the visual composition of the Development.

2.6.1 Consented Layout – July 2016 – 18 Turbines – Tip Height 115 m

93. In July 2011 a scoping request was submitted on behalf of Partnership for Renewables (PfR) for a wind farm development consisting of 18 (three-bladed) turbines, with a maximum tip height of 132 m.

94. The Consented Scheme, consented in July 2016, comprised of a wind farm layout of 18 turbines with a maximum tip height of 115 m. The Consented Layout is presented in Figure 2.3a.

95. The Applicant purchased the Partnership for Renewables development portfolio in 2017, including the Consented Scheme.

96. An initial feasibility study was undertaken to understand what scope there was for a redesigned wind farm in the same location that uses taller, higher yielding turbines. Wind turbines are generally becoming larger with greatly improved generation outputs that can

be achieved from an increased rotor size, alongside a significant reduction in electricity generation costs. This study concluded that a project which broadly reflects the Consented Scheme could be designed using a smaller number of taller turbines.

2.6.2 Scoping Layout – October 2019 – Up to 14 Turbines – Maximum Tip Height 145 m

97. A design workshop, attended by technical and environmental specialists from the EIA team, was held in the autumn of 2019 following the completion of the preliminary environmental survey work. This was informed by the identified environmental constraints digitised and analysed by the technical assessors.

98. In designing the Scoping Layout, turbines were positioned to avoid, as far as possible, immediately known onsite constraints (such as residential property noise buffers and peat presence, as known at the time). It also incorporated consideration of landscape and visual effects with a focus on designing a visually balanced scheme within the context of the surrounding landscape and its sensitivities that was broadly in keeping with the Consented Scheme.

99. The key design changes which influenced the development of the Scoping Layout are summarised below:

- Use of taller turbines than consented; and
- Reduction in the maximum number of turbines from 18 to 14.

100. The Scoping Layout (shown on Figure 2.3a) was developed in October 2019 and consisted of up to 14 turbines with a maximum tip height of 145 m.

101. The Development was scoped under the EIA Regulations in October 2019, and a Scoping Opinion was received from the Scottish Government on the 18th December 2019 (ECU Reference: ECU00001956).

2.6.3 January Design Day Layout – January 2020 – Up to 12 turbines – Maximum Tip Height 149.9 m

102. Following the Scoping process, the Applicant considered a layout which removed turbines in the western extent of the Site. The change in the total turbine number from 14 to 12 was made to further reduce environment impacts (primarily landscape and visual effects).

103. Additionally, the Applicant increased the maximum tip height of the Development from 145 m to 149.9 m. This change to the tip height was to ensure economic viability of the Development, following the reduction in turbine numbers to enable consideration of more productive turbines. The change in turbine tip height resulted in increased spacing between turbines to improve energy yield.

104. The nominal height increase was not considered to result in turbines being at odds with the scale of the landscape and enabled a reduction in turbine numbers. Together these changes provided a greater opportunity to improve visual composition.

105. As described in **Chapter 4: EIA Methodology** of this EIA Report, this change in the proposed maximum turbine tip height followed the completion of the formal Scoping process. On behalf of the Applicant, Arcus submitted a further consultation letter to the ECU on the 20 January 2020; this letter was circulated to EIA consultees and is published on the ECU website[6] under the Reference: ECU00001956. EIA consultees were invited to review their previous consultation responses in light of the consideration of slightly taller turbines and the ECU subsequently confirmed that the agreed EIA scope remained

[6] Scottish Government (2020) Energy Consents Unit [Online] Available at: https://www.energyconsents.scot/Default.aspx (Accessed 26/06/2021)

suitable and that formal re-scoping was not required (see Technical Appendix A4.3 of **Chapter 4: EIA Methodology**).

106. The Tip Height Increase Consultation was undertaken in January 2020. A copy of responses are included within Technical Appendix A4.4.

107. The reduction in turbine number from 14 to 12 and movement of turbine positions was beneficial in achieving a more balanced composition from key viewpoints. This included: close views from the east and south-east, e.g. LVIA Viewpoints 6 (Core Path 154 near Eddleston) and 11 (A703 near Langside Farm); distant views from Viewpoint 19 (Cademuir Hill Fort) in the Upper Tweeddale NSA; distant views from the Moorfoot Hills (e.g. Viewpoint 20 (Blackhope Scar)); and distant views from the Pentland Hills (e.g. Viewpoint 24 (Bleak Law)).

108. The January Design Day Layout saw all turbines move beyond 50 m from watercourses, to ensure there will be no direct hydrological impact as a result of turbines; similarly, a turbine (T10 as per the Scoping Layout) was moved from the 160 m buffer of Courhope, ring enclosures 750m NE of Greenside (SM2756) to reduce indirect setting effects.

2.6.4 April Design Day Layout – April 2020 – Up to 12 Turbines – Maximum Tip Height 149.9 m

109. The Layout developed on the April Design Day (Figure 2.3b) reflected a re-design of the January Design Day Layout following feedback from the first round of public exhibitions held for the Development. At this stage, turbine movements were largely based around landscape and visual considerations, protection of private water supplies, noise (residential receptors), and ecological feature constraints.

110. The key landscape and visual considerations included views from the closest residential receptors, settlements and roads in the surrounding area, recreational locations and views from the Upper Tweeddale NSA.

111. The April Design Day Layout (Figure 2.3b) reduced the visibility of the Development from some of the closest residential receptors including those at Harehope (to the south of the Site), whereby turbines moved north away from this cluster of properties and down the slope. The horizontal extent of the Development was also reduced in views from properties at Nether Stewarton, and the prominence of the turbines was reduced in views from Cloich Farm.

112. The layout reduced the horizontal extents of the Development and achieved a more evenly spaced layout in views from key locations in the Upper Tweeddale NSA including LVIA Viewpoints 4 (Black Meldon), 9 (Haswellsykes) and 19 (Cademuir Hill Fort). It also reduced visibility of turbines from the Meldon Valley (LVIA Viewpoint 5). The April Design Day Layout (Figure 2.3b) reduced visibility of turbine hubs in views from the west e.g. LVIA Viewpoints 8 (B7059 between Boghouse and Kaimhouse) and 12 (A702 approach to West Linton). It also improved the composition of the layout in views from Gladhouse Reservoir as represented by LVIA Viewpoint 21.

113. In addition to the landscape and visual considerations and moves detailed above, there were several other moves for other environmental considerations, as summarised in Table 2.2 overleaf.

Table 2.2: Key Design Changes following January Design Day Layout to April Design Day Layout

Turbine No.	Key Design Changes from January Design Day Layout to April Design Day Layout
T1	Moved approx. 1.2 km north away from an area housing an important ecological feature, and away from nearby residential properties down the slope.
T2	Moved approx. 321 m north away from nearby residential properties down the slope.
T9	Moved approx. 780 m south and removed from the 160 m buffer of Whaup Law, cairn (SM2755) to reduce indirect setting effects.
T10	Moved approx. 277 m south-west away from the residential property of Cloich Farm – this move was in the interest of operational turbine noise at the residential property.

2.6.5 Final Draft Layout – September 2020 – Up to 12 Turbines – Maximum Tip Height 149.9 m

114. The Final Draft Layout (presented on Figure 2.3b) was developed in September 2020 following a design review meeting where further constraints mapping from completed surveys and more detailed Digital Terrain Modelling (DTM) data were used to microsite turbine and infrastructure locations within the complex topography on the Site.

115. Changes to turbine locations (as detailed in Table 2.3. below) were largely driven by engineering considerations although environmental considerations also benefitted. Moving the turbines away from steeper gradients significantly reduces the amount of cut and fill earthworks and improves the fit of the road and turbine pad infrastructure within the landscape. By reducing the construction footprint of the Development, it will be constructed with less land disturbance, reducing the potential for land slip and the area of forestry to be felled. Therefore, these moves benefit various environmental disciplines including hydrology, ecology, and ornithology.

Table 2.3: Key Design Changes following April Design Day Layout to Draft Final Layout

Turbine No.	Key Design Changes from January Design Day Layout to April Design Day Layout
T1	Moved approx. 60 m north-east onto land which had a less steep gradient.
T6	Moved approx. 70 m north-east onto land which had a less steep gradient.
T7	Moved approx. 61 m north-west onto land which had a less steep gradient.
T8	Moved approx. 155 m north-east, downhill from approx. 457 m AOD to approx. 450 m AOD. Whilst this move was largely driven by engineering constraints, and to maintain turbine spacing, it also further reduced landscape and visual effects in some views.
T9	Moved approx. 98 m north-east to maintain turbine spacing.
T11	Moved approx. 108 m north onto land which had a less steep gradient.
T12	Moved approx. 50 m north to maintain turbine spacing.

116. The layout takes account of key landscape and visual considerations as described above, including views experienced from nearby residential properties and key design viewpoints such as those within the Upper Tweeddale NSA. The changes as described in the table above resulted in a slight improvement to the composition of the layout from several locations including LVIA Viewpoints 17 (Glentress Forest, Makeness Kipps), 21

(Gladhouse Reservoir), 23 (Stob Law), 24 (Bleak Law) 25 (Lee Pen) and 26 (B7007 northern edge of the Moorfoot Hills).

2.6.6 Turbine Freeze Layout – January 2021 – Up to 12 Turbines – Maximum Tip Height 149.9 m

117. The Turbine Freeze Layout (presented on Figures 2.3b) represents the Development layout proposed in this EIA Report; the layout is comprised of up to 12 turbines at a tip height of up to 149.9 m. The layout incorporates necessary rotor spacing requirements, based on a prevailing south-westerly wind, and the turbines positioned to minimise interaction with onsite constraints, including areas of deep peat and watercourses. This included some minor refinements (as described in Table 2.4 below, and following text) to a number of turbine positions, as more detailed site survey results became available.

118. The layout incorporates infrastructure elements which were not present on the Scoping Layout and other earlier iterations. This includes internal access tracks, a substation compound, a temporary construction compound, and borrow pit locations. The Site contains an existing internal network of forestry tracks which have been used as much as possible.

Table 2.4: Key Design Changes following Draft Final Layout to Turbine Freeze Layout

Turbine No.	Key Design Changes from Turbine Chill Layout to Turbine Freeze Layout
T1, T2, T4, T5, T6, T7, T9, T10, & T12	No change from Draft Final Layout.
T3	Moved approx. 36 m north to avoid impacts on the catchment area of a Private Water Supply (PWS); move included refinement of associated access track further away from Private Water Supply catchment.
T8	Moved approx. 45 m south-east to avoid a deposit of peat.
T11	Associated infrastructure, including access track and crane hardstanding, reorientation to avoid peat deposit and to ensure crane hardstanding is beyond nearby 50 m watercourse buffer.

119. Following a PWS site visit, T3 was moved approx. 36 m north of its location as per the Draft Final Layout; the movement of T3 moved it further downhill from the ridgetop it was originally close to, and away from a geological fault line. This positive move further minimises the potential for PWS impacts to arise from the construction of T3 as the turbine is now located on the far side of the ridge from the PWS and its catchment. Additionally, by moving the turbine away from the geological fault line, further confidence is achieved that there is no sub-surface connectivity between the T3 location and the PWS. Further information on this is contained within **Chapter 10: Hydrology and Hydrogeology.**

120. T8 and its associated infrastructure was moved 45 m south-east to avoid a deposit of peat. Likewise, T11's associated infrastructure was reoriented to avoid a peat deposit – these amendments result in all of the Development's turbines and crane hardstandings being located out of peat deposits. Additionally, the reorientation of T11 associated infrastructure also removed it from a 50 m buffer of a nearby watercourse.

121. The technical assessments within this EIA Report include an allowance for micrositing of the application layout up to 50 m to ensure that any new environmental or engineering factors can be addressed at the time of detailed foundation design and construction.

2.6.6.1 *Final Infrastructure Layout*

122. The final infrastructure layout is presented on Figure 3.1: Detailed Development Site Layout of **Chapter 3: Project Description**.

Access Tracks

123. The internal onsite access track layout for the final turbine arrangement was developed so that it meets the following criteria:

- Upgrade of existing tracks where possible;
- Minimisation of the variation in the vertical alignment of the tracks;
- Minimising the overall length of new tracks;
- Ensuring a safe and efficient layout to facilitate wind farm construction;
- Minimisation of incursion into environmental constraint areas (e.g. deep peat, sensitive habitats, watercourse buffers);
- Minimisation of the number of watercourse crossings and alignment of tracks so that crossings are approximately at right angles; and
- Minimisation of tracks through areas of peat greater than 0.5 m in depth.

Borrow Pits

124. The borrow pit locations have been selected to avoid environmental constraints and were identified following a review of geological data and topography to determine where extractable rock of suitable quality is to be found. Borrow pit 1 is located in the north of the Site, along the northern main access track; it is an existing quarry used by FLS for construction of forestry tracks. Borrow pit 2 is located in a disused quarry in the east of the Site. Borrow pit 2 was originally located north, near Cloich Farm; however, following a PWS site visit to Cloich Farm, the borrow pit position was relocated to ensure its operation had no effect on the property's PWS.

Substation Compound

125. The location of the substation compound, adjoining the northern main the access track, was selected as it is an appropriate distance away from the turbine locations and close to the construction compound. Its location is in an area with no hard constraints.

126. The substation compound is located on the lower slopes of Peat Hill within an area of young forestry which will provide screening from surrounding landscape and visual receptors.

Temporary Construction Compound

127. The location of the temporary construction compound, adjoining the northern main the access track, was selected as it is an appropriate distance from the turbine locations and close to a borrow pit for construction. Its location is in an area with no hard constraints.

128. The temporary construction compound is located adjacent to both borrow pit 1 and the proposed substation compound within an area of young forestry which will provide screening from surrounding landscape and visual receptors.

Access

129. Access will be via the A703, the 'D17 Whim – Shiplaw' and the 'D18 Cloich' public roads, which is the same access as the Consented Scheme.

2.7 SUMMARY

130. Various economic, technical and environmental considerations were established by a combination of baseline surveys, assessment and consultation with stakeholders.

131. The final turbine layout and associated infrastructure assessed in this EIA Report has been carefully developed taking these factors into account and is considered to achieve the balance required to increase the renewable energy generation capacity of the Site whilst minimising the introduction of new environmental effects.

132. The final Development turbine layout and associated infrastructure is described in **Chapter 3: Project Description** and shown on Figure 3.1.

CLOICH FOREST WIND FARM

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Chapter 3

Project Description

3 PROJECT DESCRIPTION

3.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment Report (EIA Report) provides a description of the proposed Cloich Forest Wind Farm ('the Development') which forms the basis of the assessments presented within Chapters 5 to 17. It provides details of the construction phase, the 30-year operational phase and decommissioning phase of the Development.

2. The Development is located within Cloich Forest approximately 5.5 kilometres (km) north-west of Peebles ('the Site').

3. This Chapter includes an overview of the Development followed by a detailed description of the main components and their method of construction. Measures that have been built into the design of the Development to reduce effects, also known as 'embedded' mitigation measures, are set out in the previous chapter (**Chapter 2: Site Selection and Design**), and in this Chapter. In addition to these embedded mitigation measures, Chapters 5 to 18 present mitigation and enhancement measures where specifically relevant to their assessment topic.

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

- Figure 3.1a-d: Detailed Development Site Layout;
- Figure 3.2: Indicative Turbine Elevation;
- Figure 3.3: Indicative Foundation Design;
- Figure 3.4: Indicative Crane Hardstanding;
- Figure 3.5: Indicative Cable Trench Detail;
- Figure 3.6: Indicative Substation & BESS Compound;
- Figure 3.7: Indicative Control Building & BESS Elevation;
- Figure 3.8: Indicative Construction Compound;
- Figure 3.9: Indicative Access Track;
- Figure 3.10: Indicative Culvert Details;
- Figure 3.11: Indicative Bridge Detail;
- Figure 3.12: Proposed Temporary Junction Arrangement at Existing A703 / D17 Junction;
- Figure 3.13: Outline Design of Borrow Pit 1; and
- Figure 3.14: Outline Design of Borrow Pit 2.

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

- A3.1: Borrow Pit Assessment.

3.2 DESCRIPTION OF THE DEVELOPMENT

3.2.1 Development Overview

6. The Development comprises a wind powered electricity generating station known as Cloich Forest Wind Farm with a generation capacity exceeding 50 MW. It will involve the construction and operation of a wind farm and associated infrastructure, and include widening works along the main public road access, as described in Table 3.1 below.

7. The Development will comprise:

- Up to 12 wind turbines including external transformers and associated infrastructure including:
  - Widening works along public road;
  - A substation compound & building;
  - An approximate 20 MW battery energy storage system (BESS); and
  - Forestry felling and compensatory planting.

8. The Development is located within Cloich Forest approximately 5.5 kilometres (km) north-west of Peebles ('the Site'). As the Site is currently used as a commercial forestry plantation with existing good quality forestry tracks, efforts have been made to utilise these existing tracks where possible. The components of the Development are summarised in Table 3.1 and shown on Figure 3.1.

Table 3.1 Key Parameters of the Development

Element	**Details**
Turbines	Up to 12 turbines with a maximum tip height of 149.9 m. Depending on the final turbine choice, a small transformer may be located at the base of each turbine. Each turbine will have a foundation with a diameter of approximately 24 m, with a depth of up to 3 m (Figure 3.3).
Public Road Access (D17 Whim – Shiplaw & D18 Cloich)	From the junction with the A703, the route to the main body of the Site will be afforded via the 'D17 Whim – Shiplaw' & 'D18 Cloich' public roads. The Public Road Access consists of approximately 2.4 km of public road and will be subject to road widening works. The existing surfaced road's width varies between approximately 3 m and 5 m. The road upgrade works will create a width of at least 4.5 m along its length, suitable for the delivery of turbine components, and cranes. For much of the route, widening works can be carried out in the road verge, with some re-alignment of field boundaries where appropriate. The widening works are illustrated in Figure 3.1.
Site Entrance	The Site encompasses both the 'D17 Whim – Shiplaw' & 'D18 Cloich' public roads which lead to the Site Entrance located on existing forestry track, which will form part of the Onsite Access Tracks, at the western extent of the Site; additionally, there will be a Secondary Entrance in the eastern portion of the Site, which will be used by vehicles etc. already inducted via the Site Entrance at an earlier date. Figure 3.1 illustrates both the Site Entrance and the Secondary Entrance.

Element	Details
Onsite Access Tracks	Onsite Access Tracks occur from the point at which public road (the D18 Cloich) ceases, as shown on Figure 3.1 & Figure 1.3 of **Chapter 1: Introduction**. The Onsite Access Tracks are served by two main access points, as described above. Onsite Access tracks within the wind farm will have a width of approximately 5 m, with the exception of the proposed new connecting track that is for light vehicle use only and connects the northern and southern areas of the Site (see Figure 3.1 & Figure 3.9). This, approximately, 1.4 km long section of track will be constructed to Forestry and Land Scotland (FLS) Civils Specifications and will not be used for transporting oversized turbine components or cranes. It is anticipated to be 3 m wide. Access tracks will consist of approximately 7.6 km of existing forestry tracks (with some minor upgrading in locations), and approximately 8.2 km of newly constructed track.
Electrical Infrastructure	Onsite cabling will be laid underground alongside the access tracks where possible, linking the turbine transformers to the wind farm control building and substation (Figure 3.5). Transformer units for wind turbines will be located in kiosks (3m x 2.5m x 2.5m) adjacent to turbines. A substation compound will be located at approximately NGR 320611, 649305 (Figure 3.1). The compound measuring approximately 100 m x 50 m will include a single storey control building, external electrical infrastructure, BESS components, recycling and storage, and vehicle parking etc. (Figure 3.6).
Battery Energy Storage System (BESS)	An approximate 20 Megawatt (MW) BESS facility will be located within the substation compound, as shown on Figure 3.1 & Figure 3.6. It is proposed that the BESS will comprise of four 'energy storage units' (ESU), where one ESU contains: • 2 x battery containers; • 1 x transformer; • 1 x HVAC Cooler; • A perimeter fence; and • Electrical cabling connecting to the nearby substation.
Crane Hardstanding	Crane hardstandings will be required adjacent to each turbine, this will consist of an area of approximately 1250 m^2 at each turbine (Figure 3.4). In addition to the main hardstanding area, there will be an auxiliary crane area which will consist of a temporary flattened area for crane assembly and turbine blade storage which will not be formed of hardstanding.
Temporary Construction Compound	A temporary construction compound will be required during the construction of the Development, forming an area of hardstanding providing space for temporary construction cabins, parking and lay down areas; this will measure approximately 100 m x 50 m and be located in the western area of the Site, at approximately NGR 320548, 649205 (Figure 3.1 & Figure 3.8).
Borrow Pits	Up to two onsite borrow pits are proposed. One is located approximately 130 m north-east of T12, along one of the main access tracks into the Site and will extend an existing quarry; the second borrow pit is to be located in the west of the Site, approximately 170 m north of T5, and will extend an disused quarry. Given that the track layout reuses 7.6 km of existing access track, less aggregate will be required when compared to a typical wind farm of this size, and the use of both borrow pits may not be required.

9. It is estimated that the permanent footprint of the Development, including infrastructure and following restoration, will be approximately 17 hectares (ha). This includes upgrades to existing forestry track and public road. During the construction period it is estimated

that a further approximate 16 ha will be temporarily required, which includes the borrow pits, laydown areas, and the construction compound which will be reinstated following the construction works.

10. As the Development is largely located within commercial forestry plantation, felling is required to accommodate infrastructure, including: access tracks, turbine infrastructure, borrow pits, the substation compound, and the construction compound. Further details are outlined in Section 3.2.12 of this Chapter.

3.2.2 Wind Turbines and Associated Infrastructure

3.2.2.1 Wind Turbines

11. Consent is being sought for the erection of up to 12 three-bladed horizontal axis wind turbines with a maximum height from base to tip that will not exceed 149.9 m (with the blade in the vertical position). Figure 3.2 illustrates a typical turbine of this type. The blades will be made of fiberglass reinforced epoxy and mounted on a tapered tubular steel tower. The turbines will be light grey in colour and the finish of the tower and blades will be semi-gloss and semi-matt respectively.

12. The specific turbine is dependent on the final choice of turbine models available at the time of procurement and will be chosen with the aim of optimising renewable energy generation at the Site. However, the chosen turbines will have a maximum blade tip height of no more than 149.9 m, which is the upper limit of the environmental and planning parameters considered in this EIA.

13. Turbines are typically of a variable speed type, so that turbine rotor speed will vary according to wind speed. Turbines of the dimensions proposed typically have rotational speeds of between 6 and 14 revolutions per minute (rpm), depending on variations in wind speed, generating power for all wind speeds between approximately 3 and 25 metres per second (m/s). At speeds greater than 25 m/s, turbines typically reduce power output by pitching the blades out of the wind to protect the turbine from damage caused by high wind speeds. These very high wind conditions usually prevail for less than 1% of the year.

14. The turbines are computer controlled to ensure that at all times, the turbine faces directly into the wind to ensure optimum efficiency. The rotors of all 12 turbines will rotate in the same direction.

15. When operating, the rotational movement of the blades is transferred through the gearbox, to drive the generator. This produces a three-phase power output typically at 690 Volts (V), which is transferred from the generator to the turbine transformer. The turbines will be controlled and monitored from within the proposed control building and will also be remotely monitored where performance details and statistical information for each turbine will be recorded.

16. During the construction phase, two cranes are typically required to install the turbines, consisting of a larger 800 – 1000 tonne main crane and a secondary 400 – 500 tonne crane. The cranes would use the crane hardstandings as described in Section 3.2.3. The construction contractors would determine the actual cranes used following the turbine procurement process, together with the exact programme and number of teams on site.

17. The method for erecting each turbine would depend on the turbine supplier and Site conditions. Turbine components would either be lifted directly off transportation units for erection or more typically stored adjacent to the crane hardstanding area. The tower sections are initially erected, followed by the nacelle and then the hub depending on the blade installation. The turbine blades would then be lifted individually and attached to the hub or if sufficient space is available would be attached to the hub at ground level

then raised together and attached to the nacelle. The overall assembly process for each turbine takes approximately two to four days, depending on weather conditions.

18. The layout of the Development is shown in Figure 3.1 and coordinates of the proposed turbine locations are provided in Table 3.2. The turbines will be subject to a micro-siting allowance (detailed in Section 3.2.11) to allow flexibility for encountering unknown ground constraints during pre-construction and construction.

Table 3.2 Wind Turbine Co-ordinates

Turbine No.	Easting	Northing
1	319967	646980
2	320015	645991
3	320558	646130
4	320947	646570
5	321167	647062
6	320149	647527
7	320425	646942
8	320616	647950
9	320830	647414
10	320594	648446
11	320190	648389
12	320212	648875

3.2.2.2 Turbine Foundations

19. It is anticipated that the turbine foundations would comprise a standard concrete gravity foundation constructed on poured concrete with steel reinforcement. Concrete batching may occur onsite; however, to present a worst case scenario the traffic and transport assessment within **Chapter 12: Access, Traffic and Transportation** will assume onsite concrete batching does not occur.

20. As shown on Figure 3.3, concrete foundations will be up to 24 m in diameter with a varying thickness increasing from around 0.5 m at the foundation edge to 2 m at turbine bases. Atop the concrete foundation, a layer of foundation backfill will be compacted, typically around 1 m deep. Designs vary depending on ground conditions but typically, concrete volumes for turbines of this size range from 460 m^3 to 570 m^3, and would include up to 90 tonnes of steel reinforcement.

21. The detailed design specification for the foundation would depend on the geotechnical site investigations undertaken during the enabling works to establish the nature of the subsoil condition at each turbine location. Each foundation would be designed separately according to the ground conditions, chosen turbine type, and manufacturer specification. Where suitable ground conditions exist, rock-anchored foundation solutions will be considered. These foundations can dramatically reduce the scale of the foundation required to restrain the wind turbine structure in terms of: ground area disturbance, excavation size needed, materials handled, reinforcement tonnage used, and concrete volume placed and finished.

22. The ground excavation methods would vary depending on the local ground conditions and the nature of the surface vegetation. The general processes would be as follows:

- Topsoil/turf will be stripped and stored local to the point of excavation in order to be reused in restoration of the turbine construction area. Excess materials will be moved to other locations on the site requiring reinstatement materials;
- Subsoil (if present) will be stripped and stored local to the point of excavation, keeping this material separate from the topsoil/turf. Excess materials will be moved to other locations on the site requiring reinstatement materials;
- Excavation of turbine foundations will then take place typically followed by: formation preparation, placement of 6N graded stone, installation of cable ducts, concrete blinding, installation of the WTG anchor cage structure, the reinforcement cage structure c/w all earthing cables, formwork/shuttering, and then the structural concrete; and
- After the foundation has been poured the area would be backfilled as soon as practicable with excavated materials, pending turbine installation.

23. Once the turbines have been installed, the immediate construction area around the turbine bases would be restored using the retained topsoil or turf to within approximately 1 m of the tower bases. A 4 m wide area of hardstanding would then be laid around the tower base. Material won from foundation and track excavations would, if suitable, be used in the landscaping of access tracks and restoration of site infrastructure including borrow pits and construction areas.

3.2.2.3 Transformers and Cabling

24. Depending on the final choice of turbine, transformers will either be located within the turbine tower (with internal switchgear) or externally, close to the base of the tower. For the purposes of this assessment it has been assumed that the transformers will be located adjacent to each turbine. An external transformer will normally be placed within a glass reinforced plastic (GRP) housing, the size of housing will depend on the type of transformer selected but in general it will be approximately 3 m by 2.5 m in plan and 2.5 m in height above surrounding ground level, located adjacent to the turbine within the hardstanding area.

25. The transformers will be either oil-filled with a bunded footing to remove any risk of spillage or a solid cast resin type which is effectively non-polluting. The transformers will increase the electrical voltage from 690 V to 33 kilovolts (kV).

26. Turbines will be connected by 33 kV single phase power cables which will be laid in trenches alongside the access tracks, with a depth of 0.8-1 m. The excavated trenches will also include SCADA cables or fibre optic cables. This will allow interrogation and control of individual turbines as well as remote monitoring. A copper cable will also be located in the trench and will be connected to the substation and each turbine to provide an earthing system to provide protection from lightning strikes and electrical faults. The cables will be laid on a sand bed, then surrounded by further sand and backfilled using suitably graded material. Clay, or equivalent low permeability barriers, will be inserted into the cable trenches at regular intervals to avoid the trenches becoming preferential drainage pathways. Details of typical trenches are shown in Figure 3.5.

3.2.3 Crane Hardstandings

27. Each turbine requires an area of hardstanding adjacent to the turbine foundation to provide a stable base on which to site the turbine components and cranes for the erection of the turbine.

28. The main working area at each hardstanding area composed of crushed stone will be approximately 50 m x 25 m, the footprint of the main hardstanding will be approximately 1250 m^2. There will be smaller temporary auxiliary crane areas which are required for

the assembly of the main crane jib and 'blade fingers' which are required for the storage of the turbine blades.

29. A typical arrangement is shown in Figure 3.4; however, the final arrangement of the hardstanding will depend on the method of erection and exact specification of the cranes chosen by the turbine erection contractor. The hardstandings will be sufficiently level and with a suitable load-bearing capacity for storage of turbine components and operation of the cranes.

30. Surface water and groundwater levels will be managed to ensure that natural drainage patterns are maintained and that water levels within excavations do not rise beyond appropriate and safe limits. Various cable ducts and other ancillaries will be installed within the foundations and under the access track crossing points.

31. Construction of the crane hardstanding would be similar to the construction of the Site access tracks as described in Section 3.2.4. Surplus excavated material would be reused elsewhere within the Site such as for track maintenance during construction or during borrow pit reinstatement. Similarly, any surplus topsoil would be used to restore track edges or the borrow pits after construction.

32. The crane hardstanding would be left in place following construction in order to allow for the use of similar machinery should major components need replacing during the operation of the Development. These would also be utilised during decommissioning at the end of the Development's life, at which point the crane hardstanding areas would be restored.

3.2.4 Access

3.2.4.1 Site Entrance

33. The main Site Entrance will be located within the Site Boundary, on the western access track, as illustrated on Figure 3.1. A Secondary Entrance is located on the eastern access track, as illustrated on Figure 3.1. During construction, security huts will be located at both the Site Entrance and the Secondary Entrance for health and safety purposes.

34. **Chapter 12: Access, Traffic and Transport**, has identified the following abnormal loads delivery route from the anticipated Port of Delivery, Grangemouth Port:

- Loads will exit the port and proceed towards Earl's Gate Roundabout via the A904 Earl's Road;
- At the roundabout, turn left onto the A905 and travel southbound towards Cadger Brae Roundabout and merge onto the M9 via the M9 Junction 5 Slip Road;
- Continue along the M9 southeast bound and merge onto the M8 via the M8 Junction 2 Slip Road;
- Continue along the M8 westbound towards Hermiston Gait Roundabout and at the roundabout, take the 3rd exit onto the A720 City of Edinburgh Bypass and travel toward Sheriffhall Roundabout;
- At the roundabout take the 5th exit onto the A7 and travel southbound toward Hardengreen Roundabout;
- At the roundabout, take the 3rd exit onto the B6392 and travel southbound towards Rosewell;
- At the B6392 / A6094 Roundabout, take the 1st exit onto the A6094;
- Continue on the A6094 southbound and turn right onto the B6372 northbound at its junction with the B6372;
- Continue on the B6372 northbound and turn left onto the B7026 southbound at its junction with the B7026;
- Continue on the B7026 southbound towards the B7026 / A6094 roundabout and take the 2nd exit, remaining on the A6094;

- Continue on the A6094 southbound towards the A6094 / A703 / A701 junction and turn left onto the A703;
- Continue on the A703 southbound for approximately 4.5 miles and turn right onto the D17 Road towards Cloich Farm (Figure 3.12);
- Continue on the D17 Road for approximately 1 mile and merge onto the D18 Cloich Road;
- Continue on the D18 Cloich Road for approximately 1 mile and turn left onto Cloich Farm Road to reach the Secondary Entrance; and
- The Site Entrance is reached by continuing along the D18 onto Cloich Forest forestry track and taking the next available left turn.

3.24.2 Access Tracks

35. The access tracks have been designed to minimise environmental disturbance and land take wherever possible by re-using as much existing forestry track as possible, avoiding areas of deep peat, environmental constraints identified during the EIA and minimising the number of watercourse crossings.

36. The length of onsite access tracks will total approximately 15.8 km which consists of localised upgrades to 7.6 km of existing forestry track and 8.2 km of new track.

37. New tracks will be constructed to connect the existing forestry tracks to the turbine locations to enable the turbine components, construction materials and construction staff to be transported to their locations, and to enable access for subsequent maintenance visits. The proposed track layout is illustrated in Figure 3.1.

38. Access tracks will be approximately 5 m (as described in Table 3.1) in width, with an additional 0.5 m verge on either side subject to local ground conditions. The proposed access track south of T1 and T7, shown in Figure 3.1 as 'New Access Track (Construction Traffic Only)', will be approximately 3 m wide and only used by construction traffic vehicles, excluding abnormal load vehicles. The tracks have been designed to have sufficient radii for turning of the construction vehicles, abnormal loads and plant. Turning heads have been included within the design as necessary to allow abnormal load vehicles and cranes to undertake turns during the turbine delivery and assembly process. These are incorporated into the crane hardstanding areas in order to minimise land take.

39. Figure 3.9 illustrates typical track designs which are likely to be employed for the Development's tracks. It is anticipated that access tracks would be constructed using a 'cut track' design. Topsoil is stripped to expose a suitable rock or sub-soil horizon on which to build the track. The track is built up on a geotextile layer by laying and compacting crushed rock to a depth dependent on ground conditions and topography. Generally, the surface of the track will be flush with or raised slightly above the surrounding ground level.

40. Excavated soils would be stored at no greater than 3 m in height, directly adjacent to, or near the tracks on ground appropriate for storage of materials i.e. relatively dry and flat ground, a minimum of 50 m away from any watercourses. Where possible, reinstatement will be carried out as track construction progresses.

41. The access tracks will be left in place after construction of the Development and can be utilised for forestry or recreational access as well as access to the turbines for maintenance and repair works.

42. Prior to the commencement of site construction, a detailed engineering specification for the access track design will be submitted to the planning authority as part of a Planning Conditions Compliance Statement which will include Construction Method Statements (CMS) for all aspects of construction.

43. A Drainage Management Plan (DMP), which will detail proposed surface drainage measures to treat and deal with all the surface runoff from the Site, will be designed in

accordance with Sustainable Drainage Systems (SuDS) principles. This plan will form part of a Construction Environmental Management Plan (CEMP) for the Development. The Development's CEMP will be drafted and agreed in consultation with the Council prior to construction of the Development.

44. All access tracks will incorporate robust drainage, including drainage channels running adjacent to the tracks, on one or both sides. The track would be designed to be cambered at gradients up to 4% towards the drainage channels to prevent a build-up of surface water and allowing the track to act as a watercourse. Use of rock check dams and other forms of catchment within access track drainage channels will also help to control surface water run-off speeds and reduce sedimentation, particularly during periods of very wet/thawing weather. The make-up of the tracks will also be as permeable as possible to prevent any instances of surface water build up.

45. Cross drainage pipes will be installed at regular intervals to prevent flooding or surcharging of the drainage channels and to maintain natural drainage catchments. Headwalls and sumps will also be included to protect pipe ends.

46. The implementation of the drainage design will be developed in response to a risk appraisal undertaken by the contractor and will be proactive, rather than being reactive to any events arising once works commence. The design will reduce the risk of sedimentation (from loose material) and pollution (from accidental spillage) of all downstream watercourses.

All construction works will be carried out in accordance with best practice guidance as per NatureScot's *'Good Practice during Wind Farm Construction*[1].

3.2.5 Watercourse Crossings

47. As noted above, the track layout design has sought to limit the number of watercourse crossings; however, given the nature of the Site a number of crossing points are necessary. There is a requirement for 13 crossings for watercourses. Of these, 11 are existing crossing points as part of the existing forestry track network and public road, both of which may require upgrading; two watercourses would be subject to a new crossing. The locations of watercourse crossings are detailed in full in **Chapter 10: Hydrology and Hydrogeology**.

48. The type and design of each watercourse crossing will be dependent on the stream morphology, peak flows, local topography and ecological requirements, and will be chosen so as to avoid or minimise potential environmental effects. A typical watercourse crossing design is shown in Figure 3.10.

49. The watercourse crossing which crosses Courhope Burn will be constructed as a bridge, rather than a typical culvert crossing due to the nature and size of Courhope Burn. Figure 3.11 illustrates a typical bridge which is likely to be used.

50. Any crossing would be designed in accordance with Construction Industry Research and Information Association (CIRIA) Culvert design and operation guide (C689)[2] and incorporating the most recent climate change allowances, to ensure sufficient capacities for spate or flooding events.

[1] NatureScot (2019) Good practice during Wind Farm Construction [Online] Available at: https://www.nature.scot/guidance-good-practice-during-wind-farm-construction (Accessed 22/06/2021)
[2] Benn, J, Kitchen, A, Kirby, A, Fosbeary, C, Faulkner D, Latham, D, Hemsworth, M (Dec 2019) Culvert, screen and outfall manual (C786F) https://www.ciria.org/ItemDetail?iProductCode=C786F&Category=FREEPUBS (Accessed 22/06/2021)

51. Any watercourse crossings would be subject to the requirements of The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended)[3] (CAR) and Water Environment (Miscellaneous) (Scotland) Regulations 2017[4].

3.2.6 Substation Compound

52. The substation compound would be located on an area of crushed stone hardstanding measuring approximately 100 m x 50 m. The compound is centred at approximately NGR 320609, 649301, as shown on Figure 3.1.

53. The substation compound will be partitioned into two broad sections, accommodating the control building and associated external electrical switchgear, and the BESS which is detailed in Section 3.2.7 below. It will also include an area for vehicle parking and storage during the construction period. A typical arrangement is shown in Figure 3.6.

54. The principal element of the substation compound is the control building which contains the electrical infrastructure and control elements of the Development. This will likely comprise a single storey unit measuring approximately 10 m x 25 m with a pitched roof as shown in Figure 3.7. The control building will include control components, including metering equipment, switchgear, the central computer system and electrical control panels as well as welfare facilities, associated air conditioning systems, and a maintenance room. The substation compound will also include a septic tank and buried rainwater tank associated with the control building.

55. In addition to the electrical infrastructure housed within the control building, there will be external electrical switchgear located within the substation compound, which will be adjacent to the substation. External switchgear would be located within a security fence of up to 3 m height and served via a locked access gate.

56. The wind farm substation building will have its own foul drainage system, as noted above regarding a rainwater collection tank and septic tank. Surface water will drain via soakaway or other preferred SuDS method to be agreed with the Council.

57. The final designs for the buildings and compound will incorporate sustainable design features and will be agreed with the Council.

58. The underground cables from the wind turbines would be brought into the substation building in ducts. The ducts would guide the cables to the appropriate switchgear inside the building. Communications cables would enter in a similar manner.

59. Lighting will be kept to a minimum and will be limited to working areas only and will comply with health and safety requirements. Lighting will be down lit and linked to timers and movement sensors so that light pollution is kept to a minimum.

3.2.7 Battery Energy Storage System (BESS)

60. Also located within the Substation Compound is a BESS, as illustrated in both Figures 3.6 and 3.7. The BESS will be an approximate 20 Megawatt (MW) facility and will be able to import power from the national grid or wind turbines and export to the national grid as required providing a 'security buffer' to cope with supply and demand events. Battery storage components would be contained in sealed units within the Substation Compound, as shown on Figure 3.1.

[3] The Water Environment (Controlled Activities) (Scotland) Regulations 2011
http://www.legislation.gov.uk/ssi/2011/209/contents/made (Accessed 22/06/2021)
[4] Water Environment (Miscellaneous) (Scotland) Regulations 2017.
http://www.legislation.gov.uk/ssi/2017/389/contents/made (Accessed 22/06/2021)

61. It is proposed that the BESS will comprise of four 'energy storage units' (ESU), where one ESU contains:

- 2 x battery containers;
- 1 x Transformer;
- 1 x HVAC Cooler;
- A perimeter fence; and
- Electrical cabling connecting to the nearby electrical substation.

62. The battery containers would be of steel construction and appear very similar to shipping containers, each approximately 12 m in length. These would be arranged in tandem i.e. two containers on a combined plinth with a shared transformer unit and coolers. A separating wall between the pair of containers is the highest elevated point at 3.8 m. This overall structure is called an ESU, of which the proposal comprises four in total. Each ESU will measure approximately 17.1 m by 7.6 m and would be 3.8 m at its maximum height.

63. A separate switchgear container for the necessary electrical plant to operate and monitor the units is also proposed. The container would measure up to 15 m by 4 m and 3.2 m in height. A security fence of up to 3 m height would be installed around the perimeter and the site would be served via a locked access gate. The fence specification and final battery configuration would be agreed at a later stage through an appropriately worded condition.

3.2.8 Grid Connection

64. The grid connection does not form part of the Section 36 consent application for the Development. The consent for the grid connection will be sought by the relevant owner/operator of the local transmission network, Scottish Power Transmission (SPT). The Network Operator will be responsible for the consenting (via a separate "Section 37" application), construction, operation, and maintenance of the grid connection.

65. A grid connection offer has been accepted by the Applicant and it is proposed that the Development will connect into the grid at Currie substation, located approximately 23 km to the north-west of the Site. The precise grid route has not yet been confirmed by SPT, but the route will be designed to minimise effects on environmental receptors.

3.2.9 Temporary Infrastructure

3.2.9.1 Temporary Construction Compound

66. A temporary construction compound will be created for the duration of the build centred at approximately NGR 320548, 649205 as shown on Figure 3.1. This area has been chosen within a relatively level area of the Site, close to the Site entrance and with suitable separation distance from any environmental constraints identified during the EIA process. The area of the compound will measure approximately 100 m x 50 m and will include space for:

- Temporary construction cabins for site office and staff welfare facilities with provision for sealed waste storage and removal;
- Areas for storing materials;
- Parking for project related vehicles; and
- Containerised storage for tools and spares.

67. A typical construction compound arrangement is shown on Figure 3.8. Welfare facilities for site personnel will be required during construction which would be located within the construction compound. Foul water and effluent would be treated either via septic tank with soakaway designed to SEPA guidelines (including GPP4) or by the use of chemical

facilities with periodic material for off-site disposal. Any facilities would be subject to agreement with SEPA.

68. The area to be used for the construction compound would be stripped of topsoil to expose a suitable formation which will be stored for future re-instatement. A geosynthetic material base or similar will then be laid followed by a layer of suitable material then a further geosynthetic material laid prior to the top surface of blended fines.

69. Appropriate bunding arrangements will be employed in all areas where fuel and oil storage tanks will be situated, in order to prevent contamination of the surrounding soils, vegetation, surface water and ground water. The fuel storage area will be above ground with secondary containment in accordance with SEPA's GPP2 (Above Ground Oil Storage Tanks), PPG7 (Refuelling facilities) and GPP8 (Safe storage and disposal of fuel oils), and will be situated a minimum of 50 m from watercourses to reduce the risk of pollution of watercourses. Any contaminated run-off within the sealed bund will be removed to a licensed waste management facility.

70. Following completion of the construction phase the components of the compounds will be removed and the area fully restored.

3.2.9.2 Borrow Pits

71. It is the intention to source aggregate for the construction of access tracks, structural fill beneath turbine foundations, construction compounds and turbine hardstandings from on-site borrow pits as far as possible. Sourcing aggregate from within the Site, rather than an off-site quarry, has the advantage of reducing the number of heavy goods vehicles (HGV) on public roads.

72. Taking account of the anticipated materials balance from the preliminary outline design and the assumption that the rock cut during construction would be reused, it is anticipated that approximately 120,000 m^3 would be required from borrow pits to complete the works.

73. Two potential borrow pits have been identified with an estimated 318,471 m^3 of available aggregate. This is additional capacity to that required for construction materials which allows some flexibility in the use of borrow pits, and it is therefore likely that the final borrow pit dimensions will be smaller than those presented; however, for the purpose of the EIA Report it is assumed that both borrow pits are used to their full extents as a worst case.

74. The locations of the borrow pits are shown on Figure 3.1; one is located north-east of the T12 in the north of the Site, and the second is located north of T5, in the east of the Site. The plans and profiles of the borrow pits are shown in Figures 3.13 and 3.14. A Borrow Pit Assessment is also presented in Appendix A3.1.

75. The locations of the two borrow pits have been influenced by environmental considerations to minimise the impacts on ecology, peatlands, cultural heritage, hydrology, private water supplies (PWS), and landscape as described within the relevant technical chapters of this EIA Report. The final location, number and estimate of material from each potential site would be determined once full ground investigation works and testing have been completed. The borrow pits will require the use of plant to both extract and crush the resulting rock to the required grading. It is anticipated that most rock will be extracted by breakers however some blasting may be required. Precise details will be confirmed at the construction stage.

3.2.10 Site Signage

76. During construction, the Site will have suitable signage to protect the health and safety of workers, contractors and the general public. There will be a sign giving the operator's name, the name of the Development and an emergency contact telephone number. On the turbines and substation building, there will be further signs giving information about the component, potential hazards, the operator's name, the location grid reference, and the emergency telephone number. The signage will occur largely on footpaths and along tracks; however, the exact final locations and design of the signage will be defined prior to the Development becoming operational.

3.2.11 Micro-Siting

77. Current knowledge of the ground conditions at the Site is based on desk top studies and preliminary site investigations, including walkover surveys and peat probing. These would be developed prior to construction by intrusive ground investigations which may result in minor adjustments to turbine and ancillary infrastructure locations to account for ground conditions and foundation design.

78. A 50 m micro-siting allowance has been proposed for turbines and ancillary infrastructure and considered in the EIA. Turbines and associated infrastructure would not be micro-sited into deeper peat or closer to watercourses except with prior agreement from the SEPA.

79. The micro-siting allowances are considered and assessed throughout the technical and environmental chapters (Chapters 5 - 17) completed as part of the EIA for the Development.

80. It should be noted that section of track proposed at the junction of the D18 Cloich & Cloich Farm Road will be aligned to avoid damage to the mature beech tree located at approximate NGR 322257, 649890. Further details for safeguarding this tree are included within **Chapter 7: Ecology** of this EIA Report.

3.2.12 Forestry Removal

81. As Development is largely located within commercial forestry plantation, felling is required to accommodate infrastructure, including tracks, turbine infrastructure, borrow pits, substation and construction compound. This includes a 110 m radius around each turbine position and 7.5 m either side of access tracks.

82. In total 70.62 ha of forestry would be removed for infrastructure construction. The area of forestry removed will be compensated for by an appropriately designed new compensatory forestry planting scheme to satisfy the requirements of the Control of Woodland Removal Policy[5].

83. Some crops adjoining the areas to be felled for infrastructure construction will require further tree clearance due to the predicted instability of these adjoining stands of trees. The area of proposed management felling for windblow mitigation is 129.63 ha representing approximately 12% of the stocked forest area within the Site. Areas felled for windblow mitigation within the forests would be replanted with a replacement crop in the same location with species determined by the approved restocking plan within the existing LMP.

[5] Forestry Commission Scotland (2009). The Scottish Government's Policy on the Control of Woodland Removal. Edinburgh. Available at: https://forestry.gov.scot/publications/349-scottish-government-s-policy-on-control-of-woodland-removal-implementation-guidance (Accessed 22/06/2021)
Note that in April 2019 Forestry Commission Scotland became "Scottish Forestry".

84. The forest removal will be undertaken using conventional harvesting and/or mulching for younger crops and brash. Activities will be carried out using standard forest harvesting equipment with commercial timber removed from the Site.

85. Further details on the Forest Design for the Site are explored in **Chapter 13: Forestry**.

3.2.13 Restoration

86. Site restoration will involve the restoration of track and hardstanding verges, borrow pits and the temporary construction compound to provide a natural ground profile with non-geometric surfaces and tie-ins with existing undisturbed ground levels. Restoration will be undertaken at the earliest opportunity to minimise storage of turf and other materials and to allow restoration of disturbed areas as early as possible and in a progressive manner.

87. A restoration plan for the site will be secured by condition and agreed with the Council and relevant statutory consultees.

3.3 CONSTRUCTION AND DEVLEOPMENT PHASING

88. The on-site construction period is estimated at approximately 18 months in duration and would comprise the following principal operations:

- Upgrade of the D17 and D18 public roads within the Site;
- Construction of access junction off the A703;
- Phased forestry felling to facilitate construction;
- Installation of temporary and permanent drainage;
- Extraction of stone from the onsite borrow pits;
- Construction of the temporary construction compound;
- Upgrade of existing forestry tracks and construction of new access tracks, including watercourse crossing points;
- Construction of the substation compound area;
- Construction of the substation building, including a control building and BESS;
- Excavation of shallow cable trenches approximately 1 m off the edge of the track and cable laying adjacent to the access tracks and crane hardstandings for drainage;
- Construction of turbine foundations;
- Construction of crane hardstanding areas;
- Delivery, erection and commissioning of wind turbines;
- Connection of onsite electrical distribution cables;
- Commissioning of the site equipment; and
- Restoration of the borrow pits and the temporary construction compound.

3.3.1 Construction Period

89. It is expected that many of the above operations will be carried out concurrently, although predominantly in the order identified in Chart 3.1 below, which will minimise the overall length of the construction programme. An indicative Construction Programme is illustrated in Chart 3.1. It should be noted that felling, as described in **Chapter 13: Forestry**, to facilitate the construction of the Development, as outlined in Chart 3.1 below, is likely to commence approximately six months prior to the construction commencement date, and continue for six months in parallel with construction activities. The current forestry Land Management Plan (LMP) has a significant amount of timber within the Site due for felling during the period of 2025-2030; therefore, a significant volume of timber may have already been felled and extracted prior to the construction of the Development in line with the current LMP. For the purpose of the traffic assessment presented in **Chapter 12: Access, Traffic and Transportation** all of this felling has been attributed to the Development and it is assumed that all permanent and management felling will be completed within the twelve-month period described above to present a worst-case scenario.

90. The starting date for construction activities will largely be dependent upon the date that consent may be granted and grid availability; subsequently, the programme would be influenced by constraints on the timing and duration of any mitigation measures confirmed in the individual technical chapters or by the consent decision, as well factors such as weather and ground conditions experienced on the Site.

Chart 3.1: Indicative 18 Month Construction Programme

Activity	**Month**																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Site Access	■																	
Site Establishment / Amenities	■	■																
Establish North Borrow Pit			■	■														
Construction of New Access Tracks & Upgrades				■	■	■	■	■	■									
Construction of Substation				■	■	■	■	■	■	■								
Construction of Turbine Foundation & Hardstand					■	■	■	■	■	■	■	■	■	■				
EBoP Works (Cabling & substation Fit Out)					■	■	■	■	■	■	■	■	■	■	■			

Activity	**Month**																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Turbine Delivery & Installation																		
Grid Connection																		
Testing and Commissioning (EBoP & WTG)																		

91. It is proposed that construction activities be limited to the working hours of 07:00 to 19:00 Monday to Friday and 07:00 to 13:00 on Saturdays, with the exception of any emergency working or turbine deliveries. During the installation phase, there may be the requirement for extended working as some critical elements of installation cannot be stopped once started, such as concrete pouring. This would be agreed in advance with the Council.

3.3.2 Construction Methods and Environmental Management

92. The construction phase will be controlled via a series of detailed method statements, which will be prepared by a civil engineering contractor appointed by the Applicant, who will have overall responsibility for environmental management on the construction site. While these method statements can only be formulated following detailed site investigation and detailed engineering design it is possible to indicate the outline of the methods that will be used, particularly in relation to environmental management.

93. The services of specialist advisors will be retained as appropriate, such as an archaeologist and ecologist, to be called on as required to advise on specific environmental issues. The appointed civil engineering contractor working with specialist advisors (E.g. Ecological / Environmental Clerk of Works) will ensure construction activities are carried out in accordance with the mitigation measures outlined in this EIA Report.

94. Prior to construction, a detailed Construction Environmental Management Plan (CEMP) would be prepared that collates all measures required during construction to avoid and minimise environmental harm including guidance and best practice. The CEMP would include, but not be limited to:

- Site induction and training;
- Working hours;
- Enabling works;
- Surface water and drainage management;
- Waste management;
- Wastewater and water supply monitoring and control;
- Oil and chemical delivery and storage;
- Water quality monitoring;
- Ecological protection measures;
- Private Water Supply protection measures;
- Construction noise management;
- Cultural heritage protection measures;
- Handling of excavated materials;
- Forest and woodland management;

- Reinstatement and restoration;
- Traffic management;
- Environment incident response and reporting;
- Use and extent of borrow pits;
- Method statements and risk assessments;
- Final drawings and details of access tracks; and
- Final drawings and details of turbine foundations.

95. To ensure that the mitigation and management measures detailed within this EIA Report are carried out, construction personnel and contractors will be required to adhere to the CEMP which will form an overarching document for all construction site management requirements.

96. Contractors will also be required to adhere to the following to minimise environmental effects of the construction process:

- Conditions required under the Consent and deemed planning permission;
- Requirements of statutory consultees including SEPA and NatureScot (formerly Scottish Natural Heritage (SNH)); and
- All relevant statutory requirements and published guidelines that reflect 'best practice'.

97. The Applicant will require that all contractors follow the principles of ISO14001 - 'Environmental Management Systems - Specification and Guidance for Use'[6], and will provide the following:

- Details of main contractor's corporate environmental policy;
- Assessment of environmental impacts during construction;
- Procedures and controls for environmental management;
- Environmental monitoring details and reporting systems;
- Schedule of contractual and legislative requirements; and
- Schedule of relevant consents, licences and authorisations.

98. The CEMP will be agreed with the relevant statutory bodies including SEPA, NatureScot, and the Council prior to commencement of construction, and performance against the CEMP will be monitored by the Applicant's Construction Project Manager throughout the construction period.

99. Particular environmental impacts and associated mitigation measures required to be addressed within the CEMP are discussed in relevant sections of this EIA Report.

100. In addition, the CEMP will typically be supported by the following documents which apply to the construction process:

- Water Construction Environmental Management Plan;
- Peat Management Plan;
- Pollution Prevention Plan;
- Traffic Management Plan;
- Site Waste Management Plan; and
- Restoration Plan.

[6] ISO (2015) ISO 14001:2015 Environmental management systems – Requirements with guidance for use [Online]. Available at: https://www.iso.org/standard/60857.html (Accessed 15/06/2021).

3.3.3 Construction Materials

101. The key materials which would be required for the construction of the track, turbine foundations, hardstanding areas and cable trenches are:

- Crushed stone;
- Geotextile;
- Cement;
- Sand;
- Concrete quality aggregate: high strength structural grade, which is not prone to substantial leaching of alkalis;
- Steel reinforcement; and
- Electrical cable.

102. All materials will be sourced and transported to the site from local suppliers, where possible, with the exception of materials sourced from onsite borrow pits.

3.3.4 Construction Movements

103. Various vehicle types are required during the construction stage of the Development; of these, the majority would be standard road vehicles of similar type to those using local roads on a daily basis. However, the delivery of the main wind turbine components would require vehicles and transport configurations that are longer and/or wider and/or heavier than standard road vehicles, this is discussed in **Chapter 12: Access, Traffic and Transportation**.

3.3.5 Waste Management

104. All waste will be removed off-site for safe disposal at a suitably licensed waste management facility in accordance with current waste management regulations. Wherever possible, excavated stone or soils will be re-used on site, primarily for the restoration of disturbed ground. All details of this will be included within the CEMP, as agreed with the Council and SEPA.

105. The main items of construction waste and their sources are:

- Hardcore, stone, gravel from temporary surfaces to facilitate construction waste, and concrete;
- Subsoil from excavations for foundations and roads;
- Timber from temporary supports, shuttering and product deliveries;
- Miscellaneous building materials left over from construction of the control building;
- Sanitary waste from chemical toilets (if used);
- Plastics packaging of material; and
- Lubricating oils, diesel - unused quantities at end of construction period.

106. Subsoil will be used for reinstatement of construction areas and landscaping. Oils and diesel will be removed from the Site and be used or disposed of by an approved waste contractor in accordance with provisions of the Special Waste Regulations 1996[7] if it is unsuitable to use elsewhere

107. In the event of the complete decommissioning of the wind turbines, all mechanical/electrical equipment will be removed from the Site, the control building will be removed, turbine foundations will be covered over with soil and any disturbed ground will be reinstated and reseeded. All cables would be cut off below ground level, de-energised, and left in-situ. It is anticipated that tracks would remain *in-situ* and continue to be used for forestry management.

[7] The UK Government (1996) The Special Waste Regulations 1996 [Online] Available at: https://www.legislation.gov.uk/uksi/1996/972/contents/made (Accessed 22/06/2021)

108. The decommissioned turbine components will have sufficient salvage value to ensure their proper recycling, however it is customary that a financial bond is put in place with the local authority to ensure that provision is secured for decommissioning works in the event that the operator is unable to fulfil its requirements. An important environmental issue in the decommissioning of the wind turbines will be the proper handling and disposal of any contaminating material (e.g. lubricating/cooling oils etc.). The Applicant undertakes to ensure that all such contaminating material will be removed from the Site in accordance with best practice.

109. The civil engineering contractor will be required to prepare a Site Waste Management Plan (SWMP) to ensure that best practice principles are applied with regard to reducing, re-using and recycling of all materials.

3.3.6 Health and Safety Related Issues

110. Health and safety issues during construction and decommissioning fall under the Construction (Design and Management) (CDM) Regulations 2015[8]. Health and safety will be initially addressed as part of the Pre-Construction Information Pack prepared by the Applicant. The Construction Project Manager will be required to prepare a Construction Phase Plan (Health and Safety Plan) and to forward information to the Applicant during the works to enable the Health and Safety File to be completed.

111. Turbines are designed to be safe and are built to withstand extreme wind conditions. The turbines selected for the Development will have a proven record in terms of safety and reliability.

112. Day-to-day operational and maintenance activities will be co-ordinated with the private landowner's operational requirements.

113. Public access to the Site will be restricted throughout the construction working area during construction for health and safety reasons and will be reinstated following cessation of construction activities.

114. An Operations and Maintenance Manual for the design life of the Development will be prepared by the Contractor and will cover all operational and decommissioning procedures.

3.4 OPERATIONAL PHASE

115. The Development will have an operational lifespan of up to 30 years from full commissioning of the proposed turbines.

3.4.1 Turbine and Infrastructure Maintenance

116. Turbine maintenance will be carried out in accordance with the manufacturer's specification. The following routine turbine maintenance will be undertaken:

- Initial service;
- Routine maintenance and servicing;
- Gearbox oil changes;
- Blade, gearbox and generator inspections; and
- Replacement of blades and components as required.

117. Operational site inspections will be undertaken on a weekly basis and the servicing of turbines will be undertaken as per the turbine manufacturer requirements, usually once per year, but with monthly visits by the manufacturer's servicing team.

[8] Health and Safety Executive (2015) Construction Design and Management Regulations 2015 [Online] Available at: http://www.hse.gov.uk/construction/cdm/2015/index.htm (Accessed 22/06/2021).

118. Ongoing track maintenance will be undertaken to ensure safe access is maintained to all parts of the Development all year round.

119. All wastes arising as a result of servicing and maintenance (e.g. lubricating oils, cooling oils, packaging from spare parts or equipment, unused paint etc.) will be removed from the Site and reused, recycled or disposed of in accordance with best practice.

3.4.2 Snow Clearance

120. Safe access to the Development is required year round. There is potential for the Development to experience snowfall and therefore clearance of snowdrifts may be necessary via grading of the track using suitable ploughing plant.

3.5 DECOMMISSIONING

121. As noted previously, the operational lifespan of the Development and associated infrastructure will be up to 30 years. Following this, an application may be submitted to retain or replace the turbines, or alternatively they will be decommissioned.

122. Decommissioning would involve the following:

- Dismantling and removal of the wind turbines and electrical equipment;
- Reinstatement of the turbine areas and associated hardstanding; and
- Demolition and removal of control building and compound.

123. Turbine components and electrical equipment would be dismantled and removed in a similar manner to their delivery and erection. Turbine towers, nacelles and blades would be transported from the Site as abnormal loads. A route assessment will be undertaken prior to decommissioning to identify the best route to remove the components offsite. Turbine components would be broken up offsite in controlled environments ready for reuse, recycling or appropriate disposal.

124. The removal of the top 1 m of the turbine base and plinth would be undertaken, requiring an excavated trench around the upstand to provide a working area. Breakout of the top part of the plinth would be undertaken using an excavator-mounted jack hammer. The cables would be cut level with the remaining concrete. Metal from the bolt ring will also be disposed of through the removal of the top 1 m of the turbine base and plinth. Once the broken out concrete has been removed, the area would be reinstated by backfilling with soil/peat to an agreed method statement.

125. A similar process would be undertaken for the substation building, with the equipment removed offsite for breaking up and appropriate disposal and the building demolished. The top one metre of the concrete foundation slab would be broken up and removed, and the ground reinstated with topsoil. However cut faces are likely to be retained, as there would be insufficient material to fully backfill the substation area.

126. The access tracks will be retained *in situ* at decommissioning for use by FLS. The cables will also be left in situ.

127. Overall, it is estimated that the decommissioning period for the Development would be approximately eight to twelve months.

CLOICH FOREST WIND FARM

EIA Report – Volume 1 – EIA Report Text

Chapter 4

EIA Methodology

4 EIA METHODOLOGY

4.1 INTRODUCTION

1. As the proposed Cloich Forest Wind Farm ('the Development') exceeds 50 MW, the Applicant is seeking consent from the Scottish Ministers under Section 36 of the Electricity Act 1989 (as amended)[1], and for planning permission to be deemed to be granted under Section 57(2) of the Town and Country Planning (Scotland) Act 1997[2] ('the Application').

2. Environmental Impact Assessment (EIA) is a process aimed to ensure that permissions for developments with potentially significant effects on the environment are granted only after assessment of the likely significant environmental effects has been undertaken and taken into consideration. The assessment must be carried out following consultation with statutory consultees, other interested bodies and members of the public. This Chapter of the Environmental Impact Assessment Report ('the EIA Report') describes the EIA process for the Development and is supported by the following Technical Appendices:

- Technical Appendix A4.1: Scoping Report;
- Technical Appendix A4.2: Scoping Opinion (received December 2019);
- Technical Appendix A4.3: ECU Letter Responding to Tip Height Increase;
- Technical Appendix A4.4: Tip Height Increase Consultation Exercise Responses (Received January/February 2020); and
- Technical Appendix A4.5: Gatecheck Report (submitted August 2020).

4.2 EIA PROCESS

3. With an overall generating capacity of over 50 megawatts (MW), consent for the Development is being sought from the Scottish Ministers under Section 36 of the Electricity Act 1989[3]. The requirements that apply to EIA in Scotland for wind farm generating stations with an electrical output capacity in excess of 50 MW are provided under the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[4] (hereafter referred to as the 'EIA Regulations').

4. The EIA Regulations implement European Union (EU) Directive 2014/52/EU which amended Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. The United Kingdom's decision to leave the European Union has no impact on the EIA Regulations, as the EU Directives on EIA were required to be translated into domestic law when the United Kingdom was a full member state of the EU.

5. The EIA Regulations outline the process of an EIA and the criteria that would determine if an EIA is necessary or not, the relevant environmental studies and statements, how the information is evaluated by the Scottish Ministers, Planning Authority and consultative bodies, and how this is implemented through consent under Section 36 of the Electricity Act 1989.

6. Schedule 2 of the EIA Regulations lists certain types of developments for which an EIA is required where there are likely to be significant effects on the environment by virtue of factors such as the nature, size or location of the development proposal.

[1] UK Government, 1989, Electricity Act 1989 [Online] Available at: http://www.legislation.gov.uk/ukpga/1989/29/contents (Accessed 22/06/2021)
[2] UK Government (1997) Town and Country Planning (Scotland) Act 1997 [Online] Available at: http://www.legislation.gov.uk/ukpga/1997/8/section/57 (Accessed 22/06/2021)
[3] UK Government, Electricity Act 1989 [Online] Available at: https://www.legislation.gov.uk/ukpga/1989/29/contents (Accessed 22/06/2021)
[4] The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. London: HMSO [Online] Available at: http://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 22/06/2021)

7. The results of the EIA are presented in this EIA Report which, as prescribed in Schedule 4 of the EIA Regulations, is required to include a *"description of the likely significant effects"* of the Development; the effects which are not considered to be significant do not need to be described. It is therefore necessary for the scope of the EIA to be appropriately and clearly defined to ensure that any likely significant effects are described and assessed.

4.3 EIA METHODOLOGY

8. This EIA Report has been prepared following a systematic approach to EIA and project design. The process of distinguishing environmental effects is iterative and cyclical, running concurrently with the design process, whereby the design of the Development is refined in order to avoid or reduce potential adverse environmental effects using mitigation as necessary.

9. The EIA process follows a number of stages broadly in line with the following:

- Site selection and feasibility;
- Screening – to determine if an EIA is required (unless an Applicant volunteers an EIA, as is the case with the Development);
- Pre-application consultation with statutory and non-statutory consultees;
- Scoping - to identify the parameters of the assessment issues on which the EIA should focus;
- Baseline studies - to establish the current environmental conditions at the Site;
- Identification of potential environmental effects, including cumulative effects;
- Mitigation to avoid or reduce the effects through iterative design process;
- Assessment of residual effects;
- Preparation of an EIA Report;
- Submission of the EIA Report;
- Consideration of application and environmental information by the Scottish Government, the relevant local authority (The Scottish Borders Council, referred to hereafter as 'the Council') and other statutory and non-statutory consultees;
- Determination of application; and
- Implementation and monitoring.

10. The EIA Regulations require that an EIA Report should include a range of information including: a description of the development, a description of reasonable alternatives, baseline information, a description of the likely significant effects of the development, and mitigation measures amongst other factors.

11. This EIA Report has been prepared in accordance with the EIA Regulations and includes the required information.

4.4 CONSULTATION

12. Consultation has formed an essential part of the EIA. The EIA team and Cloich Windfarm Partnership LLP ('the Applicant'), have proactively engaged interested parties throughout the EIA process to determine their views on the Development and assessment methodology, and to collect baseline information. This engagement has principally been undertaken within the following key stages:

- Pre-scoping – procuring initial feedback on the Development and agreeing extent of consultation;
- Scoping – outlining EIA methodology and documentation of key issues (October to December 2019);
- Consultation on tip-height increase following Scoping (January 2020);
- Further Technical Consultation – gathering baseline information from relevant organisations and local residents, and confirming survey methodologies outwith the formal Scoping process;
- Gatecheck – engagement with the Energy Consents Units (ECU) and key consultees to identify how comments received at Scoping have been incorporated; and
- Public Engagement: Informing site design through Online Public Exhibitions – communication with local communities and consideration of baseline information.

13. Further detail on each stage is included in the following subsections.

4.4.1 Pre-scoping

14. Consultation was commenced with the ECU of the Scottish Government in August 2019 and with the Council in April 2019, following completion of a feasibility study and prior to Scoping. The primary purpose of this engagement was to introduce the Development and to agree the approach to Scoping, including agreement on the consultees to be contacted as part of the Scoping exercise.

4.4.2 Scoping

15. The aim of the Scoping process is to identify key environmental issues at an early stage; determine which elements of the Development are likely to cause significant environmental effects; and identify issues that can be 'scoped out' of the assessment. This exercise for the Development established the studies and level of detail required to inform the EIA Report.

16. The request for a Scoping Opinion was submitted to the Scottish Government in October 2019. The request was accompanied by a Scoping Report (Technical Appendix A4.1) which described the Development, the proposed EIA methodology, and the key issues to be considered within this EIA Report. The Scoping Report was also sent to a range of consultees, as agreed with the ECU.

17. The Scoping Opinion was issued by the ECU in December 2019. A copy is included within Technical Appendix A4.2.

18. Table 4.1 provides an overview of the issues raised by the consultees at the Scoping stage. The detail of the individual responses received during the EIA, including at the Scoping stage, is set out in the relevant technical chapters. Where appropriate, reference is provided to where the comments have been addressed within this EIA Report.

Table 4.1: Scoping Responses

Consultee	No Response	No Comments	Landscape and Visual	Ecology / Ornithology	Hydrology / Hydrogeology	Peat	Cultural Heritage	Noise	Existing Infrastructure	Forestry	Socio-economics / Recreation	Access / Traffic	Climate Change / Carbon Balance	Cumulative Effects	Overarching EIA Comments	Relevant Chapter
Statutory Consultees																
Scottish Borders Council			✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	Chapters 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, & 17
Scottish Environment Protection Agency (SEPA)				✓	✓	✓									✓	Chapters 2, 3, 4, 7, 8, 9, & 10
NatureScot (formerly SNH)			✓	✓		✓								✓		Chapters 5, 7, 8, 9, & 15
Historic Environment Scotland (HES)							✓									Chapter 6
Non-Statutory Consultees																
Arqiva	✓															N/A
Atkins		✓														Chapter 17
British Telecommunications		✓														Chapter 17
British Horse Society	✓															N/A
Civil Aviation Authority	✓															N/A
Crown Estate Scotland	✓															N/A
Defence Infrastructure Organisation									✓							Chapter 14
Edinburgh – BAA Aerodrome Safeguarding		✓														Chapter 14
Fisheries Management Scotland				✓												Chapter 7
Galloway Fisheries Trust	✓															N/A
Glasgow Prestwick Airport		✓														Chapter 14
Highlands and Islands Airport		✓														Chapter 14
John Muir Trust		✓														Chapter 15
Joint Radio Company Limited		✓														Chapter 17
Mountaineering Scotland	✓															N/A
NATS Safeguarding									✓							Chapter 14
OFCOM	✓															N/A

Consultee	No Response	No Comments	Landscape and Visual	Ecology / Ornithology	Hydrology / Hydrogeology	Peat	Cultural Heritage	Noise	Existing Infrastructure	Forestry	Socio-economics / Recreation	Access / Traffic	Climate Change / Carbon Balance	Cumulative Effects	Overarching EIA Comments	Relevant Chapter
RSPB Scotland	✓															N/A
Scottish Forestry	✓															N/A
Scottish Rights of Way and Access Society (ScotWays)			✓								✓				✓	Chapters 2, 3, 4, 5 & 15
Scottish Water					✓											Chapter 10
Scottish Wild Land Group (SWLG)	✓															N/A
Scottish Wildlife Trust	✓															N/A
Visit Scotland	✓															N/A
Other Consultees																
Eddleston and District Community Council			✓		✓			✓			✓				✓	Chapters 2, 3, 4, 5, 9, 10, 11, & 15
Lamancha, Newlands and Kirkurd Community Council			✓								✓					Chapters 5 & 15
Manor, Stobo and Lyne Community Council			✓		✓			✓	✓						✓	Chapters 2, 3, 4, 5, 10, & 11
Royal Burgh Peebles and District Community Council			✓													Chapter 5
Inverleithen and District	✓															N/A

4.4.3 Tip Height Increase Consultation

19. Following Scoping, the Applicant sought to increase the maximum tip height of the turbines from 145 metres (m) to 149.9 m. Therefore, the Applicant undertook a further round of scoping consultation which was agreed with the ECU ('the Increased Tip Height Consultation').

20. Arcus Consultancy Services Ltd (Arcus), on behalf of the Applicant, submitted a further consultation methodology and request letter to the ECU for approval on the 20th January 2020; this letter is published on the ECU website[5] under the Reference: ECU00001956. The ECU confirmed in writing to Arcus and relevant consultees that Arcus' methodology was sufficient and confirmed that re-scoping was not required (Technical Appendix A4.3).

21. The Tip Height Increase Consultation was undertaken via email by Arcus in January 2020. A copy of responses are included within Technical Appendix A4.4.

[5] Scottish Government (2020) Energy Consents Unit [Online] Available at: https://www.energyconsents.scot/Default.aspx (Accessed 16/06/2021)

22. Table 4.2 provides an overview of the issues raised by the consultees following the Increased Tip Height Consultation. The detail of the individual responses received during the EIA, including at the Increased Tip Height Consultation stage, is set out in the relevant technical chapters. Where appropriate, reference is provided as to where the comments have been addressed within this EIA Report.

Table 4.2: Increased Tip Height Consultation Responses

Consultee	**No Response**	**No Comments**	**Landscape and Visual**	**Ecology / Ornithology**	**Hydrology / Hydrogeology**	**Peat**	**Cultural Heritage**	**Noise**	**Existing Infrastructure**	**Forestry**	**Socio-economics, / recreation**	**Access / Traffic**	**Climate Change / Carbon Balance**	**Cumulative Effects**	**Overarching EIA Comments**	**Relevant Chapter**
Statutory Consultees																
Scottish Borders Council			✓	✓			✓	✓				✓				Chapters 5, 6, 7, 8, 10, & 11
NatureScot (formerly SNH)	✓[6]															N/A
Non-Statutory Consultees																
Atkins		✓														Chapter 17
British Telecommunications		✓														Chapter 17
Civil Aviation Authority	✓															N/A
Defence Infrastructure Organisation									✓							Chapter 14
Edinburgh – BAA Aerodrome Safeguarding		✓														Chapter 14
Glasgow Prestwick Airport		✓														Chapter 14
Highlands and Islands Airport		✓														Chapter 14
Joint Radio Company Limited		✓														Chapter 17
NATS Safeguarding									✓							Chapter 14
OFCOM	✓															N/A
Other Consultees																
Eddleston and District Community Council															✓[7]	Chapter 4

[6] SNH provided no formal response to the Tip Height Increase Consultation but further/ongoing dialogue took place, culminating in 20/07/2020.

[7] Eddleston and District Community Council disagreed with the principle of the consultation and stated their intention to wait until official ECU confirmation that the processes/methodology being employed for further consultation was correct; following ECU approval, no official response was received from Eddleston and District Community Council. However, ongoing dialogue regarding the Development remained live throughout the EIA process.

Consultee	No Response	No Comments	Landscape and Visual	Ecology / Ornithology	Hydrology / Hydrogeology	Peat	Cultural Heritage	Noise	Existing Infrastructure	Forestry	Socio-economics, / recreation	Access / Traffic	Climate Change / Carbon Balance	Cumulative Effects	Overarching EIA Comments	Relevant Chapter
Lamancha, Newlands and Kirkurd Community Council	✓															N/A
Manor, Stobo and Lyne Community Council	✓															N/A
Royal Burgh Peebles and District Community Council	✓															N/A

4.4.4 Further Technical Consultation

23. In addition to the formal Scoping process, where appropriate, authors of technical assessments within this EIA Report engaged directly with statutory and non-statutory consultees throughout the duration of the EIA Report preparation stage to further refine the scope for each assessment. Consultees contacted in this manner include NatureScot, SEPA, HES, the Council's Environmental Health Department, and the Council's Transport and Structures department.

24. A summary of all relevant consultation is documented in the relevant Technical Chapters 5 to 17 of this EIA Report.

4.4.1 Gatecheck

25. In line with the ECU Gatechecking procedure[8] for Section 36 developments, a Gatecheck report was issued to the ECU and statutory consultees once an advanced design had been reached in August 2020. The Gatecheck report described how the design of the Development has evolved since the pre-scoping stage, highlighting influencing factors on the design either as a response to environmental constraints identified during the EIA process or through consultation feedback from statutory or non-statutory consultees.

26. A key element to the Gatecheck report was the collation of scoping responses with details on how the points raised by various consultees have been addressed and how this has influenced the design of the Development and the progression of the EIA. The Gatecheck report is included as Technical Appendix A4.5.

4.4.2 Public Engagement

27. Prior to the current COVID-19 restrictions taking effect, the Applicant hosted one round of Public Exhibitions during February 2020. The second and final round of Public Exhibitions required alternative arrangements to engage with the local community in light of COVID-19 restrictions; this was achieved through an 'Online Public Exhibition'.

[8] Scottish Government (2020), Gate-checking process for Section 36 and Section 37 applications [Online] Available at: https://www.gov.scot/Topics/Business-Industry/Energy/Infrastructure/Energy-Consents/Guidance/Gatecheckingprocessforsection36andsection37applica (Accessed on 22/06/2021)

28. In addition to the public exhibitions, the Applicant also corresponded with members of the local community through continued dialogue via email. Table 4.3 summarises the steps undertaken to ensure the local community were informed and involved with the process.

Table 4.3: Community Engagement throughout EIA Process

Date	**Exercise**
April 2019	Attendance at meeting (11 April 2019) with the Council to outline project position and re-design plans.
August 2019	Introductory letters were sent to the community councils, including: • Eddleston & District Community Council; • Lamancha, Newlands and Kirkurd Community Council; • Royal Burgh of Peebles & District; and • Manor, Stobo & Lyne Community Council.
October 2019	Attendance at meeting at the Barony Hotel, Peebles, (31st October 2019) with Community Councils and two local residents. The conversations largely related to general discussion around initial proposal, public exhibitions and main EIA elements, including: Private Water Supplies (PWS); Landscape & Visual Impact; Noise; and Telecommunications.
February 2020	First stage public exhibitions held: • Newlands Activity Centre (Romanno Bridge), Tuesday, 18th February (3 pm – 7 pm) • Eddleston Village Hall (Eddleston), Wednesday, 19th February (3 pm – 8 pm) Advertised through EDF project website[9], newspaper adverts (Peeblesshire News), letters to community councils and letters to residents (within ~5 km of the Site).
February / March 2020	Following the original public exhibitions, meetings with neighbouring community councils were not possible due to COVID 19 restrictions.
Throughout 2020 / 2021	Since the first round public exhibitions there has been extensive consultation/communication with the local community councils and residents relating largely to assessment of impacts upon private water supplies (PWS). Further consultation was undertaken with SEPA on the issues of PWS Risk Assessment Methodology; further details on this is contained within **Chapter 10: Hydrology and Hydrogeology** of this EIA Report. Extensive consultation with community councils and local residents via email and telephone calls.
April 2021	Public Exhibitions held: • Online at: www.edf-re.uk/our-sites/cloich (16 - 26 April 2021) Advertised through EDF project website[10], newspaper adverts (Peeblesshire News), letters to community councils and letters to residents (within ~5 km of the Site).

[9] EDF Renewables (2020) Cloich Wind Farm [Online] Available at: https://www.edf-re.uk/our-sites/cloich (Accessed 28/01/2021)
[10] EDF Renewables (2020) Cloich Wind Farm [Online] Available at: https://www.edf-re.uk/our-sites/cloich (Accessed 28/01/2021)

29. The public exhibitions provided information, including graphics and visualisations to the public. The first round of public exhibitions were held in Romannobridge and Eddleston, as detailed above; these exhibitions displayed visualisations of an early design iteration for the Development, alongside information relating to the EIA and consenting process, including:

- Project facts including maps of the wind farm location and layout;
- The need for the Development;
- The application, determination and public consultation processes;
- Project Benefits; and
- EIA process including the key findings to date relating to:
  - Landscape and Visual Amenity, including: figures, and photomontages or wirelines from key viewpoints;
  - Ecology;
  - Ornithology;
  - Archaeology and Cultural Heritage;
  - Noise;
  - Traffic and Transport;
  - Geology, Hydrology & Hydrogeology;
  - Socio-economics, Recreation and Tourism;
  - Climate Change and Carbon Balance; and
  - Aviation and Telecommunications.

30. The second round of public exhibitions were hosted online due to the Coronavirus pandemic, in line with the Scottish Government's COVID-19 advice and guidelines[11]. The Applicant originally planned to hold conventional second round public exhibitions in person; however, the exhibition materials, largely mirroring the above but for the final EIA design, were provided for inspection on a dedicated project online consultation webpage instead. The aim of the second exhibition was to introduce the final proposals for the Development.

31. Over the course of the online public exhibition, a total of approximately 165 visitors were recorded as having visited the dedicated project webpage.

4.5 THE EIA REPORT

32. The information that the Applicant is required to submit as part of the EIA process is presented in this EIA Report. The information contained within the EIA Report was largely identified in the Scoping Opinion issued by the ECU, which was based on consultee responses to the Scoping Report.

33. The preparation and production of this EIA Report has been conducted in accordance with relevant regulations and good practice guidance. Relevant legislation, policy and guidance are referred to in each of the technical assessments within the EIA Report. Overarching regulation, policy and guidance documents have been used in preparing this EIA Report are:

- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended)[12];
- Scottish Planning Policy (SPP) (June 2014)[13];

[11] The Scottish Government (2020) Online Public Exhibition established in accordance with COVID-19 Scottish Government advice and regulations [Online] Available online at: https://www.gov.scot/publications/coronavirus-covid-19-planning-guidance-on-pre-application-consultations-for-public-events/ (Accessed 22/06/2021)
[12] Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 [Online] Available at: http://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 22/06/2021)
[13] The Scottish Government (2014) Scottish Planning Policy [Online] Available at: https://beta.gov.scot/publications/scottish-planning-policy/ (Accessed 22/06/2021)

- Planning Advice Note (PAN) 1/2013: Environmental Impact Assessment, 2013[14] which, whilst prepared to inform EIAs under the Town and Country Planning (Scotland) Act 1997 as amended, is also relevant to EIAs produced under the EIA Regulations;
- Planning Circular 1/2017: Environmental Impact Assessment Regulations, 2017[15];
- Environmental Impact Assessment Handbook (Scottish Natural Heritage, 2018)[16]; and
- Environmental Impact Assessment Guide to Delivering Quality Development (Institute of Environmental Management and Assessment [IEMA], 2016)[17].

34. This EIA Report conveys the findings of the assessment of the potential significant environmental effects of the Development during construction, operation and decommissioning.

35. The EIA Report comprises of the following documents:

- **Volume 1** – EIA Report Text;
- **Volume 2** – EIA Report Figures;
  - **Volume 2a** – Figures excluding LVIA;
  - **Volume 2b** – LVIA Figures;
  - **Volume 2c** – LVIA Visualisations;
- **Volume 3** – EIA Report Technical Appendices; and
- **Volume 4** – EIA Report Non-Technical Summary.

36. The EIA Report includes chapters covering the following technical areas:

- **Chapter 5:** Landscape and Visual Impact Assessment (LVIA);
- **Chapter 6:** Archaeology and Cultural Heritage;
- **Chapter 7:** Ecology;
- **Chapter 8:** Ornithology;
- **Chapter 9:** Geology, Ground Conditions, and Peat;
- **Chapter 10:** Hydrology and Hydrogeology;
- **Chapter 11:** Noise;
- **Chapter 12:** Access, Traffic, and Transportation;
- **Chapter 13:** Forestry;
- **Chapter 14:** Aviation and Radar;
- **Chapter 15:** Socio-economics, Land Use, Recreation, and Tourism;
- **Chapter 16:** Climate Change and Carbon Balance; and
- **Chapter 17:** Other Issues.

37. **Chapter 17: Other Issues** includes the following technical areas: Shadow Flicker, Telecommunications, Utilities, and Health and Safety (Including: Major Accidents and Disasters).

38. Each of the technical chapters follows the broad assessment principles outlined in Section 4.6.

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[14] The Scottish Government (2013, Rev. 2017) Planning Advice Note 1/2013 Environmental Impact Assessment [Online] Available at: http://www.gov.scot/Publications/2013/08/6471 (Accessed 22/06/2021)
[15] The Scottish Government (2017) Planning Circular 1/2017 Environmental Impact Assessment regulations [Online] Available at: https://www.gov.scot/publications/planning-circular-1-2017-environmental-impact-assessment-regulations-2017/ (Accessed on 22/06/2021)
[16] Scottish Natural Heritage (2018) Environmental Impact Assessment Handbook [Online] Available at: https://www.nature.scot/handbook-environmental-impact-assessment-guidance-competent-authorities-consultees-and-others (Accessed 22/06/2021)
[17] IEMA (2016) Environmental Impact Assessment Guide to: Delivering Quality Development

39. **Chapter 18: Summary of Mitigation** presents a summary of the main effects of the Development, along with a description of any proposed mitigation measures.

4.6 TECHNICAL ASSESSMENTS

40. Each of the technical assessments follows a systematic approach with the main steps as follows:

- Introduction, assessment methodology and significance criteria;
- Description of the baseline conditions;
- Assessment of potential effects;
- Cumulative effects assessment;
- Mitigation measures and residual effects;
- Summary of effects (residual effects); and
- Statement of significance.

41. A summary of each step is highlighted below.

4.6.1 Introduction, Assessment Methodology and Significance Criteria

42. Each technical assessment sets out the relevant legislation, policy and guidance together with scope and methodology used to carry out the assessment of potential effects, including the criteria that are used to establish which effects are significant. The methodology seeks to ensure transparency in the assessment. Each technical assessment has the criteria set out for assessing significance. Where a level of significance is attributed to an effect, this is based on technical guidance and professional judgement, informed by consideration of the sensitivity of the receptor and the degree of the effect.

43. This section also sets out the scoping requirements and pre-application consultation responses that form the framework and scope of the specialist assessment work for the topic.

4.6.2 Description of Baseline Conditions

44. In order to evaluate the potential environmental effects, the existing environmental conditions were recorded through field and desktop research. Prior to fieldwork studies, desktop studies were undertaken to gain a preliminary understanding of the study area. Where appropriate, site-specific baseline field surveys were then undertaken by experienced professionals to provide an understanding of the current condition of the Site and the surrounding area.

45. This forms the baseline, alongside a prediction of these conditions into the future. Such predictions can involve a high number of variables and be subject to large uncertainties, and as a result, in some cases, the current baseline condition is assumed to remain unchanged throughout the timeframe of the Development.

46. The baseline has been used to assess the sensitivity of receptors within the study areas. Wind farms that are operational or consented at the time of commencing the assessments are treated as being part of the existing baseline except where specific guidance advises to the contrary.

47. The approach to describing baseline conditions is set out in each relevant technical chapter. Baseline information is used to inform the layout of the Development. From baseline information, constraints were identified which were considered as part of the design process. Further detail on the design process adopted for the Development is detailed in **Chapter 2: Site Selection and Design** and **Chapter 3: Project Description**.

4.6.3 Assessment of Potential Effects

48. The prediction of potential significant effects covers the three phases of the Development: construction, operation, and decommissioning, as different environmental effects are likely to arise during the different stages. The effects during construction and decommissioning are generally considered to be short term effects, and those arising as a result of the operation of the Development are generally considered to be long term effects. Each technical assessment considers the nature of effects and includes cumulative effects with other developments where appropriate.

49. Following identification of potential environmental effects, the baseline information is used to predict changes to existing conditions, and conduct an assessment of these changes.

50. The significance of effects resulting from the Development will be determined through a combination of the sensitivity of the receiving environment (the sensitivity) and the predicted degree of change (the magnitude) from the baseline state.

4.6.3.1 Sensitivity of Receptors

51. Environmental sensitivity may be categorised by multiple factors, such as the presence of rare or endangered species, transformation of natural landscapes, soil quality and land-use etc. The initial assessment, consultation and scoping stages identified these factors along with the implications of the predicted changes.

52. The sensitivity classification of the receiving environment varies between the different technical areas of assessment e.g. landscape and visual, ecology, noise etc. Sensitivity is normally defined as high, medium or low. Table 4.4 details a general framework for determining the sensitivity of receptors; however, each technical assessment will specify their own appropriate sensitivity criteria that will be applied during the EIA and details will be provided in each technical chapter.

Table 4.4: Framework for Determining Sensitivity of Receptors

Sensitivity of Receptor	Definition
Very High	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.
Low	The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance.
Negligible	The receptor is resistant to change or is of little environmental value.

4.6.3.2 Magnitude of Change

53. For the purposes of environmental assessment, the magnitude of an 'effect' is generally dependent on the degree to which the change affects the feature or asset, from a fundamental, permanent or irreversible change that changes the character of the feature or asset, to barely perceptible changes that may be reversible. Magnitude would also encompass the certainty of whether an impact would occur. General criteria for assessing the magnitude of an effect are presented in Table 4.5. Each technical assessment will apply their own appropriate magnitude of effects criteria during the EIA, with the details provided in the relevant EIA chapter.

Table 4.5: Framework for Determining Magnitude of Change

Magnitude of Effects	Definition
High	A fundamental change to the baseline condition of the asset, leading to total loss or major alteration of character.
Medium	A material, partial loss or alteration of character.
Low	A slight, detectable, alteration of the baseline condition of the asset.
Negligible	A barely distinguishable change from baseline conditions.

54. If the effects of zero magnitude (i.e. none / no change) are identified, this will be made clear in the assessment.

4.6.3.3 Significance of Effect

55. The sensitivity of the asset and magnitude of the predicted impacts will be used as a guide, in addition to professional judgement, to assess the level of effects. Table 4.6 summarises guideline criteria for assessing the significance of effects.

Table 4.6: Framework for Assessment of the Significance of Effects

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

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

57. Zero magnitude effects upon a receptor will result in no effect, regardless of sensitivity.

58. This EIA Report generally follows the above principles in relation to the identification of significant effects; however, some technical assessments may adopt a variation process. The assessment criteria used to determine the significance of effects are made explicit in each technical assessment chapter within this EIA Report.

4.6.4 Mitigation Measures

59. The IEMA EIA Guide to Delivering Quality Development Report demonstrates that EIA is an iterative process rather than a unique, post-design, environmental appraisal. In adopting this approach, the findings of the technical environmental studies used to inform the design of the project, and hence achieve a 'best fit' with the environment. This approach has been adopted in respect of the Development; where potentially significant effects have been identified, their avoidance or minimisation has been prioritised at the design stage. This is referred to within this EIA Report as 'embedded mitigation', i.e. mitigation that is embedded within the project design, and includes best practice as well as design features.

60. In line with the mitigation hierarchy identified in the updated PAN 1/2013 (V1.0, 2017), the strategy of avoidance, reduction, and remediation is a hierarchical one, which seeks to:

- First to avoid potential effects;
- Then to reduce those which remain; and
- Lastly, where no other measures are possible, to propose compensatory measures.

61. Appropriate mitigation measures are discussed within each technical chapter as relevant.

4.6.5 Cumulative Effects Assessment

62. In accordance with the EIA Regulations, the assessment has considered 'cumulative effects'. By definition, these are effects that result from incremental changes caused by past, present or reasonably foreseeable developments together with the Development being assessed. For the cumulative assessment, the combined effects of several developments are considered. Individual projects may not give rise to significant effects but when considered with other developments, there may be a significant cumulative effect.

63. Cumulative assessment addresses the combined effects from the addition of the Development to a baseline of identified wind farms on landscape and visual, hydrology, ecology, ornithology, noise, cultural heritage, traffic and transport, recreation, tourism and other impacts.

64. Other developments which may come forward in the future, but which do not currently have sufficient information available in relation to their likely effects to make an informed cumulative assessment (*e.g.* those within scoping), are not considered in detail in this EIA Report.

65. The extent of any cumulative assessment is defined in each technical assessment chapter and can include both existing and proposed wind farm developments and other forms of development. The potential landscape and visual effects, for example, which relate to the intervisibility of individual wind farm development schemes, will be much more wide ranging than noise effects which will be limited to receptors in the more immediate vicinity of the Development.

66. Consideration of cumulative effects has been undertaken for all technical assessments. Where no cumulative effects are likely, this is stated. Operational wind farms are considered to be part of the baseline in the majority of assessments. In relation to some of the technical chapters, specific guidance and policy exists advising that effects associated with existing wind farm developments should be considered as cumulative effects. Where relevant, these are noted within each chapter.

4.6.6 Residual Effects

67. The residual effects of the Development are those that remain following successful implementation of the identified mitigation and enhancement measures.

68. Residual effects are identified in each technical assessment alongside an assessment of whether any residual effects are significant or not in terms of the EIA Regulations.

4.6.7 Statement of Significance

69. Following the identification of residual effects, each Chapter will present a Statement of Significance. Effects are considered to be significant for the purposes of the EIA Regulations where the effect is classified as being of 'major' or 'moderate' significance.

4.7 ASSUMPTIONS AND LIMITATIONS OF EIA

70. A number of assumptions have been made during preparation of this EIA Report, as set out below. The assumptions are:

- The principal land uses adjacent to the Site remain as they are at the time of the submission of the application, except in cases where permission has already been granted for development. In these cases, it is assumed that the approved development will take place, and these have been treated as contributing to "cumulative" effects; and
- Information provided by third parties, including publicly available information and databases is correct at the time of writing.

71. The EIA has been subject to the following limitations:

- Baseline conditions are accurate at the time of the physical surveys but, due to the dynamic nature of the environment, conditions may change during the site preparation, construction and operational phases; and
- The assessment of cumulative effects has been reliant on the availability of known information relating to existing wind farm developments as at January 2021.

72. Assumptions specific to certain environmental aspects are discussed in the relevant Chapters of this EIA Report.

CLOICH FOREST WIND FARM

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Chapter 5

Landscape and Visual Impact Assessment

5 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

5.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment Report ('the EIA Report') evaluates the effects of the Cloich Forest Wind Farm ('the Development') on the landscape and visual resource. This assessment was undertaken by Chartered Landscape Architects (CMLI) from LUC (Land Use Consultants) on behalf of Cloich Windfarm Partnership LLP ('the Applicant').

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

- A5.1: Landscape and Visual Impact Assessment (LVIA) Methodology;
- A5.2: Zone of Theoretical Visibility (ZTV) Mapping and Visualisation Methodology; and
- A5.3: Residential Visual Amenity Assessment (RVAA).

3. Accompanying figures are included as Figures 5.1.1 – 5.1.11 contained in Volume 2b – LVIA Figures. Accompanying visualisations are illustrated as Figures 5.2.1 – 5.2.26 contained in Volume 2c: LVIA Visualisations and have been prepared in accordance with the methodology set out in Appendix A5.2.

4. This Chapter includes the following elements:

- Legislation, Policy and Guidance;
- Consultation;
- Assessment Methodology and Significance Criteria;
- Landscape Baseline Conditions;
- Visual Baseline Conditions;
- Cumulative Baseline;
- Assessment of Potential Effects (including Cumulative Landscape and Visual Impact Assessment (CLVIA));
- Mitigation and Residual Effects;
- Summary of Effects;
- Statement of Significance; and
- Glossary.

5. The CLVIA has been incorporated into the tables found within Section 5.9: Assessment of Potential Landscape and Visual Effects.

5.2 LEGISLATION, POLICY AND GUIDANCE

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

5.2.1 Assessment Guidance

- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations (2017)[1] (hereafter referred to as 'the EIA Regulations');
- Landscape Institute and the Institute of Environmental Management & Assessment (2013), Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3)[2];

[1] The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. London: HMSO [Online] Available at: http://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 22/06/2021)
[2] Landscape Institute and the Institute of Environmental Management & Assessment (2013), Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3)

- Scottish Natural Heritage (SNH)[3] (2018), A Handbook on Environmental Impact Assessment, Appendix 2: Landscape and Visual Impact Assessment, Version 5[4];
- SNH (2017), Visual Representation of Wind Farms, Version 2.2[5];
- SNH (2012), Assessing the cumulative impact of onshore wind energy developments[6];
- Landscape Institute (2019), Technical Guidance Note 06/19 Visual representation of development proposals[7];
- Landscape Institute (2019), Technical Guidance Note 02/19 Residential Visual Amenity Assessment[8];
- NatureScot (2020), General pre-application and scoping advice for onshore wind farms[9]; and
- SNH (unpublished, 2018), Guidance for Assessing Effects on Special Qualities and Special Landscape Qualities. Working Draft 11[10].

5.2.2 Design and Locational Guidance

- SNH (2017), Siting and Designing Wind Farms in the Landscape, Version 3[11];
- SNH (2009), Policy Statement No 02/02: Strategic Locational Guidance for Onshore Windfarms in Respect of the National Heritage[12];
- SNH (2015), Spatial Planning for Onshore Wind Turbines – natural heritage considerations, Guidance[13];
- SNH (2019), Good Practice During Windfarm Construction, Version 4[14];

[3] SNH changed name to NatureScot in August 2020, during drafting of LVIA. Many reference documents and consultation responses were published prior to this name change. Where these have been published prior to the name change, SNH is referred to.
[4] SNH (2018), A Handbook on Environmental Impact Assessment, Appendix 2: Landscape and Visual Impact Assessment, Version 5. [Online] Available at: https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf (Accessed 29/03/2021)
[5] SNH (2017), Visual Representation of Wind Farms, Version 2.2. [Online] Available at: https://www.nature.scot/visual-representation-wind-farms-guidance (Accessed 29/03/2021)
[6] Scottish Natural Heritage (SNH) (2012), Assessing the cumulative impact of onshore wind energy developments. [Online] Available at: https://www.nature.scot/guidance-assessing-cumulative-impact-onshore-wind-energy-developments (Accessed 29/03/2021)
[7] Landscape Institute (2019), Technical Guidance Note 06/19 Visual representation of development proposals. [Online] Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf (Accessed 29/03/2021)
[8] Landscape Institute (2019), Technical Guidance Note 2/19: Residential Visual Amenity Assessment (RVAA). [Online] Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/03/tgn-02-2019-rvaa.pdf (Accessed 29/03/2021)
[9] SNH (2020), General pre-application and scoping advice for onshore wind farms. [Online] Available at: https://www.nature.scot/general-pre-application-and-scoping-advice-onshore-wind-farms (Accessed 29/03/2021)
[10] SNH (unpublished, 2018). Guidance for Assessing Effects on Special Qualities and Special Landscape Qualities. Working Draft 11
[11] SNH (2017), Siting and Designing Wind Farms in the Landscape, Version 3. [Online] Available at: https://www.nature.scot/siting-and-designing-wind-farms-landscape-version-3a (Accessed 29/03/2021)
[12] SNH (2009), Policy Statement No 02/02: Strategic Locational Guidance for Onshore Windfarms in Respect of the National Heritage.
[13] SNH (2015), Spatial Planning for Onshore Wind Turbines – natural heritage considerations, Guidance. [Online] Available at: https://www.nature.scot/sites/default/files/2019-10/Guidance%20-%20Spatial%20Planning%20for%20Onshore%20Wind%20Turbines%20-%20natural%20heritage%20considerations%20-%20June%202015.pdf (Accessed 29/03/2021)
[14] SNH (2019), Good Practice During Windfarm Construction, Version 4. [Online] Available at: https://www.nature.scot/sites/default/files/2020-12/Good%20Practice%20during%20wind%20farm%20construction%20-%204th%20Ed.pdf (Accessed 29/03/2021)

- SNH (2015), Constructed Tracks in the Scottish Uplands, 2nd Edition[15];
- Scottish Government (2014), Scottish Planning Policy[16];
- Scottish Government (2017), Scottish Energy Strategy: The future of energy in Scotland[17];
- Scottish Government (2017), Onshore Wind Policy Statement[18]; and
- Scottish Government (2003), Planning Advice Note (PAN) 68: Design Statements[19].

5.2.3 Local Development Plans and Supplementary Planning Guidance

- Scottish Borders Council (2016), Local Development Plan[20];
- Scottish Borders Council (2018), Supplementary Guidance Renewable Energy[21]; and
- Scottish Borders Council (2016), Wind Energy Consultancy Update of Wind Energy Landscape Capacity and Cumulative Impact Study[22] (hereafter 'The Scottish Borders Landscape Capacity Study'.

[15] SNH (2015), Constructed Tracks in the Scottish Uplands, 2nd Edition. [Online] Available at: https://www.nature.scot/sites/default/files/Publication%202015%20-%20Constructed%20tracks%20in%20the%20Scottish%20Uplands.pdf (Accessed 29/03/2021)
[16] Scottish Government (2014), Scottish Planning Policy (SPP). [Online] Available at: https://www.gov.scot/publications/scottish-planning-policy/ (Accessed 29/03/2021)
[17] Scottish Government (2017), Scottish Energy Strategy: The future of energy in Scotland. [Online] Available at: https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/ (Accessed 29/03/2021)
[18] Scottish Government (2017), Onshore Wind Policy Statement. [Online] Available at: https://www.gov.scot/publications/onshore-wind-policy-statement-9781788515283/ (Accessed 29/03/2021)
[19] Scottish Government (2003), Planning Advice Note (PAN) 68: Design Statements. [Online] Available at: https://www.gov.scot/publications/planning-advice-note-68-design-statements/ (Accessed 29/03/2021)
[20] Scottish Borders Council (2016), Local Development Plan. [Online] Available at: https://www.scotborders.gov.uk/info/20051/plans_and_guidance/121/local_development_plan (Accessed 29/03/2021)
[21] Scottish Borders Council (2018), Supplementary Guidance Renewable Energy. [Online] Available at: https://www.scotborders.gov.uk/info/20051/plans_and_guidance/766/renewable_energy_supplementary_guidance (Accessed 29/03/2021)
[22] Scottish Borders Council (2016), Supplementary Guidance Renewable Energy. [Online] Available at: https://www.scotborders.gov.uk/downloads/download/659/renewable_energy_supplementary_guidance (Accessed 29/03/2021)

5.3 CONSULTATION

5.3.1 Scoping Responses and Consultations

7. Consultation for the LVIA was undertaken with the consultees listed in Table 5.1.

Table 5.1: Consultation Responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
Scottish Borders Council (Landscape Architect)	Scoping Opinion (Pages A5-A6), 18/12/2019	Suggest reinstating a number of viewpoints used in the previous LVIA: 1) Cross Border Drove Road (West); 2) Old Post Road Core Path (to east of Observatory, residential receptor); 3) Minor road near Spylaw and Wester Deans; 4) B7059 near Boghouse; 5) Viewpoint on A701 (either near Mountain Cross or southern end of Romanno Bridge, where there is visibility); 6) Haswellsykes; 7) Glentress Forest (Makeness Kipps; and 8) B7059 near Flemington access.	A description of the viewpoint selection process is provided in Section 5.6.4. Through discussions with Scottish Borders Council it was agreed that (1), (2), (3), (4), (5), (6) and (7) were to be taken forward to detailed assessment. (8) was not taken forward to detailed assessment due to limited theoretical visibility from the B7059.
		Note that focusing the cumulative assessment on a 20 km study area is acceptable.	Consideration of cumulative effects is provided in Section 5.9, focusing on schemes within 20 km.
		State an assumption that the landscape and visual effects on the Historic Environment Scotland (HES) Inventory listed Portmore Designed Landscape will be thoroughly assessed.	Consideration of landscape and visual effects on Portmore Designed Landscape is provided in Section 5.9.3.1 (Table 5.34).
		Recommend that, for properties within 2 km of the nearest turbine and with visibility, wirelines are accompanied by aerial and site photographs plus photomontages, particularly for those that meet the Stage 4 threshold in the Landscape Institute’s Technical Guidance Note on Residential Visual Amenity Assessment.	Consideration of effects on residential visual amenity for properties within 2 km of the nearest turbine is provided in Appendix A5.3: Residential Visual Amenity Assessment (RVAA).
Scottish Borders Council (Landscape Architect)	Tip Height Increase Consultation (17/02/2020)	Nothing further to add from original scoping response. Noted that the ZTV shows an increase in visual impact on the northern edge of the Upper Tweeddale NSA and other	Consideration of the NSA is provided in Section 5.9.4 (Table 5.65).

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		limited areas elsewhere. The visual effects should be assessed within the LVIA, noting that increased visibility may correspond to a Core Path route.	
Scottish Borders Council (Landscape Architect)	Further consultation via email dated 18/03/2020	Recommend retention of viewpoints 1 (Cross Borders Drove Road - east), 11 (Gladhouse Reservoir), 16 (Cross Borders Drove Road - west) and 18 (B7059 near Boghouse). Agree with retention of LVIA viewpoints 2, 3, 4, 5, 6, 7, 10, 12, 13, 14, 15, 17, 19, 20, 21, 22, 24, 28, 29 and 30. Agree with removal of LVIA viewpoints 8 and 9. Agree that Haswellsykes is represented by VP19, Glentress by VP20, Kirkton Manor by VP10, Meldons Road by VP1.	A description of the viewpoint selection process is provided in Section 5.6.4. Through discussion with Scottish Borders Council it was agreed that (1), (11), (16) and (18) were to be taken forward to detailed assessment.
		Request additional viewpoints from: a) Stobo road; b) Manor Valley road; c) Traquair House, Bonnington Road (Peebles); and d) Dawyck	A description of the viewpoint selection process is provided in Section 5.6.4. Through discussion with Scottish Borders Council it was agreed that (a) was to be taken forward to detailed assessment.
NatureScot	Scoping Opinion (Pages A23-A25), 21/11/2019	Consider that the increase in the height of the turbines to 145 m will undo the mitigation proposed (reducing tip height from 132 m to 115 m) for the Consented Scheme which, following a Public Local Inquiry (PLI), was granted consent on 8 July 2016 (Planning and Environmental Appeals Division (DPEA) Reference: WIN-140-1).	The evolution of the design of the Development is described in **Chapter 2: Site Selection & Design**.
		Consider that the Development may re-introduce significant effects on the Upper Tweeddale NSA. Note that key issues in relation to the special qualities of the NSA are 1) The appreciation of distinctive landforms within and immediately adjacent to the NSA, 2) The scenic composition of views from within the NSA, and 3) the wind farm's design	Consideration of the NSA is provided in Section 5.9.4 (Table 5.65).

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		and visual coherence, including forest removal and ancillary infrastructure.	
		Request that draft SNH guidance Assessing the impacts on Special Landscape Qualities – Working Draft 11-09 November 2018 is used for the assessment of effects on the NSA.	Consideration of the NSA is provided in Section 5.9.4 (Table 5.65).
		Request additional viewpoints: 1) One of the hill tops in the Moorfoots to show both Cloich and Bowbeat; 2) From the B7007 on the northern edge of the Moorfoots (e.g. GR NT08633890); 3) From the A701 to the west of the Site; and 4) From the minor road on the north-western slopes of the Moorfoots.	A description of the viewpoint selection process is provided in Section 5.6.4. Through discussion with NatureScot it was agreed that viewpoint locations at (1), (2), (3) and (4) were to be taken forward to detailed assessment.
		Request that all ZTVs show the NSA boundary.	The NSA boundary with ZTV is shown on Figure 5.1.7.
		Request justification for the viewpoint selection and where it differs from the Consented Scheme LVIA. Request wireframes from consented proposal LVIA are included.	A description of the viewpoint selection process is provided in Section 5.6.4. Wireframes from Viewpoints 4 (Black Meldon), 6 (Core Path 154 near Eddleston), 7 (Minor road near Spylaw and Wester Deans), 11 (A703 near Langside Farm (North of Peebles), 12 (A702, approach to West Linton), 14 (B712/ Stobo Road), 16 (Haswellsykes), 18 (A702, Dolphinton), 19 (Cademuir Hill Fort), 22 (Carnethy Hill) and 23 (Stob Law) have been included in the Project Comparison Report.
NatureScot	Further consultation via email dated 01/05/2020	Consider that the current selection of LVIA viewpoints does not represent views from the Upper Tweeddale NSA.	A description of the viewpoint selection process is provided in Section 5.6.4. LVIA viewpoints 14, 16, 19 and 23 are within the Upper Tweeddale NSA.
		Request a sequential assessment from the John Buchan Way as it runs through	Consideration of effects on the John Buchan Way is provided in Section 0

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		the NSA, including wireframes to illustrate worst-case effects.	(Table 5.64) as represented by LVIA viewpoint 19.
		Request additional viewpoints: a) On the Tweed Cycle Route / B712 in the NSA (318881, 638288); b) From the Meldon Valley (worst-case); c) From one of the two Meldons (e.g. Black Meldon at GR 320611, 642513); d) Viewpoint 10 should be at the highest point of the hill (e.g. GR 323040, 637490); and e) Viewpoint 9 at Dolphinton should be retained.	A description of the viewpoint selection process is provided in Section 5.6.4. Through discussion with NatureScot it was agreed that viewpoint locations at (a), (b), (c), (d) and (e) were to be taken forward to detailed assessment.
Eddleston & District Community Council	Scoping Opinion (Pages A31-A33), 15/11/2019	Comment that the LVIA viewpoints should represent residential receptors and other visual receptors including those using the Cross Borders Drove Road.	A description of the viewpoint selection process is provided in Section 5.6.4.
		Comment that taller turbines will lead to greater visibility from the Upper Tweeddale NSA, from Eddleston and from major transport routes.	Consideration of the NSA is provided in Section 5.9.4 (Table 5.65). Consideration of effects on residents in Eddleston is provided in Section 5.9.3.2 (Table 5.52). Consideration of effects on road users is provided in Section 0 and from specific viewpoints within Section 5.9.3.
Lamancha, Newlands and Kirkurd Community Council	Scoping Opinion (Pages A41), 18/11/2019	Request additional viewpoints: a) on the Cross Borders Drove Road, south-east of Romanno (GR 318600 646150); and b) at Grange Hill above Lamancha (GR 320150 651450).	A description of the viewpoint selection process is provided in Section 5.6.4.
Manor, Stobo & Lyne Community Council	Scoping Opinion (Pages A42-A44), 21/11/2019	Note concern for effects on the Upper Tweeddale NSA, in particular the view from Black and White Meldon.	Consideration of the NSA is provided in Section 5.9.4 (Table 5.65).
		Considered that the photomontages in the Consented Scheme application LVIA were inadequate.	Photomontages for the current application have been prepared in accordance with SNH's Visual Representation of Wind Farms Guidance, Version 2.2 (Feb 2017) and are presented in

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
			Volume 2c: LVIA Visualisations.
		Request additional viewpoints: (a) The Old Drove Road to the South-West of the Site; (b) From the ridge above Lamancha to the west of the Site; and (c) From at least one of the settlements at Wester Deans, Spylaw and Cowieslinn to the north of the Site (e.g. Cowieslinn junction).	A description of the viewpoint selection process is provided in Section 5.6.4.
Community Council of the Royal Burgh of Peebles & District	Scoping Opinion (Pages A48), 27/10/2019	Comment that the proposal will be visible to residents and visitors to Peebles, particularly at the 'gateway' to Peebles south of Leadburn.	Consideration of effects on residents in Peebles is provided in Section 5.9.3.2 (Table 5.56). Consideration of effects on road users travelling south on the A703 is provided in Section 0 and from specific viewpoints within Section 5.9.3 (Table 5.36 and Table 5.38).
Scottish Rights of Way and Access Society (ScotWays)	Scoping Opinion (Pages A49-A54), 29/11/2019	Note the presence of Rights of Way BT6, BT10, BT40 and BT41 within the Site, as well as the historic Cross Borders Drove Road and Post Road through the Meldons routes.	Consideration of effects on recreational receptors on walking routes is provided in Section 0 and from specific viewpoints within Section 5.9.3.
		Consider that turbines at the north and south ends of the Scoping layout will dominate the Cloich hill ridge, being 'modest' in height.	Consideration of effects on the Site and local landscape character is provided in Section 5.9.2.
		Comment that the Moorfoot Hills and Pentland Hills should be considered in the assessment, with the Pentlands being more important given their Regional Park status.	Consideration of the Moorfoot Hills and Pentland Hills is provided in Section 5.9.2.
		Comment that close views from nearby public roads should be considered in the assessment.	Consideration of views from roads is provided in Section 0, and specific viewpoints within Section 5.9.3.
		Comment that the integrity of the Upper Tweeddale NSA has to be considered, in addition to its special qualities.	Consideration of the NSA is provided in Section 5.9.4 (Table 5.65).
		Comment on the need for consistency of viewpoints with the Consented Scheme LVIA to allow for fair comparison of	A description of the viewpoint selection

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		effects, with supporting wireframes to aid comparison.	process is provided in Section 5.6.4. Wireframes from Viewpoints 4 (Black Meldon), 6 (Core Path 154 near Eddleston), 7 (Minor road near Spylaw and Wester Deans), 11 (A703 near Langside Farm (North of Peebles), 12 (A702, approach to West Linton), 14 (B712/ Stobo Road), 16 (Haswellsykes), 18 (A702, Dolphinton), 19 (Cademuir Hill Fort), 22 (Carnethy Hill) and 23 (Stob Law) have been included in the Comparison Document.
		Comment that they do not consider the proposed LVIA is taking a satisfactory approach to care for the interests of people involved in active open-air recreation.	Consideration of recreational receptors is provided in Section 5.9.3.

5.4 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

8. The LVIA methodology was prepared in accordance with the principles contained within GLVIA3 and is described in detail in Appendix A5.1. Appendix A5.1 should be referred to whilst reviewing the findings of this assessment in order to gain a clear understanding of how findings of significance have been informed.

9. The key steps in the methodology for assessing both landscape and visual effects are as follows:

- The area from which the Development may theoretically be visible was established through creation of a ZTV covering up to 40 km from the outermost wind turbines of the Development, refer to Figure 5.1.2a and b for blade tip ZTV;
- The landscape of the Study Area was analysed, and landscape receptors identified;
- The visual baseline was recorded in terms of the places where people will be affected by views of the Development, and the nature of views and visual amenity, seen by different groups of people;
- Viewpoints were selected (including representative viewpoints, specific viewpoints and illustrative viewpoints), in consultation with Scottish Borders Council ('the Council') and NatureScot (formally Scottish Natural heritage (SNH)); and
- Likely effects on landscape and visual resources were identified, separately as required.

5.4.1 Study Area / Survey Area

10. The Study Area for the assessment is defined as 40 km from the outermost wind turbines of the Development in all directions, as recommended in SNH guidance[23] for turbines of 131-150 m blade tip height. The extent of the Study Area is shown on Figure 5.1.1. The consideration of landscape and visual effects, including cumulative effects, on receptors is dealt with in the sections which follow, with specific reference to the distance within which the potential for significant effects is considered likely for both landscape and visual receptors.

11. To consider cumulative effects of the Development in relation to other schemes in the wider area, wind farms within 20 km of the outermost wind turbines of the Development have been included for the purposes of modelling and detailed assessment, as agreed with NatureScot and the Council. A review of patterns of development is also provided for wind farms in the wider area as required, following guidance from SNH[24]. Wind farms within 60 km of the outermost wind turbines of the Development are shown on Figure 5.1.8.

12. A ZTV map to maximum blade tip height (149.9 m) was generated, illustrating areas from where the proposed wind turbines may be visible in the Study Area. The ZTV was based on bare earth topography and therefore does not take account of potential screening by vegetation or buildings. The ZTV is used as a tool for understanding where significant visual effects may occur. Receptors located outside the ZTV will not be affected by the wind turbines of the Development and are not considered further in the assessment. The ZTV to tip height is shown on Figure 5.1.2a and b, and the ZTV to hub height (83.4 m) is shown on Figure 5.1.3a and b.

5.4.2 Scope of Assessment

13. The key issues for the assessment of potential landscape and visual effects relating to the Development are listed below. The following effects have been assessed in accordance with the principles contained within GLVIA3:

- Effects on the physical landscape of the Application Site ('the Site');
- Effects on the perceived landscape character of Landscape Character Types (LCT) within a 15 km radius from the outermost wind turbines of the Development;
- Effects which could be of relevance to the reasons for designation as described by key characteristics/special qualities of nationally and locally designated landscapes within the Study Area, as well as the overall integrity of nationally designated areas, as required by Scottish Planning Policy (SPP);
- Effects on visual receptors at representative viewpoints;
- Effects on visual receptors at settlements and routes in the Study Area;
- Effects on residential receptors within 2 km of the outermost wind turbines of the Development; and
- Cumulative landscape and visual effects (including combined, successive and sequential visual effects).

[23] SNH (2017). Visual Representation of Wind Farms, Version 2.2.
[24] SNH (2012). Assessing the Cumulative Impacts of Onshore Wind Energy Developments.

5.4.3 Elements Scoped Out of Assessment

14. On the basis of the desk-based and field survey work undertaken, the professional judgement and experience of the assessment team, experience from other relevant projects, feedback received from consultees, and policy guidance or standards, the following potential effects have been scoped out of the assessment:

- Effects on visual receptors beyond a 40 km radius from the outermost wind turbines of the Development, where it is judged that potential significant effects are unlikely to occur;
- Effects on landscape character beyond a 15 km radius from the outermost wind turbines of the Development, where the potential for significant effects on landscape character is limited;
- Effects on designated landscapes beyond a 15 km radius from the outermost wind turbines of the Development, from where potential significant effects on key characteristics and/or special qualities, or views are judged unlikely to occur;
- Effects on routes and settlements beyond a 15 km radius from the outermost wind turbines of the Development, where the potential for significant visual and sequential effects is limited;
- Effects on landscape and visual receptors with minimal or no theoretical visibility (as predicted by the ZTV) and/or very distant visibility, and are therefore unlikely to be subject to significant effects; and
- Cumulative effects in relation to turbines under 50 m to blade tip height, single turbines beyond 5 km from the outermost wind turbines of the Development and schemes at Scoping stage (except where otherwise stated).

5.4.4 Design Parameters

15. Potential landscape and visual effects associated with the Development have been a key consideration in the design evolution, to be balanced against onsite constraints and maximising wind yield. Landscape and visual objectives have included the consideration of effects on residential visual amenity from nearby properties and the composition of the layout in key views from the Upper Tweeddale NSA.

16. Micrositing of turbines (up to 50 m as specified in **Chapter 3: Project Description**) is considered unlikely to result in changes to predicted landscape or visual effects, and therefore will not materially alter the findings of this assessment. Further information on the design process is included in **Chapter 3: Project Description**.

5.4.5 Baseline Survey Methodology

17. Field survey work was carried out during several visits under differing weather conditions between October 2019 and September 2020, and records were made in the form of field notes and photographs. Field survey work included a visit to the Site, visits to viewpoints and designated landscapes, visits to residential properties (from publicly accessible locations) within 2 km of the outermost wind turbines of the Development, and extensive travel around the Study Area to consider potential effects on landscape character and on experiences of views seen from specific viewpoints, settlements and routes.

5.4.5.1 Desk Based Research and Data Sources

18. The following data sources have informed the baseline and assessment:

Landscape Character and Landscape Capacity

- SNH (2019), Scottish Landscape Character Types Maps and Descriptions[25];

[25] SNH (2019), Scottish Landscape Character Types Maps and Descriptions [Online] Available at: https://www.arcgis.com/apps/webappviewer/index.html?id=e3b4fbb9fc504cc4abd04e1ebc891d4e&extent=-2030551.0017%2C6851563.2052%2C1100309.6769%2C8923312.4198%2C102100 (Accessed 30/03/2021)

- Scottish Borders Council (2016), Wind Energy Consultancy Update of Wind Energy Landscape Capacity and Cumulative Impact Study; and
- ASH Consulting Group (1998), The Borders Landscape Assessment[26].

Designated Areas

- SNH (2010), The special qualities of the National Scenic Areas, SNH Commissioned Report No.374[27];
- NatureScot and Historic Environment Scotland (2020), Guidance on Designating Local Landscape Areas[28];
- Scottish Borders Council (2012), Local Landscape Designations Supplementary Planning Guidance[29];
- Midlothian Council (2017), Special Landscape Areas Supplementary Guidance[30];
- East Lothian Council (2018), Special Landscape Areas Supplementary Guidance[31];
- West Lothian Council (2013), West Lothian Local Landscape Designation Review[32]; and
- South Lanarkshire Council (2010), Validating Local Landscape Designations[33].

Data Sources

- Ordnance Survey (OS) Maps at 1:50,000 and 1:25,000 scales;
- OS Terrain® 5 height data (DTM);
- OS Terrain® 50 height data (DTM);
- Ordnance Survey 1:25,000 raster data;
- Ordnance Survey 1:50,000 raster data; and
- Ordnance Survey 1:250,000 raster data.

Cumulative Assessment

- Data from other wind farm applications for the cumulative assessment[34]; and
- Scottish Borders Council and the Energy Consents Unit (websites) to inform the cumulative assessment.

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[26] ASH Consulting Group (1998), The Borders Landscape Assessment. [Online] Available at: https://www.nature.scot/naturescot-review-112-borders-landscape-character-assessment (Accessed 30/03/2021)
[27] SNH (2010) The special qualities of the National Scenic Areas. Scottish Natural Heritage Commissioned Report No.374 (iBids and Project no 648) [Online] Available at: https://www.nature.scot/naturescot-commissioned-report-374-special-qualities-national-scenic-areas (Accessed 30/03/2021)
[28] SNH (2020), Guidance on Designating Local Landscape Areas. [Online] Available at: https://www.nature.scot/guidance-designating-local-landscape-areas (Accessed 30/03/2021)
[29] Scottish Borders Council (2012), Local Landscape Designations Supplementary Planning Guidance. [Online] Available at: https://www.scotborders.gov.uk/directory_record/20043/local_landscape_designations/category/28/approved_planning_guidance (Accessed 30/03/2021)
[30] Midlothian Council (2017), Special Landscape Areas Supplementary Guidance. [Online] Available at: https://www.midlothian.gov.uk/downloads/file/3206/special_landscape_areas_supplementary_guidance (Accessed 30/03/2021)
[31] East Lothian Council (2018), Special Landscape Areas Supplementary Guidance. [Online] Available at: https://www.eastlothian.gov.uk/downloads/download/13103/supplementary_planning_guidance_spg (Accessed 30/03/2021)
[32] West Lothian Council (2013), West Lothian Local Landscape Designation Review. [Online] Available at: https://www.westlothian.gov.uk/media/4841/West-Lothian-Local-Landscape-Designation-Review/pdf/WestLothianLocalLandscapeDesignationReview(LLDR)-FinalReportJune2013.pdf (Accessed 30/03/2021)
[33] South Lanarkshire Council (2010), Validating Local Landscape Designations. [Online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/factsheet/2018/06/south-lanarkshire-council-planning-authority-core-documents/documents/renewable-energy/landscape-designations-report/landscape-designations-report/govscot%3Adocument/SLC_Landscape_Designations_Report_-_Nov_2010.pdf (Accessed 30/03/2021)
[34] A cut-off date of 26th January 2021 was applied for the inclusion of developments within the cumulative assessment

5.4.6 Methodology for the Assessment of Effects

19. The significance of the potential effects of the Development was classified by professional consideration of the sensitivity of the receptor and the magnitude of the potential effect.

5.4.6.1 Sensitivity of Receptors

20. The sensitivity of the baseline conditions, including the importance of environmental features on or near to the Site or the sensitivity of potentially affected receptors, was assessed in line with best practice guidance, legislation, statutory designations and / or professional judgement.

21. Judgements regarding the sensitivity of landscape or visual receptors require consideration of both the susceptibility of the landscape or visual receptor to the type of development proposed and the value attached to the landscape or visual receptor or view. Judgements have been recorded as high, medium, or low. Detailed information about the approach to the assessment of sensitivity for both landscape and visual receptors is provided in Appendix A5.1.

5.4.6.2 Magnitude of Change

22. The magnitude of change was identified through consideration of the Development, the degree of change to baseline conditions predicted as a result of the Development, the duration and reversibility of an effect and best practice guidance and legislation.

23. Judgements regarding the magnitude of landscape or visual change have been recorded as high, medium, or low and combine an assessment of the size, scale and geographical extent of the landscape or visual effect, its duration and reversibility. Detailed information about the approach to the assessment of magnitude for both landscape and visual receptors is provided in Appendix A5.1.

5.4.6.3 Significance of Effect

24. The sensitivity of the receptor and the magnitude of the predicted effects was used as a guide, in addition to professional judgement, to predict the significance of the likely effects.

25. Appendix A5.1 provides full details of the criteria considered in judging the identified aspects of sensitivity (susceptibility and value) and magnitude of change (size/scale, geographical extent, duration and reversibility), and the grades used to describe each.

26. In terms of the direction of effects (positive or adverse), there is a wide spectrum of opinion regarding wind energy development. To cover the worst-case scenario, effects are assumed to be adverse, unless stated otherwise.

27. This determination requires the application of professional judgement and experience to take on board the many different variables which need to be considered, and which are given different weight according to site-specific and location-specific considerations in every instance. Judgements have been made on a case by case basis, guided by the principles set out in Diagram 1 of Appendix A5.1.

28. Although a numerical or formal weighting system has not been applied, consideration of the relative importance of each aspect was made to feed into the overall decision. Levels of effect have been identified as negligible, minor, moderate or major, where moderate and major effects are considered significant in the context of the EIA Regulations.

5.4.7 Assessment Limitations

29. No substantial information gaps have been identified during the preparation of baseline information or the undertaking of the assessment, and it is considered that there is sufficient information to enable an informed decision to be taken in relation to the

identification and assessment of likely significant effects on landscape, views, and visual amenity.

5.4.8 Embedded Mitigation

30. Landscape and visual considerations, including the appearance of the Development from key viewpoints, played a key role in the progression of the wind farm design. Consideration was given to the location of the turbines, as well as all ancillary infrastructure. Best practice guidance, including Siting and Designing Wind Farms in the Landscape (SNH, 2017) was considered throughout the design process. The development of the wind farm design is discussed in detail in **Chapter 2: Site Selection & Design**. Further commitments which have been made to reduce landscape and visual effects, such as the protection of vegetation and restoration of disturbed areas after construction are detailed in **Chapter 18: Summary of Mitigation** and will be included within the Construction Environmental Management Plan (CEMP) which will be produced following consent and prior to construction.

5.4.9 Visualisation Methodology

31. The methodology for production of the visualisations was based on current good practice guidance as set out by SNH[35]. Detailed information about the approach to viewpoint photography, ZTV and visualisation production is provided in Appendix A5.2.

5.5 LANDSCAPE BASELINE CONDITIONS

5.5.1 Introduction

32. This section presents an overview of the landscape baseline including current landscape character (including constituent landscape elements), landscape condition and any designations attached to the landscape.

5.5.2 The Site and Context

33. The Site context is described in **Chapter 2: Site Selection & Design** and detailed information on the Development is provided in **Chapter 3: Project Description**, including Figure 3.1. In landscape terms, the Site forms part of the Cloich Hills which fall within the Plateau Outliers LCT, within the Scottish Borders. The Site is covered by forestry at various stages of the planting, growing, and felling cycle.

34. Landform varies within the Site, with elevation ranging from approximately 280 m Above Ordnance Datum (AOD) in the north-east of the Site to approximately 476 m AOD at the peak of Crailzie Hill in the south. The topography of the Site comprises the rolling Cloich Hills, including Peat Hill (466 m AOD), Ewe Hill (462 m AOD), White Rig (325 m AOD) and Crailzie Hill. The hills are crossed by several watercourses in narrow valleys, including Middle Burn, Flemington Burn, Martyr's Dean, Courhope Burn and Harehope Burn. Those watercourses that flow south-west feed into the Flemington Burn in the west of the Site and eventually feed into the River Tweed. Those watercourses that flow down to the north-east of the Site feed into Middle Burn and Shiplaw Burn which feeds into Eddlestone Water and eventually the River Tweed.

35. There is one building within the Cloich Hills, a derelict property at Courhope to the south of Ewe Hill. However, this property is not within the Site boundary. On the north-eastern Site boundary there is a property and outbuildings at Cloich Farm. There is evidence of historic settlement within the Site in the form of settlements, enclosures and sheepfolds.

36. Access to the Site is via an existing unclassified road connecting to the A703 in the east via Shiplaw, which runs through the lower-lying valley landscape associated with the

[35] SNH (2017). Visual Representation of Wind Farms, Version 2.2

Eddleston Water. There are forestry tracks within the Site and the track to the south of Courhope forms part of the Cross Borders Drove Road, one of Scotland's Great Trails. Another promoted path runs between Courhope and Cloich Farm. A Right of Way runs along the valley to the west of Crailzie Hill, as shown on Figures 5.1.2 and 5.1.3.

37. Within 5 km to the south and west of the Site, the predominant land cover is one of open, elevated moorland-covered hills, including Wether Law (479 m AOD) and Hag Law (446 m AOD) which flank the Site to the west, and Black Meldon (407 m AOD) and White Meldon (427 m AOD) to the south. Beyond these hills, on lower-lying land near the main roads of the A701 to the west and A72 to the south, properties and settlements are more frequent. There are also properties and settlements located within 5 km to the east, along the A703 Peebles to Penicuik road, including the settlement of Eddleston and clusters of properties at Nether Kidston, Redscarhead, Cringletie, Wormiston, Milkieston and Hattonknowe.

38. The closest residential properties within approximately 2 km of the Development are located at Stewarton to the east of the Site, Harehope to the south, Early Burn and Whitelaw Burn to the east, and Cloich Farm to the north-east of the Development.

5.5.3 The Study Area

39. The Study Area, shown in Figure 5.1.1, extends to a 40 km radius from the outermost turbines of the Development in all directions. The majority of the Study Area to the south and east is within the Council area. The north-east of the Study Area falls within the Midlothian Council area (3 km from the Site) and East Lothian Council area (23 km from the Site). The west of the Study Area largely falls within the South Lanarkshire Council area, approximately 7.5 km to the west of the Site, whilst West Lothian, North Lanarkshire and Falkirk Council areas are in the north-west, at distances of 12 km, 29 km and 35 km from the Site, respectively. Parts of the north of the Study Area fall within the City of Edinburgh Council area and Fife Council area, at approximately 11 km and 30 km from the Site, respectively.

40. The landscape character of the Study Area is varied and includes: hills and ridges, upland and lowland valleys, and lowland plains and grasslands in the north; upland fringes, plateau moorland and grasslands intersected by upland valleys in the east; southern uplands and rocky upland fringes interspersed by upland glens and valleys to the south; and plateau moorlands and farmland with upland and incised river valleys in the west.

41. Within the Study Area, forestry is a common feature of the higher ground extending to the east of the Site, notably across extensive areas of the southern Moorfoot Hills, near Peebles. Smaller blocks of forestry and occasional areas of broadleaved woodland are scattered throughout the Study Area, particularly across the land between the Pentland Hills and Moorfoot Hills. On the lower slopes and flatter ground between these ridges, there is a predominance of agricultural land.

42. The Study Area is well-populated, with the larger settlements of Peebles located approximately 5.5 km to the south-east of the Site, and Penicuik approximately 9 km to the north. In addition, there are several small villages, individual farmsteads and hamlets. Other more distant settlements within the Study Area include: Innerleithen, Selkirk, Galashiels and Melrose to the south-east; Biggar to the south-west; Lanark to the west; Livingston and Bathgate to the north-west; and the City of Edinburgh to the north.

43. At its closest, the A701, which is the main road running between Edinburgh and Dumfries, is approximately 2 km to the west of the Site. The A702 runs broadly parallel to the west of the A701, connecting Edinburgh with the A74(M) in the south-west. It is approximately 5.5 km to the west of the Site at its closest point. The A703 is located to the east of the Site running along the valley of the Eddleston Water. In addition, the A72 (Hamilton to

Galashiels road) is approximately 3 km to the south of the Site running adjacent to the River Tweed and Lyne Water.

44. There are several long-distance footpaths within the Study Area, including the Cross Borders Drove Road which crosses the Site, and runs from the north-west of the Study Area towards Hawick in the south-east. The Southern Upland Way is in the south and east of the Study Area, and at its closest is approximately 16 km to the south-east of the Site. The Borders Abbey Way and St. Cuthbert's Way are also located in the south-east of the Study Area, near Melrose, at distances in excess of 30 km from the Site. In addition, the John Buchan Way crosses the southern part of the Study Area between Peebles and Broughton, and at its closest is approximately 7 km from the Site.

45. There are numerous National Cycle Network (NCN) routes within the Study Area, including NCN Route 1 which runs adjacent to the River Tweed from Galashiels to Innerleithen before travelling north along the B709, through the Moorfoot Hills towards Edinburgh. An NCN Link continues from Innerleithen to Peebles, and NCN Route 196 is located to the north of the Site near Penicuik. NCN Route 74 runs broadly adjacent to the A74(M) in the south-west of the Study Area, and there are several additional NCN routes to the north of the Pentland Hills in West Lothian and Edinburgh.

46. There are several existing large-scale wind farms within the Study Area. The closest, Bowbeat Wind Farm, is within 10 km of the Site, in the Moorfoot Hills to the east. Refer to Table 5.7 for further detail of wind farms in the area.

47. There are several designated and non-designated cultural heritage assets within the Study Area. Further information on these is provided in **Chapter 6: Archaeology and Cultural Heritage**.

5.5.4 Landscape Character Types

48. This section provides a description of landscape character (including constituent landscape elements) – drawing on published studies, supplemented with project specific research and field work where relevant.

49. The landscape character of the Study Area is described in the online 'Scottish Landscape Character Assessment', published by NatureScot in 2019. LCTs across the Study Area are shown in Figure 5.1.4 and are shown overlaid with the ZTV in Figure 5.1.5.

50. Except for part of the minor road (D18 – area 1) running from the A703 to Cloich Forest, most of the Site lies within LCT92 – Plateau Outliers. This is an upland plateau landscape comprising hills and ridges covered by a mosaic of coarse grassland, heather and forestry, separated by major river valleys. Settlement is of a low density and widely dispersed in this landscape, and where present is confined to sheltered valleys. Land use is predominately rough grazing, moorland, and forestry. The landscape of the Plateau Outliers is large in scale, with a notable difference in relief (between 250 m and 380 m) between the valley floors and hill summits.

51. The LCTs within 40 km of the Site are listed in Table 5.2 below. Theoretical visibility of the proposed wind turbines of the Development (ZTV coverage) is used as a means of identifying which LCTs require further assessment, and which LCTs can be scoped out because they are unlikely to experience significant effects arising from the Development. LCTs beyond 15 km from the Site, and those with limited theoretical visibility within 15 km of the Site, are not considered further within the assessment.

Table 5.2: Landscape Character Types

Landscape Character Types	Theoretical visibility of proposed wind turbines of the Development (ZTV coverage) and other considerations to determine if LCT carried forward for detailed assessment
0 - Urban	Limited visibility beyond 20km. Not considered further.
90 - Dissected Plateau Moorland	Widespread visibility across this LCT. **Considered in the assessment.**
91 - Plateau Grassland - Borders	Limited visibility beyond 15km. Not considered further.
92 - Plateau Outliers	Widespread visibility across this LCT, as the Development is within this LCT. **Considered in the assessment.**
93 – Southern Uplands with Scattered Forest – Borders	Intermittent visibility throughout this LCT to the south of the Site. **Considered in the assessment.**
94 - Rolling Moorland	No visibility from this LCT. Not considered further.
95 – Southern Uplands – Borders	Extensive visibility across this LCT to the south of the Site. **Considered in the assessment.**
96 - Southern Uplands with Forest - Borders	No visibility from this LCT. Not considered further.
99 – Rolling Farmland – Borders	Widespread visibility across this LCT. **Considered in the assessment.**
101 - Rocky Upland Fringe	No visibility from this LCT. Not considered further.
102 – Upland Fringe with Prominent Hills	Large areas of theoretical visibility from distances of 3.5 km and 10 km. **Considered in the assessment.**
103 - Undulating Upland Fringe	No visibility from this LCT. Not considered further.
104 – Upland Fringe Rough Grassland	Extensive visibility across this LCT to the north-east of the Site. **Considered in the assessment.**
108 - Lowland Margin	No visibility from this LCT. Not considered further.
109 - Lowland Margin with Hills	No visibility from this LCT. Not considered further.
113 – Upland Valley with Pastoral Floor	Intermittent theoretical visibility across this LCT, within 5 km of the Site. **Considered in the assessment.**
114 – Pastoral Upland Valley	Widespread visibility across this LCT to the east of the Site. **Considered in the assessment.**
115 - Upland Valley with Mixed Farmland	No visibility from this LCT. Not considered further.
116 – Upland Valley with Woodland	Intermittent theoretical visibility across this LCT, within 5 km of the Site. **Considered in the assessment.**
117 - Pastoral Upland Fringe Valley	No visibility from this LCT. Not considered further.
118 - Settled Upland Fringe Valley	No visibility from this LCT. Not considered further.
119 - Wooded Upland Fringe Valley	No visibility from this LCT. Not considered further.
120 - Lowland Valley with Farmland	No visibility from this LCT. Not considered further.
151 - Lowland Plateaux - Central	No visibility from this LCT. Not considered further.
152 - Lowland River Valleys - Central	No visibility from this LCT. Not considered further.

Landscape Character Types	Theoretical visibility of proposed wind turbines of the Development (ZTV coverage) and other considerations to determine if LCT carried forward for detailed assessment
155 - Coastal Farmland - Central	No visibility from this LCT. Not considered further.
166 - Upland Glens - Dumfries Galloway	Very limited visibility from this LCT, at distances over 30 km. Not considered further.
176 - Foothills with Forest - Dumfries Galloway	No visibility from this LCT. Not considered further.
177 - Southern Uplands - Dumfries Galloway	Very limited visibility from this LCT, at distances over 30 km. Not considered further.
178 - Southern Uplands with Forest - Dumfries Galloway	No visibility from this LCT. Not considered further.
192 - Coastal Hills - Fife	No visibility from this LCT. Not considered further.
195 - Coastal Braes	No visibility from this LCT. Not considered further.
196 - Coastal Flats - Fife	No visibility from this LCT. Not considered further.
200 - Rolling Farmland - Glasgow Clyde Valley	Large areas of theoretical visibility, but at distances over 25 km. Not considered further.
201 – Plateau Farmland – Glasgow & Clyde Valley	Limited visibility from this LCT, at distances in excess of 10 km. Not considered further.
204 - Incised River Valley	No visibility from this LCT. Not considered further.
207 - Upland River Valley - Glasgow Clyde Valley	No visibility from this LCT. Not considered further.
208 - Broad Valley Upland	Limited theoretical visibility across this LCT, at distances in excess of 20 km. Not considered further.
209 - Upland Glen - Glasgow Clyde Valley	Very limited visibility from this LCT, at distances over 20 km. Not considered further.
210 – Undulating Farmland and Hills	Some visibility from the eastern and central part of this LCT. **Considered in the assessment.**
212 – Moorland Hills – Glasgow & Clyde Valley	Large areas of theoretical visibility from Site-facing slopes. **Considered in the assessment.**
213 - Plateau Moorland - Glasgow Clyde Valley	Limited theoretical visibility from Site-facing slopes in this LCT, however at distances of over 20 km. Not considered further.
219 - Broad River Valley	No visibility from this LCT. Not considered further.
266 - Plateau Moorland – Lothians	Intermittent visibility throughout this LCT, within 10 to 15 km of the Site. **Considered in the assessment.**
267 - Plateau Grassland - Lothians	Limited theoretical visibility across this LCT, at distances in excess of 20 km. Not considered further.
268 – Upland Hills – Lothians	Some visibility from Site-facing slopes within this LCT, at distances of approximately 10 km. **Considered in the assessment.**
269 – Upland Fringes – Lothians	Extensive visibility across this LCT to the north-east of the Site. **Considered in the assessment.**
270 - Lowland River Valleys – Lothians	Widespread visibility throughout this LCT, within 10 km of the Site. **Considered in the assessment.**
271 - Lowland River Corridors - Lothians	No visibility from this LCT. Not considered further.

Landscape Character Types	**Theoretical visibility of proposed wind turbines of the Development (ZTV coverage) and other considerations to determine if LCT carried forward for detailed assessment**
272 - Lowland Hills and Ridges – Lothians	Intermittent visibility throughout this LCT, in excess of 10 km. Not considered further.
273 - Lowland Plateaux - Lothians	No visibility from this LCT. Not considered further.
274 - Lowland Plain	No visibility from this LCT. Not considered further.
275 - Lowland Farmed Plain - Lothians	Some theoretical visibility from this LCT, at distances over 25 km. Not considered further.
276 - Lowland Hill Fringes - Lothians	No visibility from this LCT. Not considered further.
278 - Coastal Terrace - Lothians	Some theoretical visibility from this LCT, at distances over 25 km. Not considered further.
279 - Settled Coastal Farmland	Some theoretical visibility from this LCT, at distances over 25 km. Not considered further.
280 - Coastal Farmland - Lothians	No visibility from this LCT. Not considered further.

52. The Council's Supplementary Guidance on Renewable Energy (2018) sets out detailed policy considerations against which all proposals for wind energy will be assessed. It contains the onshore spatial framework as required by SPP, identifying areas where wind farms will not be acceptable, areas of significant protection, and areas with potential for wind farm development. The Site falls within an area with potential for wind farm development[36].

53. The Council's Update of Wind Energy Landscape Capacity and Cumulative Impact Study (Ironside Farrar, 2016) forms part of the Supplementary Guidance on Renewable Energy. The study is based on the Borders Landscape Character Assessment (ASH Consulting Group, 1998) which has now been superseded by SNH's online character assessment. The Site forms part of the *Central Southern Uplands*, and falls within *LCT 3 Plateau Outliers*, subtype *(i) Eddleston / Lyne Interfluve*. At the time of preparation, the study noted that "*There is a Section 36 proposal currently pending for 18no turbines at Cloich Forest*." The *Eddleston / Lyne Interfluve* subtype is identified as being of Medium/High landscape sensitivity and Medium/High landscape value, with no capacity for 'very large' turbines (100 m +) and low capacity for 'medium' (25-50 m) and 'large' (50-100 m) turbines. The study states that "*Large turbine developments should be avoided in the more prominent areas and take advantage of the topographical containment the landscape provides.*"[37]

[36] Scottish Borders Council (2018) Supplementary Guidance Renewable Energy [Online] Available at: https://www.scotborders.gov.uk/downloads/download/659/draft_renewable_energy_supplementary_guidance (Accessed 29/03/2021)
[37] Ironside Farrar (2016) Update of Wind Energy Landscape Capacity and Cumulative Impact Study [Online] Available at: https://www.scotborders.gov.uk/downloads/download/659/renewable_energy_supplementary_guidance (pg.37) (Accessed 29/03/2021).

5.5.5 Designated Landscapes

54. The Site is not located within any designated landscapes, however there are a number within the Study Area, including National Scenic Areas (NSAs), Special Landscape Areas (SLAs) and a Regional Scenic Area (RSA).

55. The landscapes within the Study Area which are designated for their scenic or landscape value are listed in Table 5.3 below, shown on Figure 5.1.6 and overlaid onto the ZTV in Figure 5.1.7. Theoretical visibility of the Development is described in the table and used as a means of identifying which designated landscapes require further assessment, and which are unlikely to be affected by the Development and are therefore not considered further.

5.5.5.1 Nationally designated landscapes

56. There are two NSAs located within the Study Area: Upper Tweeddale NSA, and Eildon and Leaderfoot NSA. The Upper Tweeddale NSA is located approximately 2.3 km to the south of the Site, at its closest point, and the Eildon and Leaderfoot NSA is approximately 33 km to the south-east of the Site. The special qualities of NSAs are described in the NatureScot report *'The Special Qualities of the National Scenic Areas'* [38]. Potential implications for the special landscape qualities of the NSAs are considered in Section 5.9.

5.5.5.2 Locally designated landscapes

57. Within the Study Area, locally and regionally designated landscapes include SLAs in the Scottish Borders, East Lothian, Midlothian, West Lothian and South Lanarkshire Council areas and an RSA designation in the Dumfries and Galloway Council area.

58. The Tweed Valley SLA is located approximately 2 km to the south of the Site. There are also many locally designated landscapes across the 40 km Study Area, as outlined in Table 5.3 and illustrated on Figure 5.1.6. Potential implications for the special qualities of the SLAs are considered in Section 5.9.

Table 5.3: Designated Landscapes

Designated Landscape	**Theoretical visibility of proposed wind turbines of the Development (ZTV coverage) and other considerations to determine if Designated Landscape carried forward for detailed assessment**
National Scenic Areas	
Upper Tweeddale (1)	Widespread theoretical visibility at distances of 2 km up to 16 km. **Considered in the assessment.**
Eildon and Leaderfoot (2)	No theoretical visibility. Not considered further.
Special Landscape Areas	
Pentland Hills (Scottish Borders Council, West Lothian Council, Midlothian Council) (1)	Extensive theoretical visibility at distances of 3 km to 13 km. **Considered in the assessment.**
Scottish Borders Council	
Tweed Valley (2)	Large areas of theoretical visibility, at distances of 2 km up to 20 km. **Considered in the assessment.**
Tweedsmuir Uplands (3)	Theoretical visibility, at distances of 5 km to 30 km. **Considered in the assessment.**

[38] SNH (2010) The special qualities of the National Scenic Areas. Scottish Natural Heritage Commissioned Report No.374 (iBids and Project no 648) [Online] Available at: https://www.nature.scot/naturescot-commissioned-report-374-special-qualities-national-scenic-areas (Accessed 30/03/2021)

Designated Landscape	**Theoretical visibility of proposed wind turbines of the Development (ZTV coverage) and other considerations to determine if Designated Landscape carried forward for detailed assessment**
Tweed, Ettrick and Yarrow Confluences (4)	No theoretical visibility. Not considered further.
Lammermuir Hills (5)	Limited theoretical visibility, at distances of between 27 km and 40 km. Not considered further.
Midlothian Council	
Gladhouse Reservoir and Moorfoot Scarp (6)	Extensive theoretical visibility at distances of 4 km to 16 km. **Considered in the assessment.**
South Esk Valley and Carrington Farmland (7)	Limited theoretical visibility, at distances of 9 km to 15 km. Not considered further.
North Esk Valley (8)	Limited theoretical visibility. Not considered further.
Tyne Valley (9)	Some theoretical visibility, at distances of between 15 km and 25 km. Not considered further.
Fala Moor (10)	Some theoretical visibility at distances of nearly 25 km. Not considered further.
Fala Rolling Farmland and Policies (11)	Limited theoretical visibility at distances of over 25 km. Not considered further.
South Lanarkshire Council	
Pentland Hills and Black Mount (12)	Theoretical visibility at distances of 8 km to 17 km. **Considered in the assessment.**
Upper Clyde Valley and Tinto (13)	Theoretical visibility, at distances over 15 km. Not considered further.
Middle Clyde Valley (14)	Limited theoretical visibility, at distances of over 25 km. Not considered further.
Douglas Valley (15)	Limited theoretical visibility, at distances of over 35 km. Not considered further.
Leadhills and Lowther Hills (16)	Limited theoretical visibility at distances of over 35 km. Not considered further.
West Lothian Council	
Almond and Linehouse Valleys (17)	No theoretical visibility. Not considered further.
Airngath Hill (18)	No theoretical visibility. Not considered further.
Avon Valley (19)	No theoretical visibility. Not considered further.
Bathgate Hills (20)	No theoretical visibility. Not considered further.
Forth Coast (21)	No theoretical visibility. Not considered further.
Blackridge Heights (22)	Limited theoretical visibility at distances of over 35 km. Not considered further.
East Lothian Council	
River Esk (23)	Some theoretical visibility, at distances of over 25 km. Not considered further.
Elphinstone Ridge (24)	Theoretical visibility at distances of over 25 km. Not considered further.
Humbie Head Waters (25)	Limited theoretical visibility at distances of over 25 km. Not considered further.

Designated Landscape	**Theoretical visibility of proposed wind turbines of the Development (ZTV coverage) and other considerations to determine if Designated Landscape carried forward for detailed assessment**
Fisherrow Sands (26)	Some theoretical visibility, at distances of over 25 km. Not considered further.
Prestonpans Coast (27)	Some theoretical visibility, at distances of over 30 km. Not considered further.
Ormiston Yew & Fountainhall (28)	Limited theoretical visibility at distances of over 25 km. Not considered further.
Winton Walks (29)	Some theoretical visibility, at distances of over 30 km. Not considered further.
Garden County Farmland (30)	Some theoretical visibility, at distances of over 35 km. Not considered further.
Samuelston (31)	Some theoretical visibility, at distances of over 35 km. Not considered further.
Bolton (32)	Limited theoretical visibility, at distances of over 35 km. Not considered further.
Clerkington & Tyne (33)	Some theoretical visibility, at distances of over 35 km. Not considered further.
Port Seton to North Berwick Coast (34)	Some theoretical visibility, at distances of over 35 km. Not considered further.
Lammer Law & Hopes to Yester (35)	Limited theoretical visibility, at distances of over 30 km. Not considered further.
Lammermuir Moorland (36)	Limited theoretical visibility, at distances of over 35 km. Not considered further.
Linplum (37)	Some theoretical visibility, at distances of nearly 40 km. Not considered further.
Regional Scenic Areas	
Moffat Hills (Dumfries and Galloway Council) (1)	Limited visibility, at distances of over 30 km. Not considered further.

5.5.6 Wild Land Areas

59. Wild Land Areas (WLA) are not designated but are identified and mapped by NatureScot (2014), with accompanying WLA descriptions published by NatureScot in January 2017[39]. They are afforded *'areas of significant protection'* status within SPP which states that development proposed within these areas should *"demonstrate that any significant effects on the qualities of these areas can be substantially overcome by siting, design or other mitigation"*[40].

60. There is one WLA located within the Study Area, as shown on Figure 5.1.6: Talla - Hart Fells (WLA 2), located approximately 22 km to the south of the Site. Theoretical visibility from Talla - Hart Fells WLA, as illustrated by Figure 5.1.7, is limited to the summit of Hart Fell (808 m AOD) and Craigmaid (553 m AOD). At distances of over 29 km it is not anticipated that this visibility will result in any significant landscape or visual effects within

[39] SNH (2017) Wild Land Area descriptions [Online] Available at: https://www.nature.scot/wild-land-area-descriptions
[40] The Scottish Government (2014) Scottish Planning Policy [Online] Available at: https://www.gov.scot/publications/scottish-planning-policy/ (pg.39) (Accessed 29/03/2021).

the WLA, nor affect the noted key attributes and qualities of the WLA. The WLA is therefore not considered further in the assessment.

5.5.7 Gardens and Designed Landscapes

61. There are several Inventory-listed Gardens and Designed Landscapes (GDL) and Local GDLs within the Study Area. Within 5 km of the Development these include: Barony Castle; Portmore; The Whim; Lamancha; Macbiehill; Halmyre; Kaimes; Romanno; Spitalhaugh; Scotstoun and Cringletie. There is widespread theoretical visibility of the Development from these GDLs in addition to more distant GDLs including Rutherford Castle, Lynedale/ Medwyn and Slipperfield House. Of these GDL, only Portmore is open to the public (on limited days in the summer). Barony Castle and Cringletie are hotels. Effects on the setting of GDLs are considered in detail within **Chapter 6: Archaeology and Cultural Heritage**. Effects on views from Portmore House, which is periodically open to the public, with the wider areas of the GDL also being accessible to recreational walkers at all times, are considered in the visual assessment. Dawyck Botanic Garden, which is open to the public, is considered in the assessment of effects on the Upper Tweeddale NSA in Section 5.9.4.

5.6 VISUAL BASELINE CONDITIONS

5.6.1 Introduction

62. This section describes the extent of theoretical visibility of the Development within the Study Area and identifies the visual receptors that will be assessed. This section also introduces the representative viewpoints that will be used to assess effects on visual receptors, including the reasons for their selection.

5.6.2 Analysis of Visibility of the Development

63. Figures 5.1.2 and 5.1.3 show the theoretical visibility of the Development to maximum blade tip height (149.9 m) and maximum hub height (83.4 m) respectively. The ZTV indicates that across the Study Area theoretical visibility of the Development is relatively widespread within approximately 10 km of the Site, becoming more localised beyond this distance.

64. Within 5 km of the Site there is theoretical visibility from the A703 and minor roads in the east as they run along the Eddleston Valley. This includes visibility from the small settlement of Eddleston, the hamlets of Milkieston and Redscarhead, and numerous properties and farmsteads in the valley. Visibility from the A701 to the north-west is indicated as being limited to between 1 and 8 turbines, and generally only turbine blades will be visible. There is limited theoretical visibility from clusters of properties at Whim Farm, Damside, Romannobridge and Mountain Cross. There is no visibility from the A72 to the south-west within 5 km of the Site. There is theoretical visibility from several hill summits within 5 km, including: Wether Law immediately west of the Site, Whiteside Hill to the south-west, and Black Meldon and White Meldon to the south, the latter being located within the Tweed Valley SLA. There is theoretical visibility from the Cross Borders Drove Road which passes through the Site, between Hamilton Hill in the south-east and the outskirts of West Linton in the north-west.

65. Between 5 km and 10 km from the Site there is theoretical visibility from summits and west-facing slopes of the Moorfoot Hills to the east, including from the fringes of the Gladhouse Reservoir and Moorfoot Scarp SLA. There is also theoretical visibility from the farmed upland fringes to the north-east of the Site, including the A703, parts of the A701, and the A6094. There is visibility indicated from parts of the Pentland Hills SLA between Auchencorth Moss to the north, and Mendick Hill to the west. There is theoretical visibility from the A702 to the north-west and several settlements including West Linton, Carlops

and Dolphinton. There is visibility indicated from the Upper Tweeddale NSA to the south including parts of the B172 and Cademuir Hill. There is theoretical visibility from parts of Peebles to the south-east and parts of Glentress Forest within the Tweed Valley SLA.

66. Between 10 km and 20 km from the Site theoretical visibility is mostly from hill tops and slopes facing the Site, and the farmed upland fringes to the north-east including parts of the A702, A703, Penicuik, Loanhead on the outskirts of Edinburgh and Gorebridge. There is visibility indicated from the Moorfoot Scarp and parts of Gladhouse Reservoir to the north-east. There is visibility indicated from the Pentland Hills to the west and north-west including from West Cairn Hill, Byrehope Mount, Black Law and Dunsyre Hill. From the south-west there is theoretical visibility from parts of the A721 around Elsrickle. From the south there is visibility from the Upper Tweeddale NSA including from the area around Dawyck to the east of the B712, and from hill tops including Stob Law and Pykestone Hill. From the south-west there is theoretical visibility from parts of the Tweed Valley and Tweedsmuir Uplands SLAs, south of Peebles and Innerleithen.

67. Between 20 km and 40 km from the Site there is theoretical visibility from: rolling farmland to the north-east, including parts of the Lammermuir Hills and Fala Moor; the summits of the Moffat Hills to the south; the Tinto Hills to the south-west; and rolling farmland and moorland around Lanark and Forth to the west.

5.6.3 Key Visual Receptors

68. Potential visual receptors include:

- Residents, including views from isolated properties, scattered communities or defined settlements;
- Road users (including those travelling on recognised tourist routes);
- Those engaged in recreational activities (e.g. hill walkers and cyclists); and
- People at their place of work, including agricultural workers.

5.6.4 Selection of Viewpoints for Assessment

69. This section sets out the viewpoints that are used to represent and assess the visual effects of the Development. The viewpoint list is a representative selection of locations agreed with the statutory consultees; it is not an exhaustive list of locations from which the Development will be visible.

70. A total of 26 viewpoints were selected through desk study, site work, and discussions with statutory consultees (as detailed in Table 5.1). The viewpoints are all publicly accessible, as advocated by GLVIA3[41], and include:

- Locations selected to represent the experience of different types of receptor;
- Locations at different distances to provide a representative range of viewing angles and distances (i.e., short, medium and long-distance views);
- Locations which illustrate key cumulative interactions with other existing, consented and/or proposed wind farms (i.e., either in combined or successive views);
- Locations which represent a range of viewing experiences (i.e., static views and points along sequential routes);
- Specific viewpoints selected because they represent promoted views or viewpoints within the landscape; and
- Illustrative viewpoints chosen specifically to demonstrate a particular visual effect or specific issue (which could include restricted visibility in particular locations).

71. The viewpoints used to assess the visual effects are listed in Table 5.4 below and their locations are shown on Figure 5.1.2.

[41] The selection of viewpoints for LVIA should take account of the factors listed in Paragraph 6.20 of GLVIA3.

Table 5.4: Viewpoint Locations

Viewpoint Locations[42]					
No.	Location	Reason for Selection	Grid Reference		Approx. Distance (km)**[43]**
			Easting	Northing	
1	Cross Borders Drove Road (west)	Represents views of recreational walkers along the Cross Borders Drove Road (one of Scotland's Great Trails) which passes through the Site.	318590	646165	1.4
2	Cross Borders Drove Road (east)	Represents views of recreational walkers along the Cross Borders Drove Road (one of Scotland's Great Trails) which passes through the Site.	322527	644769	2.4
3	Old Post Road Core Path (east of Observatory)	Represents views of residents, road users and walkers on a minor road and Core Path.	323157	649501	2.8
4	Black Meldon	Represents views of recreational receptors at a hilltop location within the Upper Tweeddale NSA.	320617	642509	3.5
5	Meldon Valley	Represents views of road users and recreational receptors at a gateway to the Upper Tweeddale NSA.	321290	642463	3.7
6	Core Path 154 near Eddleston	Represents views of walkers travelling along Core Path 154 to the east of Eddleston.	324732	647452	3.6
7	Minor Road near Spylaw and Wester Deans	Represents views of road users on this minor road, and residential receptors at Spylaw Cottage and Wester Deans.	322064	652223	3.8
8	B7059 between Boghouse and Kaimhouse	Represents views of road users and residents.	316572	649749	3.7
9	Portmore House	Represents views of recreational receptors within Portmore Inventory-listed Garden and Designed Landscape.	325190	648820	4.4
10	A701 Mountain Cross	Represents views of road users and residents at Mountain Cross.	314968	646687	5.0
11	A703 near Langside Farm (North of Peebles)	Represents views of road users and residents, adjacent to the A703 to the north of Peebles and within the Tweed Valley SLA.	324940	641911	6.1
12	A702, approach to West Linton	Represents views of road users on the A702. This viewpoint is within the Pentland Hills SLA.	315377	652513	6.1

[42] A number of the viewpoint locations are also used as assessment points within the Assessment of Effects on Special Landscape Qualities in Section 5.9
[43] Distance between viewpoint and the nearest wind turbine of the Development.

Viewpoint Locations[42]					
No.	Location	Reason for Selection	Grid Reference		Approx. Distance (km)[43]
			Easting	Northing	
13	A703 Lay-by	Represents views of road users along the A703, to the north-east of the Site.	324064	654031	6.4
14	B712 / Stobo Road	Represents views of road users within the Upper Tweeddale NSA.	319392	639277	6.7
15	Path near Wester Happrew Burn	Represents views of recreational receptors along the path near Riding Hill and within the Tweedsmuir Uplands SLA.	315460	640528	7.1
16	Haswellskyes	Represents views of road users and recreational receptors within the Upper Tweeddale NSA.	321175	638649	7.4
17	Glentress Forest, Makeness Kipps	Represents views of recreational receptors at the summit of Makeness Kipps.	328116	644817	7.3
18	A702, Dolphinton	Represents views of road users and residents adjacent to the A702, near Dolphinton. This viewpoint is on the edge of the Pentland Hills and Black Mount SLA.	310609	646807	9.4
19	Cademuir Hill Fort	Represents views of recreational receptors visiting Cademuir Hill Fort, within the Upper Tweeddale NSA.	323039	637489	9.0
20	Blackhope Scar	Represents views of walkers on the edge of the Gladhouse Reservoir and Moorfoot Scarp SLA.	331511	648324	10.4
21	Gladhouse Reservoir	Represents views of road users and visitors to Gladhouse Reservoir, in the Gladhouse Reservoir and Moorfoot Scarp SLA.	330486	654310	11.5
22	Carnethy Hill	Represents views of recreational receptors at a hilltop location within the Pentland Hills SLA.	320390	661900	13.0
23	Stob Law	Represents views of recreational receptors at a hilltop location within the Upper Tweeddale NSA.	323063	633292	13.1
24	Bleak Law	Represents views of recreational receptors at the hill summit, within the Pentland Hills and Black Mount SLA.	306724	650780	13.6
25	Lee Pen	Represents views of recreational receptors at a hilltop location within the Tweed Valley SLA.	332599	638604	14.1
26	B7007 (northern edge of Moorfoot Hills)	Represents views of road users within the Gladhouse Reservoir and Moorfoot Scarp SLA.	335230	654774	15.9

5.6.5 Settlements

72. Settlements are those defined as such within the Scottish Borders Local Development Plan (2016), West Lothian Local Development Plan (2018), Midlothian Local Development Plan (2017) and South Lanarkshire Proposed Local Development Plan 2 (2018).

73. Settlements considered in the assessment are detailed in Table 5.5 below. In order to focus on potentially significant effects, settlements from which there is no theoretical visibility are not considered further in this assessment (see ZTV in Figure 5.1.2). In addition, settlements with limited visibility over a longer distance (i.e. beyond 15 km from the Development), where views of the surrounding landscape (including the Site) are not important to setting and where it is unlikely that significant effects could occur are not considered further in the assessment. The ZTV does not take account of any screening or filtering of views by built form or vegetation, which will substantially reduce visibility from most settlements.

Table 5.5: Settlements

Settlement	Theoretical Visibility of Development (ZTV coverage)
Within 5 km	
Eddleston (Scottish Borders)	Extensive theoretical visibility across the settlement, potential for close-range views of turbines. **Considered in the assessment.**
Romannobridge (Scottish Borders)	Theoretical visibility across the settlement, potential for close-range views of turbines. **Considered in the assessment.**
West Linton (Scottish Borders)	Theoretical visibility (generally low levels) across the settlement. **Considered in the assessment.**
Within 5-15 km	
Auchendinny (Midlothian)	Limited theoretical visibility from across this settlement. Not considered further.
Blyth Bridge (Scottish Borders)	Theoretical visibility (generally low levels) is indicated across the settlement; however, views are likely to be screened by intervening vegetation. Not considered further.
Broughton (Scottish Borders)	No theoretical visibility. Not considered further.
Candy Mill (South Lanarkshire)	No theoretical visibility. Not considered further.
Cardrona (Scottish Borders)	No theoretical visibility. Not considered further.
Carlops (Scottish Borders)	Low levels of theoretical visibility across this settlement, however views are likely to be screened by intervening vegetation. Not considered further.
Dolphinton (Scottish Borders)	Extensive theoretical visibility is indicated across the settlement. **Considered in the assessment.**
Dunsyre (South Lanarkshire)	Theoretical visibility from across the entirety of this settlement; however, views are likely to be screened by intervening vegetation. Not considered further.
Elsrickle (South Lanarkshire)	Some limited theoretical visibility from this settlement; however, views are likely to be

Settlement	Theoretical Visibility of Development (ZTV coverage)
	screened by intervening vegetation. Not considered further.
Howgate (Midlothian)	Some limited theoretical visibility from this settlement; however, views are likely to be screened by intervening vegetation. Not considered further.
Peebles (Scottish Borders)	Some limited theoretical visibility is indicated from this settlement; however, the presence of intervening-built development and vegetation is likely to largely screen the development from view. Some visibility may be experienced by residential receptors located along the A703, near the settlement boundary. **Considered in the assessment.**
Penicuik (Midlothian)	Theoretical visibility is indicated across the settlement, particularly in the north. However, the presence of intervening-built development and vegetation will likely screen / filter views. Not considered further.
Silverburn (Midlothian)	Theoretical visibility is indicated from across the entirety of this settlement; however, views are likely to be screened by intervening vegetation. Not considered further.
Skirling (Scottish Borders)	No theoretical visibility. Not considered further.
Walston (South Lanarkshire)	No theoretical visibility. Not considered further.

5.6.6 Routes

74. Visibility from a route is not uniform along its entire length. This is because views of the surrounding landscape change as one moves along the route depending on the surrounding topography, built form, structures, tree cover and vegetation pattern alongside the route. Theoretical visibility of the Development from routes across the Study Area is illustrated in Figure 5.1.2. They include a hierarchy of roads, railways and recreational routes (promoted long distance footpaths, Core Paths and cycle routes). Road and rail routes tend to use low lying areas or valleys and passes, but walking routes are more variable and often pass over hills and along ridges.

75. Based on an analysis of theoretical visibility and potential views, Table 5.6 below provides information on which routes have been carried forward for detailed assessment. Due to the lower susceptibility of receptors typically using roads and railways, those beyond 10 km from the Site have been scoped out of the assessment. Country lanes have also been scoped out of the assessment as they tend to be less frequently used by large numbers of road users. Due to the higher susceptibility of receptors using promoted long-distance footpaths and cycle routes, these have been included at up to 15 km from the Site. Where there is limited theoretical visibility, or where actual visibility from a route is likely to be limited due to localised screening, these routes are not considered further in this LVIA, as the likelihood for significant sequential effects is limited.

Table 5.6 Routes

Route	Theoretical Visibility of Development (ZTV coverage)
Roads (within 10 km)	
A701	Theoretical visibility along extensive stretches of the road. **Considered in the assessment.**
A703	Theoretical visibility along extensive stretches of the road. **Considered in the assessment.**
A72	Limited theoretical visibility from this route. Not considered further**.**
A702	Theoretical visibility along extensive stretches of the road. **Considered in the assessment.**
A721	Intermittent theoretical visibility indicated from stretches of the route, largely beyond 10 km. Not considered further.
A766	Theoretical visibility indicated from stretches of this route, however likely screened by intervening vegetation and built development. Not considered further.
A6094	Some intermitted visibility along this route. Not considered further.
B7059	Theoretical visibility along extensive stretches of the road. **Considered in the assessment.**
B712	Some intermittent visibility along this route, between 5 km and 8 km. **Considered in the assessment.**
B7062	Some intermittent visibility along this route, however likely screened by intervening vegetation. Not considered further.
B7026	Some intermittent visibility along this route, at distances of over 10 km. Not considered further.
B6372	Some intermittent visibility along this route, at distances of over 10 km. Not considered further.
B7007	Some intermittent visibility along this route, at distances of over 10 km. Not considered further.
B709	No visibility. Not considered further.
B7016	No visibility. Not considered further.
Meldons Road	Intermittent visibility along this route within 5 km. **Considered in the assessment.**
National Cycle Routes (within 15 km)	
National Cycle Network Route 1	No theoretical visibility indicated within 15 km of the Site. Not considered further.
National Cycle Network Route 196	Limited theoretical visibility indicated within 15 km to the north of the Site. Not considered further.
National Cycle Network Link Route: Peebles to Innerleithen	No theoretical visibility indicated within 15 km of the Site. Not considered further.
Long Distance Walking Routes (within 15 km)	
Cross Borders Drove Road	Extensive theoretical visibility. **Considered in the assessment.**
John Buchan Way	Extensive theoretical visibility. **Considered in the assessment.**

Route	Theoretical Visibility of Development (ZTV coverage)
Core Paths (within 5 km)	
Core Path 146	Theoretical visibility, but afforded screening by intervening vegetation. Not considered further.
Core Path 147	Limited theoretical visibility. Not considered further.
Core Path 150	Extensive theoretical visibility. **Considered in the assessment.**
Core Path 151	Theoretical visibility, but likely screened by vegetation. Not considered further.
Core Path 152	Theoretical visibility, but likely screened by vegetation. Not considered further.
Core Path 154	Extensive theoretical visibility. **Considered in the assessment.**
Core Path 168	Limited theoretical visibility. Not considered further.
Core Path 174	Theoretical visibility from extensive sections of this Core Path. **Considered in the assessment.**

5.6.7 Residential Visual Amenity Assessment

76. Views from residential properties within 2 km of the nearest wind turbines of the Development have been assessed as part of a Residential Visual Amenity Assessment (RVAA). The RVAA is presented in Appendix A5.3: Residential Visual Amenity Assessment.

5.7 CUMULATIVE BASELINE

5.7.1 Existing Wind Farm Development

77. There are a number of operational wind farms and wind farms under construction located across the Study Area, as listed in Table 5.7 below and shown on Figure 5.1.9. Operational wind farms and those under construction are included as part of the baseline for the LVIA and considered as part of the primary LVIA assessment.

5.7.2 Identification of Developments to be included in the CLVIA

78. In line with NatureScot guidance[44], the scope for the assessment of cumulative landscape and visual effects included wind farms and wind farm proposals within an initial 60 km radius search area from the Development, to identify the distribution of wind energy development in the wider area, as shown on Figure 5.1.8.

79. The assessment of effects focuses on developments that are likely to give rise to significant cumulative effects and concentrates on the relationship between the Development and other operational, consented and proposed developments (i.e. developments with a valid application or awaiting determination following appeal/public inquiry). In this instance the assessment focuses on schemes within 20 km of the Development, because of the limited scope for significant cumulative effects beyond this distance. Cumulative schemes within 40 km are listed in Table 5.7 below and shown on the wireframes in Figures 5.2.1 – 5.2.26 in order to illustrate the wider cumulative context.

80. Single turbines were given consideration where it was judged that potential interactions with the Development may give rise to significant cumulative effects; this was judged to be within 5 km of the Development. Proposals that have not yet progressed beyond scoping stage are not considered within the assessment.

[44] SNH (2012). Assessing the cumulative impact of onshore wind energy developments.

81. Wind energy developments located within the 20 km radius Study Area, which are considered likely to give rise to significant cumulative effects and therefore included in the CLVIA have been selected as follows:

- Single wind turbines of ≥50 m blade tip height within a 5 km radius of the proposed outermost wind turbines; and
- Wind farms (e.g. clusters of 2 or more wind turbines) with wind turbines of ≥80 m blade tip height within a 20 km radius of the proposed outermost wind turbines.

82. Consented wind farms and wind farms currently in the planning system are considered as part of the assessment of potential future cumulative effects and included in the CLVIA.

83. A cut-off date of 26th January 2021 was applied for the inclusion of developments within the cumulative assessment. These developments are listed in Table 5.7 below and shown on Figure 5.1.9. Wind farms included in the assessment are highlighted in grey.

Table 5.7: Other Wind Farm Developments

Name	Status	Number of Wind Turbines	Blade Tip Height (m)	Distance (km)[45]
Operational and Under Construction (considered in the primary LVIA)				
Bowbeat	Operational	24	80	6.9
Carcant	Operational	3	99.7	15.8
Muirhall South	Operational	3	147	18.6
Harburnhead	Operational	22	126	18.7
Muirhall Extension	Operational	2	147	19.1
Muirhall	Operational	6	125	19.4
Glenkerie	Operational	11	120	20.0
Pearie Law	Operational	6	125	20.9
Pates Hill	Operational	7	107	22.2
Burnhouse - Carnwrath	Operational	2	64	23.0
Toddleburn	Operational	12	125	24.2
Dun Law - Phase 2	Operational	35	75	25.8
Longpark	Operational	18	100	25.8
Clyde Extension	Operational	54	142	26.0
Tormywheel	Operational	15	102	26.0
Dun Law - Phase 1	Operational	26	63.5	27.1
Clyde	Operational	152	125	28.0
Black Law Extension Phase 1	Operational	23	126.5	28.6
Pogbie Extension	Operational	6	74	28.6
Pogbie	Operational	6	76	28.7

[45] Approximate distance between the outermost turbines of the Development and other wind farms.

Name	Status	Number of Wind Turbines	Blade Tip Height (m)	Distance (km)[45]
Black Law	Operational	54	115.1	29.1
Keith Hill	Operational	5	76	29.4
Black Law Extension Phase 2	Operational	11	126.5	31.2
Langhope Rig	Operational	10	121.5	32.6
Torrance Farm Extension	Operational	2	125	33.2
Standhill Farm	Operational	2	84	33.6
Torrance Farm	Operational	3	125	33.8
Drumduff	Operational	3	120	36.8
Burnhead	Operational	13	127	37.2
Fallago Rig	Operational	48	125	37.6
Middle Muir	Operational	15	149.9	39.1
Consented (considered in the CLVIA as not yet part of the baseline)				
Camilty	Consented	6	149.9	17.5
Glenkerie Extension	Consented	6	100	20.8
Tormywheel Extension	Consented	2	126.5	27.1
Priestgill	Consented	7	200	31.4
West Benhar	Consented	8	149.9	32.1
Watsonhead Farm	Consented	2	150	35.1
Broken Cross surface mine	Consented	2	55.7	36.3
Birkhill	Consented	2	98.14	37.4
Hartwood	Consented	7	126.5	37.4
Proposed and Appeal/ Public Inquiry (considered in the CLVIA as less certain and not part of the baseline)				
Longhill Burn	Application	8	180	23.6
Heathland	Application	14	180	24.0
Whitelaw Brae	Application	14	133.5	28.3
Broken Cross	Application	10	149.9	35.4
Forrestfield	Application	4	125	37.5
Crookedstane	Application	4	126.5	39.2

84. It should be noted that the cumulative wind farm baseline is constantly changing, and there may be changes to the status or list of wind energy developments considered between carrying out the assessment and the determination of the application. Unless

there are substantial changes to proposals that will materially alter the pattern of cumulative development (such as the addition of a large wind farm located within a 10 km radius of the Development), it is considered that the cumulative assessment undertaken for the relevant landscape and visual receptors will remain relevant.

85. Given the varied status, and therefore certainty, associated with un-built wind farms across the Study Area the CLVIA is structured to report on two potential development scenarios:

- Scenario 1: Higher level of certainty: the addition of the Development to a landscape with operational, under construction and consented wind farms; and
- Scenario 2: Lower level of certainty: the addition of the Development to a landscape with operational, under construction, consented and undetermined valid planning applications.

86. However, as there are no wind farms at planning or appeal stage within the cumulative Study Area (20 km) the CLVIA does not consider Scenario 2 effects.

87. The CLVIA has focused on the assessment of 'additional' cumulative effects, i.e. the additional effect of adding the Development to a baseline of other built or unbuilt wind farms. Where 'total' cumulative effects (i.e. assessment which considers the total effects if all current, past and future proposals are deemed present, including the Development) are significant, then reference is also made to these. The CLVIA has been incorporated into the tables found within Section 5.9: Assessment of Potential Landscape and Visual Effects.

88. Combined ZTVs (Figures 5.1.10 to 5.1.11) for other wind farms have been prepared to show where ZTVs overlap and where cumulative effects may arise.

5.7.3 General Observations – Current Baseline (Operational and Under Construction Developments)

89. General observations on the location, pattern and scale of existing wind energy development across the Study Area are summarised below:

- The closest commercial scale wind farm development to the Site, Bowbeat Wind Farm, in the Moorfoot Hills approximately 7 km to the east of the nearest turbine, with Carcant Wind Farm approximately 16 km away in the same direction;
- Between approximately 24 km – 30 km north-east of the Site, there is a cluster of existing wind energy developments including: Toddleburn, Dun Law, Pogbie and its extension, and Keith Hill. The operational Fallago Rig Wind Farm is located beyond this cluster, at approximately 38 km;
- A larger cluster is concentrated in an area of upland plateau to the west of the Site, to the south of the A71 near West Calder, which includes the Black Law schemes, Tormywheel, Pates Hill, Pearie Law, Harburnhead and Muirhall and its extensions, at a distance of approximately 18 – 32 km;
- Another large cluster of wind farms is present to the south-west of the Site in the upland hills adjacent to the A74 and River Clyde near Crawford. It includes Clyde Wind Farm and its extension and Glenkerie. Both clusters are at approximately 20 km from the Site;
- The wind turbines at Torrance Farm and its extension, Standhill Farm, Burnhead and Drumduff are located between 32 km and 38 km to the north-west of the Development, near Blackridge; and
- Longpark Wind Farm is located approximately 26 km to the east of the Development, north of Galashiels. This is an individual scheme which does not form part of a cluster. Likewise, Langhope Rig approximately 32 km to the south-east of the Development does not form part of an existing cluster of wind farms.

90. The CZTV in Figure 5.1.10 illustrates where only the Development is theoretically visible, where only other operational wind farms within 20 km are theoretically visible, and where both are theoretically visible together.

91. Within 5 km of the Development the CZTV indicates that the Development will typically be seen together with other operational wind farms (in particular Bowbeat Wind Farm) from areas of rolling moorland and farmland to the north, east and south, including from parts of the Cross Borders Drove Road and the summits of Black Meldon and White Meldon. The Development will introduce theoretical visibility of turbines to the north-west and west of the Site including parts of the A701 and B7059, although mainly turbine tips will be visible due to screening by the intervening landform. The Development will also introduce visibility of turbines to parts of the A703 to the east of the Site and some of the west-facing slopes of the Eddleston Valley.

92. Beyond 5 km the Development will typically be seen together with operational wind farms from the Pentland Hills and their south-east facing slopes, including the A702 and settlements along it, from areas of settled farmland in the north of the Study Area and from the Southern Uplands and their north facing slopes. The Development will introduce theoretical visibility of turbines to a small part of the A702 and West Linton to the north-west, parts of the A701 and A703 to the north and some of the valleys in the Southern Uplands to the south including parts of the Tweed Valley, Manor Valley and the area around Stobo.

5.7.4 General Observations – Consented Developments (Existing, plus Consented Developments)

93. General observations on the location, pattern and scale of existing and consented wind energy development across the Study Area are summarised below:

- Camilty Wind Farm will be located approximately 17.5 km to the north-west of the Development, and will increase the extents of the Harburnhead and Pearie Law Wind Farm cluster;
- Glenkerie Extension will be located approximately 21 km to the south-west of the Development, and will increase the extent of the operational Glenkerie Wind Farm;
- Tormywheel Extension will be located approximately 27 km to the north-west of the Development and will extend the turbines at the operational Tormywheel Wind Farm, and increase the general extent of turbines to the west of the Pentland Hills. Additionally, this cluster includes the consented Heathland and Longhill Burn Wind Farms, with 17 turbines at 132 m tip height and 8 turbines at 180 m tip height, respectively. However, both Heathland and Longhill Burn Wind Farm have new applications for taller turbines;
- Priestgill Wind Farm will be located approximately 31 km south-west of the Development, and will increase the extent of turbines at the Clyde cluster;
- West Benhar Wind Farm is consented 32 km to the north-west and will generally increase the extent of turbines at the Blacklaw, Hartwood and Tormywheel cluster. Additionally, the two consented turbines at Watsonhead Farm will also increase the presence of turbines in this area;
- The two turbine Broken Cross Surface Mine scheme is consented approximately 36 km to the south-west of the Development and will increase the extent of a small cluster of single turbines located along the M74 near Lesmahagow. Likewise, the two consented turbines at Birkhill (approximately 37 km from the Development) will also increase extent of turbines in this location; and
- The consented Hartwood Wind Farm is located approximately 37 km to the north-west of the Development.

94. The CZTV in Figure 5.1.11 illustrates where only the Development is theoretically visible, where only other operational and consented wind farms within 20 km are theoretically visible, and where both are theoretically visible together.

95. Given that the consented Glenkerie Extension and Camilty wind farms are in close proximity to other existing wind farms, the patterns of visibility will be very similar to the operational CZTV shown in Figure 5.1.10 as described under 5.7.3 above.

96. Within 5 km of the Development, the CZTV indicates that the area where only the Development will be visible is slightly reduced, as compared with Figure 5.1.10, on the west-facing slopes of Eddleston Valley, given that Glenkerie Extension may also be perceptible in these views, albeit at a distance of over 20 km.

97. Beyond 5 km the CZTV indicates that the area where only the Development will be visible is slightly reduced, as compared with Figure 5.1.10, in small parts of the Pentland Hills and Southern Uplands. The area where only other wind farms are visible is increased, as compared with Figure 5.1.10, from elevated parts of the Pentland Hills and Southern Uplands, where Camilty and Glenkerie Extension are likely to be visible.

5.7.5 General Observations – Proposed Developments at Application and Appeal

98. As of the 26th January 2021[46], there are no proposed wind farms within 20 km of the Development. General observations on the location, pattern and scale of existing, consented and proposed wind energy development across the Study Area are summarised below:

- Heathland Wind Farm (at application) and Longhill Burn Wind Farm (at application), are located approximately 24 km to the north-west of the Development. These wind farms will increase the extent of the Harburnhead and Pearie Law Wind Farm cluster;
- Forrestfield Wind Farm (at application) is located 37 km to the north-west of the Development, near Fauldhouse;
- Broken Cross Wind Farm (at application) is located approximately 35 km to the south-west of the Development, and will increase the extent of a small cluster of single turbines located along the M74 near Lesmahagow; and
- Likewise, the Crookedstane and Whitelaw Brae Wind Farms (both at application) are located approximately 39 km and 28 km to the south-west, respectively. These will increase the extent of turbines at Clyde Wind Farm.

5.8 THE 'DO NOTHING' SCENARIO

99. Although there is an extant consent for the Site, for the purposes of this assessment, in the absence of the Development it is likely that the land will continue under the same land use, and the character of the Site is therefore unlikely to change notably. However, the landscape and visual amenity of the Study Area is likely to be influenced by several 'forces for change' including further wind energy development. The consent at the Site for the consented Cloich Forest Wind Farm ('the Consented Scheme') demonstrates an established planning principle for an onshore wind farm in this location, and a legal fall-back position should consent not be granted for the Development. Forces for change are those factors affecting the evolution of the landscape and which may, consequently, affect the perception of the Study Area in the near or distant future. Although prediction of these is necessarily speculative, those of relevance are discussed briefly below.

100. Wind farm development is a clear force for change and is likely to continue. Figure 5.1.9 illustrates the location and extent of operational, consented, and proposed wind farms within the Study Area. In addition, there are an increasing number of operational,

[46] A cut-off date of 26th January 2021 was applied for the inclusion of developments within the cumulative assessment.

consented and proposed domestic wind turbines of varying heights and rotor diameters, located within the surrounding landscape, as shown on Figure 5.1.8. As land owners diversify income and seek opportunities to generate energy for domestic and commercial use, it is likely that interest in this type of development will continue.

101. Agriculture within the Study Area, including land management practices, pastoral grazing and arable farming, and commercial forestry, are likely to remain important land uses.

5.9 ASSESSMENT OF POTENTIAL LANDSCAPE AND VISUAL EFFECTS

102. The assessment of landscape and visual effects follows the methodology summarised in this Chapter and set out in detail in Appendix A5.1 and is based upon the project description outlined in **Chapter 3: Project Description**. The LVIA reports on construction and operational effects separately.

5.9.1 Construction Effects

5.9.1.1 Sources of Effects during Construction

103. During the proposed 18-month construction phase, there will be potential short-term landscape and visual effects arising from the presence of partially constructed infrastructure and undertaking of construction activities on the Site (as described in **Chapter 3: Project Description**). Effects occurring during the construction phase are reversible unless otherwise stated (e.g., creation of new landform which remains as a permanent feature beyond the lifespan of the operational phase (30 years) of the Development).

104. The changes arising from the construction of the Development will be primarily associated with:

- Up to 12 turbines with a maximum blade tip height of 149.9 m;
- External turbine transformers;
- Access tracks, including widening of existing tracks, and areas of hardstanding;
- On site substation and control building, including battery storage units;
- Temporary laydown areas;
- Temporary construction compound;
- Borrow pits; and
- Felling and replanting of selected forest coupes as detailed in **Chapter 3: Project Description** and **Chapter 13: Forestry.**

105. Most of the effects which will occur during the construction phase will be **short-term** and largely **reversible**, limited to the Site and the immediate surrounding vicinity from which construction activities may be perceptible. The main exception to this is construction of the proposed turbines. However, landscape and visual effects arising from the presence of partially constructed turbines will be comparable to the operational effects (although arguably to a lesser degree as construction-related effects will be of a shorter duration and transient in nature). Therefore, effects arising from the introduction of partially constructed turbines are not anticipated to exceed the long-term operational effects.

5.9.1.2 Landscape Effects during Construction

106. Potential effects on the landscape character and resources of the Site are considered in Table 5.8 below. Landscape effects during construction will be largely limited to the host LCT, as effects beyond the extents of the Site will be indirect and largely related to the construction of the partially erected turbines. As such, effects on the wider LCT are not considered to be any greater than operational effects.

Table 5.8: Construction effects on the Site

The Site
Location and baseline description: The Site is described in detail in Section 5.5.2: The Site and Context.
Sensitivity: The Site forms part of a large-scale landscape with a simple pattern of upland moorland and forestry. The Site forms part of the skyline from neighbouring valleys and is inter-visible with nearby designated landscapes. Human influences within the Site include forestry and tracks. Overall, susceptibility is judged to be **medium**. The Site is not within a designated landscape but is inter-visible with other nationally and locally designated landscapes in proximity, including the Upper Tweeddale NSA approximately 2 km to the south. The Cross Borders Drove Road, which runs through the Site, is one of Scotland's Great Trails and is therefore an indicator of scenic and recreational value. Overall, the landscape value of the Site is judged to be **medium**. Taking account of the judgements of susceptibility and value, overall sensitivity is **medium**.
Magnitude of Change and Significance of Landscape Effects: Construction activities will result in direct effects on the landscape of the Site. The main construction activities with the potential to affect the Site include felling works; excavations and track construction; the presence of tall cranes and partially built towers whilst turbines are being erected; and the movement of construction vehicles and plant. There will be **large-scale** changes within the Site relating to construction activity. The geographical extent of these changes will be at the site level (**small**) with areas of retained forestry across the Site helping to reduce effects associated with lower-level construction activity. The construction works are expected to last approximately 18 months, so will be **temporary** and **short-term**. The level of reversibility will be varied, from fully reversible changes associated with ground disturbances (albeit that vegetation will take some time to recover) to longer lasting effects associated with infrastructure that forms part of the operational scheme. Overall, the magnitude of change is judged to be **high**. Overall, the effect of construction on the Site will be **Significant (major)**, however these effects will be temporary and largely contained within the geographical extent of the Site. Most effects will cease following the 18-month construction period. Decommissioning of the Development is expected to take approximately 12 months. Due to the similar activities involved in both the construction and dismantling of a wind farm, a similar level of effect is predicted on the landscape of the Site.

5.9.1.3 Visual Effects during Construction

107. In terms of visual effects during the construction phase, beyond those experienced at the Site level where low-level construction activity will be apparent in certain views, these will largely relate to views of tall cranes and turbine construction experienced from the wider Study Area. These effects will be transient and change throughout the construction period as wind turbines are gradually constructed in sections. As such, visual effects during the construction phase are unlikely to exceed the level of effect associated with operational visual effects and are not assessed separately.

5.9.1.4 Proposed Mitigation

108. Measures such as arrangements for vegetation and soil removal, storage and replacement and the restoration of disturbed areas after construction will be detailed in a Construction Environmental Management Plan (CEMP) produced following consent and prior to construction, which will also include reference to Construction Method Statements.

5.9.1.5 Residual Construction Effects

109. The assessment of effects above assumes all construction related, best practice, mitigation measures are implemented, therefore the residual effects arising from construction will remain as identified in the section above.

5.9.1.6 Decommissioning

110. Decommissioning of the Development is expected to take approximately 12 months. Due to the similar activities involved in both the construction and dismantling of a wind farm, a similar level of effect is predicted on the landscape and visual amenity within the Study Area.

5.9.2 Operational Landscape Effects

111. The main likely effects of the operational Development on the landscape will be associated with the presence of the wind turbines, turbine transformers and ancillary infrastructure including access tracks, onsite substation, battery storage and Site access track as described in **Chapter 3: Project Description** and shown on Figure 3.1.

5.9.2.1 Operational Effects on the Fabric of the Site

112. This section describes the operational effects resulting from the Development on the landscape fabric of the Site and the LCTs which have been identified as requiring detailed consideration in Table 5.2. Further information on key characteristics of each LCT is provided in the tables below.

113. All operational effects are considered to be long-term, reversible and adverse unless stated otherwise.

Table 5.9: Operational effects on the Site

The Site
Location and baseline description: The Site is described in detail in Section 5.5.2: The Site and Context.
Sensitivity: The Site is judged to be of **medium** sensitivity as set out in **Table 5.8** above.
Magnitude of Change and Significance of Landscape Effects: There will be **large-scale** changes to the Site relating to the physical loss of forestry (up to 70.62 ha) and the introduction of new features including up to 12 turbines and associated infrastructure (including access roads and turning areas, hard standings, substation and battery storage) which will change the character of the Site from forestry to forestry with a wind farm. The change will be experienced within a small geographical extent. The overall magnitude of change is judged to be **high**. Overall, the effect on the Site will be **Significant (major).**
Potential for Cumulative Effects: There are currently no other consented wind farm developments located within the Site. As such no significant additional or total cumulative landscape effects are predicted under scenario 1.

5.9.2.2 Operational Effects on Landscape Character

114. LCTs within 40 km of the Development are illustrated on Figure 5.1.4, with theoretical visibility from those LCTs shown on Figure 5.1.5. The assessment describes the potential effects on landscape character resulting from the introduction of the Development during the operational phase. Consideration is also given to potential cumulative landscape effects arising in conjunction with other existing, consented and/or proposed wind farms. The assessment is limited to those LCTs where potentially significant effects are considered possible, as detailed in Table 5.2. Operational effects are long-term, reversible and adverse unless stated otherwise.

Table 5.10: Operational Effects on LCT 92: Plateau Outliers (host)

SNH (2019) LCT	LCT 92: Plateau Outliers
Location and Baseline Description: This LCT is centred on the Cloich Hills and covers a large part of the Study Area within 5 km of the Site, including most of the Site itself (excluding the minor road (D18 – area 1)_running from the A703 to Cloich Forest). It is located to the north-west of Peebles, broadly between the Tweed Valley to the south, Eddleston Valley to the east and rolling farmland to the north-west. A further unit of this LCT is found approximately 3.5 km to the south-west of the Site at its closest point, between Broughton to the south, and the A72 to the north. Key characteristics include: • "*Discrete hill masses separated from main plateau by major river valleys;* • *Greater height difference between summits and valley floors;* • *Gradation of landscape scale between hill slopes and valleys;* • *Mosaic of land cover types: heather moor, grassland and plantation woodland;* • *Low density settlement, mainly confined to sheltered valleys; and* • *High density of prehistoric burials and settlements*"[47].	
Sensitivity: The LCT is large in scale, with strong topographical variety between the hill summits and valley floors. There are no operational wind turbines within this LCT, however the landscape is influenced by human development, including areas of forestry (e.g. across the Cloich Hills and Woolshears Hill). There is also visibility of built development in neighbouring valleys including roads and settlements. However, the LCT forms the skyline in views from more sensitive neighbouring valley landscapes and there is also a great sense of exposure from elevated hill summits, largely resulting from long-range views to nearby hill ranges including the Pentland Hills and Moorfoot Hills. The overall susceptibility of the landscape is judged to be **medium**. A small part of the host LCT unit is within the Tweed Valley SLA, to the south-east of the Site. At its closest, this designation is 1.2 km from the Site boundary. The entirety of the second LCT unit, to the south-west of the host unit is within the boundary of designated landscapes, including parts of the Upper Tweeddale NSA and Tweedsmuir Uplands SLA. The Cross Borders Drove Road cuts through the host LCT unit, indicating its recreational value. The recreational value and the presence of designated landscapes indicates a **medium-high** landscape value across the LCT. Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **medium** overall. The Scottish Borders Landscape Capacity Study (2016) identifies both units of the Plateau Outliers LCT (which has the same extents as LCT 92) as being of Medium/High landscape sensitivity. The host unit (Eddleston/ Lyne Interfluve) has a High/Medium landscape value and the unit to the south-west (Broughton Heights) has a High landscape value. No underlying landscape capacity for wind turbines over 120 m to tip is identified within the LCT, however the study outlines that all the capacity for large scale turbines was occupied by the Consented Scheme.	
Magnitude of Change and Significance of Landscape Effects: Direct operational effects will arise through the introduction of up to 12 turbines and associated infrastructure, and the removal of approximately 70.62 Ha of forest within the Site. The introduction of turbines will locally alter the "*predominantly open*"[48] landscape and may disrupt the "*wide horizons and distant views gained from the hills over the surrounding landscape*"[49] which are noted in relation to perception in the SNH Landscape Character Assessment (2019). There are currently no other operational wind turbines within this LCT. The ZTV (refer to Figure 5.1.5) indicates that there is extensive theoretical visibility from this LCT within 5 km. Theoretical visibility is also extensive across the northern areas of the more southerly unit, however, beyond 7 km visibility is more intermittent, largely screened by the intervening landforms of Ladyurd Hill, Brown Dod and the Lochurd Hills. More distant visibility is limited to Site-facing slopes of the summits of Clover Law, Grey Yade and Trahenna Hill to the south. The Development will be a noticeable feature in views towards the interior of the LCT, where the turbines will often be seen on the skyline. In lower-lying views from the unit to the south-west of	

[47] SNH (2019) National Landscape Character Assessment. Landscape Character Type 92: Plateau Outliers. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20092%20-%20Plateau%20Outliers%20-%20Final%20pdf.pdf (Accessed 29/03/2021)
[48] Ibid.
[49] Ibid.

SNH (2019) LCT	LCT 92: Plateau Outliers
the Site, to the south of the A72, the Development will be afforded some screening by intervening topography, however views from more elevated locations such as hill summits and Site-facing slopes will be more extensive with limited screening. A **large-scale** change will be experienced over a large geographical extent including the majority of the host LCT unit and a large proportion of the second unit in the south-west. Overall, the magnitude of change is judged to be **high** within 7 km of the Development, extending to Broughton Heights to the south-west of the Site. Overall, the effect of the Development on this LCT is judged to be **Significant (major)**.	
Potential for Cumulative Effects: There are currently no other consented wind farm developments located within or in proximity to the LCT. As such no significant additional or total cumulative landscape effects are predicted under scenario 1.	

Table 5.11: Operational Effects on LCT 90: Dissected Plateau Moorland

SNH (2019) LCT	LCT 90: Dissected Plateau Moorland
Location and Baseline Description: Within the Study Area, this LCT is found as three discrete units. The largest unit is located approximately 1 km to the east of the Site at its closest point and includes the most westerly extents of the Moorfoot Hills. This LCT unit also includes the Tweed Valley Forest Park and Glentress Forest in the south. A second smaller unit is located approximately 7 km to the north-west of the Site, within the Pentland Hills. The third unit is more distant at approximately 27 km to the north-east of the Site; this unit is expansive, comprising much of the Lammermuir Hills. Key characteristics include: • "*Plateau landform consisting of a series of level-topped hills and ridges;* • *Strong topographic identity and overall grandeur of scale;* • *Individual hill masses separated by steep sided valley features of differing scales;* • *Semi-natural peatland, heather moorland and grassland communities dominant, with a high degree of perceived naturalness of vegetation cover;* • *Very low settlement density with isolated, dispersed pattern;* • *Scattered prehistoric settlement and burial mounds above water courses; and* • *Sense of wildness created by wide horizons and long distance, unobstructed views*"[50].	
Sensitivity: This is a large-scale landscape, with some topographical variety and a simple landcover of moorland and grassland. The influence of human activity is apparent, particularly towards the edges of the LCT. Within the LCT there are operational wind farms (e.g. Bowbeat and Carcant) and areas of forestry (e.g. Glentress Forest). There is also visibility of built development in neighbouring LCTs including near Eddleston and West Linton. However, the hills form the skyline in views from more sensitive neighbouring valley landscapes and there is also a great sense of exposure in parts, largely resulting from long-range views to other hill ranges including the Pentland Hills, Moorfoot Hills and Cheviot Hills. The overall susceptibility of the landscape is judged to be **medium**. Large parts of the LCT are within designated landscapes, including the Pentland Hills SLA to the north-west of the Site, and to a lesser extent the Tweed Valley SLA to the south-east. Overall scenic value is therefore **medium-high**. Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **medium**. The Scottish Borders Landscape Capacity Study (2016) identifies all units of the Dissected Plateau Moorland LCT (which has the same extents as LCT 90) as being of Medium landscape sensitivity. The closest unit to the Site (Moorfoot Plateau) has a Medium/High landscape value, the unit to the north-west (Western Pentlands) has a High landscape value, and the more distant unit to the east (Lammermuir Plateau) has a High landscape value.	

[50] SNH (2019) National Landscape Character Assessment. Landscape Character Type 90: Dissected Plateau Moorland. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20090%20-%20Dissected%20Plateau%20Moorland%20-%20Final%20pdf.pdf. (Accessed 29/03/2021)

SNH (2019) LCT	LCT 90: Dissected Plateau Moorland
Magnitude of Change and Significance of Landscape Effects: The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. Visibility of the Development from this LCT will alter the "*sense of wildness*"[51] resulting from the "*wide horizons and long distance, unobstructed views*"[52] from the LCT. The ZTV indicates that potential visibility of turbines will be extensive across the unit to the north-west of the Site (Pentland Hills), from summits and Site-facing slopes at distances of between 7 km and 13 km. Visibility from the unit to the east of the Site (Moorfoot Plateau) is extensive within 7 km, becoming more intermittent beyond this distance and limited to hill summits such as Windlestraw Law. From both LCT units there is potential for turbines to be visible against the skyline. A **medium-scale** change will be experienced over a large geographical extent (affecting a relatively large proportion of several LCT units), and overall, the magnitude of change is judged to be **medium**. Overall, the effect of the Development on this LCT is judged to be **Significant (moderate)** for the western fringes of the Moorfoot unit, within approximately 7 km of the Development, west of Dundreich. This reduced to a **not significant (minor)** effect within the Pentland Hills unit, and a **not significant (negligible)** effect elsewhere within the LCT where there is some visibility from distant summits.	
Potential for Cumulative Effects: There are currently no other consented wind farm developments located within or in proximity to the LCT. As such no significant additional or total cumulative landscape effects are predicted under scenario 1.	

Table 5.12: Operational Effects on LCT 93: Southern Uplands with Scattered Forest – Scottish Borders

SNH (2019) LCT	LCT 93: Southern Uplands with Scattered Forest – Scottish Borders
Location and Baseline Description: Within the Study Area, this LCT occurs as two units to the south-east of the Site, at distances of approximately 10 km and 27 km, respectively. The closest unit is larger and encompasses the Southern Uplands between Innerleithen in the north and the Ettrick Valley in the south. The second unit is smaller and located just south of the Ettrick Valley. Key characteristics include: • "*Large-scale rolling landform with higher dome or cone-shaped summits;* • *Significant areas of peatland and heather moorland;* • *Mosaic of grassland, bracken and rushes on lower ground;* • *Locally prominent scattered large areas of forestry; and* • *Degree of remoteness, wild character and grandeur of scale unique within the region*".[53]	
Sensitivity: The LCT is large in scale, with a simple landform, strong topographical variety and strong inter-visibility with sensitive landscapes. There are no operational wind turbines within this LCT, however the landscape is influenced by human development, including scattered areas of forestry. Whilst there is visibility of built development in neighbouring valleys including the main roads of the A72 and A701 and residential properties from the edges of the LCT, the interior is more isolated with little human influence except occasional farmsteads. There is also a great sense of exposure from hill	

[51] Ibid.
[52] Ibid.
[53] SNH (2019) National Landscape Character Assessment. Landscape Character Type 93: Southern Uplands with Scattered Forest – Borders. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20093%20-%20Southern%20Uplands%20with%20Scattered%20Forest%20-%20Borders%20-%20Final%20pdf.pdf. (Accessed 29/03/2021)

SNH (2019) LCT	LCT 93: Southern Uplands with Scattered Forest – Scottish Borders
summits which offer distant and panoramic views. It is noted that the higher summits are *"visually highly sensitive"*[54]. The overall susceptibility of the landscape is judged to be **medium**. The majority of the large LCT unit to the south-east of the Development is within locally designated landscapes including the Tweed Valley SLA, Tweedsmuir Uplands SLA, and Tweed, Ettrick and Yarrow Confluences SLA, indicating its **medium-high** scenic value. Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **medium**. The Scottish Borders Landscape Capacity Study (2016) identifies the Southern Uplands with Scattered Forest LCT (which has the same extents as LCT 93 and 95) as being of medium landscape sensitivity. The unit (Broadlaw Group) has a high landscape value.	
Magnitude of Change and Significance of Landscape Effects: The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. Visibility of the Development from this LCT may alter the "*degree of remoteness, wild character and grandeur of scale*"[55] as a result of introducing tall, man-made features into the surrounding landscape. The ZTV indicates potential visibility of turbines across parts of this LCT. Intermittent visibility of up 12 turbines is indicated between approximately 10 and 27 km across this LCT, however is largely limited to hill summits, and Site-facing slopes. A **medium-scale** change will be experienced over a small geographical extent. Theoretical visibility is more extensive in the most north-westerly part of the LCT, within approximately 13 km of the Site. Beyond this area, the scale of change is expected to be lower, owing to the presence of intervening landform and areas of forestry near Minch Moor. Therefore, the overall the magnitude of change is judged to be **low**. Overall, the effect of the Development on this LCT is judged to be **Not Significant (minor).**	
Potential for Cumulative Effects: There are currently no other consented wind farm developments located within or in proximity to the LCT. As such no significant additional or total cumulative landscape effects are predicted under scenario 1.	

Table 5.13: Operational Effects on LCT 95: Southern Uplands - Borders

SNH (2019) LCT	LCT 95: Southern Uplands - Borders
Location and Baseline Description: Within the Study Area, this LCT occurs as one extensive unit to the south and south-west of the Site, between distances of approximately 6 km and 35 km, from Kirkton Manor in the north to Hart Fell in the south. Key characteristics include: • "*Extensive, large scale rolling upland landscape with dome or cone-shaped summits and ridges;* • *Glacial carved and smoothed landforms, including u-shaped valleys, hanging valleys and corries;* • *Steep-sided valleys with numerous burns;* • *Open, exposed character;* • *Significant areas of peatland and heather moorland on higher slopes;* • *Transition to rough grazing on lower slopes, with some sizeable areas of conifer woodland at base of main glens;* • *Upland areas largely undeveloped, except for occasional upland farms;* • *Reservoirs and roads in main glens;* • *High degree of remoteness, wild character and grandeur of scale within the region; and* • *Wide ranging panoramic views from summits.*"[56]	

[54] Ibid.
[55] Ibid.
[56] SNH (2019) National Landscape Character Assessment. Landscape Character Type 95: Southern Uplands – Borders. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20095%20-%20Southern%20Uplands%20-%20Borders%20-%20Final%20pdf.pdf. (Accessed 29/03/2021)

<table>
<tr><th>SNH (2019) LCT</th><th>LCT 95: Southern Uplands - Borders</th></tr>
<tr><td colspan="2">Sensitivity:
The LCT is large in scale, with a simple landcover and landform which has a high level of topographical variety from steep-sided and U-shaped valleys to cone shaped summits and ridges. There is one operational wind farm within the west of this LCT (Glenkerie Wind Farm). In addition, there are a number of wind farms just beyond the western boundary of the LCT, including Clyde Wind Farm and its extension. The LCT is characteristically remote with little human influence beyond occasional farmsteads within valleys. Hill summits within the interior of the LCT, popular with hillwalkers, offer distant and panoramic views to the surrounding landscapes. The overall susceptibility of the landscape is judged to be high.
The LCT has strong inter-visibility with sensitive landscapes, and the entirety of the LCT is within designated landscapes including the Tweedsmuir Uplands SLA and part of the Upper Tweeddale NSA. In addition, parts of the LCT near its southern boundary are within the Talla - Hart Fells WLA. The LCT is therefore considered to have high scenic value.
Taking account of the judgements of susceptibility and value, including the presence of the Upper Tweeddale NSA in the north of the LCT, the sensitivity of the LCT is judged to be high.
The Scottish Borders Landscape Capacity Study (2016) identifies the Southern Uplands with Scattered Forest LCT (which has the same extents as LCT 93 and 95) as being of medium landscape sensitivity. The unit (Broadlaw Group) has a high landscape value.</td></tr>
<tr><td colspan="2">Magnitude of Change and Significance of Landscape Effects:
The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. Visibility of the Development from this LCT may alter the "high degree of remoteness, wild character and grandeur of scale"[57] as a result of introducing tall, man-made features into the surrounding landscape and subsequently may have adverse effects on the "wide ranging panoramic views"[58] available from the summits.
The ZTV indicates that potential visibility of up to 12 turbines will be available across the elevated parts of this LCT within approximately 15 km of the Site, including from parts of the Upper Tweeddale NSA. Beyond 15 km, theoretical visibility is more intermittent and largely confined to hill summits and Site-facing slopes.
A small-scale change will be experienced over a medium geographical extent within 15 km. Overall, the magnitude of change is judged to be low within 15 km. The scale of change will reduce to barely perceptible beyond 15 km owing to the greater distance and limited theoretical visibility.
Overall, the effect of the Development on this LCT is judged to be Not Significant (minor) within 15 km with a not significant (negligible) effect beyond 15 km.</td></tr>
<tr><td colspan="2">Potential for Cumulative Effects:
The consented Glenkerie Extension Wind Farm will be located within the western extents of this LCT and will slightly extend the influence of the operational Glenkerie Wind Farm on this LCT. Both schemes are located towards the fringes of the LCT, where there are many turbines at Clyde Wind Farm and its extension along the boundary of the neighbouring LCT. As such, these schemes are unlikely to notably change the cumulative baseline within this LCT.
The Development will extend the influence of wind farms in northerly views from this LCT. The introduction of the Development will result in a small-scale change under scenario 1.
As operational wind farms (Glenkerie) already influence the western extents of the LCT, and there are numerous operational schemes just beyond the boundary of the LCT, no significant additional cumulative effects on landscape character are predicted for this LCT.</td></tr>
</table>

[57] Ibid.
[58] Ibid.

Table 5.14: Operational Effects on LCT 99: Rolling Farmland - Borders

SNH (2019) LCT	LCT 99: Rolling Farmland - Borders
Location and Baseline Description: Within the Study Area, this LCT is commonly found adjacent to upland and plateau moorland LCTs. There are three units of this LCT within the Study Area including one adjacent to LCT 92 (host LCT) to the north-west of the Site. The other two units are in excess of 30 km to the east and south-east of the Development. Key characteristics include: • "*Undulating relief, becoming more pronounced at higher elevations;* • *Distinctive areas of flat or constant gentle gradients, giving wide horizons and skyscapes;* • *Large-scale strong geometric field pattern, enclosed by hedgerows, with scattered coniferous woods;* • *Mix of arable, ley pasture and permanent grazing land;* • *Moderately densely settled, with frequent farmsteads and small villages; and* • *Well kempt, prosperous appearance.*"[59]	
Sensitivity: The LCT is medium in scale, being located on the fringes of the larger-scale uplands. There is a pattern of medium to large arable and pastoral fields with hedgerows and scattered forestry. There are no operational wind farms within this LCT, however it is a farmed and settled landscape with built development and infrastructure, including the A701 and A702. Hill summits are more open and offer distant and panoramic views. The overall susceptibility of the landscape is judged to be **medium**. The LCT has some inter-visibility with sensitive landscapes, and the most western extents of the LCT unit to the north-west of the Site are within the Pentland Hills SLA. The LCT is considered as having **medium** scenic value overall. Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **medium**. The Scottish Borders Landscape Capacity Study (2016) identifies the Rolling Farmland LCT (which has the same extents as LCT 99) as being of Medium/High landscape sensitivity. The West Linton unit, which is to the north-west of the Site, has a Medium/High landscape value in the Capacity Study.	
Magnitude of Change and Significance of Landscape Effects: The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. Visibility of the Development from areas of higher ground within this LCT may alter the "*distant views often gained… to the adjacent upland areas*"[60], as noted as a key characteristic, as a result of introducing tall, man-made features into the surrounding landscape. The ZTV indicates that there is theoretical visibility from the West Linton unit of the LCT, between approximately 2 km and 8 km from the Site. There is no theoretical visibility from the more distant units in the east and south-east of the Study Area. From the West Linton unit, the ZTV indicates potential visibility of up to 12 turbines from upper slopes. Visibility is greatest in the more elevated north-west of the LCT and reduces to visibility of 1-3 turbines in the lower lying south-east. Visibility of the Development from lower lying regions is largely screened by the intervening landform of Wether Law (479 m AOD) and Hag Law (446 m AOD). Overall, a **medium-scale** change will be experienced over a large geographical extent within 8 km, including the parts of the LCT which fall within the Pentland Hills SLA. The scale of change will reduce in proximity to the Site owing to the screening provided by intervening topography. Therefore, the overall the magnitude of change is judged to be **medium**. Overall, the effect of the Development on this LCT is judged to be **Significant (moderate).**	
Potential for Cumulative Effects: There are currently no other consented wind farm developments located within or in proximity to the LCT. As such no significant additional or total cumulative landscape effects are predicted under scenario 1.	

[59] SNH (2019) National Landscape Character Assessment. Landscape Character Type 99: Rolling Farmland – Borders. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20099%20-%20Rolling%20Farmland%20-%20Borders%20-Final%20pdf.pdf. (Accessed 29/03/2021)
[60] Ibid.

Table 5.15: Operational Effects on LCT 102: Upland Fringe with Prominent Hills

SNH (2019) LCT	**LCT 102: Upland Fringe with Prominent Hills**
Location and Baseline Description: This LCT is present as two units in the Study Area. One unit is located approximately 3 km to the west of the Site, at its closest point. The other is located approximately 31 km to the south-east at its closest point. Key characteristics include: • "*Typically steep, cone or dome-shaped hills, frequently of volcanic or igneous rock giving strong landform identity;* • *Diverse surrounding landform types, ranging from smooth undulations to strongly elongated ridges and hollows;* • *Land cover dominated by permanent pasture;* • *Locally frequent woodland cover;* • *Generally low settlement density with isolated farmsteads and occasional small settlements;* • *Rich in visual contrasts, with individual hills as dominant focal points of views; and* • *Diversity of landscape scale.*"[61]	
Sensitivity: The LCT is medium in scale, with a diverse and rugged landform of steep, cone and dome-shaped hills. There are no operational wind farms within this LCT, however there is built development and infrastructure, such as small settlements, farmsteads and the A701, A72 and A721. The overall susceptibility of the landscape is judged to be **medium**. The LCT has some inter-visibility with sensitive landscapes, and a small portion of the LCT unit to the south-west of the Site falls within the Tweedsmuir Uplands SLA designation. Overall, the LCT is considered as having **medium** scenic value. Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **medium**. The Scottish Borders Landscape Capacity Study (2016) identifies the Grassland with Hills LCT (which has the same extents as LCT 102) as being of Medium/High landscape sensitivity. The unit to the west of the Site (Skirling) has a Medium/High landscape value.	
Magnitude of Change and Significance of Landscape Effects: The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. The Development is unlikely to affect views of the "*focal points of the individual hills*"[62] which are noted as a key characteristic. The ZTV indicates potential visibility of up to 12 turbines across the more elevated northern part of this LCT within approximately 10 km of the Site. Visibility reduces to 1-3 turbines in the lower lying south-east where the main road cuts through the LCT, following the topographic low. The other LCT unit within the Study Area has no theoretical visibility of the Development. Overall, a **small-scale** change will be experienced over a medium geographical extent within 10 km. Therefore, the overall the magnitude of change is judged to be **low**. Overall, the effect of the Development on this LCT is judged to be **Not Significant (minor).**	
Potential for Cumulative Effects: There are currently no other consented wind farm developments located within or in proximity to the LCT. As such no significant additional or total cumulative landscape effects are predicted under scenario 1.	

[61] SNH (2019) National Landscape Character Assessment. Landscape Character Type 102: Upland Fringe with Prominent Hills. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20102%20-%20Upland%20Fringe%20with%20Prominent%20Hills%20-%20Final%20pdf.pdf. (Accessed 29/03/2021)
[62] Ibid.

Table 5.16: Operational Effects on LCT 104: Upland Fringe Rough Grassland

SNH (2019) LCT	LCT 104: Upland Fringe Rough Grassland
Location and Baseline Description: Within the Study Area, one small, isolated unit of Upland Fringe Rough Grassland is located approximately 1 km to the north-east of the Site. Key characteristics include: • "*Gently sloping and undulating landform with distinctive localised small-scale mounds and terraces;* • *Open vegetation cover dominated by coarse grassland with rushes in wetter areas, occasional improved pastures, broadleaved trees and conifer forest blocks;* • *Low density settlement with a few scattered farmsteads; and,* • *A simple uniform landscape with distant open views and visual horizons dominated by surrounding upland landscapes*".[63]	
Sensitivity: The LCT is characterised by a simple and uniform landform with relatively little topographic variety. There are no operational wind farms within this LCT, however there is built development including farms and farmsteads, and infrastructure including the A703. The overall susceptibility of the landscape is judged to be **low**. The LCT is not within any designated landscapes, although it has some inter-visibility with nearby sensitive landscapes. The LCT is relatively scarce within the Study Area and has some features of conservation interest such as its wet grassland. Overall, the LCT is considered as having **medium** scenic value. Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **medium**. The Scottish Borders Landscape Capacity Study (2016) identifies the Poor Rough Grasslands LCT (which has the same extents as LCT 104) as being of Medium/High landscape sensitivity. The Leadburn unit to the north-east of the Site has a Low/Medium landscape value.	
Magnitude of Change and Significance of Landscape Effects: The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. Visibility of the Development from this LCT may alter the "*distant open views and visual horizons dominated by surrounding upland landscapes*"[64] as a result of introducing tall, man-made features into the surrounding landscape. The ZTV indicates potential visibility of up to 12 turbines across the LCT, with just a few very small isolated pockets with reduced visibility of up to four turbines. The turbines of the Development will be visible at distances of between approximately 4 km and 9 km. Overall, a **medium-scale** change will be experienced over a large geographical extent. Therefore, the overall the magnitude of change is judged to be **medium**. Overall, the effect of the Development on this LCT is judged to be **Significant (moderate).**	
Potential for Cumulative Effects: There are currently no other consented wind farm developments located within or in proximity to the LCT. As such no significant additional or total cumulative landscape effects are predicted under scenario 1.	

[63] SNH (2019) National Landscape Character Assessment. Landscape Character Type 104: Upland Fringe Rough Grassland. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20104%20-%20Upland%20Fringe%20Rough%20Grassland%20-%20Final%20pdf.pdf. (Accessed 29/03/2021)
[64] Ibid.

Table 5.17: Operational Effects on LCT 113: Upland Valley with Pastoral Floor

SNH (2019) LCT	**LCT 113: Upland Valley with Pastoral Floor**
Location and Baseline Description: Several units of this LCT are found in the south of the Study Area. The closest is adjacent to the Plateau Outliers (host) LCT, approximately 2 km to the south-west of the Site. They appear as elongated linear units cutting through areas of upland and plateau and include the valleys of parts of the River Tweed, Lyne Water, Yarrow Water and Ettrick Water. Key characteristics include: • "*Glaciated valleys with moderately to strongly sloping sides and flat floor modified by river bluffs and glacial moraine;* • *Improved pastures with occasional small woodlands and tree lines on valley floors;* • *Rough unimproved grazing, heather moorland or coniferous forest on valley sides;* • *Scattered stone-built villages with farmsteads and dwellings dispersed along river terraces, lower valley sides and tributary valleys; and* • *A simple, distinctive landscape strongly enclosed by uplands with intermittent long views along valley corridors.*"[65]	
Sensitivity: The LCT is small in scale with steep-sided slopes enclosing the flat valley floor. There are no operational wind farms within this LCT, which is rural in nature with small villages and farmsteads scattered along the valley. The overall susceptibility of the landscape is judged to be **high**. Most of the LCT units within the Study Area are within designated landscapes, namely the Upper Tweeddale NSA and Tweedsmuir Uplands SLA. The most distant unit along the Ettrick Water is not within any designated landscapes. Overall, the LCT is considered as having **high** scenic value. Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **high**. The Scottish Borders Landscape Capacity Study (2016) identifies the Upland Valley with Pastoral Floor LCT (which has the same extents as LCT 113) as being of High/Medium landscape sensitivity. The units to the south-west of the Site (Lyne Water and Biggar Water/Upper Tweed) both have a high landscape value, and the units to the south (Manor Water, Upper Yarrow and Upper Ettrick) have a medium landscape value.	
Magnitude of Change and Significance of Landscape Effects: The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. Visibility of the Development from this LCT may alter the views available through glimpses along tributary valleys as a result of introducing tall, man-made features into the enclosing upland landscape. The ZTV indicates potential visibility of up to 12 turbines from small parts of the Lyne Water and Tarth Water unit of the LCT, to the south-west of the Site. The turbines of the Development will be visible from tributary valleys and more elevated areas on the enclosing valley slopes. Overall, a **small-scale** change will be experienced over a small geographical extent. Therefore, the overall magnitude of change is judged to be **low**. Overall, the effect of the Development on this LCT is judged to be **Not Significant (minor).**	
Potential for Cumulative Effects: There are currently no other consented wind farm developments located within the LCT. The consented Glenkerie Extension is likely to be visible in westerly views from parts of the Tweed Valley unit, including the A701, however there is very limited visibility of the Development from this unit of the LCT and therefore no cumulative effects are anticipated. **Additional significant cumulative effects on landscape character are therefore unlikely for this LCT.**	

[65] SNH (2019) National Landscape Character Assessment. Landscape Character Type 113: Upland Valley with Pastoral Floor. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20104%20-%20Upland%20Fringe%20Rough%20Grasslan(Accessed 29/03/2021)d%20-%20Final%20pdf.pdf. (Accessed 29/03/2021)

Table 5.18: Operational Effects on LCT 114: Pastoral Upland Valley

SNH (2019) LCT	**LCT 114: Pastoral Upland Valley**
Location and Baseline Description: Within the Study Area, this LCT occurs as two linear units oriented in a north-south alignment. One unit is located adjacent to the east of LCT 92 (host LCT) along the valley of the Eddleston Water. The minor road (D18 – area 1) running from the A703 to Cloich Forest and the Development is partially located within this unit. The second unit, approximately 14 km to the east, broadly follows the path of the Gala Water from the Moorfoot Hills to Galashiels in the south. Key characteristics include: • "*Flat valley floor with smooth moderately sloping sides incised by narrow tributary valleys and enclosed by rolling dissected plateau uplands;* • *Land cover of permanent pastures on valley floor and sides with frequent woodlands, merging with unimproved grassland and heather on upper slopes;* • *Scattered farms and villages along the valley floor and lower sides typically built around road junctions and river crossings; and* • *A medium scale enclosed landscape of smooth curves, strongly influenced by the surrounding uplands.*"[66]	
Sensitivity: The LCT is medium in scale and strongly influenced by the enclosing uplands in the surrounding landscape. The LCT has a simple landscape pattern comprising flat valley floors with smooth, moderately sloped enclosing valley slopes and frequent woodland and vegetation. There are no operational wind farms within this LCT, however there are small villages and farmsteads scattered along the valley as well as main roads following the valley floors, including the A703 and A7. The overall susceptibility of the landscape is judged to be **medium**. The majority of this LCT is not within a designated landscape, however a small area in the south of the valley of Eddleston Water falls within the Tweed Valley SLA. The LCT has some inter-visibility with other nearby sensitive landscapes. Therefore, the LCT is considered as having **medium** scenic value overall. Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **medium**. The Scottish Borders Landscape Capacity Study (2016) identifies the Pastoral Upland Valley LCT (which has the same extents as LCT 114) as being of medium landscape sensitivity. The two units (Eddleston Water and Gala Water) have a High/Medium landscape value.	
Magnitude of Change and Significance of Landscape Effects: The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. Visibility of the Development from this LCT may alter the medium to long range views available along the valley corridor and may adversely affect the influence of the surrounding uplands, including the Cloich Hills. The ZTV indicates potential visibility of up to 12 turbines across extensive areas of the Eddleston Water unit of the LCT, which is located to the east of the Site, encompassing Eddleston Valley. Typically, the turbines will be seen on the skyline in views to the west. There is no theoretical visibility from the Gala Water unit of the LCT, which is located approximately 14 km further east, between the Lammermuir and Moorfoot Hills. Overall, a **large-scale** change will be experienced over a large geographical extent from the Eddleston Water unit. Therefore, the overall magnitude of change is judged to be **high**. Overall, the effect of the Development on this LCT is judged to be **Significant (moderate)** in the Eddleston unit, which is closest to the Site. The Gala Water unit will have no theoretical visibility and therefore the Development will have **no effect** on the Gala Water unit.	
Potential for Cumulative Effects: There are currently no other consented wind farm developments located within or in proximity to the LCT. As such no significant additional or total cumulative landscape effects are predicted under scenario 1.	

[66] SNH (2019) National Landscape Character Assessment. Landscape Character Type 114: Pastoral Upland Valley. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20114%20-%20Pastoral%20Upland%20Valley%20-%20Final%20pdf.pdf. (Accessed 29/03/2021)

Table 5.19: Operational Effects on LCT 116: Upland Valley with Woodland

SNH (2019) LCT	**LCT 116: Upland Valley with Woodland**
Location and Baseline Description: Within the Study Area, two units of this LCT are found to the south and south-east of the Site at distances of approximately 2.5 km and 24 km at their closest points. The largest unit runs to the south of the Site and appears as an elongated linear unit broadly following the route of the River Tweed. The second smaller and more distant unit is located along the Ettrick Water near Selkirk, in the south-east of the Study Area. Key characteristics include: • "*Meandering river valley, strongly enclosed by uplands;* • *Flat valley floor, broad and open in places, narrow and more intimate in others;* • *Prominent terraces (haughlands) caused by fluvial and glacial action;* • *Strong influence of woodland, with extensive coniferous forest prominent on valley sides, and mature hedgerow tree lines, broadleaf, and mixed policy woodlands on valley floor;* • *Traditional dwellings, farmsteads and hamlets clustered at the foot of valley side slopes;* • *Mill towns prominent on valley floor and sides;* • *Tower houses and mansions common along river banks;* • *Prehistoric hillforts common on gently rounded hill tops; and* • *Designed policies and parklands significantly contribute to woodland cover and character.*"[67]	
Sensitivity: The scale of the LCT varies from broad and open to narrow and more intimate, with a varied patchwork of pasture and arable fields enclosed by hedgerows, woodland and shelterbelts on the floodplain, with rough grass and heather moorland at higher elevations. There are no operational wind farms within this LCT, however there are numerous settlements including Peebles and Innerleithen and other smaller villages. Additionally, the A72 runs along much of the length of the valley, broadly following the path of the River Tweed. The overall susceptibility of the landscape is judged to be **high**. The majority of this LCT is within designated landscapes. The most westerly extents of the main LCT unit fall within the Upper Tweeddale NSA. The mid-section of the LCT, from Peebles to Thornielee, is within the Tweed Valley SLA, whilst the most easterly extents of the unit and most of the second smaller LCT unit are within the Tweed, Ettrick and Yarrow Confluences SLA. Therefore, the LCT is considered as having **high** scenic value overall. Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **high**. The Scottish Borders Landscape Capacity Study (2016) identifies the Upland Valley with Woodland LCT (which has the same extents as LCT 116) as being of High landscape sensitivity. The Middle Tweed unit has a high landscape value.	
Magnitude of Change and Significance of Landscape Effects: The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. Visibility of the Development from this LCT may affect the long-range views available along the valley corridor and may affect the views of the surrounding uplands and prehistoric forts. The ZTV indicates that potential visibility of up to 12 turbines will be largely limited to the LCT unit to the south of the Site, within 10 km of the Site. Visibility is indicated in more elevated regions and is widespread across the settlement of Peebles. However, visibility is likely to be greatly reduced as a result of built development and the presence of intervening vegetation such as forestry and woodland within the LCT. No theoretical visibility is indicated from the smaller and more distant Ettrick unit of the LCT. Overall, a **small-scale** change will be experienced over a medium geographical extent. Therefore, overall, the magnitude of change is judged to be **low**. However, there will be localised areas, such as elevated hills to the south of the Site, where the magnitude of change will be higher. Overall, the effect of the Development on this LCT is judged to be **Not Significant (minor),** in the most northerly extents of the closest unit, to the north of Peebles and within approximately 7 km of the Site. Elsewhere within the LCT unit, the effect is reduced to **Not Significant (negligible).**	

[67] SNH (2019) National Landscape Character Assessment. Landscape Character Type 116: Upland Valley with Woodland. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20116%20-%20Upland%20Valley%20with%20Woodland%20-%20Final%20pdf.pdf. (Accessed 29/03/2021)

SNH (2019) LCT	LCT 116: Upland Valley with Woodland
Potential for Cumulative Effects: There are currently no other consented wind farm developments located within or in proximity to the LCT. As such no significant additional or total cumulative landscape effects are predicted under scenario 1.	

Table 5.20: Operational Effects on LCT 210: Undulating Farmland and Hills

SNH (2019) LCT	LCT 210: Undulating Farmland and Hills
Location and Baseline Description: This LCT is found in the west of the Study Area, as two units separated by a linear, elongated unit of broad valley upland. At its closest, the LCT is approximately 7 km to the west of the Site. Key characteristics include: • *"A varied landform of rounded hills, ridges and undulating farmland;* • *Transition between Plateau Farmland to the north and the higher Southern Uplands - Glasgow & Clyde Valley and Plateau Moorlands - Glasgow & Clyde Valley to the south and west;* • *Farmland, mostly pastoral, with a notable range of tree and woodland cover;* • *Distinctive pattern of shelterbelts and field boundaries on lower hill slopes;* • *Some areas of coniferous woodland, larger in the south of the area;* • *Becoming generally higher and more open with poorer pasture towards the southwest, although the highest hill, Black Mount is at the eastern reaches;* • *Settlement is sparse and mostly consists of scattered farmsteads and very occasional small villages;* • *Areas and features of historic and archaeological significance;* • *A predominantly rural and pastoral character that contrasts with the busier adjacent river valleys; and* • *Views to distinctive hills nearby, the southern uplands beyond and, more closely, to adjacent wide upland river valleys."*[68]	
Sensitivity: The LCT is a medium in scale, with a varied landform of hills, ridges and undulations. There are no operational wind farms within this LCT, however there are isolated farmsteads, small hamlets and settlements (e.g. Biggar) within this farmed landscape, and roads cutting through the LCT including the A72 and A701. Whilst pastoral farmland, including shelter belts and field boundaries limit the sense of exposure across this LCT, there is a greater sense of exposure from hill summits including Black Mount, Quothquan Law and Castle Hill which each have *"important"*[69] views as identified by SNH in relation to perception. The overall susceptibility of the landscape is judged to be **low**. The LCT has some inter-visibility with sensitive landscapes, and much of the LCT across both units falls within the Pentland Hills and Black Mount SLA and Upper Clyde Valley and Tinto SLA. Therefore, the LCT is considered to have **high** scenic value. Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **medium**. The South Lanarkshire Landscape Capacity Study for Wind Energy (2016) identifies the Biggar and Dunsyre unit of the Rolling Farmland LCT (which predominantly covers the same extents as the closest unit of LCT 210 to the west of the Site) as being of Medium/High landscape sensitivity and value. The rest of LCT 210 falls within the Foothills LCT (Carmichael/Roberton unit) which is identified as having a Medium landscape sensitivity and Medium/High landscape value.	

[68] SNH (2019) National Landscape Character Assessment. Landscape Character Type 210: Undulating Farmland and Hills. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20210%20-%20Undulating%20Farmland%20and%20Hills%20-%20Final%20pdf.pdf. (Accessed 29/03/2021)
[69] Ibid.

SNH (2019) LCT	LCT 210: Undulating Farmland and Hills
Magnitude of Change and Significance of Landscape Effects: The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. Visibility of the Development from areas of higher ground within this LCT may alter the "v*iews to distinctive hills nearby*"[70] as a result of introducing tall, man-made features into the surrounding landscape. Both LCT units will have theoretical visibility of the Development, with visibility from approximately 7 km to the west of the Site, extending to distances in excess of 31 km. The ZTV indicates potential visibility of up to 12 turbines across large parts of this LCT, usually confined to elevated land and Site-facing slopes. The Development is likely to be seen in the same direction as the more distant Bowbeat Wind Farm. Visibility reduces to up to three turbines on the lower slopes and is likely to be further limited by intervening vegetation. Many areas are indicated as having no theoretical visibility, due to intervening topography. Overall, a **small-scale** change will be experienced over a medium geographical extent within approximately 10 km, reducing to no change at greater distances. Therefore, the overall the magnitude of change is judged to be **low**. Overall, the effect of the Development on this LCT is judged to be **Not Significant (minor).**	
Potential for Cumulative Effects: There are currently no other consented wind farm developments located within the LCT, or in proximity to it. Therefore, no additional or total cumulative visual effects are predicted to occur for this cumulative assessment scenario.	

Table 5.21: Operational Effects on LCT 212: Moorland Hills – Glasgow & Clyde Valley

SNH (2019) LCT	LCT 212: Moorland Hills – Glasgow & Clyde Valley
Location and Baseline Description: Within the Study Area, one small, isolated unit of Moorland Hills is found in the west, approximately 10 km from the Site. The LCT includes the most south-westerly extents of the Pentland Hills. Key characteristics include: • "*Western tail of the Pentland Hills, comprising areas of open moorland dropping steeply in places to the surrounding lowlands;* • *Large scale, gently sloping plateau;* • *Dominance of heather and peat moorland and rough grazing with small areas of coniferous forestry;* • *Largely unsettled landscape with areas of archaeological interest;* • *Apparently wild character of the landscape; and* • *Panoramic views to and from this Landscape Character Type*".[71]	
Sensitivity: The LCT is part of a large-scale landscape with a gently sloping plateau. The LCT is largely unsettled with a general absence of modern development and human activity. There are no operational wind farms within the LCT. However, there is some visibility of built development in neighbouring farmed LCTs including to the east. There is a strong sense of exposure in elevated areas, with long-range panoramic views available from summits and upper slopes. The overall susceptibility of the landscape is judged to be **medium**. The majority of the LCT falls within the Pentland Hills and Black Mount SLA, and the LCT has strong inter-visibility with several nearby sensitive landscapes. Therefore, the LCT is considered to have **high** scenic value.	

[70] Ibid.
[71] SNH (2019) National Landscape Character Assessment. Landscape Character Type 212: Moorland Hills – Glasgow & Clyde Valley. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20212%20-%20Moorland%20Hills%20-%20Glasgow%20&%20Clyde%20Valley%20-%20Final%20pdf.pdf. (Accessed 29/03/2021)

SNH (2019) LCT	LCT 212: Moorland Hills – Glasgow & Clyde Valley
Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **high**. The South Lanarkshire Landscape Capacity Study for Wind Energy (2016) identifies the Old Red Sandstone Hills (Western Pentland Hills) LCT, which broadly covers the same extents as LCT 212 as being of Medium/High landscape sensitivity and value.	
Magnitude of Change and Significance of Landscape Effects: The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. Visibility of the Development from this LCT will alter the "*feeling of remoteness and wild character*"[72] as identified by SNH in relation to perception of the LCT, as a result of introducing tall, man-made features into the surrounding landscape. The ZTV indicates that potential visibility of turbines will be extensive across the most eastern extents of the LCT, closest to the Site. Visibility of up to 12 turbines is indicated between 10 and 15 km from the Site. Beyond 15 km there is no theoretical visibility as a result of screening by the ridge of hills which form part of the Pentland Hills. From this LCT there is potential for turbines to be visible above hills and against the skyline. A **small-scale** change will be experienced over a medium geographical extent, and overall, the magnitude of change is judged to be **low**. Overall, the effect of the Development on this LCT is judged to be **Not Significant (minor).**	
Potential for Cumulative Effects: There are currently no other consented wind farm developments located within the LCT. However, the consented Glenkerie Extension will be perceptible in distant southerly views, and Camilty Wind Farm in views to the north, albeit often screened by intervening landform. The Development will extend the influence of wind farms in easterly views from the LCT. Given the influence of existing wind farms on the character of outward views from this LCT, and as the Development will likely be seen in the context of Bowbeat and other more distant wind farms to the north-east of the Study Area, there is **unlikely to result in significant cumulative effects on landscape character under scenario 1.**	

Table 5.22: Operational Effects on LCT 266: Plateau Moorlands - Lothians

SNH (2019) LCT	LCT 266: Plateau Moorlands - Lothians
Location and Baseline Description: This LCT is found in the east of the Study Area, as two units in the Moorfoot Hills and Lammermuir Hills. At its closest, the nearest LCT unit is approximately 4 km to the east of the Site, whilst the second, larger unit is approximately 29 km to the north-east of the Site. Key characteristics include: • "*Modest hills and moors forming broad plateaux with rounded summits;* • *Smooth convex hill slopes dissected by a complex tracery of valley landforms which vary in scale and appearance, from minor burn narrow incised gullies to occasional wider flat-bottomed valleys of larger rivers;* • *Medium to large scale landscape;* • *Open upland character with sparse tree cover;* • *Expanses of heather moorland, with rough grasses on upper slopes, with poor rough grassland and occasional improved pasture on lower slopes;* • *Generally unenclosed, with some post and wire fences along roads and access tracks, and occasional stone sheep stells and walls around farmsteads;* • *Sparsely inhabited, with scattered farmsteads in valleys;* • *Reservoirs creating local focal points;* • *Historic human influences evident in the many enclosures, cairns, hill forts and stone circles;* • *Steep north-facing scarps with spectacular panoramic views overlooking the coastal plain of Lothian to the north with views across the Firth of Forth; and* • *Forms the skyline when viewed from the lower land to the north.*"[73]	

[72] Ibid.
[73] SNH (2019) National Landscape Character Assessment. Landscape Character Type 266: Plateau Moorlands – Lothians. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20266%20-%20Plateau%20Moorland%20-%20Lothians%20-%20Final%20pdf.pdf. (Accessed 29/03/2021)

SNH (2019) LCT	**LCT 266: Plateau Moorlands - Lothians**
Sensitivity: The LCT is a medium to large-scale landscape with some topographical variety including rounded hills and the steep and more rugged Moorfoot Scarp. The influence of human activity, including existing wind farms is apparent within this LCT, particularly in the more distant Lammermuir Hills unit. Bowbeat Wind Farm is on the southern fringes of the LCT where it borders LCT 90. The overall landscape susceptibility is therefore judged to be **medium**. The majority of the LCT is within a designated landscape, and the closest LCT unit is entirely within the Gladhouse Reservoir and Moorfoot Scarp SLA. Additionally, the LCT has strong inter-visibility with nearby sensitive landscapes. Therefore, the LCT is considered to have **high** scenic value. Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **medium**. The Landscape Capacity Study for Wind Turbine Development in Midlothian (2007) identifies the Moorfoot Hills unit of the Uplands LCT (which covers the same extents as LCT 266) as having medium landscape sensitivity.	
Magnitude of Change and Significance of Landscape Effects: The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. Visibility of the Development from this LCT may alter the sense of "*wild land character*"[74] which is derived from the *"exposure and relative lack of roads, settlements or urban features"*[75], as identified by SNH in relation to perception. Therefore, the introduction of tall, man-made features into the surrounding landscape may affect the sense of wilderness and remoteness, although it is noted that the LCT is not without some manmade elements, including pylons, access tracks and wind turbines. The ZTV indicates that potential visibility of turbines will be largely limited to the hill tops and Site-facing slopes of the ridge of hills which forms the western boundary of the closest LCT unit, approximately 4 km to the east of the Site. This ridge provides a high level of screening with large areas of the LCT experiencing no visibility of the Development. There is some theoretical visibility of the Development along the Moorfoot Scarp at distances in excess of 10 km, however the intervening hills and slopes of the Moorfoots to the immediate south will partially screen the Development, with a maximum of eight turbines visible. Overall, a **small-scale** change will be experienced over a medium geographical extent. The magnitude of change is judged to be **low**. Overall, the effect of the Development on this LCT is judged to be **Not Significant (minor).**	
Potential for Cumulative Effects: There are currently no other consented wind farm developments located within or in proximity to the LCT. As such no significant additional or total cumulative landscape effects are predicted under scenario 1.	

[74] Ibid.
[75] Ibid.

Table 5.23: Operational Effects on LCT 268: Upland Hills- Lothians

SNH (2019) LCT	**LCT 268: Upland Hills - Lothians**
Location and Baseline Description: This LCT is found in the north-west of the Study Area, as one large, elongated unit that covers much of the Pentland Hills. At its closest point, the LCT unit is approximately 7.5 km to the north-west of the Site. Key characteristics include: • "*Visually sensitive north-facing escarpment overlooking Edinburgh and its predominantly flat surrounding area;* • *Two parallel ridge lines separated by a deep internal valley;* • *Visual containment of inner valleys and core areas;* • *Diversity of landcover types, including heather moor, grassland, broadleaf woodland, open water and wetland;* • *Drystone dykes and sheep stells on upper slopes;* • *Rich variety of heritage assets, including cairns, forts and enclosures;* • *Heavily used recreational resource, with network of footpaths and minor tracks linking important access points;* • *Visual importance derived from dominant position within heavily populated lowland area;* • *Forms a distinct and recognisable backdrop from many settlements within adjacent lowlands and Upland Fringes; and* • *Panoramic views from summits and ridges*."[76]	
Sensitivity: The LCT is a large-scale and topographically varied landscape which is largely lacking evidence of modern development and human activity, although the landcover of the hills has been modified by agricultural influences. There are no operational wind farms within the LCT. However, there is some visibility of built development in neighbouring LCTs to the east and north. There is a great sense of tranquillity and isolation in parts, largely resulting from panoramic views available from hill summits and ridges. The overall landscape susceptibility is therefore judged to be **medium**. The majority of the LCT falls within the Pentland Hills SLAs designated by the Midlothian and West Lothian Councils. The LCT has strong inter-visibility with several other sensitive landscapes, both nearby and more distant. Due to the extent of landscape designations across the LCT and its high recreational value, the LCT is considered as having a **high** value overall. Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **high**. The Landscape Capacity Study for Wind Turbine Development in Midlothian (2007) identifies the Pentland Hills unit of the Uplands LCT (which has the same extents as LCT 268) as having high landscape sensitivity. The Landscape Capacity Study for Wind Turbine Development in West Lothian (2011) identifies the Western Pentland Hills unit of the Upland Hill LCT (which broadly has the same extents as LCT 268) as being an Area of Highest Sensitivity to wind farm development.	
Magnitude of Change and Significance of Landscape Effects: The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. Visibility of the Development from this LCT will alter the "*panoramic views from summits and ridges*"[77] as a result of introducing tall, man-made features into the surrounding landscape. The ZTV indicates that potential visibility will be experienced across relatively large areas of the LCT, focussed on the south-eastern facing slopes of the Pentland Hills. Visibility of up to 12 turbines is indicated between 7.5 and 17 km across this LCT. From this LCT there is potential for turbines to be visible against the skyline, however in the most elevated areas, the Development will be largely backclothed by distant landform. A **small-scale** change will be experienced over a medium geographical extent, and overall, the magnitude of change is judged to be **low**. Overall, the effect of the Development on this LCT is judged to be **Not Significant (minor).**	

[76] SNH (2019) National Landscape Character Assessment. Landscape Character Type 268: Upland Hills – Lothians. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20268%20-%20Upland%20Hills%20-%20Lothians%20-%20Final%20pdf.pdf. (Accessed 29/03/2021)
[77] Ibid.

SNH (2019) LCT	LCT 268: Upland Hills - Lothians
Potential for Cumulative Effects: There are no cumulative schemes within this LCT. The consented Camilty Wind Farm will bring wind farm development in closer proximity to the Pentlands and will increase the influence of wind farms in elevated views west from this LCT. The Glenkerie Extension will be perceptible in distant southerly views from this LCT. The Development will be read as a single scheme in views to the south and south-east of the LCT. It will be seen in combined and successive views with other operational wind farms including the large clusters to the west of the Pentlands and Bowbeat to the south-east. This is **unlikely to result in additional significant cumulative effects on landscape character for this LCT.**	

Table 5.24: Operational Effects on LCT 269: Upland Fringes - Lothians

SNH (2019) LCT	LCT 269: Upland Fringes - Lothians
Location and Baseline Description: Within the Study Area, this LCT occurs as two linear units oriented broadly in a north-east to south-west alignment, running adjacent to the Pentland Hills in the north-west of the Study Area, and the Moorfoot and Lammermuir Hills in the east of the Study Area, at distances of approximately 12 km and 3 km respectively. Key characteristics include: • "*Broadly undulating, landforms forming a series of smooth rounded hills and slopes, some steep-sided and some gently sloping, shelving gradually from the Uplands northward to merge with rolling farmlands;* • *Occasional hills where underlying geology incorporates harder strata;* • *Varied scale, openness and land use reflecting transitional nature between upland and lowland;* • *Incised watercourses have etched v-shaped valleys into the slopes, often forming deep cleughs;* • *Occasional larger rivers flow through similar, but larger-scale, v-shaped channels;* • *Remnant heather moorland and rough grassland on high ground gives way to improved grassland and then to arable land on the lowest elevations, with a parallel transition from post and wire fence and walls to beech and hawthorn hedges;* • *Some areas of extensive coniferous forest, but tree cover is more frequent in the form of shelterbelts;* • *Deciduous woodland is restricted to steeper land in river channels, though this includes some important ancient woodlands;* • *Dispersed settlement pattern of farmsteads and clusters of cottages, with occasional small villages;* • *Distinctive character of rural road network, dense in places, including local features such as fords and bridges;* • *Quarries, overhead lines and busy A roads which have localised influence in some parts of the landscape;* • *Clearly transitional landscape between lowland and upland characters; and* • *Views across the lowland, and to the coast in the east, backed by the ridge lines of the hills to the south.*"[78]	
Sensitivity: The LCT is a large-scale landscape of broad, undulating slopes which gradually transitions to the more varied rolling terrain in the north. The LCT has a varied landcover pattern comprising areas of arable and pasture fields, improved grassland, remnant heather moorland and rough grassland, and areas of forestry, woodlands and shelterbelts. There are visible signs of human activity in the form of transport corridors, small villages and farmsteads, and occasional industrial developments such as quarries. There are several wind farms within this LCT, primarily in the LCT unit to the west of the Pentland Hills, near Forth. There are also numerous small settlements and villages and major roads including the A7, A701, A69, and A70, which tend to cut across the valley. The overall landscape susceptibility is therefore judged to be **low**.	

[78] SNH (2019) National Landscape Character Assessment. Landscape Character Type 269: Upland Fringes – Lothians. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20269%20-%20Upland%20Fringes%20-%20Lothians%20-%20Final%20pdf.pdf. (Accessed 29/03/2021)

SNH (2019) LCT	**LCT 269: Upland Fringes - Lothians**
Parts of this LCT are within designated landscapes, including the Pentland Hills SLA to the north and north-west of the Site, and Gladhouse Reservoir and Moorfoot Scarp SLA and South Esk Valley and Carrington Farmland SLA in the north-east. Beyond 15 km in the north-east of the Study Area, the LCT falls within other SLAs including Fala Moor, Fala Rolling Farmland and Policies, Humbie Head Waters and Lammer Law & Hopes to Yester. The LCT is considered to have **high** scenic value overall. Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **medium**. The Landscape Capacity Study for Wind Turbine Development in Midlothian (2007) identifies the Upland Fringes LCT (which has the same extents as LCT 269) as having varying landscape sensitivity. The Gladhouse/Auchencorth Moorlands unit has a predominantly medium landscape sensitivity with localised areas near the Moorfoot Scarp identified as Medium-High sensitivity. The North Lammermuir Platform also has Medium-High landscape sensitivity. The Landscape Capacity Study for Wind Turbine Development in West Lothian (2011) identifies the North-West Pentland Fringes unit of the Upland Hill Fringes LCT (which broadly has the same extents as LCT 269) as having medium landscape sensitivity.	
Magnitude of Change and Significance of Landscape Effects: The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. Visibility of the Development from this LCT may alter the long range and expansive views of the surroundings gained from within the landscape. The ZTV indicates that potential visibility of up to 12 turbines will be extensive within 15 km to the north-east of the Site. However, visibility is likely to be reduced as a result of the presence of intermittent vegetation such as forestry and woodland within the LCT. A **small-scale** of change will be experienced over a large geographical extent. However, there will be localised areas closer to the Site, such as near Auchencorth Moss, where the scale of change will be higher. Therefore, the overall magnitude of change is judged to be **medium**. Overall, the effect of the Development on this LCT is judged to be **Significant (moderate)** from around the Auchencorth Moss area within approximately 5 -10 km of the Site. Elsewhere across the LCT, particularly to the north-east of the Site, the effect reduces to **Not Significant (negligible).**	
Potential for Cumulative Effects: The consented Camilty Wind Farm is located within the LCT unit to the north-west of the Pentland Hills. This wind farm will be located in proximity to the operational Harburnhead and Pearie Law Wind Farms. There are no cumulative schemes within the LCT unit to the north and north-east of the Development. There is very limited theoretical visibility of the Development from the unit where Camilty is located, and therefore the relationship between them is **not considered likely to result in any additional significant cumulative effects under scenario 1.**	

Table 5.25: Operational Effects on LCT 270: Lowland River Valleys - Lothians

SNH (2019) LCT	**LCT 270: Lowland River Valleys - Lothians**
Location and Baseline Description: This LCT occurs as numerous small linear units oriented broadly in a north to south alignment in the north-east of the Study Area. In addition, there is a larger, less linear unit extending from Penicuik to Dalkeith in a north-east to south-west orientation broadly adjacent to the north-eastern extents of the Pentland Hills. At its closest point the LCT is approximately 6.5 km to the north of the Site. Key characteristics include: • "*Meandering rivers and tributary streams flowing northward from the hills;* • *Predominantly incised river valleys, enclosed and often narrow, though with landform ranging from sections of broader floodplain to very narrow gorges with distinctive rock exposures, although the lower North and South Esk are more open in character;* • *Well wooded with extensive deciduous riparian woodland, and mature mixed policy woodlands associated with the numerous estates;* • *Scrub and pasture within open areas of valley sides, giving way to arable land with shelterbelts on upper slopes and fringes;*	

SNH (2019) LCT	**LCT 270: Lowland River Valleys - Lothians**
• *Large number of significant historic buildings, including vernacular cottages, 18th and 18th Century farmsteads, churches (often with highly visible spires), industrial architecture, castles and towerhouses. Large country houses, often with extensive designed landscapes;* • *Remnants of the coal mining industry are evident around the North and South Esk, where rolling farmland, settlement, transport infrastructure, light industry and business uses, also illustrate the diversity of land uses; and* • *Views are generally contained by enclosed topography and dense woodland, opening out on the farmed and settled upper slopes which give longer distance views to the Pentland Hills to the west. Many valleys are rural and tranquil, whilst quiet and secluded locations occur within all the valleys.*"[79]	
Sensitivity: The LCT is a small-scale and topographically varied landscape, which comprises incised and enclosed river valleys with arable land on upper slopes and fringes. The LCT is well wooded with deciduous riparian woodland, estate woodlands, shelterbelts and hedgerows. There are no operational wind farms within this LCT. There are numerous settlements including Penicuik, Bonnyrigg and Loanhead, and other smaller villages. Additionally, there are several main roads including the A701, A702, A68 and A7, feeding into the busy A720 by-pass. The overall landscape susceptibility is judged to be **high**. Parts of the LCT are designated, including the Pentland Hills SLA, South Esk Valley and Carrington Farmland SLA and North Esk Valley SLA, which are all within 15 km of the Site. Whilst designated parts of the LCT are considered as having higher scenic value, the value of the LCT as a whole is considered to be **medium**, especially in the areas closer to the Site which feature a lot of built development. Taking account of the judgements of susceptibility and value, the sensitivity of the LCT is judged to be **medium**. The Landscape Capacity Study for Wind Turbine Development in Midlothian (2007) identifies the Lowland River Valleys LCT (which broadly has the same extents as LCT 270) as having varying landscape sensitivity. The North Esk unit has a Medium-High landscape sensitivity, whilst the South Esk and Upper Tyne Water have High landscape sensitivities.	
Magnitude of Change and Significance of Landscape Effects: The Development will not be located in the LCT and so landscape effects will be indirect, resulting from changes in how the character of the LCT is perceived. Visibility of the Development from this LCT may alter the extensive views of the wider landscape of nearby hills experienced from valley crests and upper slopes, however the strong topographical enclosure and wooded slopes of the valleys will limit visibility from within the valleys. The ZTV indicates that potential visibility of up to 12 turbines will be largely limited to the LCT unit to the north-east of the Site, within 15 km. Greater visibility is indicated in more elevated regions and is widespread across the settlements along the A703. However, visibility is likely to be greatly reduced as a result of intervening-built development and vegetation such as forestry and woodland. Overall, a **small-scale** change will be experienced over a medium geographical extent. The overall magnitude of change is judged to be **low**. Overall, the effect of the Development on this LCT is judged to be **Not Significant (minor).**	
Potential for Cumulative Effects: There are currently no other consented wind farm developments located within or in proximity to the LCT. As such no significant additional or total cumulative landscape effects are predicted under scenario 1.	

[79] SNH (2019) National Landscape Character Assessment. Landscape Character Type 270: Lowland River Valleys – Lothians. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20270%20-%20Lowland%20River%20Valleys%20-%20Lothians%20-%20Final%20pdf.pdf. (Accessed 29/03/2021)

5.9.3 Operational Visual Effects

115. The main likely effects of the operational Development on visual amenity will be associated with the presence of the wind turbines, turbine transformers and ancillary infrastructure including access tracks, onsite substation, battery storage and Site access track as described in **Chapter 3: Project Description** and shown on Figure 3.1.

116. This section assesses the visual impact of the Development on a range of different receptors. Firstly, operational visual effects from specific viewpoints throughout the Study Area are assessed (see Section 5.9.3.1). These effects inform an understanding of operational effects from settlements (see Section 5.9.3.2) and sequential views from routes (see Section 0). As such, there is some duplication as to where various effects are considered. Where an effect is highlighted as being of relevance to both a specific viewpoint, as well as a settlement or route for example, it should not be counted as more than one effect. Essentially, the same single effect may have implications for different receptors in the same place (a road running through a settlement and past a residential property, which may also be used by tourists; a path visited by walkers that runs past a settlement, lies within a designated landscape, and falls into an LCT that is considered elsewhere, and so on). An effect may have implications for various receptors but is nevertheless the result of the same effect.

5.9.3.1 Operational Effects on Views

117. The assessment of visual effects from the 26 viewpoints selected to represent views of the Development (as listed in Table 5.4 above and shown on Figure 5.1.2a) are set out below. This assessment assumes that all effects are long-term, during the proposed 30-year operational lifespan of the Development, and reversible, unless stated otherwise.

118. Accompanying visualisations for each assessment viewpoint are contained in Volume 2c: LVIA Visualisations of the EIA Report. The visualisations were prepared in accordance with the methodology set out in Appendix A5.2.

Table 5.26: Viewpoint 1: Cross Borders Drove Road (West)

Viewpoint 1: Cross Borders Drove Road (West)				
Grid Reference	318590	646165	Figure Number	5.2.1
LCT	92: Plateau Outliers		Landscape designation	None
Direction of view	East		Distance to nearest turbine	1.4 km
Number of hubs theoretically visible	2		Number of turbines with blades theoretically visible	2
Viewpoint location and existing view	This viewpoint is located on the Cross Borders Drove Road, on the western approach to the Site. The viewpoint is representative of views experienced by recreational receptors travelling along the Cross Borders Drove Road, one of Scotland's Great Trails[80]. Views are largely contained in all directions from the viewpoint due to the presence of nearby intervening hills, including Green Knowe (401 m AOD) to the north, Drum Maw (44 m AOD) to the north-west, White Knowe (406 m AOD) to the west, Wide Hope Shank to the south, and Crailzie Hill (476 m AOD) and Ewe Hill (462 m AOD) within the Site itself. The lower slopes of Green Knowe frame the view from this viewpoint, screening the northern half of the Site from view. The foreground of the view looking east comprises rough grazing land backed by forestry			

[80] Scotland's Great Trails (undated). About SGTs [Online] Available at: https://www.scotlandsgreattrails.com/aboutsgts/ (Accessed 29/03/2021)

Viewpoint 1: Cross Borders Drove Road (West)	
	extending into the distance. The forested Crailzie Hill forms the skyline in this direction. There are no existing wind farms in views towards the Site, or in other directions.
Sensitivity	Recreational receptors, whose attention is focused on their surroundings, are considered to be of **high** susceptibility to changes in the view. The viewpoint is not located within a designated landscape; however, the Cross Borders Drove Road is recognised as a popular long-distance path. The value of the view is considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **high**.
Assessment of visual effects	The Development will introduce visibility of wind turbines into easterly views. The blades and hubs of two turbines will be visible. Due to the proximity of the viewpoint to the Site, the turbines will appear as prominent features on the slopes of the southern ridge of hills running from Crailzie Hill to Kilrubie Hill. From this viewpoint, turbines further north within the Site are screened by the intervening landform of Green Knowe, however these turbines will become visible as the receptor travels eastwards into the Site. Given the forested nature of the Site, ancillary infrastructure and tracks will not be visible. Felled forestry associated with the Development will not be visible, however a small block of forestry to the west of T3 will be felled as part of ongoing management of the forest. This will increase the amount of the turbine tower which will be visible, although the overall change in view will be minimal. The change in view will be experienced at this viewpoint and from other sections along the Cross Borders Drove Road, particularly within the Site to the east. The geographical extent of the change is judged to be medium. The introduction of the Development will result in a **large-scale** change to the view. The overall magnitude of change is judged to be **high** and taking account of the **high** sensitivity will result in a **Significant (Major)** visual effect. Sequential effects on the Cross Borders Drove Road overall are assessed in Table 5.63: Cross Borders Drove Road.
Potential for Cumulative Effects	No other operational or consented wind energy developments within 20 km of the Development will be visible from this location. Therefore, **no significant additional or total cumulative** visual effects are predicted to occur for scenario 1.

Table 5.27: Viewpoint 2: Cross Borders Drove Road (East)

Viewpoint 2: Cross Borders Drove Road (East)				
Grid Reference	322527	644769	Figure Number	5.2.2
LCT	92: Plateau Outliers		Landscape designation	None
Direction of view	North-west		Distance to nearest turbine	2.4 km
Number of hubs theoretically visible	10		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This viewpoint is located on the Cross Borders Drove Road, near Cringletie, to the south-east of the Site. It is a roadside location within undulating farmland between the Eddleston Water and Cloich Hills. The viewpoint is representative of views experienced by recreational receptors travelling along the Cross Borders Drove Road, one of Scotland's Great Trails, and is also representative of views experienced by people travelling along the road between Meldon Valley and Wormiston. There are open views to the north, south and east from this viewpoint. Views to the west are largely screened by the intervening landform of Hog Knowe, however views towards the Site to the north-west are largely unobstructed with the lower northern slopes of Hog Knowe framing the view in the foreground. The foreground of the view looking north-west comprises pastoral fields backed by forestry in the mid- to long distance. The forested Cloich Hills form the skyline in this direction. There are no existing wind farms in views towards the Site. The operational Bowbeat Wind Farm is visible in the Moorfoot Hills approximately 6 km to the north-east of the viewpoint.			
Sensitivity	Recreational receptors, whose attention is focused on their surroundings, are considered to be of **high** susceptibility to changes in the view. Road users are considered to be of **low** susceptibility to changes in the view. The viewpoint is not within a designated landscape; however, the Cross Borders Drove Road is recognised as a popular long-distance path. The value of the view is considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **high**.			
Assessment of visual effects	The Development will introduce wind turbines into views to the north-west, occupying approximately 40° of the horizontal field of view. The blades and hubs of 10 turbines, and blades of an additional 2 turbines, will be visible. The turbines will be seen above the horizon formed by the forested Cloich Hills, breaking the skyline. The turbines in the west of the Site will be partially screened by the intervening ridge of hills running through the Site. Given the forested nature of the Site, ancillary infrastructure and tracks will not be visible. Likewise, no felling associated with the development will be visible. The Development will form a prominent feature in views to the north-west, closer than the operational Bowbeat turbines which are visible to the north-east from this location. The change in view will be experienced at this viewpoint and from the nearby lower-lying land to the east of the Cloich Hills. The geographical extent of the change is judged to be medium. The introduction of the Development will result in a **large-scale** change to the view. The overall magnitude of change is judged to be **high** and taking account of the **high** sensitivity will result in a **Significant (Major)** visual effect.			

Viewpoint 2: Cross Borders Drove Road (East)	
	Sequential effects on the Cross Borders Drove Road overall are assessed in Table 5.63: Cross Borders Drove Road.
Potential for Cumulative Effects	The Development will be seen to the north-west, and the operational Bowbeat Wind Farm will be seen to the north-east on the hill tops above the Eddleston Valley. The turbines at Bowbeat will appear smaller than those of the Development, however as the two developments will not be seen adjacent to each other, the scale difference will not be noticeable. Furthermore, the Development will appear larger due to its closer proximity to the viewpoint. **No significant additional or total cumulative** visual effects are predicted to occur. No other consented wind energy developments within 20 km of the Development will be visible from this location, therefore **no significant additional or total visual effects** are predicted to occur for scenario 1.

Table 5.28: Viewpoint 3: Old Post Road Core Path (east of Observatory)

Viewpoint 3: Old Post Road Core Path (east of Observatory)				
Grid Reference	323157	649501	Figure Number	5.2.3
LCT	114: Pastoral Upland Valley		Landscape designation	None
Direction of view	South-west		Distance to nearest turbine	2.8 km
Number of hubs theoretically visible	10		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This viewpoint is located on the minor road to the east of the property at the Observatory. The viewpoint is representative of views experienced by recreational receptors travelling on the Core Path, road users and residential receptors near the Observatory. Views south towards the Site are open, with the Cloich Hills forming the skyline in mid to close range views. The saddle shaped profile of the Cloich Hills is clearly visible, blanketed by forestry. The foreground of the view consists of a relatively flat plateau of farmland and moorland bound by post and wire fencing along the roadside. Views eastwards include mature woodland and forestry with the Moorfoot Hills visible in the distance. Views west and north are characterised by gently undulating farmland, with woodland shelterbelts. A property and the observatory are visible to the west. There are no existing wind farms in views towards the Site from this viewpoint. The operational Bowbeat Wind Farm in the Moorfoot Hills is visible approximately 7 km to the south-east of the viewpoint.			
Sensitivity	This viewpoint is representative of views experienced by recreational, residential and road receptors. Recreational receptors, whose attention is focused on their surroundings, are considered to be of **high** susceptibility to changes in the view. Residential receptors are also considered to be of **high** susceptibility. Road users are considered to be of **low** susceptibility to changes in the view. The viewpoint is not located within a designated landscape or at a recognised stopping point or promoted view. The value of the view is considered to be **medium**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **medium**.			

Viewpoint 3: Old Post Road Core Path (east of Observatory)	
Assessment of visual effects	All 12 turbines will be visible from this viewpoint, breaking the skyline above the Cloich Hills. The most westerly turbines on the western and southern slopes of Ewe Hill will be largely screened by the ridge of hills, with only blades visible. Ancillary infrastructure will be entirely screened by forestry from this viewpoint. Felled forestry (keyhole) associated with the Development will not be visible, however large blocks of forestry within the central part of the Site will be felled as part of ongoing management of the forest during the operational life of the Development. Likewise, areas of forestry in the north of the Site will be felled, including around T12. This felling will slightly increase the amount of the turbine tower for T12 which will be visible, although the overall change in view will be minimal. Felling elsewhere within the Site will not increase visibility of the Development. The valley running through the Site near Courhope separates the turbines into two groups, to the north and south of the valley. The most southerly turbine is located on the distant southern slopes of the valley and helps bridge the gap between the two clusters. The southern ridge of hills is aligned with the view from this viewpoint, and therefore, the turbines on this ridge appear as slightly stacked. The geographical extent of the change is judged to be medium. The introduction of the Development will result in a **large-scale** change to the view. The overall magnitude of change is judged to be **high** and taking account of the **medium** sensitivity will result in a **Significant (Major)** visual effect.
Potential for Cumulative Effects	The Development will be seen to the south-west, and the operational Bowbeat Wind Farm will be seen in successive views to the south-east. The turbines at Bowbeat will appear smaller than those of the Development, however as the two developments will be experienced in successive views and will not be seen adjacent to each other, the scale difference will not be noticeable. Furthermore, the Development will appear larger due to its closer proximity to the viewpoint. **No significant additional or total cumulative** visual effects are predicted to occur. No other consented wind energy developments within 20 km of the Development will be visible from this location, therefore **no significant additional or total visual effects** are predicted to occur for scenario 1.

Table 5.29: Viewpoint 4: Black Meldon

<table>
<tr><th colspan="5">Viewpoint 4: Black Meldon</th></tr>
<tr><td>Grid Reference</td><td>320617</td><td>642509</td><td>Figure Number</td><td>5.2.4</td></tr>
<tr><td>LCT</td><td colspan="2">92: Plateau Outliers</td><td>Landscape designation</td><td>Tweed Valley SLA and Upper Tweeddale NSA</td></tr>
<tr><td>Direction of view</td><td colspan="2">North</td><td>Distance to nearest turbine</td><td>3.5 km</td></tr>
<tr><td>Number of hubs theoretically visible</td><td colspan="2">12</td><td>Number of turbines with blades theoretically visible</td><td>12</td></tr>
<tr><td>Viewpoint location and existing view</td><td colspan="4">This viewpoint is a hill-top location, located at the summit of Black Meldon, to the south of the Site. The viewpoint is representative of views experienced by recreational receptors, such as hill walkers, at the summit of the hill.

The viewpoint offers panoramic views in all directions, including northerly views towards the Site. In this view, the Site appears to be largely covered by forestry, blanketing much of the underlying upland plateau landscape. The Pentland Hills are visible in the distance, and properties at Harehope and Nether Stewarton are visible on the lower slopes to the south and east of the Site, respectively.

The panoramic views experienced at this location offer views of the Moorfoot Hills to the east, the Southern Uplands to the south and White Meldon to the east.

There are no existing wind farms in views towards the Site from this viewpoint, however there are views of the existing Bowbeat Wind Farm development in the Moorfoot Hills, approximately 8 km to the north-east. In addition, the operational Clyde and its Extension and Glenkerie Wind Farms are visible on the distant horizon to the south-west of the viewpoint location, at a distance of approximately 24 km and 17.5 km, respectively.</td></tr>
<tr><td>Sensitivity</td><td colspan="4">This viewpoint is representative of views experienced by recreational receptors. Recreational receptors, whose attention is focused on their surroundings, are considered to be of high susceptibility to changes in the view.

This viewpoint is located at the summit of a popular hill on the edge of the Tweeddale NSA. The value of the view is therefore considered to be high.

On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be high.</td></tr>
<tr><td>Assessment of visual effects</td><td colspan="4">All 12 turbines will be visible in northerly views from this viewpoint. They will all break the skyline, however turbine towers to the south will be partially backclothed by the forested Cloich Hills. In addition, some stacking is present in views from this viewpoint between T3, T8 and T10.

Given the elevated nature of views overlooking the Site, some tracks will be visible towards the centre of the Site, particularly following the felling of large blocks of forestry in the centre of the Site for forest management which will be replanted following construction. Likewise, once this forestry is felled, the towers of several turbines (notably T8-T12) will be more visible in views from this viewpoint. Prior to this felling, the bases of the towers and the tracks on-site will be screened by forestry, although some areas of keyhole felling associated with the Development may be visible.

The Development will form a prominent feature on the horizon, closer than the operational wind farms visible from this location. However, the Development will occupy a small proportion of the 360° panoramic views experienced from this viewpoint and will be seen in successive views with other operational wind farms including Bowbeat Wind Farm to the north-east and Glenkerie to the south-west.</td></tr>
</table>

Viewpoint 4: Black Meldon	
	The change in view will be experienced at this viewpoint and from the Site-facing upper slopes of the hill. The viewpoint also represents similar views from the neighbouring White Meldon. The geographical extent of the change is judged to be small. Due to the proximity to the Site, the introduction of the Development will result in a **large-scale** change to the view from this viewpoint. The overall magnitude of change is judged to be **high** and taking account of the **high** sensitivity will result in a **Significant (Major)** visual effect. An assessment of the effects on the Upper Tweeddale NSA is provided in Table 5.65: Operational Effects on the Upper Tweeddale NSA. A key design aim for the Development was to create a compact layout with turbines that appear in keeping with the underlying landform in terms of scale in views from the NSA.
Potential for Cumulative Effects	The Development will be seen to the north and the operational Bowbeat Wind Farm will be seen in successive views to the north-east. The turbines at Bowbeat will appear smaller than those of the Development, however as the two developments will be seen in successive views on differing sides of the Eddleston valley, the scale difference will not be noticeable. Additionally, the Development will appear larger due to its closer proximity to the viewpoint. **No significant additional or total cumulative** visual effects are predicted to occur. The consented Glenkerie Extension will be visible in successive views to the south-west from this viewpoint but will be will read as part of the operational Glenkerie and Clyde Wind Farms. At a distance of over 17 km this will result in a barely perceptible scale of change experienced over a small geographical extent. The magnitude of change will be barely perceptible. The additional and total cumulative visual effect will be **Not Significant (Negligible)** under scenario 1.

Table 5.30: Viewpoint 5: Meldon Valley

Viewpoint 5: Meldon Valley				
Grid Reference	321290	642463	Figure Number	5.2.5
LCT	92: Plateau Outliers		Landscape designation	Tweed Valley SLA
Direction of view	North		Distance to nearest turbine	3.7 km
Number of hubs theoretically visible	1		Number of turbines with blades theoretically visible	4
Viewpoint location and existing view	This viewpoint is situated on the on the minor road which runs along the Meldon Valley, between White Meldon and Black Meldon. The viewpoint is located approximately 1.5 km north of Meldon Cottage. The viewpoint is representative of views experienced by road users travelling on the minor road through the Tweed Valley SLA. Although it does not form part of the NSA citation, Meldon Valley has been described by NatureScot during consultation as the gateway to the Upper Tweeddale NSA, albeit views to the NSA are southerly, away from the Site. Views from this section of the minor road are relatively confined and concentrated down the valley, with the lower slopes of Black Meldon and White Meldon framing the view to the west and east respectively. The foreground of the view comprises the road, with heather and gorse on the lower slopes of each of the Meldons. The horizon is largely dominated by the forested slopes to the south-east of Harehope, which forms the skyline. The majority of the Site itself is largely screened by intervening landform and Harehope Forest in views looking north. However, the most southerly			

Viewpoint 5: Meldon Valley	
	extents of the Site form part of the forested slopes visible from this location. There are no existing wind farms visible from this location.
Sensitivity	This viewpoint is representative of views experienced by road users. However, as the Meldon Valley is described by NatureScot as a scenic gateway for the Upper Tweeddale NSA, it is considered that receptors will be of **medium** susceptibility to changes in the view. The viewpoint is located within the Tweed Valley SLA. The value of the view is considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **medium-high**.
Assessment of visual effects	None of the turbines will be visible from this viewpoint, as the forested horizon will provide screening of the Development, in views north looking along the valley. Visibility of the Development is limited from this minor road, as shown in Figure 5.1.2 which indicates the worst-case scenario for theoretical visibility and does not include screening by vegetation. This viewpoint represents a short section of the road where there will be theoretical visibility of the turbines. The geographical extent is considered to be small. The introduction of the Development will result in no change to the view. The overall magnitude of visual change is considered to be **low** and taking account of the **medium-high** sensitivity will result in a **Not Significant (negligible)** visual effect.
Potential for Cumulative Effects	No other operational or consented wind energy developments within 20 km of the Development will be visible from this location. Therefore, **no significant additional or total cumulative** visual effects are predicted to occur for scenario 1.

Table 5.31: Viewpoint 6: Core Path 154 near Eddleston

Viewpoint 6: Core Path 154 near Eddleston				
Grid Reference	324732	647452	Figure Number	5.2.6
LCT	114: Pastoral Upland Valley		Landscape designation	None
Direction of view	West		Distance to nearest turbine	3.6 km
Number of hubs theoretically visible	12		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This viewpoint is located on Core Path 154, on the steeply sloping farmland above and to the east of Eddleston. The viewpoint is representative of views experienced by recreational receptors travelling along the Core Path. The elevated viewpoint offers open westward views towards the Site. The foreground of the view includes the settlement of Eddleston surrounded by mature vegetation, and extensive areas of woodland and forestry visible on the hills to the west of Eddleston valley. The forested Cloich Hills within the Site are visible in the distance, forming a distinctive skyline above the valley and settlement of Eddleston. Views towards the north and south-west are open, with longer ranging views to the Pentlands and Meldon Hills, respectively. The sloping farmland limits views to the south and east. There are no existing wind farms visible from this location.			

Viewpoint 6: Core Path 154 near Eddleston	
Sensitivity	This viewpoint is representative of views experienced by recreational receptors. Recreational receptors, whose attention is focused on their surroundings, are considered to be of **high** susceptibility to changes in the view. The viewpoint is not located within a designated landscape or at a recognised stopping point or promoted view, however, is located on a Core Path. The value of the view is considered to be **medium**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **high**.
Assessment of visual effects	All 12 turbines will be visible on the skyline formed by the forested Cloich Hills, above the lower-lying Eddleston valley. The hubs of most turbines will be visible against the skyline, however turbines in the west of the Site will be partially screened by the intervening landform of Ewe Hill, Kilrubie Hill and Peat Hill. Most ancillary infrastructure and keyhole felling will be screened by forestry, however one crane hardstanding at T9 will be visible on the hillside. Although keyhole felling will not be noticeable, a large block of forestry in the centre of the Site will be felled and replanted as part of ongoing management of the forest. Felling will not affect the visibility of most turbines in the Development, however it will increase visibility of T6 and T9, by exposing more of their towers. The Development will form a prominent feature on the horizon and will occupy a large proportion of the westerly view available from this location. The change in view will be experienced at this viewpoint and from the surrounding area, including the majority of the 0.7 km long Core Path. The geographical extent of the change is judged to be **medium**. The introduction of the Development will result in a **large-scale** change to the view. The overall magnitude of change is judged to be **high** and taking account of the **high** sensitivity will result in **Significant (major)** visual effect. An assessment of operational effects on the settlement of Eddleston is provided in Table 5.52.
Potential for Cumulative Effects	No other operational or consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative** visual effects are predicted to occur for scenario 1.

Table 5.32: Viewpoint 7: Minor Road near Spylaw and Wester Deans

Viewpoint 7: Minor Road near Spylaw and Wester Deans				
Grid Reference	322064	652223	Figure Number	5.2.7
LCT	92: Plateau Outliers		Landscape designation	None
Direction of view	South		Distance to nearest turbine	3.8 km
Number of hubs theoretically visible	8		Number of turbines with blades theoretically visible	11
Viewpoint location and existing view	This viewpoint is located on the minor road connecting the A701 and the A703, to the north of the Site, near the properties of Wester Deans and Spylaw Cottage. This viewpoint is representative of views experienced by road users on the minor road, and the residential receptors at Spylaw Cottage and Wester Deans.			

Viewpoint 7: Minor Road near Spylaw and Wester Deans	
	The foreground of views looking south comprises rough grazing land bound by post and wire fencing. A linear woodland shelterbelt is seen in the middle distance of the view, partially screening the skyline formed by the Cloich Hills in the distance. The Cloich Hills are visible in the distance but are partially screened by the intervening trees near Little Dean and Wester Deans. Longer distance views to the east comprise the rolling uplands of the Moorfoot Hills, which form the eastern skyline. A few wind turbines of the operational Bowbeat Wind Farm are visible in the Moorfoot hills in views south-east, with the remainder screened by topography.
Sensitivity	Road users are considered to be of **low** susceptibility to changes in the view. The viewpoint is not located within a designated landscape or at a recognised stopping point or promoted view. The value of the view is considered to be **medium**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **medium.**
Assessment of visual effects	11 of the turbines will be theoretically visible from this viewpoint, with those in the north of the Site closer and therefore appearing larger. The most easterly turbines located on the southern ridge within the Site (T4 and T5) will be prominent albeit more distant. The remaining turbines will be largely screened by the intervening landform of Peat Hill and Ewe Hill, with visibility limited to blades. Ancillary infrastructure, including the substation compound and access track in the north of the Site, will be visible from this viewpoint. Keyhole felling associated with the Development will be entirely screened from view, however felling of forestry blocks associated with ongoing management of the forest will be visible to the north-east of T8 and around T12. The felling will not affect visibility of T8, and although large blocks will be felled around T12, the visibility of the turbine from this viewpoint will not change, due to the presence of a shelterbelt in the foreground of the view providing screening. During the winter months, when this shelterbelt has less leaf cover, there may be more visibility, but this will be limited to a slight increase in the proportion of the turbine tower of T12 visible. The change in view will be experienced at this viewpoint and from the area of farmland to the immediate north of the Site. The geographical extent of the change is judged to be medium. The introduction of the Development will result in a **large-scale** change to the view. The overall magnitude of change is judged to be **high** and taking account of the **medium** sensitivity will result in **Significant (moderate)** visual effect.
Potential for Cumulative Effects	The Development will be seen to the south, and the operational Bowbeat Wind Farm will be seen at a distance in successive views to the south-east. The turbines at Bowbeat will appear smaller than those of the Development, however as the two developments will be experienced in successive views and will not be seen adjacent to each other, the scale difference will not be noticeable. Furthermore the Development will appear larger due to its closer proximity to the viewpoint. **No significant additional or total cumulative** visual effects are predicted to occur. No other consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative** visual effects are predicted to occur for scenario 1.

Table 5.33: Viewpoint 8: B7059 between Boghouse and Kaimhouse

Viewpoint 8: B7059 between Boghouse and Kaimhouse				
Grid Reference	316572	649749	Figure Number	5.2.8
LCT	99: Rolling Farmland Borders		Landscape designation	None
Direction of view	East		Distance to nearest turbine	3.7 km
Number of hubs theoretically visible	2		Number of turbines with blades theoretically visible	5
Viewpoint location and existing view	This viewpoint is located on the B7059 between Boghouse and Kaimhouse farmsteads. It is representative of views experienced by road users travelling between West Linton and the A701 via the B7059. From this viewpoint, the Site is largely screened by intervening hills including Hag Law (446 m AOD) and Wether Law (479 m AOD). These hills form the distinctive skyline which is the main focus of the view from this viewpoint. The foreground of views looking north-east comprises farmland used for grazing interspersed with shelterbelts and scattered trees. The hills screening the Site form a smooth horizon with the hill slopes consisting of a mixture of farmland and moorland, with scattered blocks of forestry. Views to the north and south are open and long ranging, with distant views confined by mature forestry, with some mature boundary vegetation and shelterbelts visible in the foreground. Westerly views are more confined due to roadside vegetation and vegetation around Kaimhouse. No existing wind farms are visible from this viewpoint.			
Sensitivity	Road users are considered to be of **low** susceptibility to changes in the view. The viewpoint is not located within a designated landscape or at a recognised stopping point or promoted view. The value of the view is considered to be **low**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **low.**			
Assessment of visual effects	The majority of the Development will be screened by the intervening ridge of hills comprising Wether Law and Hag Law. Two hubs and three additional turbine blades will be visible against the skyline above the ridge. The most northerly turbines (T10 and T12) will be most visible due to their higher elevation and reduced screening by landform, resulting in two hubs being visible against the skyline. Overall, the Development will occupy a small extent of the available view from this viewpoint. The change in view will be experienced at this viewpoint and from a c. 1 km stretch of the B7059. The geographical extent of the change is judged to be small. The introduction of the Development will result in a **medium-scale** change to the view. The overall magnitude of change is judged to be **medium** and taking account of the **low** sensitivity will result in a **Not Significant (minor)** visual effect.			
Potential for Cumulative Effects	No other operational or consented wind energy developments within 20 km of the Development will be visible from this location. Therefore, **no significant additional or total cumulative** visual effects are predicted to occur for scenario 1.			

Table 5.34: Viewpoint 9: Portmore House

Viewpoint 9: Portmore House				
Grid Reference	325190	648820	Figure Number	5.2.9
LCT	114: Pastoral Upland Valley		Landscape designation	None
Direction of view	West		Distance to nearest turbine	4.4 km
Number of hubs theoretically visible	12		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This viewpoint is located on a woodland path within the gardens of Category A listed Portmore House, which is set within an Inventory-listed Garden and Designed Landscape (GDL) normally open to the public one day a week during July and August or on other days by arrangement. The viewpoint is located to the east of Portmore House, on a woodland path which sits near the top of the sloped gardens overlooking the house and pond. The viewpoint is representative of views experienced by recreational receptors visiting the gardens and the wider landscape, and residential receptors at Portmore House. The forested Cloich Hills within the Site form the skyline in westerly views from this viewpoint. The foreground of the view comprises grassland sloping down to the pond and Portmore House with mature deciduous woodland beyond in the middle distance. Intervening vegetation around Portmore House screens the lower slopes of Peat Hill and Ewe Hill within the Site. Views to the north, south and east are all filtered by mature mixed deciduous and coniferous trees nearby. No existing wind farms are visible from this viewpoint.			
Sensitivity	This viewpoint is representative of views experienced by recreational receptors visiting Portmore House GDL. It is also representative of views experienced by residential receptors within Portmore House. Recreational and residential receptors are considered to be of **high** susceptibility to changes in the view. The viewpoint is a popular view from within the Portmore House gardens. The value of the view is considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **high**.			
Assessment of visual effects	The Development will introduce wind turbines into westerly views and will form a prominent feature in the landscape which forms the backdrop to the GDL at the viewpoint location. The five most northernly turbines within the Site will be visible on the horizon formed by the forested Cloich Hills. These turbines will break the skyline and will occupy a large proportion of the distant views experienced from this viewpoint. The turbines further south within the Site will be largely screened by intervening vegetation. Given the forested nature of the Site, ancillary infrastructure and tracks are unlikely to be visible. Some limited areas of keyhole felling may be visible. The change in view will be experienced at this viewpoint and in the wider landscape beyond the estate. It is noted that mature vegetation will screen the Development within many other areas of the GDL particularly in the summer months when vegetation is in leaf. The geographical extent of the change is judged to be small. The introduction of the Development will result in a **medium-scale** change to the view. The overall magnitude of change is judged to be **medium**, and taking account of the **high** sensitivity will result in **a Significant (moderate)** visual effect.			

Viewpoint 9: Portmore House	
Potential for Cumulative Effects	The blade tips of the consented Glenkerie Extension are theoretically visible in distant views to the south-west. However, the turbines will be screened by intervening vegetation. Therefore, **no significant additional or total cumulative** visual effects are predicted to occur for scenario 1.

Table 5.35: Viewpoint 10: A701 Mountain Cross

Viewpoint 10: A701 Mountain Cross				
Grid Reference	314968	646687	Figure Number	5.2.10
LCT	99: Rolling Farmland – Borders		Landscape designation	None
Direction of view	East		Distance to nearest turbine	5.0 km
Number of hubs theoretically visible	1		Number of turbines with blades theoretically visible	4
Viewpoint location and existing view	This viewpoint is located on the A701 in Mountain Cross, near the junction leading to Bordlands Farm and the B7059. The viewpoint is representative of views experienced by road users and local residents. From this viewpoint, the Site is largely screened by intervening hills including White Knowe (406 m AOD), Drum Maw (445 m AOD), Hag Law (446 m AOD) and Wether Law (479 m AOD). These hills form the distinctive skyline which is the main focus of the view from this viewpoint. The foreground of views looking north-east comprises farmland used for grazing interspersed with shelterbelts and individual trees. Bordlands Farm is visible in the foreground, partially screened by intervening vegetation. The more distant hill slopes have a predominant landcover of farmland and moorland, with scattered blocks of forestry. Views to the north and south are largely confined by roadside vegetation, whilst westerly views are limited by properties at Mountain Cross. No existing wind farms are visible from this viewpoint.			
Sensitivity	Road users are considered to be of **low** susceptibility to changes in the view. Residents are considered to be of **high** susceptibility to change. The viewpoint is not located within a designated landscape or at a recognised stopping point or promoted view. The value of the view is considered to be **low**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **medium.**			
Assessment of visual effects	The Development will be largely screened by the intervening landform of White Knowe, Drum Maw, Hag Law and Wether Law, with only one turbine hub and two additional turbine blades visible from this viewpoint, set against the skyline above the ridge of hills. Ancillary infrastructure within the Site will not be visible from this location. The change in view will be experienced at this viewpoint and from the immediate surroundings. The geographical extent of the change is judged to be **small**. The introduction of the Development will result in a **small-scale** change to the view. The overall magnitude of change is judged to be **low** and taking account of the **medium** sensitivity will result in a **Not Significant (minor)** visual effect.			

Viewpoint 10: A701 Mountain Cross	
Potential for Cumulative Effects	No other operational or consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative** visual effects are predicted to occur for scenario 1.

Table 5.36: Viewpoint 11: A703 near Langside Farm (North of Peebles)

Viewpoint 11: A703 near Langside Farm (North of Peebles)				
Grid Reference	324940	641911	Figure Number	5.2.11
LCT	116: Upland Valley with Woodland		Landscape designation	Tweed Valley SLA
Direction of view	North-west		Distance to nearest turbine	6.1 km
Number of hubs theoretically visible	11		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This viewpoint is located on the A703 on the northern outskirts of Peebles, near Langside Farm. It is representative of views experienced by road users travelling along the A703. From this viewpoint, there are views of the Site to the north-west looking up the Eddleston Water valley, broadly following the route of the A703. The hills within the Site form part of the distant skyline, with the lower slopes of White Meldon framing the view to the south. The road and roadside vegetation are prominent features in the foreground of the view, with farmland for grazing bound by post and wire fences visible beyond the road. Views to the east and south are largely confined by enclosing landform, built development and mature vegetation, whilst westward views are limited by the high ground of Hamilton Hill (371 m AOD) and White Meldon (427m AOD). No existing wind farms are visible from this viewpoint.			
Sensitivity	Road users are considered to be of **low** susceptibility to changes in the view. The viewpoint is located on a main road within the Tweed Valley SLA. As such views from the road are considered to be **high** in value. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **medium.**			
Assessment of visual effects	All 12 turbines will be visible from this viewpoint, seen above the horizon in northerly views along the Eddleston valley. The Development will occupy a small proportion of the available view from this viewpoint; however, it will be the focus of the view up the valley. The most southerly turbine within the Site will be largely screened by the lower slopes of White Meldon, with just a blade tip visible. The most westerly turbines are also afforded screening by the intervening ridge of hills within the Site. In summer roadside trees will filter views towards the turbines. The turbines will not appear to extend down the slopes into the valley, instead sitting on top and slightly behind the enclosing hill slopes. The turbines will appear even in height, however, will not be evenly spaced, with some stacking between small groups of turbines.			

Viewpoint 11: A703 near Langside Farm (North of Peebles)	
	These changes in view will be experienced over a **medium** geographical extent along the A703, representing a section of approximately 4 km in length. The introduction of the Development will result in a **small-scale** change to the view. The overall magnitude of change is judged to be **low** and taking account of the **medium** sensitivity will result in **Not Significant (minor)** visual effect.
Potential for Cumulative Effects	No other operational or consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative** visual effects are predicted to occur for scenario 1.

Table 5.37: Viewpoint 12: A702, Approach to West Linton

Viewpoint 12: A702, Approach to West Linton				
Grid Reference	315377	652513	Figure Number	5.2.12
LCT	99: Rolling Farmland – Borders		Landscape designation	Pentland Hills SLA
Direction of view	South-east		Distance to nearest turbine	6.1 km
Number of hubs theoretically visible	5		Number of turbines with blades theoretically visible	11
Viewpoint location and existing view	This viewpoint is located on the A702 on the northern approach to West Linton, near Cottage Farm. It is representative of views experienced by road users travelling along the A702. From this viewpoint there are open views towards the Site looking over the lower lying land between West Linton and the A701, to the prominent hills of Wether Law (479 m AOD) and Hag Law (446 m AOD). Views of the Site to the south-east are largely screened by Wether Law (479 m AOD) and Hag Law (446 m AOD). The most northerly and southerly extents of the Site are visible beyond the intervening ridge, including Peat Hill (464 m AOD) and Crailzie Hill (476 m AOD). The A702 road is a prominent feature in the foreground of the view. Farmland bound by low stone walls and post and wire fencing is visible adjacent to the road, extending into longer distance views. Views to the north, south and west are largely limited to short to mid-range views due to the nearby landform and vegetation, including Lead Law (347 m AOD) to the south. The existing Bowbeat Wind Farm is visible from this location, in the distant Moorfoot Hills to the east.			
Sensitivity	Road users are considered to be of **low** susceptibility to changes in the view. The viewpoint is located on the main road on the boundary of the Pentland Hills SLA within the Pentland Hills Regional Park. As such views from the road are considered to be **high** in value. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **medium.**			
Assessment of visual effects	11 turbines of the Development are theoretically visible in south-easterly views from this viewpoint, however turbines in the centre and south of the Site will be screened by Wether Law and Hag Law, restricting visibility to blade tips that will be barely perceptible above the horizon. The four most			

Viewpoint 12: A702, Approach to West Linton	
	northerly turbines will be more visible due to their higher elevation and reduced screening by landform. Turbines 10 and 12 will be most prominent, appearing to sit on the horizon. The Development will occupy a small proportion of the available view from this viewpoint; however, will be visible above the main horizon in views when travelling towards West Linton, with the existing Bowbeat Wind Farm visible in the distant Moorfoot Hills to the east. From this viewpoint, the turbines will appear uneven in height, and the four most visible turbines will appear as two pairs with a noticeable gap in between. These changes in view will be experienced over a **small** geographical extent along the A702. The introduction of the Development will result in a **small-scale** change to the view. The overall magnitude of change is judged to be **low** and taking account of the **medium** sensitivity will result in a **Not Significant (minor)** visual effect.
Potential for Cumulative Effects	The operational Bowbeat Wind Farm will be seen in views to the east, with the Development seen to the south-east. The turbines of Bowbeat will appear smaller than those of the Development. Although the turbines of the Development will appear larger in scale, the Development is much closer to the viewpoint than Bowbeat. **No significant additional or total cumulative** visual effects are predicted to occur. No other consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative** visual effects are predicted to occur for scenario 1.

Table 5.38: Viewpoint 13: A703 Lay-by south of Leadburn

Viewpoint 13: A703 Lay-by south of Leadburn				
Grid Reference	324064	654031	Figure Number	5.2.13
LCT	104: Upland Fringe Rough Grassland		Landscape designation	None
Direction of view	South-west		Distance to nearest turbine	6.4 km
Number of hubs theoretically visible	9		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This viewpoint is located just south of a large lay-by on the A703, near Leadburn. It is representative of views experienced by road users travelling south along the A703. From this viewpoint, the Site is visible in south-westerly views, with the forested Cloich Hills forming the distant skyline. The road is a prominent feature in the foreground of the view, with rough grazing land bound by post and wire fences visible beyond the road, with more distant scattered vegetation. Views to the north are limited by the road and roadside vegetation, whilst views to the west are confined by high undulating farmland, with the tops of forestry visible in the distance. Views to the south and east are more open, with distant views of the Moorfoot Hills. No existing wind farms are visible from this viewpoint.			
Sensitivity	Road users are considered to be of **low** susceptibility to changes in the view.			

Viewpoint 13: A703 Lay-by south of Leadburn	
	The viewpoint is not located within a designated landscape or at a recognised stopping point or promoted view. The value of the view is considered to be **low**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **low.**
Assessment of visual effects	All 12 of the turbines will be visible from this viewpoint, seen above the horizon formed by the forested Cloich Hills in south-westerly views across gently undulating rough grazing land. The Development will occupy a small proportion of the available view from this viewpoint. From this viewpoint, many of the turbines appear to sit on or beyond the main ridge of hills within the Site, with the most western turbines largely limited to blades due to screening by intervening landform. The turbines on the southern ridge of hills, to the south of valley cutting through the Site, will appear to extend down the lower slopes of the Cloich Hills, with some stacking present due to the alignment of the ridgeline with the viewpoint. These changes in view will be experienced over a **medium** geographical extent along the A703. The introduction of the Development will result in a **medium-scale** change to the view. The overall magnitude of change is judged to be **medium** and taking account of the **low** sensitivity will result in a **not significant (minor)** visual effect.
Potential for Cumulative Effects	No other operational or consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative** visual effects are predicted to occur for scenario 1.

Table 5.39: Viewpoint 14: B712 / Stobo Road

Viewpoint 14: B712 / Stobo Road				
Grid Reference	319392	639277	Figure Number	5.2.14
LCT	116: Upland Valley with Woodland		Landscape designation	Upper Tweeddale NSA
Direction of view	North		Distance to nearest turbine	6.7 km
Number of hubs theoretically visible	5		Number of turbines with blades theoretically visible	9
Viewpoint location and existing view	This viewpoint is situated on the B712, approximately 2 km north-east of Stobo near the minor road leading to Easter Happrew. The viewpoint is representative of views experienced by road users travelling on the B712 through the Upper Tweeddale NSA. Views from this section of the B712 are relatively open, looking north-east towards the Site. The foreground of the view comprises farmland bound by stone walls along the road, which is used for rough grazing by sheep. Boundary vegetation and shelterbelts are visible in the middle distance, along with riparian woodland along the River Tweed. The Meldon Hills and Hamildean Hill form the distinct conical shaped landforms which form the distant skyline in northerly views. The Site itself is largely screened by intervening landform in views looking north. There are no existing wind farms visible from this location.			

Viewpoint 14: B712 / Stobo Road	
Sensitivity	Road users are considered to be of **low** susceptibility to changes in the view. The viewpoint is located within the Upper Tweeddale NSA. The value of the view is considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **medium**.
Assessment of visual effects	Outward views from the B712 are largely screened by intervening vegetation, particularly further south along the road. From this viewpoint, the turbines will be completely screened from view by a shelterbelt in the foreground of the view. However, more open views of the Development will be afforded from relatively localised extents of the road and often experienced in glimpses through vegetation. The geographical extent of similar views is therefore considered small. Where visible, the turbines will occupy a small proportion of long-distance views north. The turbines will be visible between in the topographic low of the horizon between Hamildean Hill (386m AOD) and Black Meldon (407m AOD) which afford partial screening of the turbines. The scale of change resulting from the introduction of the Development is considered small. The overall magnitude of visual change is considered to be **low** and taking account of the medium sensitivity will result in a **not significant (negligible)** visual effect. Where glimpsed views are possible, the effect will be minor. An assessment of the effects on the Upper Tweeddale NSA is provided in Table 5.65: Operational Effects on the Upper Tweeddale NSA.
Potential for Cumulative Effects	No other proposed or consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative visual** effects are predicted to occur for scenario 1.

Table 5.40: Viewpoint 15: Path near Wester Happrew Burn

Viewpoint 15: Path near Wester Happrew Burn				
Grid Reference	315460	640528	Figure Number	5.2.15
LCT	92: Plateau Outliers		Landscape designation	Tweedsmuir Uplands SLA
Direction of view	North-east		Distance to nearest turbine	7.1 km
Number of hubs theoretically visible	2		Number of turbines with blades theoretically visible	11
Viewpoint location and existing view	This viewpoint is located on a small path which runs adjacent to the Wester Happrew Burn, near Riding Hill (478 m AOD) in the Tweedsmuir Uplands SLA. The viewpoint is representative of views experienced by recreational receptors travelling along the path, such as hill walkers. The elevated viewpoint offers north-easterly views towards the Site, framed by the lower slopes of Cat Hill and Ladyurd Hill to the east and west, respectively. From this viewpoint, the Site is entirely screened by the intervening landform of Stevenson Hill, with the more distant Crailzie Hill which is on the boundary of the Site providing additional screening. The foreground of the view is focused along the tributary valley. The valley slopes and distant south-facing hillslopes to the north of the River Tweed consist of extensive areas of rough grazing land.			

Viewpoint 15: Path near Wester Happrew Burn	
	Views towards the east, west and south are largely enclosed by the slopes of surrounding hills. There is more visibility to the south-east, along the valley associated with Harrow Burn. Bowbeat Wind Farm is partly visible on the distant skyline to the north-east, with Riding Hill in the foreground screening the remaining turbines.
Sensitivity	This viewpoint is representative of views experienced by recreational receptors, whose attention is focused on their surroundings. Recreational receptors are considered to be of **high** susceptibility to changes in the view. The viewpoint is located within the Tweedsmuir Uplands SLA. The value of the view is therefore considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **high**.
Assessment of visual effects	11 turbines will be theoretically visible from this viewpoint in northerly views, however, will be largely screened by the intervening landform of Stevenson Hill and Crailzie Hill, with only tips visible for the majority of turbines. Two turbine hubs will be just visible. The turbines blades will appear to break the horizon, behind the intervening hills. Many of the turbine blades will be barely perceptible above the horizon. The tracks and ancillary infrastructure will not be visible. The turbines will occupy a small proportion of the views available, and the change to this view will affect a small geographical area around the viewpoint location and nearby hills. The introduction of the Development will result in a **small-scale** change to the view. The overall magnitude of change is judged to be **low** and taking account of the **high** sensitivity will result in a **not significant (minor)** visual effect.
Potential for Cumulative Effects	The operational Bowbeat Wind Farm will be partially seen in distant views to the north-east, with the Development also visible in this view. Given the intervening distance, the turbines of Bowbeat will appear smaller than those of the Development. Although the turbines of the Development are largely screened from view, the blades will appear larger in scale. The Development is much closer to the viewpoint than Bowbeat. **No significant additional or total cumulative** visual effects are predicted to occur. No other consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative** visual effects are predicted to occur for scenario 1.

Table 5.41: Viewpoint 16: Haswellsykes

Viewpoint 16: Haswellsykes				
Grid Reference	321175	638649	Figure Number	5.2.16
LCT	116: Upland Valley with Woodland		Landscape designation	Upper Tweeddale NSA
Direction of view	North		Distance to nearest turbine	7.4 km
Number of hubs theoretically visible	7		Number of turbines with blades theoretically visible	11

Viewpoint 16: Haswellsykes	
Viewpoint location and existing view	This viewpoint is a roadside location on the mid slopes to the north of Hunt Hill, within the Upper Tweeddale NSA. The viewpoint is representative of views experienced by road users travelling along the minor road. From the viewpoint there are long ranging northerly views across the Tweed Valley towards the prominent conical shaped Meldons and the Site. Pasture is present in the foreground of the view, with woodland and shelterbelts in the middle distance near the River Tweed. The more distant south-facing hillslopes on the northern side of the Tweed Valley contain pastureland with forestry blocks scattered throughout. Views to the south and west are largely screened by the slopes of Hunt Hill. The Moorfoot Hills are visible in the distance to the north-east, and views of Cademuir Hill and Hill Fort are possible to the east, with some mature vegetation visible in the foreground. No existing wind farm development is visible from this viewpoint.
Sensitivity	This viewpoint is representative of views experienced by road users who are considered to be of **low** susceptibility to changes in the view. The viewpoint is located within the Upper Tweeddale NSA. The value of the view is therefore considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **medium.**
Assessment of visual effects	The majority of the turbines will be theoretically visible from this viewpoint in northerly views. A total of 11 blades and seven hubs will be visible. The turbines will appear as noticeable features on the distant horizon, breaking the skyline. However, the turbines located in the most southern and western extents of the Site will be largely screened by intervening landform. The turbines are relatively evenly spaced although there is some stacking. The tracks and ancillary infrastructure will not be visible. The turbines will occupy a small proportion of the views available, and the change to this view will affect a small geographical area around the viewpoint location and nearby hills. The introduction of the Development will result in a **small-scale** change to the view. The overall magnitude of change is judged to be **medium** and taking account of the **medium** sensitivity will result in a **significant (moderate)** visual effect. An assessment of the effects on the Upper Tweeddale NSA is provided in Table 5.65: Operational Effects on the Upper Tweeddale NSA. A key design aim for the Development was to create a compact layout with turbines that appear in keeping with the underlying landform in terms of scale in views from the NSA.
Potential for Cumulative Effects	No other operational or consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative visual** effects are predicted to occur for scenario 1.

Table 5.42: Viewpoint 17: Glentress Forest, Makeness Kipps

Viewpoint 17: Glentress Forest, Makeness Kipps				
Grid Reference	328116	644817	Figure Number	5.2.17
LCT	90: Dissected Plateau Moorland		Landscape designation	None
Direction of view	West		Distance to nearest turbine	7.3 km
Number of hubs theoretically visible	12		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This viewpoint is a hill-top location, located at the summit of Makeness Kipps, within Glentress Forest to the south-east of the Site. The viewpoint is representative of views experienced by recreational receptors, such as walkers and mountain bikers, at the summit of the hill. The viewpoint is not easily accessible, therefore likely to represent fewer recreational receptors than elsewhere in Glentress Forest. The viewpoint offers panoramic views across forested hills towards a distant skyline which includes the Cloich Hills to the west. Longer ranging views are available towards the Pentland Hills to the north-west, and Upper Tweeddale and the Tweedsmuir Hills to the south-west. The Moorfoot Hills are prominent in views to the north-east and east. Bowbeat Wind Farm, located approximately 2 km north of the viewpoint, is a prominent feature on the horizon, in successive northerly views. The operational Black Law and its extensions, Tormywheel, Pates Hill, Muirhall, Muirhall Extension and Muirhall South wind farms form a belt of wind farms on the distant horizon in westerly views towards the Site. However, due to the intervening distance of greater than 28 km and partial screening provided by intervening topography, these turbines are barely perceptible. Additionally, the operational Glenkerie Wind Farm and Clyde Wind Farm and its extension are visible in successive views to the south-west of this viewpoint, at distances of approximately 24 km and 31 km, respectively. This cluster, again, appears small in scale and is partially backclothed by distant landform. Despite the similar distances, the Glenkerie scheme is more visible than the Muirhall and Black Law schemes as it is afforded less screening by vegetation and intervening landform.			
Sensitivity	This viewpoint is representative of views experienced by a limited number of recreational receptors. Recreational receptors, whose attention is focused on their surroundings, are considered to be of **high** susceptibility to changes in the view. The viewpoint is not located within a designated landscape or at a recognised stopping point, however, is located at the summit of a hill within Glentress Forest, popular with mountain bikers and recreational walkers. The Kipps form part of a promoted mountain biking route through Glentress. The value of the view is therefore considered to be **medium**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **medium**.			
Assessment of visual effects	All 12 turbines of the Development will be visible from this elevated viewpoint in westerly views. The turbines will appear as prominent features in views, although due to the elevated nature of the viewpoint, will appear largely backclothed by the landscape, with blade tips breaking the skyline. Only four of the more elevated turbines near the summits of Peat Hill and Ewe Hill (T6, T8, T10 and T12) will have their hubs above the horizon. From this viewpoint, the Development will appear to have some uneven gaps as a result of the apparent clustering of six turbines into two groups of three. Given the distant nature of this view, the tracks and ancillary infrastructure are unlikely to be visible.			

Viewpoint 17: Glentress Forest, Makeness Kipps	
	The Development will introduce additional wind turbines into the view; however, these will appear more distant than the prominent Bowbeat Wind Farm visible to the north of the viewpoint. The Bowbeat scheme appears slightly larger in scale compared to the Development and takes up a larger horizontal field of view. The Development will occupy a small proportion of the panoramic views available, and the change to this view will affect a small geographical area around the viewpoint location and neighbouring hills. The introduction of the Development will result in a **medium-scale** change to the view. The overall magnitude of change is judged to be **medium** and taking account of the **medium** sensitivity will result in a **significant (moderate)** visual effect.
Potential for Cumulative Effects	The operational Bowbeat Wind Farm will be visible in successive views to the north of the viewpoint. Although the turbines of Bowbeat Wind Farm are smaller than those of the Development, they will appear of a slightly larger scale compared to the Development due to their closer proximity to the viewpoint. **No significant additional or total cumulative** visual effects are predicted to occur. The consented Glenkerie Extension is located approximately 24 km to the south-west of this viewpoint and will be read as part of the operational Glenkerie and Clyde Wind Farm grouping. At this distance the change will be barely perceptible. Although this cumulative assessment focuses on wind farms within 20 km of the Site, it is noted that other consented schemes will be visible on the distant skyline behind the Development, including Tormywheel Extension and West Benhar. These wind farms will be read as part of a belt of operational wind farm development on the horizon which includes Black Law and Tormywheel. Given the distance to consented wind farms and their proximity to existing wind farm clusters, this will result in a barely perceptible scale of change experienced over a small geographical extent. The cumulative magnitude of change to views will be barely perceptible and the additional and total cumulative visual effect will be **not significant (negligible)** for scenario 1.

Table 5.43: Viewpoint 18: A702, Dolphinton

Viewpoint 18: A702, Dolphinton				
Grid Reference	310609	646807	Figure Number	5.2.18
LCT	210: Undulating Farmland and Hills		Landscape designation	Pentland Hills and Black Mount SLA
Direction of view	East		Distance to nearest turbine	9.4 km
Number of hubs theoretically visible	9		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This viewpoint is located on the A702 within the settlement of Dolphinton, near the junction leading to Westmill. The viewpoint is representative of views experienced by road users and local residents. From this viewpoint, the Site is largely screened by intervening hills including White Knowe (406 m AOD), Drum Maw (445 m AOD), Hag Law (446 m AOD) and Wether Law (479 m AOD). The foreground of views looking east comprises farmland interspersed with forestry shelterbelts. Views to the north and west are largely limited by the properties located along the A702, with mature forestry and vegetation in the background. Views to the south are more open with distant views to the hills in the				

Viewpoint 18: A702, Dolphinton	
	Upper Tweeddale NSA, with mature trees marking the boundaries to fields visible in the foreground. No existing wind farms are visible from this viewpoint.
Sensitivity	Road users are considered to be of **low** susceptibility to changes in the view. Local residents are considered to be of **high** susceptibility. The viewpoint is located on the edge of the Pentland Hills and Black Mount SLA which is within the Pentland Hills. The value of the view is considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **high.**
Assessment of visual effects	The Development will be largely screened by the intervening landform of White Knowe, Drum Maw, Hag Law and Wether Law. All 12 turbines will be visible against the skyline above the distant ridge of hills. Nine turbine hubs will be visible, however, in most cases the hubs appear to sit on the horizon and those in the north of the Site will be afforded some screening by forestry. Ancillary infrastructure within the Site will not be visible from this location. The change in view will be experienced at this viewpoint and from other locations along the A702 as people travel north-east. However, the presence of intermittent roadside vegetation further limits visibility. Therefore, the geographical extent of the change is judged to be **small**. The introduction of the Development will result in a **small-scale** change to the view. The overall magnitude of change is judged to be **low** and taking account of the **high** sensitivity will result in a **not significant (minor)** visual effect.
Potential for Cumulative Effects	No other operational or consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative visual** effects are predicted to occur for scenario 1.

Table 5.44: Viewpoint 19: Cademuir Hill Fort

Viewpoint 19: Cademuir Hill Fort				
Grid Reference	323039	637489	Figure Number	5.2.19
LCT	113: Upland Valley with Pastoral Floor		Landscape designation	Upper Tweeddale NSA
Direction of view	North		Distance to nearest turbine	9.0 km
Number of hubs theoretically visible	12		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This viewpoint is a hillside location, situated at Cademuir Hill Fort, within the Upper Tweeddale NSA to the south of the Site. The viewpoint is representative of views experienced by recreational receptors, such as hill walkers. The viewpoint offers panoramic views in all directions, including northerly views towards the Site. The Site forms a small part of these panoramic views and is a gently undulating distant ridge of hills covered by forestry, behind the moorland slopes of Black and White Meldon. There are scattered dwellings in the valley below Cademuir Hill and the town of Peebles is visible to the north-east. The valley is well-wooded, with numerous small blocks of woodland and shelterbelts. There are larger			

Viewpoint 19: Cademuir Hill Fort	
	blocks of forestry on the south-facing valley slopes including Jedderfield Plantation and Edston Wood, and there is a small quarry at Edston. The panoramic views experienced at this location offer views of the Moorfoot Hills to the north-east, the Tweedsmuir Uplands to the south, Manor Valley to the south-west, the Upper Tweeddale to the west, and the Meldons, Cloich Hills and Pentland Hills to the north. The operational Bowbeat Wind Farm is visible on the skyline in north-easterly views from this viewpoint, at distances of approximately 10.5 km. In addition, the blade tips of turbines at the Black Law, Muirhall, Tormywheel and Harburnhead Wind Farms are theoretically visible on the distant horizon in north-westerly views, although are barely perceptible at distances of greater than 25 km.
Sensitivity	This viewpoint is representative of views experienced by recreational receptors. Recreational receptors, whose attention is focused on their surroundings, are considered to be of **high** susceptibility to changes in the view. This viewpoint is located at the summit of a popular hill within the Upper Tweeddale NSA. The value of the view is therefore considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **high**.
Assessment of visual effects	All 12 turbines will be visible in northerly views from this viewpoint. They will all break the skyline; however, some turbine towers will be partially backclothed by the forested Cloich Hills. Given the distant nature of the viewpoint, ancillary infrastructure and tracks are not likely to be perceptible. The Development will form a distant feature on the horizon and will occupy a small proportion of the 360° panoramic views experienced from this viewpoint. The Development will be seen in successive views with other operational wind farms including Bowbeat Wind Farm to the north-east, which is at a similar distance from the viewpoint. The change in view will be experienced at this viewpoint and nearby hill summits and Site-facing slopes. The geographical extent of the change is judged to be **medium**. The introduction of the Development will result in a **medium-scale** change to the view. The overall magnitude of change is judged to be **medium** and taking account of the **high** sensitivity will result in **significant (moderate)** visual effect. An assessment of the effects on the Upper Tweeddale NSA is provided in Table 5.65: Operational Effects on the Upper Tweeddale NSA. A key design aim for the Development was to create a compact layout with turbines that appear in keeping with the underlying landform in terms of scale in views from the NSA.
Potential for Cumulative Effects	As noted above, the operational turbines in the north-west of the Study Area, including Black Law, Muirhall, Tormywheel and Harburnhead Wind Farms will not be perceptible in views. However, the operational Bowbeat Wind Farm will be visible in successive views to the north-east of the viewpoint. The turbines of Bowbeat will appear smaller than those of the Development, however given that both the Development and Bowbeat will not be visible in the same direction of view, the difference in scale will not be as pronounced. **No significant additional or total cumulative** visual effects are predicted to occur. No other consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative visual effects** are predicted to occur for scenario 1.

Table 5.45: Viewpoint 20: Blackhope Scar

Viewpoint 20: Blackhope Scar				
Grid Reference	331511	648324	Figure Number	5.2.20
LCT	90: Dissected Plateau Moorland and 266: Plateau Moorland – Lothians		Landscape designation	Gladhouse Reservoir and Moorfoot Scarp SLA
Direction of view	West		Distance to nearest turbine	10.4 km
Number of hubs theoretically visible	11		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This is an elevated viewpoint located at the summit of Blackhope Scar (651 m AOD) on the boundary of the Gladhouse Reservoir and Moorfoot Scarp SLA. The viewpoint is representative of views experienced by recreational receptors, such as hill walkers. The viewpoint offers elevated views towards the Site to the west. Due to the presence of intervening landform the northern extents of the Site are partially screened. The southern part of the Site, although more visible, is entirely backclothed by landform. The foreground of the view comprises a series of moorland covered hills. At a distance of approximately 1.5 km the operational Bowbeat Wind Farm is prominent in views to the south-west and occupies a large horizontal field of view in the same direction as the Site. To the north-east of the viewpoint, the ridge of hills forming the Moorfoots extends into the distance, with the lower lying land around Edinburgh and Midlothian visible further to the north. Long distance views to the Firth of Forth are available. The Pentland Hills are noticeable features on the horizon to the north-west. Views south extend across the upland hills towards Glentress Forest, which forms part of the skyline in this view. The operational Glenkerie Wind Farm and Clyde Wind Farm are visible to the south-west of this viewpoint, beyond the Bowbeat turbines at a distance of approximately 29 km and 36 km, respectively. Whilst Clyde appears to sit on the horizon, Glenkerie is completely backclothed by distant landform. The operational Harburnhead, Tormywheel, Black Law and Muirhall Wind Farms are on the distant horizon in north-westerly and westerly views. However, due to the intervening distance of greater than 30 km and some screening by intervening forestry, these turbines are barely perceptible. A large cluster of wind farms is also visible in easterly views, including Pogbie, Keith Hill, Dun Law, Fallago Rig and Toddleburn. These schemes are at distances of between approximately 13 km and 27 km. In this view, Carcant Wind Farm is also visible at a distance of approximately 6.5 km. With the exception of Fallago Rig which sits on the horizon, all these schemes appear completely backclothed by landform.			
Sensitivity	This viewpoint is representative of views experienced by recreational receptors, whose attention is focused on their surroundings. Therefore, recreational receptors are considered to be of **high** susceptibility to changes in the view. This viewpoint is located at a hill summit within the Gladhouse Reservoir and Moorfoot Scarp SLA. However, the viewpoint is located near the existing Bowbeat Wind Farm. The value of the view is therefore considered to be **medium**.			

Viewpoint 20: Blackhope Scar	
	On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **medium**.
Assessment of visual effects	All 12 turbines will be visible in westerly views. The turbines will appear to be predominantly backclothed by distant landform, with only a few blade tips breaking the skyline. The most northerly turbines will be afforded screening by intervening landform with the turbine hubs entirely hidden or appearing to sit on the interim horizon. Ancillary infrastructure and tracks will not be perceptible from this viewpoint. The Development will form a noticeable feature on the horizon, however, will be visible in the background of the existing Bowbeat Wind Farm located to the west of the viewpoint. The Development will appear to extend the existing view of turbines, with half of the turbines visible behind the existing wind farm. The turbines will appear even in height but with some stacking between the most southerly turbines. This is minimal and due to the intervening distance and the presence of Bowbeat Wind Farm in the foreground will be largely unnoticeable. The Development will occupy a small proportion of the 360° panoramic views experienced from this viewpoint, however, will increase the overall extent of the view occupied by turbines. The change in view will be experienced at this viewpoint and the surrounding Site-facing slopes. The geographical extent of the change is judged to be **small**. The introduction of the Development will result in a **small-scale** change to the view. The overall magnitude of change is judged to be **low** and taking account of the **medium** sensitivity will result in a **not significant (minor)** visual effect.
Potential for Cumulative Effects	As noted above, there are several clusters of operational wind farms visible from this viewpoint, including Glenkerie and Clyde Wind Farms to the south-west of the viewpoint, Harburnhead, Tormywheel, Black Law and Muirhall Wind Farms are on the distant horizon in the west and north-west, and the large cluster to the east comprising Pogbie, Keith Hill, Dun Law, Fallago Rig and Toddleburn. The Development will not form part of any of these clusters, appearing of a distinctly different scale, in a separate part of the Study Area. However, the Development will be seen in the same view as Bowbeat Wind Farm which is in the foreground of the view. Perspective will assist in balancing the turbine scale from this viewpoint, as the smaller, closer turbines of Bowbeat will appear of a larger scale than the more distant turbines of the Development. **No significant additional or total cumulative** visual effects are predicted to occur. The consented Glenkerie Extension is located approximately 29 km to the south-west of this viewpoint and will be read as part of the operational Glenkerie and Clyde Wind Farm grouping. At this distance and with existing Bowbeat turbines in the foreground of the view the change will be barely perceptible. Although this cumulative assessment focuses on wind farms within 20 km of the Site, it is noted that other consented schemes will be visible on the distant skyline behind the Development, including Priestgill, Watsonhead Farm, Hartwood and Tormywheel Extension. These wind farms will be read as part of a belt of operational wind farm development on the horizon. Given the distance to consented wind farms and their proximity to existing wind farm clusters, this will result in a barely perceptible scale of change experienced over a small geographical extent. The cumulative magnitude of change to views will be barely perceptible and the additional and total cumulative visual effect will be **not significant (negligible)** for scenario 1.

Table 5.46: Viewpoint 21: Gladhouse Reservoir

Viewpoint 21: Gladhouse Reservoir				
Grid Reference	330486	654310	Figure Number	5.2.21
LCT	269: Upland Fringes – Lothians		Landscape designation	Gladhouse Reservoir and Moorfoot Scarp SLA
Direction of view	South-west		Distance to nearest turbine	11.5 km
Number of hubs theoretically visible	12		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This viewpoint is located on the north-easterly shore of Gladhouse Reservoir, by the parking area. It is representative of views experienced by recreational receptors at the reservoir. The Site is visible in south-westerly views, forming part of the distant horizon of hills. The foreground of the view is focussed on the large reservoir which includes a small wooded island. This vegetated island partially screens the Site from view. Views to the north and east are largely confined by mature forestry and roadside vegetation, and views to the south are focused on the north-facing slopes of the Moorfoot Hills. The existing Bowbeat Wind Farm is partly visible in views south towards the Moorfoot Hills at a distance of approximately 7 km, with forestry alongside the reservoir screening some of the turbines.			
Sensitivity	This viewpoint is representative of views experienced by recreational receptors, whose attention is focused on their surroundings. Therefore, recreational receptors are considered to be of **high** susceptibility to changes in the view. This viewpoint is located at a stopping point by Gladhouse Reservoir and is located within the Gladhouse Reservoir and Moorfoot Scarp SLA. Therefore, the value of the view is therefore considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **high**.			
Assessment of visual effects	The Development will introduce turbines into south-westerly views from this viewpoint. The turbines will be visible on the distant horizon, set against the skyline. The vegetated island in the foreground of the view will partially screen the Development, with only turbines in the far north (T12) and far south (T2, T3, T4 and T5) visible. Generally, the turbines will be evenly spaced, although there is some fluctuation in their height, reflecting the underlying topography of the hills. Given the distant nature of the viewpoint and screening from intervening forestry, ancillary infrastructure and tracks will not be visible. The Development will form a distant feature on the horizon and will occupy a small proportion of available views. The turbines will be seen in successive views with other operational wind farms including Bowbeat Wind Farm to the south. The change in view will be experienced at this viewpoint and in locations around the reservoir, including from some locations along the minor road connecting to the A703 to the west of Gladhouse Reservoir. However, the presence of vegetation surrounding the reservoir largely limits visibility from the road which follows the banks of the reservoir. The geographical extent of the change is judged to be small.			

Viewpoint 21: Gladhouse Reservoir	
	The introduction of the Development will result in a **small-scale** change to the view. The overall magnitude of change is judged to be **low** and taking account of the **high** sensitivity will result in a **not significant (minor)** visual effect.
Potential for Cumulative Effects	As noted above, the Development will be seen to the south-west, and the operational Bowbeat Wind Farm will be seen in successive views to the south. Although the turbines of Bowbeat Wind Farm are smaller than those of the Development, perspective will make them appear of a larger scale compared to the Development due to their closer proximity to the viewpoint. **No significant additional or total cumulative** visual effects are predicted to occur. No other consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative** visual effects are predicted to occur under scenario 1.

Table 5.47: Viewpoint 22: Carnethy Hill

Viewpoint 22: Carnethy Hill				
Grid Reference	320390	661900	Figure Number	5.2.22
LCT	268: Upland Hills – Lothians		Landscape designation	Pentland Hills SLA - Midlothian
Direction of view	South		Distance to nearest turbine	13.0 km
Number of hubs theoretically visible	12		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This is an elevated viewpoint located at the summit of Carnethy Hill (573 m AOD) within the Pentland Hills (Midlothian) SLA. The viewpoint is representative of views experienced by recreational receptors, such as hill walkers. The viewpoint offers panoramic views in all directions, including southerly views towards the Site. Due to the elevated and distant nature of this viewpoint, the Site appears entirely backclothed by the distant Southern Uplands and Upper Tweeddale. The view south comprises a number of smaller hills and gently undulating farmland, with landcover comprising moorland and rough grazing land. Scattered blocks of forestry, woodland and shelterbelts are present in the view, including Laughatlothian Wood, South Bank Wood, the woods around Penicuik House and Deepsyke Forest. Edinburgh and the Firth of Forth are visible to the north, whilst the wider Central Belt can be seen in the north-west. Penicuik is visible to the south-east of the viewpoint. There are several existing wind farms visible from this viewpoint. The operational Bowbeat Wind Farm is visible on the distant horizon in views to the south-east. All of these turbines appear to sit against the skyline. The three-turbine Carcant scheme and Toddleburn Wind Farm are partially visible north-east of Bowbeat. A large cluster of turbines is visible to the east, including Dun Law Wind Farm, Fallago Rig, Keith Hill and Pogbie Wind Farm. However, at distances of over 26 km, these turbines are barely perceptible, and with the exception of Fallago Rig, and some turbines at Dun Law, most turbines appear completely backclothed by landform.			

Viewpoint 22: Carnethy Hill	
	Glenkerie Wind Farm and Clyde Wind Farm are theoretically visible in the distance to the south-west, however, are barely perceptible at distances of approximately 35 km and 40 km, respectively. A large cluster of turbines, comprising the Pearie Law, Harburnhead, Black Law, Pates Hill and Tormywheel Wind Farms is visible in successive views to the west of the viewpoint, at distances of approximately 17 km. This cluster of turbines is located on lower-lying, flatter land to the west of the Pentland Hills. Longer ranging views are available between hill summits, and this cluster of turbines occupies a large proportion of the horizontal field of view. Additionally, a smaller cluster of turbines, comprising Burnhead and Drumduff Wind Farms is visible further north, at distances of approximately 32 km.
Sensitivity	This viewpoint is representative of views experienced by recreational receptors, whose attention is focused on their surroundings. Therefore, recreational receptors are of **high** susceptibility to changes in the view. This viewpoint is located at the summit of a popular hill within the Pentland Hills SLA (Midlothian) and within the Pentland Hills Regional Park. The value of the view is therefore considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **high**.
Assessment of visual effects	All 12 turbines will be visible in views south. Due to the elevated nature of this viewpoint, the turbines will appear to be largely backclothed by distant landform, however, some blade tips will break the skyline. The turbines in the south-east of the Site will be afforded some screening by the landform within the Site and will appear to sit lower than the rest of the turbines. From this viewpoint there will be some stacking between turbine groups. Ancillary infrastructure and tracks will not be perceptible at this distance. The Development will form a distant feature on the horizon and will occupy a small proportion of the 360° panoramic views experienced from this viewpoint. The Development will be seen in successive views with other operational wind farms including Bowbeat, Harburnhead, Pearie Law and Glenkerie. The change in view will be experienced at this viewpoint and the surrounding Site-facing slopes within the Pentlands. The geographical extent of the change is judged to be medium. The introduction of the Development will result in a **small-scale** change to the view. The overall magnitude of change is judged to be **low** and taking account of the **high** sensitivity will result in a **not significant (minor)** visual effect.
Potential for Cumulative Effects	As noted above, there are several clusters of operational wind farms visible in successive views from this viewpoint, including Glenkerie and Clyde Wind Farms to the south, the large cluster comprising the Pearie Law, Harburnhead, Black Law, Pates Hill and Tormywheel Wind Farms to the west, and the large cluster of turbines including Dun Law, Fallago Rig, Keith Hill and Pogbie Wind Farms to the east. In addition, the operational Bowbeat Wind Farm is visible on the distant horizon to the south-east. The Development will form a distinctly separate development to any of these clusters, appearing of a different scale, in a separate part of the Study Area. The closer proximity of the Development will make the turbines appear of a larger scale than other operational turbines throughout the Study Area. **No significant additional or total cumulative** visual effects are predicted to occur. The consented Glenkerie Extension is located approximately 35 km to the south-west of this viewpoint and will be read as part of the operational Glenkerie and Clyde Wind Farm grouping. At this distance the change will

Viewpoint 22: Carnethy Hill	
	be barely perceptible. The Development will also be seen in successive views with the consented Camilty scheme which will appear in front of operational wind farms including Harburnhead and Pearie Law, in views to the west at a distance of approximately 14 km. Although this cumulative assessment focuses on wind farms within 20 km of the Site, it is noted that other consented schemes will be visible on the distant skyline to the west including Watsonhead Farm, Tormywheel Extension, Hartwood and West Benhar. These wind farms will be read as part of a belt of operational wind farm development on the horizon. Given the distance to consented wind farms and their proximity to existing wind farm clusters, this will result in a barely perceptible scale of change experienced over a medium geographical extent. The cumulative magnitude of change to views will be barely perceptible and the additional and total cumulative visual effect will be **not significant (negligible)** for scenario 1.

Table 5.48: Viewpoint 23: Stob Law

Viewpoint 23: Stob Law				
Grid Reference	323063	633292	Figure Number	5.2.23
LCT	95: Southern Uplands – Borders		Landscape designation	Upper Tweeddale NSA
Direction of view	North		Distance to nearest turbine	13.1 km
Number of hubs theoretically visible	12		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This is an elevated viewpoint located at the summit of Stob Law (676 m AOD) within the Upper Tweeddale NSA. The viewpoint is representative of views experienced by recreational receptors, such as hill walkers. The viewpoint offers panoramic views in all directions, including northerly views towards the Site. Due to the elevated and distant nature of this viewpoint, the Site appears entirely backclothed by the distant Pentland Hills. The distinctive conical shaped Meldon Hills are visible in front of the Site, their moorland slopes contrasting with the forested land cover of the Site. The Moorfoot Hills are prominent in views towards the north-east. The foreground of the view comprises a series of hills blanketed in moorland and rough grazing land, with scattered blocks of forestry. The operational Bowbeat Wind Farm is visible on the horizon in successive views to the north-east of the viewpoint, at a distance of approximately 15 km. All of the Bowbeat turbines appear to sit against the horizon with their blades breaking the skyline. Clyde Wind Farm is visible in views to the south-west, at distances of over 20 km. The operational Pearie Law, Harburnhead, Black Law, Tormywheel, Burnhead, Drumduff, and Pates Hill Wind Farms form large clusters of turbines visible on the distant horizon in successive views to the north-west. However, due to the intervening distance of 31 km, the turbines appear barely perceptible in views.			
Sensitivity	This viewpoint is representative of views experienced by recreational receptors, whose attention is focused on their surroundings. Therefore, recreational receptors are of **high** susceptibility to changes in the view. This viewpoint is located at the summit of a popular hill within the Upper Tweeddale NSA. The value of the view is therefore considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **high**.			

Viewpoint 23: Stob Law	
Assessment of visual effects	All 12 turbines will be visible in northerly views from this viewpoint. Due to the elevated nature of this viewpoint, the turbines will appear to be largely backclothed by distant landform, with only some blade tips breaking the skyline. There will be some stacking between turbines in the middle of the Site. Due to the intervening distance, ancillary infrastructure and tracks will not be perceptible from this viewpoint. The Development will form a distant feature on the horizon and will occupy a small proportion of the 360° panoramic views experienced from this viewpoint. The Development will be seen in the same view as other operational wind farms, notably Bowbeat Wind Farm and the more distant Fallago Rig to the north-east, Clyde Wind Farm to the south-west, and Harburnhead, Pearie Law, Torrance Farm and Black Law to the north-west. The Development will read as a standalone wind farm which is backclothed, rather than seen against the skyline as other operational wind farms are. The change in view will be experienced at this viewpoint and the surrounding Site-facing slopes. The geographical extent of the change is judged to be medium. The introduction of the Development will result in a **small-scale** change to the view. The overall magnitude of change is judged to be **low** and taking account of the **high** sensitivity will result in a **not significant (minor)** visual effect. An assessment of the effects on the Upper Tweeddale NSA is provided in Table 5.65: Operational Effects on the Upper Tweeddale NSA. A key design aim for the Development was to create a compact layout with turbines that appear in keeping with the underlying landform in terms of scale in views from the NSA.
Potential for Cumulative Effects	As noted above, there are several clusters of operational wind farms visible in successive views from this viewpoint, including Clyde Wind Farms to the south-west, Bowbeat Wind Farm to the north-east, and the large cluster comprising the Pearie Law and, Harburnhead, Black Law, Tormywheel, Burnhead, Drumduff, and Pates Hill Wind Farms in the distant north-west. The Development will form a distinctly separate development to any of these clusters, appearing of a different scale, in a separate part of the Study Area. The closer proximity of the Development will make the turbines appear of a larger scale than other operational turbines throughout the Study Area. **No significant additional or total cumulative** visual effects are predicted to occur. Visibility of consented wind farms including Camilty will generally be limited to blade tips on the distant horizon in successive views to the north-west. However, due to the intervening distance, along with intervening landform and vegetation, it is unlikely this scheme will be visible from this viewpoint. Given the distance to consented wind farms and their proximity to existing wind farm clusters, this will result in a barely perceptible scale of change experienced over a medium geographical extent. The cumulative magnitude of change to views will be barely perceptible and the additional and total cumulative visual effect will be **not significant (negligible)** for scenario 1.

Table 5.49: Viewpoint 24: Bleak Law

Viewpoint 24: Bleak Law				
Grid Reference	306724	650780	Figure Number	5.2.24
LCT	212: Moorland Hills – Glasgow Clyde Valley		Landscape designation	Pentland Hills and Black Mount SLA
Direction of view	East		Distance to nearest turbine	13.6 km
Number of hubs theoretically visible	12		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This is an elevated viewpoint located at the summit of Bleak Law (445 m AOD) within the Pentland Hills and Black Mount SLA. The viewpoint is representative of views experienced by recreational receptors, such as hill walkers. The viewpoint offers elevated views towards the Site to the east. Due to the elevated and distant nature of this viewpoint, the Site appears entirely backclothed by the distant Moorfoot Hills, with parts of the Cloich Hills forming an interim horizon. Intervening landform, including Wether Law (479 m AOD) and Hag Law (446 m AOD) partially screen the Site from view. To the north and north-west of the viewpoint, the ridge of hills forming the Pentlands extend into the distance, sloping down to more open and gently undulating land to the east, backed by the hills within and around the Site, with the Moorfoot Hills visible in the distance. The Southern Uplands and Upper Tweeddale are visible to the south and south-east. The prominent Tinto Hills are noticeable features on the horizon to the south-west, whilst more open views across lower lying land in South Lanarkshire are gained in westward views. Existing wind farm development is visible in 360° views from this viewpoint. The operational Bowbeat Wind Farm in the Moorfoot Hills is visible on the distant horizon in easterly views towards the Site, at a distance of approximately 22 km. The turbines appear as a cluster, with all the turbines breaking the skyline. The three-turbine Carcant scheme is barely noticeable in views to the north-east, with only blade tips visible behind intervening landform. A larger cluster of turbines including Dun Law (phases 1 and 2), Fallago Rig, Keith Hill and Pogbie are visible further east of Carcant. The operational Glenkerie Wind Farm is seen in distant southerly views, along with Clyde Wind Farm, at distances in excess of 22 km. It is largely backclothed and afforded some screening by intervening landform. In addition, the two smaller scale turbines of Ferniehaugh Farm are visible in the foreground of the view towards the Development. These turbines are entirely backclothed by forestry and landform. They are below 80m and therefore are not considered as part of the cumulative assessment. A large cluster of turbines, comprising the Pearie Law and Harburnhead Wind Farms is visible in successive views to the north-west of the viewpoint, at distances of approximately 7 km. The majority of these turbines are visible, although visibility of the four most north-easterly turbines are limited to blades. Torrance Farm, Burnhead, Drumduff, Pates Hill and Standhill Farm are visible further to the west. The Muirhall, Muirhall Extension and Muirhall South Wind Farms, and Black Law and its extension are noticeable and prominent features in successive views to the west of the viewpoint. The Muirhall Wind Farms appear as a linear row of large-scale turbines, taking up a large horizontal field of view, approximately 5 km from the viewpoint, with the Black Law Wind Farms and Tormywheel Wind Farm on the distant horizon.			

Viewpoint 24: Bleak Law	
Sensitivity	This viewpoint is representative of views experienced by recreational receptors, whose attention is focused on their surroundings. Therefore, recreational receptors are of **high** susceptibility to changes in the view. This viewpoint is located at the summit of a popular hill within the Pentland Hills and Black Mount SLA and within the Pentland Hills Regional Park. The value of the view is therefore considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **high**.
Assessment of visual effects	All 12 turbines will be visible in easterly views from this viewpoint. The turbines will appear to be predominantly backclothed by distant landform, with some blade tips and one hub breaking the skyline. The most easterly turbines will be afforded some screening by the intervening Cloich Hills. Ancillary infrastructure and tracks will not be perceptible at this distance. The turbines will appear relatively even in height and for the most part, the turbines appear evenly spaced, although there are gaps between turbines 8 and 9, and turbines 3 and 4. The Development will occupy a small proportion of the 360° panoramic views experienced from this viewpoint, however will increase the overall extent of the view occupied by turbines, with the existing Bowbeat Wind Farm visible on the distant horizon to the east behind the most northerly turbines. The change in view will be experienced at this viewpoint and the surrounding hills and Site-facing slopes. The geographical extent of the change is judged to be medium. The introduction of the Development will result in a **small-scale** change to the view. The overall magnitude of change is judged to be **low** and taking account of the **high** sensitivity will result in a **not significant (minor)** visual effect.
Potential for Cumulative Effects	As noted above, there are several clusters of operational wind farms visible in successive views from this viewpoint, including the cluster of turbines comprising Dun Law, Fallago Rig, Keith Hill and Pogbie Wind Farms in the north-east, Glenkerie and Clyde Wind Farms to the south, Muirhall and Black Law to the west, Harburnhead and Pearie Law to the north, and Burnhead, Tormywheel, Drumduff, Pates Hill and Torrance Farm Wind Farms to the north-west. The Development will form a distinctly separate wind farm to any of these clusters, appearing of a different scale, in a separate part of the Study Area. However, the Development will be seen with the operational Bowbeat Wind Fam which is visible in the background of the Development in easterly views from this viewpoint. Perspective will assist here as the larger scale appearance of the turbines of the Development will be partly attributed to its closer proximity to the viewpoint. **No significant additional or total cumulative** visual effects are predicted to occur. The Development will be seen in successive views with the consented Glenkerie Extension which is located to the south-east of this viewpoint at a distance of approximately 20 km and will appear as an extension to Glenkerie Wind Farm. The Development will also be seen in successive views with the consented Camilty Wind Farm to the north, however this will be largely screened by intervening topography. Given the intervening distance between the consented wind farms and the Development and the cohesion of these schemes with the existing pattern of wind farm development, the cumulative magnitude of change to views will be **low** and the additional and total cumulative visual effect will be **not significant (minor)** for scenario 1.

Table 5.50: Viewpoint 25: Lee Pen

Viewpoint 25: Lee Pen				
Grid Reference	332599	638604	Figure Number	5.2.25
LCT	90: Dissected Plateau Moorland		Landscape designation	Tweed Valley SLA
Direction of view	North-west		Distance to nearest turbine	14.1 km
Number of hubs theoretically visible	12		Number of turbines with blades theoretically visible	12
Viewpoint location and existing view	This is an elevated viewpoint located at the summit of Lee Pen (502 m AOD) within the Tweed Valley SLA. The viewpoint is representative of views experienced by recreational receptors, such as hill walkers. The viewpoint offers expansive north-westerly views towards the Site. There are many intervening hills between the Site and the viewpoint, which form multiple horizons. The forested hills at Glentress Forest partially screen the northern extents of the Site. The foreground of the view comprises extensive areas of moorland, with the contrasting Glentress Forest visible beyond. The Tweed Valley is visible at the base of the upland hillslopes, with some scattered blocks of forestry, woodland and shelterbelts present on the mid to lower slopes of the enclosing valley sides. There are views of the Moorfoot Hills to the north and the Southern Uplands to the south. The Upper Tweed valley is a notable feature to the south and west, with the settlements of Innerleithen, Peebles and Cardrona, and the A72 visible aligned along the river course. Bowbeat Wind Farm in the Moorfoot Hills is visible from this location, approximately 8.5 km to the north of the viewpoint.				
Sensitivity	This viewpoint is representative of views experienced by recreational receptors, whose attention is focused on their surroundings. Therefore, recreational receptors are of **high** susceptibility to changes in the view. This viewpoint is located at the summit of a popular hill within the Tweed Valley SLA. The value of the view is therefore considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **high**.				
Assessment of visual effects	All 12 turbines will be visible in north-westerly views from this viewpoint. The turbines in the middle of the Site will be partially backclothed, with those in the north and south mainly seen against the skyline. Ancillary infrastructure and tracks will not be perceptible from this viewpoint. The turbines will appear even in height, and evenly spaced, with the exception of stacking between turbines 4 and 7. Due to the intervening distance this will be largely unnoticeable. The Development will form a noticeable feature on the horizon, however, will occupy a small proportion of the 360° panoramic views experienced from this viewpoint. The Development will be seen in the same view as the operational Bowbeat Wind Farm. The change in view will be experienced at this viewpoint and the surrounding Site-facing slopes. The geographical extent of the change is judged to be **small**. The introduction of the Development will result in a **small-scale** change to the view. The overall magnitude of change is judged to be **low** and taking				

Viewpoint 25: Lee Pen	
	account of the **high** sensitivity will result in a **not significant (minor)** visual effect.
Potential for Cumulative Effects	As noted above, the operational Bowbeat Wind Farm will be visible in successive views to the north of the viewpoint. Although the turbines of Bowbeat Wind Farm are smaller than those of the Development, they will appear of a similar scale due to proximity to the viewpoint, which will assist in providing perspective. **No significant additional or total cumulative** visual effects are predicted to occur. No other consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative** visual effects are predicted to occur under scenario 1.

Table 5.51: Viewpoint 26: B7007 (northern edge of Moorfoot Hills)

Viewpoint 26: B7007 (northern edge of Moorfoot Hills)				
Grid Reference	335230	654774	Figure Number	5.2.26
LCT	266: Plateau Moorland - Lothians		Landscape designation	Gladhouse Reservoir and Moorfoot Scarp SLA
Direction of view	South-west		Distance to nearest turbine	15.9 km
Number of hubs theoretically visible	5		Number of turbines with blades theoretically visible	8
Viewpoint location and existing view	This viewpoint is at a roadside location on the B7007 running along the northern edge of the Moorfoot Hills scarp. It is representative of views experienced by road users travelling along the B7007. From this viewpoint, open views towards the Site are experienced, looking over the lower lying land around Gladhouse Reservoir. The Site is visible on the distant horizon at distances of approximated 16 km, framed by the lower slopes of the Moorfoot scarp in the foreground. The B7007 road is a prominent feature in the foreground of the view, with post and wire fencing visible adjacent to the road. The gently undulating land to the north and west of the viewpoint comprises rough grassland for grazing, with scattered blocks of forestry and shelterbelts. Gladhouse Reservoir is also visible in the distance in views towards the Site. Views to the north, east and west are expansive, with visibility of the Pentlands in the west and the Firth of Forth in the north. Views to the south are limited by the lower slopes of the Moorfoot scarp. No existing wind farms are visible from this viewpoint.			
Sensitivity	Road users are considered to be of **low** susceptibility to changes in the view. The viewpoint is not located at a recognised stopping point or promoted view, however, is within the Gladhouse Reservoir and Moorfoot Scarp SLA. The value of the view is considered to be **high**. On balance, taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **medium.**			
Assessment of visual effects	The Development will introduce turbines into south-westerly views from this viewpoint. The turbines will be visible on the distant horizon, set against the skyline. The most southerly turbines within the Site are not visible and those within the central part of the Site are largely screened from view by			

Viewpoint 26: B7007 (northern edge of Moorfoot Hills)	
	the lower slopes of the Moorfoot Scarp. Given the distant nature of the viewpoint, ancillary infrastructure and tracks will not be visible. From this viewpoint, the turbine tips seem to be consistent in height and evenly spaced. The Development will form a noticeable but distant feature on the horizon and will occupy a small proportion of the views available from this viewpoint. The change in view will be experienced at this viewpoint and at locations further along this road, for distances of approximately 2 km between Whitelaw Cleugh and the sharp bend in the road to the west of the viewpoint. The geographical extent of the change is judged to be **medium**. The introduction of the Development will result in a **medium-scale** change to the view. The overall magnitude of change is judged to be **low** and taking account of the **medium** sensitivity will result in a **not significant (minor)** visual effect.
Potential for Cumulative Effects	No other operational or consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative** visual effects are predicted to occur under scenario 1.

5.9.3.2 Operational Effects on Views from Settlements

Residential receptors in settlements are considered to have a high susceptibility to changes in the view. The settlements in the surrounding area from which potential views of the Development are available are assessed in Table 5.52 to Table 5.56 below.

Table 5.52: Eddleston

Eddleston			
Representative viewpoint:	VP6: Core Path 154 near Eddleston	Approximate distance from settlement to nearest turbine:	3.0 km
Description	Eddleston is a small village located in the broad, south-north aligned Eddleston Valley, at the confluence of several streams. The village is located to the east of the Site and is accessed by the A703, which acts as a frontage to a number of properties. The settlement is quite concentrated, with a relatively high-density, particularly in the more modern part of the settlement to the east of the A703. Most properties are orientated towards the west. Residential properties are frequently surrounded by mature vegetation, particularly the properties to the west of the A703. This mature vegetation filters views within the valley, however some of this vegetation is deciduous and therefore may result in greater visibility in winter. Occasionally, more open views are experienced to the north and south of the settlement, and from the more elevated locations to the east.		
Sensitivity	Residential receptors are considered to be of **high** susceptibility to changes in the view. Eddleston is not located within a designated landscape however open views are afforded from more elevated locations looking across Eddleston Valley towards the Site. The value of the view is considered to be **medium**. Taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this settlement is judged to be **high**.		
Assessment of visual effects	The ZTV (Figure 5.1.2) indicates widespread theoretical visibility across the settlement. For properties in the valley floor, visibility is likely to be limited by mature deciduous vegetation in and around the settlement, including		

Eddleston	
	along the A703. More open views are available from the upper slopes of the valley in the east of the settlement. A **high** magnitude of change was identified for VP 6: Core Path 154 near Eddleston, which represents views experienced from a location on the Core Path on the more elevated slopes to the east of the settlement. However, the geographical extent of similar views within the settlement is considered **small** as the Development will be less visible from elsewhere within the settlement due to the presence of built development and intervening mature vegetation. Overall, for the areas of Eddleston which are likely to receive a view, the magnitude of visual change will be **medium**, and taking account of the **high** sensitivity of the visual receptors will result in a **significant (moderate)** visual effect.
Potential for Cumulative Effects	The viewpoint assessment for VP6: Core Path 154 near Eddleston identified the following: *"No other operational or consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore,* ***no significant additional or total cumulative visual effects*** *are predicted to occur for scenario 1."* The CZTV shown in Figure 5.1.11 indicates that both the Development and other operational schemes, notably Bowbeat Wind Farm, will be theoretically visible from areas within this settlement. However, the presence of mature vegetation within and around the settlement screens views of Bowbeat. Therefore, there will be no cumulative interaction between Bowbeat Wind Farm and the Development.

Table 5.53: Romannobridge

Romannobridge			
Representative viewpoint:	VP10: A701 Mountain Cross	Approximate distance from settlement to nearest turbine:	4.0 km
Description	Romannobridge is a small linear village located along the A701, on the eastern side of the Lyne Water. The settlement is quite dispersed, with a relatively low-density of properties. Most properties along the A701 are orientated to the east in the direction of the Site, with views out towards the ridge of hills formed by Wether Law (479m AOD), Hag Law (446m AOD), Drum Maw (445m AOD) and Whiteside Hill (368m AOD). The most northern extents of the settlement are afforded more screening by intervening vegetation (both deciduous and evergreen); however, more open views are experienced from the south of the settlement.		
Sensitivity	Residential receptors are considered to be of **high** susceptibility to changes in the view. Romannobridge is not located within a designated landscape however open views are afforded towards the ridge of hills which bound the Site to the west. The value of the view is considered to be **medium**. Taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this settlement is judged to be **high**.		
Assessment of visual effects	The ZTV (Figure 5.1.2) indicates theoretical visibility of between 1 and 6 turbines across the settlement. Actual visibility will be limited by mature intervening vegetation which filters outward views towards the Site from the majority of the settlement. A **low** magnitude of change was identified for VP10: A701 Mountain Cross, which represents views from approximately 1 km south-west of		

Romannobridge	
	Romannobridge. The geographical extent of similar views within the settlement is considered **medium**. Overall, the magnitude of visual change will be **low**, and taking account of the **high** sensitivity of the visual receptors will result in a **not significant (minor)** visual effect.
Potential for Cumulative Effects	The viewpoint assessment for VP10: A701 Mountain Cross identified the following: *"No other operational or consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore,* ***no significant additional or total cumulative visual effects*** *are predicted to occur for scenario 1."* The CZTV shown in Figure 5.1.11 indicates that the Development will introduce theoretically visible of wind farm development from this settlement. No other operational or consented schemes will be visible.

Table 5.54: West Linton

West Linton			
Representative viewpoint:	VP12: A702, approach to West Linton	Approximate distance from settlement to nearest turbine:	6.0 km
Description	West Linton is a large village located at the foot of the Pentland Hills, approximately 6 km to the north-west of the Site. The village is accessed by the A702, and by the B7059 which connects to the A701 further east. The main settlement is quite concentrated, with a relatively high density of properties, however it becomes more dispersed towards the south along the B7059. Some properties in the south of the settlement will have open views to hills to the south-east, in the direction of the Site. Views from elsewhere within the settlement tend to be screened by intervening built development and filtered by intermittent deciduous vegetation.		
Sensitivity	Residential receptors are considered to be of **high** susceptibility to changes in the view. West Linton is not located within a designated landscape however open views across the lower lying land between the settlement and the A701 are afforded from the south-east of the settlement. The value of the view is considered **medium**. Taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this settlement is judged to be **high**.		
Assessment of visual effects	The ZTV (Figure 5.1.2) indicates widespread theoretical visibility of 7-9 turbines across the majority of the settlement, with visibility of up to 12 turbines from the more elevated areas in the north-west. There will be visibility from some parts of the settlement, particularly along its south-eastern edge. Elsewhere, visibility will be limited by the presence of built development and intervening vegetation, which screens and filters outward views towards the Site. A **low** magnitude of change was identified for VP12: A702, approach to West Linton, which represents views experienced from a location on the main road as people travel into West Linton from the north. The geographical extent of similar views within the settlement is considered **small** as the Development will be less visible from elsewhere within the settlement due to the presence of built development and intervening vegetation. There may be similar views in localised areas along the south-eastern settlement boundary.		

West Linton	
	Overall, the magnitude of visual change will be **low**, and taking account of the **high** sensitivity will result in a **not significant (minor)** visual effect on residents in West Linton.
Potential for Cumulative Effects	The viewpoint assessment for VP12: A702, approach to West Linton identified the following: *"The operational Bowbeat Wind Farm will be seen in views to the east, with the Development seen to the south-east. The turbines of Bowbeat will appear smaller than those of the Development. Although the turbines of the Development will appear larger in scale, the Development is much closer to the viewpoint than Bowbeat.* ***No significant additional or total cumulative*** *visual effects are predicted to occur.* *No other consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore,* ***no significant additional or total cumulative*** *visual effects are predicted to occur for scenario 1."* The CZTV shown in Figure 5.1.11 indicates that both the Development and other operational schemes, notably Bowbeat Wind Farm, will be theoretically visible from this settlement. In particular, the western more elevated extents of the settlement will have visibility of both Bowbeat Wind Farm and the Development. As noted above, from these areas the Development will appear of a larger scale than Bowbeat. However, this is partly attributed to the Developments closer proximity to the settlement.

Table 5.55: Dolphinton

Dolphinton			
Representative viewpoint:	VP18: A702, Dolphinton	Approximate distance from settlement to nearest turbine:	9.4 km
Description	Dolphinton is a small linear village located along the A702. The settlement is quite dispersed, with a relatively low-density of properties. Most properties along the A702 are orientated to the south-east in the direction of the Site, with views out towards the distant ridge of hills formed by Wether Law (479m AOD), Hag Law (446m AOD), Drum Maw (445m AOD) and Whiteside Hill (368m AOD), and the smaller ridge of hills in the foreground including Blyth Hill (308 m AOD). Views south-east from the properties along the A702 are relatively open. Properties in the north-west of the settlement, e.g. at Peggies Knowe, are more elevated although views towards the Site tend to be filtered by intervening woodland.		
Sensitivity	Residential receptors are considered to be of **high** susceptibility to changes in the view. Dolphinton is partially located within the Pentland Hills and Black Mount SLA and is afforded distant views across the lower lying land towards the plateau of hills which form the Site. The value of the view is considered to be **high**. Taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this settlement is judged to be **high**.		
Assessment of visual effects	The ZTV (Figure 5.1.2) indicates widespread theoretical visibility of up to 12 turbines from the majority of the settlement. The turbines will be visible from some properties along the A702 where there are open views in the direction of the Site, on the distant skyline and partially screened by forestry on the horizon. Elsewhere in the settlement intervening woodland is likely to filter the majority of views. A **low** magnitude of change was identified for VP18: A702, Dolphinton, which represents views experienced from a location on the main road running through the settlement. This was due to the intervening distance and partial screening of the Development by landform and forestry on the horizon. The geographical extent of similar views within the settlement is considered to be **medium** as many of the properties along the A702 have a similarly open outlook the viewpoint. Overall, the magnitude of visual change will be **low**, and taking account of the **high** sensitivity of visual receptors will result in a **not significant (minor)** visual effect.		
Potential for Cumulative Effects	The viewpoint assessment for VP18: A702, Dolphinton identified the following: *"No other operational or consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative visual effects** are predicted to occur for scenario 1."* The CZTV shown in Figure 5.1.11 indicates that both the Development and other operational schemes, notably Bowbeat Wind Farm, will be theoretically visible from areas within this settlement. However, the presence of vegetation within the settlement provides some screening of views towards the Development. Furthermore, intervening vegetation and landform screens views of Bowbeat Wind Farm. Therefore, there will be no cumulative interaction between the Development and other operational or consented schemes.		

Table 5.56: Peebles

Peebles			
Representative viewpoint:	VP11: A703 near Langside Farm (north of Peebles)	Approximate distance from settlement to nearest turbine:	6.0 km
Description	Peebles is a small town within the Tweed Valley. The town is located to the south-east of the Site and is accessed by the A703 from the north and the A72 from the east and west, which follows the Tweed Valley. The settlement is relatively concentrated, with a high density of properties. There is some woodland along the settlement boundaries including to the north-west which filters outward views in the direction of the Site. There is also woodland in areas of open space within the settlement, including along the River Tweed. Views to the north-west from within the settlement are largely contained due to the presence of built development and trees. However, occasional more open views are experienced to the north of the settlement, including along the A703 as represented by VP11.		
Sensitivity	Residential receptors are considered to be of **high** susceptibility to changes in the view. Peebles is not located within a designated landscape however it is surrounded by the Upper Tweeddale NSA to the west and Tweed Valley SLA to the north, east and south. The value of views from the settlement are considered to be **high**. Taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this settlement is judged to be **high**.		
Assessment of visual effects	The ZTV (Figure 5.1.2) indicates theoretical visibility across the eastern part of the settlement, particularly along the most southern extents of the Eddleston Valley, and to the enclosing north-facing slopes of the Tweed Valley. However, actual visibility to the north-west in the direction of the Site will be largely limited by buildings and mature intervening vegetation. A **medium** magnitude of change was identified for VP11: A703 near Langside Farm (north of Peebles), which represents views experienced from a location on the A703 as people travel out of Peebles. However, the geographical extent of similar views within the settlement itself is considered **small** as the Development will be less visible from elsewhere within the settlement due to the presence of built development and intervening vegetation. Overall, the magnitude of visual change will be **low**, and taking account of the **high** sensitivity will result in a **not significant (minor)** visual effect.		
Potential for Cumulative Effects	The viewpoint assessment for VP11: A703 near Langside Farm (north of Peebles) identified the following: *"No other operational or consented wind energy developments within 20 km of the Development will be perceptible in views from this location. Therefore, **no significant additional or total cumulative visual effects** are predicted to occur for scenario 1."* The CZTV shown in Figure 5.1.11 indicates that the Development will introduce theoretically visible of wind farm development from this settlement. However, in reality visibility will be largely screened by built development and vegetation. No other operational or consented schemes will be visible.		

5.9.3.3 Operational Effects on Views from Routes

Sequential visual effects are assessed through considering the likely effects of the Development both in isolation, and in the context of other existing, consented and proposed wind energy developments on key routes through the study area. The routes to be assessed were identified through analysis of the ZTVs shown on Figure 5.1.2 and Figure 5.1.3. The assessment of likely effects on sequential views from these routes is detailed in Table 5.57 to Table 5.64 below.

Table 5.57: A701

A701			
Representative viewpoint:	VP 10: A701 Mountain Cross	Approximate distance from route to nearest turbine:	2 km
Description	The A701 is a major road linking Edinburgh and Dumfries. It cuts across the western part of the Study Area, in a north-east to south-west alignment. In total, the route is 115 km long, and approximately 69 km lies within the 40 km Study Area. At its closest, the road is approximately 2 km to the west of the nearest turbine. Oblique outward views from the road to the east are often screened and filtered by roadside vegetation. Where more open views are possible, the intervening ridge of hills immediately west of the Site largely screens visibility of the interior of the Site. There are localised areas where there are more open views towards the ridge of hills and the Site, notably around the small settlements of Mountain Cross, Romannobridge and Lamancha.		
Sensitivity	Road users are considered to be of **low** susceptibility to changes in the view. Within the Study Area the road passes along the boundary of the Tweedsmuir Uplands SLA, Pentland Hills SLA and Upper Clyde Valley and Tinto SLA. As such views from the road are considered to be **high** in value. Taking account of the judgements of susceptibility and value, overall sensitivity of receptors is judged to be **medium.**		
Assessment of visual effects	The ZTV (Figure 5.1.2) indicates intermittent theoretical visibility from some stretches of the A701, between Lochurd Farm to the south-west and Penicuik to the north of the Site. Between Lochurd Farm and Leadburn there will be visibility of up to 6 turbines, with partial screening provided by the intervening ridge of hills comprising White Knowe (406 m AOD), Drum Maw (445 m AOD), Hag Law (446 m AOD) and Wether Law (479 m AOD). North of Leadburn up to 12 turbines are theoretically visible although roadside vegetation and distances of over 7 km will reduce perceptibility. There is also theoretical visibility from parts of the route between Penicuik and Edinburgh, although at distances of more than 10 km and with surrounding built development the turbines are not likely to be perceptible. The following viewpoint is located on this road and is representative of views likely to be experienced: VP 10: A701 Mountain Cross represents views experienced from a section of the road to the south-west of the Site as people travel towards Edinburgh. A **low** magnitude of change was identified from this viewpoint. From extensive sections of the road, visibility of the Development will be limited to blade tips, seen in oblique views above the ridgeline. The scale of change is considered **low** and the geographical extent of similar views is considered **medium**. Along the stretch of road closest to the Site, between Mountain Cross and Leadburn the magnitude of visual change will be **low** and taking account of the **medium** sensitivity will result in a **not significant (minor)** visual effect.		

A701	
	Elsewhere along the route, the magnitude of visual change will be **barely perceptible** resulting in a **not significant (negligible)** visual effect.
Potential for Cumulative Effects	The CZTV in Figure 5.1.11 indicates that there is very limited theoretical visibility of other wind energy developments within 20 km of the Development from this route, except in the vicinity of Penicuik. Whilst the Development introduces visibility of wind farm development along sections of the A701, from Penicuik and Leadburn to Castlecraig, the CZTV indicates that visibility of other wind farm development, such as the operational Glenkerie Wind Farm and its extension, would be experienced in sequential views from localised sections of the route to the east of Biggar. Given the relatively limited stretches of the route which experience visibility of other consented wind farm development **the introduction of the Development is not judged to result in significant additional cumulative effects for scenario 1.**

Table 5.58: A702

A702			
Representative viewpoint:	VP 12: A702, approach to West Linton VP18: A702, Dolphinton	Approximate distance from route to nearest turbine:	5.8 km
Description	The A702 is a major road linking Edinburgh and Abington. It runs almost parallel to the A701 in a south-west to north-east alignment, running along the base of the Pentland Hills in proximity to the Site. At its closest, it is approximately 5.8 km to the west of the nearest turbine. It is at a higher elevation than the nearby A701, and as such is afforded more open views towards the Site. Oblique outward views from the road to the east are often screened and filtered by roadside vegetation and localised landform, particularly in the north-west beyond Silverburn. However, open and mainly oblique views towards the Site are possible along some stretches of the road between Silverburn and Dolphinton.		
Sensitivity	Road users are considered to be of **low** susceptibility to changes in the view. Within the Study Area the road passes through the Upper Clyde Valley and Tinto SLA, and along the boundary of the Pentland Hills SLA and Pentland Hills and Black Mount SLA. As such views from the road are considered to be **high** in value. Taking account of the judgements of susceptibility and value, overall sensitivity of receptors is judged to be **medium.**		
Assessment of visual effects	The ZTV (Figure 5.1.2) indicates visibility of up to 12 turbines along long stretches of the A702, from the City of Edinburgh Bypass in the north of the Study Area to Dolphinton in the south-west. Views are generally open along parts of the route between Silverburn and Dolphinton, with occasional roadside vegetation screening views towards the Site. The following viewpoints are located on this road and are representative of views likely to be experienced: VP 12: A702, Approach to West Linton represents views experienced from a section of the road to the north-west of the Site as people travel towards West Linton from the north. A **low** magnitude of change was identified from this viewpoint; and		

A702	
	VP18: A702, Dolphinton represents views experienced from a section of the road to the west of the Site as people travel northwards. A **low** magnitude of change was identified from this viewpoint The Development will typically be seen in oblique views, on the distant skyline in wider views. Most turbines will be visible as tips, except those in the north of the Site with visible hubs. The scale of change is considered **small** and the geographical extent of similar views is considered **medium**. Between Dolphinton and West Linton, the magnitude of visual change will be **low**, and taking account of the **medium** sensitivity will result in a **not significant (minor)** visual effect. Elsewhere on the route the magnitude of visual change will be **negligible**, resulting in a **not significant (negligible)** visual effect.
Potential for Cumulative Effects	The CZTV in Figure 5.1.11 indicates that there is widespread theoretical visibility of other wind energy developments within 20 km of the Development from this route, particularly between West Linton and the City of Edinburgh Bypass. Whilst the Development introduces visibility of wind farm development along sections of the A702, between West Linton and Dolphinton, the CZTV indicates visibility of other wind farm development along the route. Bowbeat and Carcant Wind Farms will be seen in oblique and distant views to the east, often at the same time as the Development. However, further south-west along the route towards the A74, sequential oblique views of other wind farms including Glenkerie and its consented extension, and Clyde Wind Farm will be experienced from localised sections of the route. Given the relatively limited stretches of the route which experience visibility of other consented wind farm development, **the introduction of the Development is not judged to result in significant additional cumulative effects under scenario 1.**

Table 5.59: A703

A703			
Representative viewpoint:	VP 11: A703 near Langside Farm (North of Peebles) VP 13: A703 Lay-by	Approximate distance from route to nearest turbine:	2.6 km
Description	The A703 is a major road that runs between the Edinburgh City Bypass and Peebles. The entire 29 km of the route is within the Study Area, however, the section running in north-south alignment along Eddleston Valley between Leadburn and Peebles is closest to the Site. At its closest, the road passes approximately 2.6 km to the east of the nearest turbine. Between Leadburn and Peebles there are oblique views towards the Site to the west. These views are largely open, although some views are screened and filtered by roadside vegetation, particularly near the settlement of Eddleston.		
Sensitivity	Road users are considered to be of **low** susceptibility to changes in the view. Within the Study Area, the most southern extents of the road pass through the Tweed Valley SLA. As such views from the road are considered to be **high** in value. Taking account of the judgements of susceptibility and value, overall sensitivity of receptors is judged to be **medium.**		
Assessment of visual effects	The ZTV (Figure 5.1.2) indicates intermittent visibility of up to 12 turbines from the A703 within the Eddleston Valley, between Leadburn in the north and Peebles in the south. Whilst views are open along much of this stretch		

A703	
	(VP 11: A703 near Langside Farm (North of Peebles) and VP 13: A703 Lay-by), visibility at Eddleston will be reduced due to the presence of mature vegetation. The following viewpoints are located on this road and are representative of views likely to be experienced: VP 11: A703 near Langside Farm (North of Peebles) represents views experienced from a section of the road to the south-east of the Site as people travel out of Peebles. A **medium** magnitude of change was identified from this viewpoint. VP 13: A703 Lay-by represents views experienced from a section of the road to the north-east of the Site as people travel south from Leadburn towards Peebles. A **medium** magnitude of change was identified from this viewpoint. From both these sections of the road, the Development will be seen in medium to long-distance oblique views. From VP11, this will be a relatively short section of the road but will be more extensive from the section represented by VP13. The scale of change is considered **medium** and the geographical extent of similar views is considered **medium**. The magnitude of visual change will be **medium** and taking account of the medium sensitivity will result in a **significant (moderate)** visual effect. The section of the A703 to the north of the Study Area, near Roslin, is not expected to have visibility due to intervening vegetation and built development. The magnitude of visual change will be **low** resulting in a **not significant (negligible)** visual effect.
Potential for Cumulative Effects	The CZTV in Figure 5.1.11 indicates that there is very limited theoretical visibility of other wind energy developments within 20 km of the Development from this route. Whilst the Development introduces theoretical visibility of wind farm development along extensive sections of the A703, between Leadburn and Peebles, the CZTV indicates visibility of other wind farm development, such as the operational Bowbeat Wind Farm, would be experienced in sequential views from localised sections of the route. Given the very limited stretches of the route which experience visibility of other wind farm development, and the lack of visibility of consented schemes, **the introduction of the Development is not judged to result in significant additional cumulative effects for scenario 1.**

Table 5.60: B7059

B7059			
Representative viewpoint:	VP 8: B7059 between Boghouse and Kaimhouse	Approximate distance from route to nearest turbine:	3 km
Description	The B7059 is a minor route that is found in the west of the Study Area. It is split into two sections; the first runs in a north south orientation from the A72 to the A701 at Romannobridge, and the second section starts a further 1.5 km north-east along the A701 travelling north-west towards West Linton. At its closest, the road is approximately 3 km from the nearest turbine. Views along the first section of the route are largely open and concentrated along the valley formed by the Lyne Water, with the enclosing valley slopes framing views. Views towards the Site are largely screened by Wood Hill, Stevenson Hill and Whiteside Hill. However, there are glimpsed views towards the Site along a small section of the road near Flemington, where		

B7059	
	longer ranging, oblique views can be experienced through the Flemington valley between Whiteside Hill and Wood Hill. The second section of the route has more roadside vegetation which limits longer ranging easterly views. Views open up in proximity to the A701, but the Site remains screened by the intervening ridge of hills comprising Wether Law, Hag Law and Drum Maw.
Sensitivity	Road users are considered to be of **low** susceptibility to changes in the view. The road does not pass through any designated landscapes within the Study Area. As such views from the road are considered to be **low** in value. Taking account of the judgements of susceptibility and value, overall sensitivity of receptors is judged to be **low.**
Assessment of visual effects	The ZTV (Figure 5.1.2) indicates that theoretical visibility will be limited to a 0.75 km stretch of the road near Flemington from the section of the route between the A701 and A72, to the south-west of the Site. From Flemington, oblique and glimpsed views of the Development are possible along the tributary valley of the Flemington Burn. A small section of the route near Romannobridge may experience visibility of up to three turbines, however roadside vegetation and the ridge of hills will largely screen views. Visibility of up to 9 turbines will be possible from the second section of the route between West Linton and the A701 for south-east bound traffic. However, visibility is in practice largely screened by roadside vegetation except in proximity to the A701 where the intervening landform will limit visibility to mostly tips. The following viewpoint is located on this road and is representative of views likely to be experienced: • VP 8: B7059, between Boghouse and Kaimhouse represents views experienced from a section of the road to the west of the Site as people travel in a south-easterly direction. A **medium** magnitude of change was identified from this viewpoint. Along the closest stretch of road to the west of the Site (VP8), the magnitude of visual change will be **medium**, and taking account of the **low** sensitivity will result in a **not significant (minor)** visual effect. Elsewhere along the route, the magnitude of visual change will be **low** due to screening by roadside vegetation, resulting in a **not significant (negligible)** visual effect.
Potential for Cumulative Effects	The CZTV in Figure 5.1.11 indicates that there is very limited theoretical visibility of other wind energy developments within 20 km of the Development from this route. The Development will introduce theoretical visibility of wind farm development along the entirety of the B7059 to the west of the A701, and some very localised visibility along the Lyne Water stretch of the road. No other consented or operational schemes will be theoretically visible from this route, and as such **the introduction of the Development is not judged to result in significant additional cumulative effects for scenario 1.**

Table 5.61: B712

B712			
Representative viewpoint:	VP 14: B712 / Stobo Road	Approximate distance from route to nearest turbine:	5.6 km
Description	The B712 is a non-primary route that runs through the Upper Tweeddale NSA, broadly following the path of the Tweed River to the west of Peebles. The road runs for approximately 12 km, between the A701 near Drumelzier in the south and the A72 near Hallyne in the north. Outward views from the route are largely contained within the valley, with the valley slopes framing the views. The views from the most western extents of the road, around Drumelzier, are quite open, becoming more enclosed around Bellspool and Dawyck Botanic Garden due to the presence of mature roadside vegetation. This pattern continues further along the road past Stobo. Direct views towards the Site open up near Easter Happrew as represented by VP14: B712 / Stobo Road.		
Sensitivity	Road users are considered to be of low susceptibility to changes in the view. Within the Study Area the road passes through the Upper Tweeddale NSA. As such views from the road are considered to be high in value. Taking account of the judgements of susceptibility and value, overall sensitivity of receptors is judged to be medium.		
Assessment of visual effects	The ZTV (Figure 5.1.2) indicates that there will be theoretical visibility of between 1 and 12 turbines from the section of the road running between Stobo and the junction with the A72. However, actual visibility will only be experienced from a short section of the road between the minor road junction to Easter Happrew and the bend in the road just north of Cloyhouse Burn because of mature roadside vegetation around Stobo. Views from this section will be localised and often experienced in glimpses through vegetation. Where visible, the turbines will be seen in direct views to the north, framed between Hamildean Hill and Black Meldon. The following viewpoint is located on this road and is representative of views likely to be experienced: • VP 14: B712/ Stobo Road represents views experienced from a section of the road to the south of the Site as people travel in a northerly direction towards the A72. A low magnitude of change was identified from this viewpoint. Along the closest stretch of road to the south of the Site (VP14), the magnitude of visual change will be low, and taking account of the medium sensitivity will result in a not significant (negligible) visual effect. No effect will be experienced from the majority of the route, between Drumelzier and Stobo.		
Potential for Cumulative Effects	The CZTV in Figure 5.1.11 indicates that there is some theoretical visibility of other wind energy developments within 20 km of the Development from this route. This is likely to be Glenkerie and Glenkerie Extension to the south-west of the route and the operational Bowbeat to the north-east. The Development will introduce theoretical visibility of wind farm development in the most northerly sections of this route (near the A72). Sequential views of other schemes including Bowbeat and Glenkerie and its extension would be experienced from further south along the route, however would be seen in distant, oblique views where visible. Given the limited theoretical visibility of the Development from this route the introduction of the Development is not judged to result in significant additional cumulative effects for scenario 1.		

Table 5.62: Meldons Road

Meldons Road			
Representative viewpoint:	VP 5: Meldon Valley	Approximate distance from route to nearest turbine:	2.2 km
Description	The Meldons Road is an unclassified road that runs between Eddleston in the north and the A72 in the south, to the south-east of the Site. It is mostly single track with passing places. The route passes through the Tweed Valley SLA between Black and White Meldon before entering the Upper Tweeddale NSA just to the south. The route follows the valley of the Eddleston Water in the north and Meldon Burn in the south. The northern end of the route is more open, with views west to the Cloich Hills and east across the Eddleston Valley. Views are more contained at the southern end of the route by landform including Black and White Meldon and South Hill Head.		
Sensitivity	Road users are considered to be of **low** susceptibility to changes in the view. Within the Study Area the road passes through the Tweed Valley SLA and Upper Tweeddale NSA. As such views from the road are considered to be **high** in value. Taking account of the judgements of susceptibility and value, overall sensitivity of receptors is judged to be **medium.**		
Assessment of visual effects	The ZTV (Figure 5.1.2) indicates that there will be theoretical visibility of up to 12 turbines approximately between Wormiston and Green Knowe, with intermittent visibility of up to 9 turbines elsewhere along the route. There will be no visibility from the route within the Upper Tweeddale NSA south of Black and White Meldon. In views from the south, as represented by VP 5, Meldon Valley, intervening forestry will screen the turbines although some tips may be visible. From the east, there will be oblique views from the road to the turbines on the skyline to the west. The following viewpoint is located on this road and is representative of views likely to be experienced: • VP 5: Meldon Valley represents glimpsed views experienced from a short section of the road to the south of the Site as people travel in a northerly direction between Black and White Meldon. A **low** magnitude of change was identified from this viewpoint. Along the closest stretch of road to the south-east of the Site, the magnitude of visual change will be **medium**, and taking account of the **medium** sensitivity will result in a **significant (moderate)** visual effect. **No effect** will be experienced from the route as it passes through the Upper Tweeddale NSA.		
Potential for Cumulative Effects	The CZTV in Figure 5.1.11 indicates that there is some theoretical visibility of other wind energy developments within 20 km of the Development from this route. This is likely to be Glenkerie and Glenkerie Extension to the south-west of the route and the operational Bowbeat to the north-east. Other wind energy developments, most notably the operational Bowbeat Wind Farm, will be visible in successive and sequential views from the northern end of the route. The Development will introduce theoretical visibility of turbines to limited sections of the route (VP 5), however forestry will screen the entire Development. No other consented or operational schemes will be theoretically visible from this route, and as such **the introduction of the Development is not judged to result in significant additional cumulative effects for scenario 1.**		

Table 5.63: Cross Borders Drove Road

Cross Borders Drove Road			
Representative viewpoint:	Viewpoint 1: Cross Borders Drove Road (West) Viewpoint 2: Cross Borders Drove Road (East)	Approximate distance from route to nearest turbine:	0.2 km
Description	The Cross Borders Drove Road follows sections of former drove road between the Cauldstane Slap in the Pentland Hills, through West Linton to Peebles and Traquair, and continues on into the Yarrow Valley. The route starts at the A70 to the west of the Pentlands. It travels south-easterly, between East Cairn Hill and West Cairn Hill before passing Baddinsgill Reservoir. From here it continues south-easterly along the route of the Lyne Water to West Linton. It crosses the A702 and continues along the B7059 before turning off the road around Kaimhouse Wood in the east. It then crosses over the A701 and continues parallel to the road towards Damside and Romannobridge. After passing through Damside, the route continues south-eastward, slowly ascending the hills towards the Site. It passes between Drum Maw and Hag Law/ Green Knowe, before entering the Site at its most western extents. The route cuts through the Site in an east-west alignment, to the south of Courhope, before emerging at Upper Stewarton and Nether Stewarton to the east of the Site. From here the route travels southwards along minor roads towards Peebles, passing by Hamilton Hill to the east. The route then passes through Peebles and ascends Kirkhope Law to the south-east of the Site. It follows the western boundary of Cardrona Forest, before continuing on to Traquair. From Traquair the route enters the Yarrow Valley and continues in a south-eastern orientation towards Hawick. The Cross Borders Drove Road can be used by a variety of recreational receptors, including walkers, horse riders and cyclists. Operational wind farms are visible from sections of the route, particularly as it crosses the Eddleston Valley where Bowbeat Wind Farm is visible.		
Sensitivity	Recreational receptors, whose attention is focused on their surroundings, are considered to be of **high** susceptibility to changes in the view. The Cross Borders Drove Road is one of Scotland's Great Trails and passes through the Tweed, Ettrick and Yarrow Confluences SLA, Tweedsmuir Uplands SLA, Tweed Valley SLA, and Pentland Hills SLA. The value of the view is therefore considered to be **high**. Taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **high.**		
Assessment of visual effects	The ZTV (Figure 5.1.2) indicates that there will be extensive theoretical visibility of the Development from the route within 15 km of the Site. Theoretical visibility is greatest within the Site and between the Site and Hamilton Hill near Peebles. The section immediately west, between the Site and the A701, has reduced visibility due to the position of the route on lower-lying land between hills. Visibility increases to the west of the A701 towards West Linton and into the Pentland Hills, although buildings and vegetation around West Linton reduce visibility from the settlement.		

Cross Borders Drove Road	
	Visibility within Peebles will be largely limited due to intervening vegetation and built development, however as the route ascends towards Kirkhope Law in the south there will be more elevated and open views. With the exception of views from immediately west of the Site, the Development will appear as a group of turbines on the horizon, particularly in views from the south-east of the Site, and from distant elevated locations to the west. In closer proximity views from the west, the turbines will be largely screened by the intervening landform of Wether Law, Hag Law and Green Knowe with mainly tips visible. The following viewpoints are located on this route, and are representative of views likely to be experienced: Viewpoint 1: Cross Borders Drove Road (West), represents views experienced by recreational receptors travelling eastbound along the route to the immediate west of the Site. A **high** magnitude of change was identified from this viewpoint. Viewpoint 2: Cross Borders Drove Road (East), represents views experienced by recreational receptors travelling westbound along the route to the east of the Site. A **high** magnitude of change was identified from this viewpoint. The magnitude of visual change will vary along the route. Along the stretches of the route on the approach to the Site from the west (VP 1), within the Site and to the south-east of the Site (VP 2) as far as Hamilton Hill, the magnitude of visual change will be **high**, and taking account of the **high** sensitivity of the receptor, will result in a **significant (major)** visual effect within approximately 4 km of the Development. The magnitude of visual change will be **low** in the section of the route to the south of Peebles, and to the west of the A701 and West Linton, resulting in a **not significant (minor)** visual effect within 4 -15 km of the Development. Elsewhere along the route, where there is no theoretical visibility, there will be **no effect**.
Potential for Cumulative Effects	The CZTV in Figure 5.1.11 indicates that there is some theoretical visibility of other wind energy developments within 20 km of the Development from this route. This includes visibility of the operational Bowbeat Wind Farm to the east, the cluster of turbines comprising Glenkerie and Clyde to the south, and the large cluster of turbines to the north-west of the Pentland Hills. In terms of cumulative change, the key changes will be the consented Glenkerie Extension to the south and Camilty Wind Farm to the north-west of the route. The Camilty scheme will be largely screened from this route, and any visibility will be limited to blade tips. The consented Glenkerie Extension may be seen in more open views from some elevated locations along the route, however visibility will be largely screened by intervening landform and/or vegetation and the scheme will be seen in the context of the existing Clyde and Glenkerie turbines. Glenkerie Extension will be largely seen backclothed by distant landform in views from this route. The Development will introduce theoretical visibility along sections of the route as it cuts across the Pentland Hills, and between West Linton and the Site. These sections of the route would have no visibility of other operational or consented schemes. The Development will introduce visibility of turbines within and to the north-west of the Site, although forestry will provide some screening and landform will reduce visibility to mainly tips. Elsewhere along the route, including the sections crossing Eddleston Valley and to the north-west of West Linton, visibility of other schemes (notably Bowbeat Wind Farm) will be experienced. Given the limited visibility of other consented wind farms visible from stretches of the route, **the introduction of the Development is not judged to result in significant additional cumulative effects for scenario 1.**

Table 5.64: John Buchan Way

John Buchan Way			
Representative viewpoint:	VP 19: Cademuir Hill Fort	Approximate distance from route to nearest turbine:	8.3 km
Description	The John Buchan Way is a popular walking route between Peebles and Broughton. It is approximately 22 km long, and most of the route passes through the Upper Tweeddale NSA, with shorter sections within the Tweedsmuir Uplands SLA. The route has three main ascents and descents, including Cademuir Hill, Easter Dawyck and Hammer Head, which provide elevated and open views across the landscape, including towards the Site.		
Sensitivity	Recreational receptors, whose attention is focused on their surroundings, are of **high** susceptibility to changes in the view. The John Buchan Way is a promoted route which passes through the Upper Tweeddale NSA and Tweedsmuir Uplands SLA. The value of the view is therefore considered to be **high**. Taking account of the judgements of susceptibility and value, overall sensitivity of receptors at this viewpoint is judged to be **high.**		
Assessment of visual effects	The ZTV in Figure 5.1.2 indicates that there will be intermittent theoretical visibility of the Development in views north from the section of the route between the B712 / Stobo Road and Morning Hill via Cademuir Hill. There is no or very limited visibility to the west of the B712 / Stobo Road. Some visibility will be possible from hill summits just off the route (e.g. Hammer Head and Clover Law). The Development will appear as a large cluster of turbines on the horizon. The turbines will typically break the skyline but will be afforded some screening by the intervening landform. The following viewpoint is located just off this route, and is representative of views likely to be experienced: • VP19: Cademuir Hill Fort represents views experienced by recreational receptors at Cademuir Hill, including those travelling along the John Buchan Way (see Figure 5.2.19). A **medium** magnitude of change was identified from this viewpoint. Between the B712 / Stobo Road and Morning Hill above Peebles, the magnitude of visual change will be **medium**, and taking account of the **high** sensitivity of the receptor, will result in a **significant (moderate)** visual effect between 8 - 10 km from the Development. Elsewhere along the route, where there is no theoretical visibility, there will be **no effect**.		

John Buchan Way	
Potential for Cumulative Effects	The CZTV in Figure 5.1.11 indicates that there is some theoretical visibility of other wind energy developments within 20 km of the Development from this route. This includes visibility of the operational Bowbeat Wind Farm to the north-east, and Clyde Wind Farm and Glenkerie Wind Farm and its consented extension to the south-west of the route. The key cumulative change will be the consented Glenkerie Extension to the south-west. When visible, the blade tips of the consented Glenkerie Extension may be seen in views from some elevated locations along the route, particularly along sections of the route to the north of Broughton. However, visibility will be largely screened by intervening landform and vegetation, in views looking south and south-west. This will result in a barely perceptible change. The Development will be visible along the easterly extents of the route, from Stobo towards Peebles. However, most sections of this route will also have visibility of the operational Bowbeat Wind Farm. No other consented schemes will be theoretically visible from this route, and as such **the introduction of the Development is not judged to result in significant additional cumulative effects for scenario 1.**

5.9.4 Operational Effects on Designated Landscapes

This section describes the implications of the Development for designated landscapes in the Study Area. Designated landscapes are shown on Figure 5.1.6 and with the ZTV overlain on Figure 5.1.7.

Based on the analysis in Table 5.3 the designated landscapes listed below have been considered in the assessment and observations are drawn from the assessment sections for landscape and visual effects, including cumulative effects:

- Upper Tweeddale NSA (Scottish Borders Council);
- Tweed Valley SLA (Scottish Borders Council);
- Tweedsmuir Uplands SLA (Scottish Borders Council);
- Gladhouse Reservoir and Moorfoot Scarp SLA (Midlothian Council);
- Pentland Hills SLA (Scottish Borders Council, West Lothian Council, Midlothian Council); and
- Pentland Hills and Black Mount SLA (South Lanarkshire Council).

Table 5.65: Operational Effects on the Upper Tweeddale NSA

Upper Tweeddale NSA
The Development The Site is to the north-west of Peebles in the Scottish Borders. The Site forms part of the relatively large-scale Cloich Hills which are covered by forestry at various stages of the planting, growing and felling cycle. At its closest, the Site boundary is approximately 2.3 km, and the closest turbine 3.5 km north of the Upper Tweeddale National Scenic Area (NSA). The Development consists of: • up to 12 turbines with a maximum blade tip height of 149.9 m; and • Ancillary development including access tracks and an onsite substation. Given the proximity of the Development to the Upper Tweeddale NSA, visibility of the Development is relatively widespread across parts of the NSA, as illustrated in Figure 5.1.7. Most visibility will arise from the introduction of the proposed wind turbines, whereas tracks and other ancillary development are unlikely to form a prominent feature in most views. However, ancillary development may be visible from closer, more elevated locations, such as Black Meldon (VP4).

Upper Tweeddale NSA			
The Study Area: The Study Area for the LVIA was defined as a 40 km radius from the Site, as shown on Figure 5.1.1. Most of the Study Area to the south and east is within the Scottish Borders, however the northern extents of the Study Area extend into Midlothian, East Lothian, City of Edinburgh, West Lothian, Falkirk, and Fife. The west of the Study Area is within North and South Lanarkshire, and a small part to the south is within Dumfries and Galloway. The Upper Tweeddale NSA covers a large area of 10,500 ha, extending south and south-west from the Site. The ZTV in Figure 5.1.7 indicates relatively widespread visibility from the eastern part of the NSA, in particular from elevated summits immediately south of the Site, to the east of the B712 road. There will be visibility from the summits and north-facing slopes of hills within the NSA, including Stob Law (676m AOD), Hundleshope Heights (685m AOD), Canada Hill (528m AOD), Cademuir Hill (407m AOD), Whitelaw Hill (479m AOD), Hunt Law (485m AOD) and The Scrape (719m AOD). Some of the intimate valleys within the NSA also experience theoretical visibility, including Manor Valley and parts of the Tweed Valley near Stobo, although it is noted that woodland, shelterbelts and roadside trees provide some screening in practice. Theoretical visibility is limited in the west of the NSA to the west of the B712, including the majority of the road itself. **Scope of Assessment:** The ZTV and consultation with the Council and NatureScot has informed the selection of five viewpoints within the NSA as listed in the table below. Photomontages (provided in Volume 2c of the EIA Report) have been produced from these viewpoints, in order to illustrate potential visibility of the Development and other wind farm developments. The viewpoint locations represent views experienced by recreational receptors at popular walking routes and hill summits within the NSA, and views experienced by road users travelling within the lower-lying valleys of the NSA. These viewpoints have informed the assessment of the Development on the Special Landscape Qualities of the NSA. Special qualities as defined in *The special qualities of the National Scenic Areas* (SNH, 2010) are listed in this table. Further information relating to landscape types was sourced from the landscape character assessment (LCA) covering this area[81].			
Location	**Grid Reference**	**Distance**	**Reason for Selection**
Viewpoint 4: Black Meldon	320617, 642509	3.5 km	Represents views of recreational receptors at a hilltop location within the Upper Tweeddale NSA.
Viewpoint 14: B712 / Stobo Road	319392, 639277	6.7 km	Represents views of road users within the Upper Tweeddale NSA.
Viewpoint 16: Haswellsykes	321175, 638649	7.4 km	Represents views of road users and recreational receptors within the Upper Tweeddale NSA.
Viewpoint 19: Cademuir Hill Fort	323039, 637489	9.0 km	Represents views of recreational receptors visiting Cademuir Hill Fort, within the Upper Tweeddale NSA.
Viewpoint 23: Stob Law	323063, 633292	13.1 km	Represents views of recreational receptors at a hilltop location within the Upper Tweeddale NSA.
How the area is used and experienced by people: The NSA is visited for a variety of recreational activities. The area is used by people travelling along the John Buchan Way (and Core Path 175) from Broughton in the west to Peebles in the east, both those travelling on foot and by mountain bike. Other Core Paths within the NSA include Core Path 143, a loop from Peebles along the River Tweed Hill. Walkers visit the NSA to climb its hills, including Stob Law, Cademuir Hill, The Scrape, Pykestone Hill and Trahenna Hill. The River Tweed, which is central to this landscape, is famed for its salmon and attracts fishing interests. In addition, the NSA contains many cultural heritage assets which attract visitors, including towers and castles, scheduled monuments, ancient settlements, cairns and hill forts. Notable features include Dreva Craig hillfort, Neidpath Castle, Barns Tower and Castle Hill in Manor Valley. There are several			

[81] SNH (2019), Scottish Landscape Character Types Maps and Descriptions.

Upper Tweeddale NSA	
Gardens and Designed Landscapes within the NSA which attract visitors, including Stobo and Dawyck, and the Local Gardens and Designed Landscapes of Barns House, Broughton Place, Rachan and Neidpath Castle. There are a number of small settlements within the NSA including Kirkton Manor, Broughton, Drumelzier and Stobo, and there are scattered dwellings elsewhere. Views within the NSA are also experienced by road users travelling through the area, notably along a small section of the A701 and A72, the entirety of the B712 and other minor roads within the area. Visual receptors within the Study Area are assessed in Section 5.9.3.	
Special Landscape Qualities (SLQ) and detailed descriptions: Special Landscape Qualities are listed in full in *The Special Landscape Qualities of the National Scenic Areas*[82]. Special Landscape Qualities which may be potentially affected by the Development are listed in the table below.	
SLQ - Diverse scenery of great charm and soft beauty	
Detailed SLQ descriptions underpinning landscape characteristics	The landscape of the Upper Tweeddale NSA is described as being a *"richly diverse landscape"*[83] with prominent landforms which creates a *"pleasing physiography"*[84] when combined with the landscape's rivers, woodland and moorlands. The NSA, compared to elsewhere within the Study Area and Scottish Borders, is distinguished by its more sharply defined and densely wooded valleys, and its more prominent, steeper and more rugged surrounding hills, which provide a greater sense of enclosure within the intimate valleys.
Impacts of the development on key characteristics and effects on SLQs	The Development is theoretically visible throughout much of the eastern part of the NSA (east of the B712), including across upland and valley landscapes which contribute towards the diverse and rich landscape of the NSA. The extent of visibility will vary depending on location within the NSA (e.g. in the valleys or hill summits), but when visible, the Development will be mainly seen against the skyline. In close views, such as from Black Meldon (VP4) on the northern edge of the NSA, the turbines will be prominent. In more distant views such as Stob Law the turbines will affect a small part of wider panoramic views across the NSA. The Development may be seen to detract from the more scenic features of the NSA landscape although other wind farms are visible on the distant horizon including Bowbeat.
Proposed (embedded) mitigation and suggested (residual) mitigation and timescales	The appearance of the Development from key locations within the NSA was a key design consideration, including the view from hill summits such as Cademuir Hill and Stob Law. A key design aim was to create a compact layout with minimal overlapping, and turbines that appear in keeping with the underlying landform in terms of scale.
Level of impact and possible future risk to SLQ(s)	This special quality focuses on the assemblage of a variety of landscape types, which combine to make an aesthetically diverse landscape. The Development will introduce wind turbines in views from valleys within the NSA including parts of the Manor Valley and upper slopes of the Tweed Valley around Stobo, although woodland will reduce visibility in some locations. The Development will also increase the presence of wind farms in views from elevated hill summits including Stob Law, Cademuir Hill, The Scrape and White Law Hill, albeit that operational wind farms are already visible on the distant skyline from these locations.

[82] SNH (2010). Commissioned Report No. 374, The Special Landscape Qualities of the National Scenic Areas
[83] SNH (2010) The special qualities of the National Scenic Areas. Commissioned Report No. 374 [Online] Available at: https://www.nature.scot/naturescot-commissioned-report-374-special-qualities-national-scenic-areas (Accessed 29/03/2021) (pg. 53)
[84] Ibid.

Upper Tweeddale NSA	
	The effect on this special quality both as a result of the Development individually and cumulatively, is considered to be **not significant (minor).** Given that existing wind farms, including the operational Bowbeat and Glenkerie Wind Farms are already present in views from the NSA, and as there will be no direct effects on key landscape features, it is considered that the Development will not significantly affect the integrity of the NSA by adversely impacting on this special quality for which it was designated.
SLQ - Green, intimate pastoral valleys	
Detailed SLQ descriptions underpinning landscape characteristics	The valleys within the NSA are green and pastoral, with larger valleys typically flat-bottomed, and the more intimate valleys 'V' shaped. The valleys are described as having *"even slopes, steepening as they rise to scree-strewn ridges or rolling, rounded wooded hills with a backdrop of interlocking moorland slopes or high, rolling moorland hill"*[85].
Impacts of the development on key characteristics and effects on SLQs	The Development will be visible from some of the valleys within the NSA including a short section of the Tweed Valley near Stobo (represented by VP14) and parts of Manor Valley. However, due to the lower-lying level of the valleys, visibility of the Development will be largely limited to blades and some hubs visible above the interlocking hills forming the skyline. Furthermore, vegetation within the valleys may filter views of the development. Most of the Development, including all ancillary development will be largely screened from view, however from some more elevated viewpoints on the upper valley slopes, such as VP16: Haswellsykes, the Development will be more visible. Ancillary infrastructure will not be visible from this viewpoint. Due to the distant nature of the Development, and its partial screening by intervening landform, the Development will not adversely affect the appearance of the *"backdrop of interlocking moorland slopes or high, rolling moorland hills"*[86] which enclose the valleys, giving them their intimate feel. However, the introduction of turbines into views above the distinctive skylines surrounding the valleys will affect the perception of the scale of the enclosing hills and affect the sense of seclusion and intimacy within the valley.
Proposed (embedded) mitigation and suggested (residual) mitigation and timescales	The appearance of the Development from key locations within the NSA was a key design consideration, including the view from valleys and lower slopes. A key design aim was to create a compact layout with minimal overlapping, and turbines that appear in keeping with the underlying landform in terms of scale.
Level of impact and possible future risk to SLQ(s)	This special quality focuses on the intimacy of pastoral valleys, which contrasts with the surrounding hills. The Development will introduce the presence of wind turbines in views from localised areas within these valleys, however the Development will not detract from the distinct backdrop of interlocking hills which frame the valley. These views may also be afforded further screening by mature vegetation present within the valleys. The ZTV in Figure 5.1.7 indicates limited visibility within the lower-lying valleys within the NSA, largely due to intervening hills and enclosing valley slopes. The effect on this special quality both as a result of the Development individually and cumulatively, is considered to be **not significant (minor).** As there will be no direct effects on key landscape features, it is considered that the Development **will not significantly affect the integrity of the NSA by adversely impacting on this special quality for which it was designated.**

85 Ibid.
86 Ibid.

Upper Tweeddale NSA	
SLQ - Expansive, open hills with panoramic views	
Detailed SLQ descriptions underpinning landscape characteristics	The NSA comprises numerous prominent hills, and a short walk to the summit provides *"360° panoramic views across the Southern Uplands"*[87], notably from landmark summits such as Black Meldon. The peaks of these hill are *"vast, open, windswept, inspiring, exhilarating, and rewarding landscapes"*[88] which can provide spectacular views across the area, including to other hill summits within and beyond the NSA boundary, and into the more intimate pastoral valleys. Due to the contrast with the low-lying valleys, the hills within the NSA often appear of a greater scale than they are.
Impacts of the development on key characteristics and effects on SLQs	The Development will be seen throughout much of the eastern part of the NSA, particularly from elevated hill summits (see VPs 4, 19 and 23). From these locations, the turbines of the Development will be seen against the skyline. From closer hill summits (including Black Meldon (VP4)) ancillary infrastructure, including access tracks will likely be visible across the forested Cloich Hills. However, in more distant views visibility will be largely limited to turbines only. The addition of the Development will adversely affect the *"360° panoramic views"* experienced from these summits and may also detract from the scale of the hills when compared to the valley, by introducing large-scale, tall, vertical features into the views.
Proposed (embedded) mitigation and suggested (residual) mitigation and timescales	Mitigation during layout design was proposed to improve the appearance of the Development from locations within the NSA, including notable hill summits such as Cademuir Hill and Stob Law. A key design aim was to create a compact layout with turbines that appear in keeping with the underlying landform in terms of scale.
Level of impact and possible future risk to SLQ(s)	This special quality focuses on the panoramic views which are experienced from the summits of hills within the NSA. The addition of the Development will increase the presence of wind energy in a number of views experienced from elevated viewpoints, and due to its closer proximity and greater scale may detract from the vast openness of the landscape and the apparent scale of the hills within and surrounding the NSA. The ZTV in Figure 5.1.7 indicates limited visibility within the western extents of the NSA, largely due to the intervening elevated hills in the north of the NSA. Given that existing wind farms are already present in elevated views from within the NSA, (including Bowbeat, Glenkerie, the large cluster to the north-west including the Black Law Group, Harburnhead and Pearie Law, and the large Clyde Wind Farm and its extension to the south-west), the Development will not offer an entirely new component in views, but increase the existing presence of wind farm activity in the vicinity of the NSA. The effect on this special quality as a result of the Development individually is considered to be **significant (moderate)** from the northern fringes of the NSA reducing to **not significant (minor)** elsewhere where there is visibility**.** As there will be no direct effects on key landscape features, and given the widescale context in which such views will be experienced, it is considered that the Development **will not significantly affect the integrity of the NSA by adversely impacting on this special quality for which it was designated.**

87 SNH (2010) The special qualities of the National Scenic Areas. Commissioned Report No. 374 [Online] Available at: https://www.nature.scot/naturescot-commissioned-report-374-special-qualities-national-scenic-areas (Accessed 29/03/2021)) (pg. 54)
88 Ibid.

Upper Tweeddale NSA
Summary of effects on SLQs and integrity of the Upper Tweeddale NSA A number of special qualities make up the Upper Tweeddale NSA, with 3 out of 8 being of most relevance to the Development. Of these, it is the special quality which describes "*expansive, open hills with panoramic views*"[89] which will potentially be affected most by the Development. This is largely because this special quality is mostly appreciated from elevated summits within the NSA, where the Development will be most visible. Existing development visible within the Study Area is limited and appears of a smaller scale; the addition of the Development will increase the perceived visual presence of wind turbines in the landscape to the north of the NSA. A **significant (moderate)** level of effect is recorded for the Development individually. A **not significant (minor)** additional cumulative effect will result, given the limited perception of other wind farm development. The effects of the Development are likely to be experienced from hill summits and Site-facing slopes within the eastern part of the NSA, as illustrated in the visualisations for Viewpoints 4, 19 and 23. In order to experience the view in this particular manner, the viewer would have to be at the top of summits, and therefore recreational hill walkers and mountain bikers are likely to be the most affected by the Development. The Development will be viewed in the context of existing wind farm development, notably Bowbeat, which is already part of the landscape in views from hills within the NSA. The Development will be of a larger scale, and in closer proximity to the NSA than Bowbeat. The ZTV indicates that the Development will introduce visibility of wind turbines into valleys within the NSA, however there will be limited visibility introduced from hill summits, which already experience views of Bowbeat. Embedded mitigation included improving the appearance of the Development from locations within the NSA, by creating a compact layout of a scale which responds to the underlying landscape. The Development is reversible in that all visible elements, such as turbines, will be removed at the end of its 30-year life span. **Overall, the assessment has found that the majority of effects experienced within the lower-lying valleys, when considered individually and cumulatively, will be not significant (minor) at most, and localised. Moderate (significant) effects are expected in relation to special qualities which are experienced at hill summits, such as panoramic views. However, it is not considered that any of the special qualities will be undermined to such an extent that the integrity of the NSA will be affected.**

Table 5.66: Operational Effects on the Tweed Valley SLA

Tweed Valley SLA
Location and baseline description The Tweed Valley is a broad, elongated SLA in the Scottish Borders covering an area of approximately 11,000 ha. At its closest, the Site boundary is approximately 1.2 km, and the closest turbine 2.4 km to the north-west of the SLA. The SLA follows the course of the River Tweed between Peebles and Thornielee. The designation statement for the SLA highlights that the broad Tweed Valley is *"typical of the Borders"* and has a *"strong sense of place"*[90]*.* The SLA has a varied mix of landscape elements including forestry, woodland, open hillsides and pastoral farmland and has a range of settlement types. The statement notes that *"landscape unfolds as the viewer follows the river through the valley, presenting new vistas"* and that *"the contrast between the well- settled valley and… landmark hills is striking."*[91] Key forces for change relevant to the Development include: changes to forestry management; potential for visual impact of development on hills outside the SLA; and the creation of hillside access

[89] SNH (2010) The special qualities of the National Scenic Areas. Commissioned Report No. 374 [Online] Available at: https://www.nature.scot/naturescot-commissioned-report-374-special-qualities-national-scenic-areas (Accessed 29/03/2021) (pg. 54)
[90] Scottish Borders Council (2012) Supplementary Planning Guidance Local Landscape Designations [Online] Available at: https://www.scotborders.gov.uk/download/downloads/id/1124/local_landscape_designations.pdf (Accessed 29/03/2021)(pg. 22)
[91] Ibid

Tweed Valley SLA

tracks. Recommendations include the consideration of effects from development on hilltops, such as wind farms, which may be visible within the valley.

Potential for the Development to affect the Special Qualities of the SLA

The Development is not located within the SLA, therefore potential effects will be indirect.

The ZTV on Figure 5.1.7 indicates intermittent theoretical visibility across the SLA. Figure 5.1.5 indicates theoretical visibility across the LCTs within the SLA which include the following:

- Upland Valley with Woodland (LCT 116): theoretical visibility indicated within 15 km of the Site, between Peebles and Innerleithen, however actual visibility will be limited by intervening vegetation and forestry, and in Peebles by built development;
- Pastoral Upland Valley (LCT 114): theoretical visibility indicated from the entirety of the LCT area within the SLA;
- Dissected Plateau Moorland (LCT 90): theoretical visibility indicated within 15 km of the Site, however, is limited to the Site-facing slopes of Lee Pen and the forested hills of Glentress Forest;
- Plateau Outliers (LCT 92): extensive theoretical visibility indicated from the most westerly extents of the SLA in which this LCT falls. Visibility is experienced from the Site-facing slopes of Hamilton Hill, both White Meldon and Black Meldon, and within the Meldon Valley; and
- Southern Uplands with Scattered forest (LCT 93): theoretical visibility indicated within 15 km from the Site, however, is limited by to the Site-facing slopes of Kailzie Hill.

The assessment of effects on landscape character identified significant effects on the key characteristics of the Plateau Outliers (LCT 92), Dissected Plateau Moorland (LCT 90), and Pastoral Upland Valley (LCT 114).

Assessment viewpoints located within the SLA include:

- VP 4: Black Meldon, to the south of the Site, represents views experienced by recreational receptors, and for which a **high** magnitude of change was identified;
- VP 5: Meldon Valley, to the south of the Site, represents views experienced by receptors travelling along the road, and for which a **medium** magnitude of change was identified;
- VP 11: A703, near Langside Farm (North of Peebles) to the south-east of the Site, represents views experienced by receptors travelling along the road, and for which a **low** magnitude of change was identified; and
- VP 25: Lee Pen, to the south-east of the Site, represents views experienced by recreational receptors at the top of the hill summit, and for which a **low** magnitude of change was identified.

The introduction of the Development has the potential to significantly affect some of the special qualities of the SLA, notably the *"the contrast between the well- settled valley and… landmark hills.[92]"* The Development will be perceptible from the most western extents of the SLA, including from Black and White Meldon, the Meldon Valley and the A703. The ZTV in Figure 5.1.7 indicates intermittent visibility elsewhere within the SLA, largely due to the intervening elevated hills on the boundary of the SLA.

Locally, the effect on the Tweed Valley SLA is considered to be **significant (moderate)**, in the area of the SLA comprising the Meldons, reducing to **not significant (minor)** elsewhere within the Tweed Valley. Given that existing wind farms, including the Operational Bowbeat and Glenkerie Wind Farms, are already present in views from the Tweed Valley SLA, and as there will be no direct effects on key landscape features, it is considered that the Development **will not significantly affect the integrity of the SLA by adversely impacting on the qualities for which it was designated.**

Potential for Cumulative Effects

The Development will be seen in successive long-distance views with the consented Glenkerie Extension from elevated locations within the SLA, although this wind farm will appear as an extension to the existing Glenkerie Wind Farm. As such the cumulative magnitude of change to views will be low and the additional and total cumulative visual effect will be **not significant (minor).**

The Development will not significantly affect the integrity of the SLA when considered in this cumulative scenario by adversely impacting on the qualities for which it was designated. As such, it

[92] Ibid.

Tweed Valley SLA
is considered that the Development **will not significantly affect the integrity of the SLA by adversely impacting on the qualities for which it was designated.**

Table 5.67: Operational Effects on the Tweedsmuir Uplands SLA

Tweedsmuir Uplands SLA
Location and baseline description The Tweedsmuir Uplands is an extensive SLA in the Scottish Borders covering an area of approximately 53,600 ha and enclosing the Upper Tweeddale NSA to the west, south and east. At its closest, the Site boundary is approximately 3.0 km, and the closest turbine 4.6 km to the north of the SLA. The SLA covers an extensive area of the Southern Uplands, extending from Biggar in the west to Minch Moor in the east, and to the edges of the Upper Tweeddale NSA and Tweed Valley SLA to the north. The designation statement for the SLA highlights that the area "comprises steep rolling landform, with deep valleys and rounded peaks of glacial origin" which is "predominantly open moorland of rough grass and heather"[93]. The statement notes that this is a "highly scenic area of dramatic landform, and has a significant degree of wildness", with "little overt human influence over the landscape"[94]. Wind farms and associated development are identified as a force for change, and the consideration of visual effects of tall developments on views to and from the landscape is recommended. It is also recommended that the wildness character of the majority of the hills is maintained.
Potential for the Development to affect the Special Qualities of the SLA The Development is not located within the SLA, therefore potential effects will be indirect. The ZTV in Figure 5.1.7 indicates intermittent theoretical visibility across the SLA. Figure 5.1.5 indicates theoretical visibility across the LCTs within the SLA which include the following: • Plateau Outliers (LCT 92): some theoretical visibility from the Site-facing valley slopes of the Lyne and Tarth Waters, to the south-west of the A72. Visibility from the lower slopes may be partially screened by intervening landform near the Site; • Southern Uplands with Scattered forest (LCT 93): theoretical visibility indicated within 15 km of the Site, however, is limited to the elevated, Site-facing slopes and hill summits; • Southern Uplands – Borders (LCT 95): theoretical visibility indicated at distances of up to 30 km from the Site, however, is largely limited to the elevated, Site-facing slopes and hill summits; • Upland Fringe with Prominent Hills (LCT 102): very limited theoretical visibility from the areas of the LCT within the SLA; and • Upland Valley with Pastoral Floor (LCT 113): very limited theoretical visibility from the areas of the LCT within the SLA. The assessment of effects on landscape character identified significant effects on the key characteristics of the Plateau Outliers LCT (LCT 92), with the remaining LCTs identified as having not significant effects. Assessment viewpoints located within the SLA include: • VP 15: Path near Wester Happrew Burn, represents northerly views experienced by recreational receptors travelling along the path near Riding Hill, within the Tweedsmuir Uplands SLA, and for which a **low** magnitude of change was identified. The introduction of the Development may affect some of the special qualities of the SLA, notably the "highly scenic area of dramatic landform, and… significant degree of wildness" and the "little overt human influence over the landscape". However, views of the Development will be limited to elevated, Site-facing slopes, particularly in the north of the SLA near Peebles and the A72. The ZTVs in Figure 5.1.7 indicate limited visibility elsewhere within the SLA, largely due to screening by the elevated hills within the interior of the SLA.

[93] Scottish Borders Council (2012) Supplementary Planning Guidance Local Landscape Designations [Online] Available at: https://www.scotborders.gov.uk/download/downloads/id/1124/local_landscape_designations.pdf (Accessed 29/03/2021) (pg. 20)
[94] Ibid.

Tweedsmuir Uplands SLA
The operational Glenkerie Wind Farm is located in the south of the SLA, and other wind farms are visible from it, including Clyde Wind Farm which is along the south-western boundary and Bowbeat Wind Farm which is visible from parts of the SLA to the distant north-east. The Development will introduce further turbines in views to the north and will result in some limited effects on the sense of *"wildness"* experienced from some hill summits within the designated area, by introducing further human influence into the landscape. Given that there are operational wind farms within and visible from the SLA, and as there will be no direct effects on key landscape features, the effect on the Tweedsmuir Uplands SLA is considered to be **not significant (minor)**, within around 10 km, reducing to **no effect** elsewhere within the SLA. It is considered that the Development **will not significantly affect the integrity of the SLA by adversely impacting on the qualities for which it was designated.**
Potential for Cumulative Effects Glenkerie Extension is located within the Tweedsmuir Uplands SLA, and in the context of the expansive SLA will appear as a small extension to an existing wind farm. The Development will be seen in successive views with the consented Glenkerie Extension from elevated locations within the SLA. From locations in the north of the SLA, the Development will appear closer and of a greater scale than Glenkerie Extension, however in more distant views from the interior of the SLA and further south, Glenkerie Extension will be closer than the Development, and may appear more prominent in views. Views of the Development and the Glenkerie Extension will be seen from relatively localised extents of the SLA, notably from elevated viewpoint locations. The cumulative magnitude of change to views will be low and the additional and total cumulative visual effect will be **not significant (minor).** As the Glenkerie Extension is within the SLA, the introduction of the Development will not affect the *"wildness"* of the SLA. The Development will introduce turbines which may increase the "*human influence over the landscape".* However, given that there are existing wind farms within the SLA, and other consented developments, the Development will not adversely impact these special qualities. The Development will not significantly affect the integrity of the SLA when considered in this cumulative scenario by adversely impacting on the qualities for which it was designated. As such, it is considered that the Development **will not significantly affect the integrity of the SLA by adversely impacting on the qualities for which it was designated.**

Table 5.68: Operational Effects on the Gladhouse Reservoir and Moorfoot Scarp SLA

Gladhouse Reservoir and Moorfoot Scarp SLA
Location and baseline description The Gladhouse Reservoir and Moorfoot Scarp SLA is in Midlothian and covers an area of approximately 11,600 ha. At its closest, the Development is located approximately 7 km to the south-west of the SLA. The SLA is centred upon Gladhouse Reservoir and the moorland and farmland surrounding it, together with the containing scarp and hill fringes of the Moorfoot Hills to the south and east. The designation statement for the SLA notes the importance of the "open and naturalistic character of Gladhouse Reservoir and its scenic juxtaposition with the dramatic scarp of the Moorfoot Hills"[95], its "open and expansive views from this landscape to both the Moorfoot Hills and the Pentland Hills"[96] and its "revelatory views from the B7007 across the open moorland and farmland of this landscape to the distant Pentland Hills"[97].
Potential for the Development to affect the Special Qualities of the SLA The Development is not located within the SLA, therefore potential effects will be indirect. The ZTV on Figure 5.1.7 indicates theoretical visibility across the SLA. Figure 5.1.5 indicates theoretical visibility across the LCTs within the SLA which include the following: • Plateau Moorland - Lothians (LCT 266): some theoretical visibility from the north-west-facing slopes of the Moorfoot Scarp, within the SLA; and • Upland Fringes – Lothians (LCT 269): extensive theoretical visibility across the part of the LCT within the SLA. The assessment of effects on landscape character in this part of the Study Area did not identify any significant effects on the key characteristics of the Plateau Moorland – Lothians LCT (LCT 266) or Upland Fringes – Lothians LCT (LCT 269). Assessment viewpoints located within the SLA include: • VP 20: Blackhope Scar, represents westerly views experienced by recreational receptors at the summit of the hill, within the SLA, and for which a **low** magnitude of change was identified; • VP 21: Gladhouse Reservoir, represents south-westerly views experienced by recreational receptors at Gladhouse Reservoir, and for which a **low** magnitude of change was identified; and • VP 26: B7007 (northern edge of Moorfoot Hills), represents views experienced by road users travelling eastbound, and for which a **low** magnitude of change was identified. The introduction of the Development may affect some of the special qualities of the SLA, notably the *"open and expansive views from this landscape to…the Pentland Hills"* including views from the B7007. However, views of the Development from the B7007 will be limited to a relatively localised section of the road between the A7 and Broad Law, where the road turns south and crosses the Moorfoot Hill escarpment. The ZTVs in Figure 5.1.7 indicate visibility elsewhere within the SLA, however visibility in the lower-lying area to the north of the Moorfoot Scarp will be frequently screened by intervening vegetation and forestry shelterbelts. In terms of effects on the perceptual special qualities and views throughout the designated landscape, the operational turbines of Bowbeat and Carcant Wind Farm are visible from parts of the SLA, typically sitting behind the Moorfoot escarpment. Bowbeat is prominent in views west from Blackhope Scar, which is the most elevated location in the Moorfoot Hills and on the southern boundary of the SLA. The Development will introduce turbines in views to the west, resulting in some limited effects on the *"open and expansive views"* towards the Pentland Hills and its *"revelatory views from the B7007"* experienced from some parts of the designated area. There will be no direct effects on key landscape features within the SLA, and given that existing wind farms are present in views from the SLA, including Bowbeat Wind Farm which is located along the southern boundary of the SLA, the overall effect on the Gladhouse Reservoir and Moorfoot Scarp SLA

[95] Midlothian Council (2017) Supplementary Guidance – Special Landscape Areas [Online] Available at: https://www.midlothian.gov.uk/downloads/file/3201/statement_of_importance_gladhouse_reservoir_and_moorfoots_scarp_sla (Accessed 29/03/2021) (pg. 1)
[96] Ibid.
[97] Midlothian Council (2017) Supplementary Guidance – Special Landscape Areas [Online] Available at: https://www.midlothian.gov.uk/downloads/file/3201/statement_of_importance_gladhouse_reservoir_and_moorfoots_scarp_sla (Accessed 29/03/2021)(pg. 2)

Gladhouse Reservoir and Moorfoot Scarp SLA
is considered to be **not significant (minor).** It is considered that the Development will not significantly affect the integrity of the SLA by adversely impacting on the qualities for which it was designated.
Potential for Cumulative Effects The Development will be seen in successive long-distance views with the consented Glenkerie Extension from elevated locations within the SLA. Glenkerie Extension will be visible in distant south-westerly views alongside the operational Glenkerie Wind Farm. The Development will be seen as a separate, larger scheme in much closer proximity to the SLA. It will appear largely backclothed when viewed from elevated locations but will appear to sit on the horizon from lower areas of the SLA. Given the intervening distance between the Development and Glenkerie Extension and that the latter will appear to extend an existing wind farm, it is considered that overall there will be a **small-scale** change experienced at localised areas within the SLA. As such, the cumulative magnitude of change will be **barely perceptible** and the additional and total cumulative visual effect will be **not significant (negligible)**. The Development will not significantly affect the integrity of the SLA when considered in this cumulative scenario. As such, it is considered that the Development **will not significantly affect the integrity of the SLA by adversely impacting on the qualities for which it was designated.**

Table 5.69: Operational Effects on the Pentland Hills SLA

Pentland Hills SLA
Location and baseline description The Pentland Hills SLA extends across three local authorities; Scottish Borders, Midlothian and West Lothian, although the West Lothian SLA is concentrated on the westward facing slopes of the ridge of hills, facing away from the Site. Within the Scottish Borders, the Pentland Hills SLA is bound by the Local Authority boundary and the A702 to the south-east. Likewise, the Midlothian SLA is bound by Local Authority boundaries and the A701 and A702 near Penicuik. It includes the uplands and the farmed lower slopes. At its closest, the Scottish Borders SLA is approximately 6 km to the north-west of the Development, and the Midlothian SLA is approximately 5 km to the north. The designation statements for the SLA highlight that the Scottish Borders area of the SLA has a *"distinctive topography"* and that the *"rolling, rounded hills have wildness character despite their small extent*"[98]. The Midlothian area of the SLA notes the importance of the *"highly scenic shapely peaks of the Pentland Hills"*[99] seen from across the Lothians, and the *"rugged and little modified character…which contributes to the distinct sense of wildness"*[100]. The Midlothian statement also notes the *"open and largely uncluttered expanse of the low-lying Auchencorth Moss which provides a simple open foreground and strong contrast with the Pentland Hills, accentuating their apparent height and drama in key views from the east"*[101]. The Scottish Borders statement notes that a key force of change is the *"potential loss of wildness character"*[102] which may occur from the introduction of wind farm development, and the Midlothian statement requires consideration of *"impacts on the sense of wildness experienced… and potential*

98 Scottish Borders Council (2012) Supplementary Planning Guidance Local Landscape Designations [Online] Available at: https://www.scotborders.gov.uk/download/downloads/id/1124/local_landscape_designations.pdf (Accessed 29/03/2021) (pg. 35)
99 Midlothian Council (2017) Supplementary Guidance – Special Landscape Areas [Online] Available at: https://www.midlothian.gov.uk/downloads/file/3204/statement_of_importance_pentland_hills_sla (Accessed 29/03/2021) (pg. 1)
100 Midlothian Council (2017) Supplementary Guidance – Special Landscape Areas [Online] Available at: https://www.midlothian.gov.uk/downloads/file/3204/statement_of_importance_pentland_hills_sla (Accessed 29/03/2021) (pg. 2)
101 Ibid.
102 Scottish Borders Council (2012) Supplementary Planning Guidance Local Landscape Designations [Online] Available at: https://www.scotborders.gov.uk/download/downloads/id/1124/local_landscape_designations.pdf (Accessed 29/03/2021) (pg. 35)

Pentland Hills SLA
for significant intrusion on key views to and from the hills", and *"any change that may occur to the simple and largely uncluttered character of Auchencorth Moss which may diminish its scenic juxtaposition with the Pentland Hills and intrude on key views."*[103]
Potential for the Development to affect the Special Qualities of the SLA The Development is not located within the SLA, therefore potential effects will be indirect. The ZTV on Figure 5.1.7 indicates theoretical visibility across the SLA within Scottish Borders and Midlothian but limited theoretical visibility from West Lothian. Figure 5.1.5 indicates theoretical visibility across the LCTs within the SLA which include the following: • Dissected Plateau Moorland (LCT 90): extensive theoretical visibility across the areas of this LCT within the SLA. Visibility is indicated from Site-facing slopes and summits of hills within the Pentlands; • Rolling Farmland – Borders (LCT 99): extensive theoretical visibility from the lower Site-facing slopes of the Pentlands; • Upland Hills – Lothians (LCT 268): extensive theoretical visibility across the areas of this LCT within the SLA. Visibility is indicated from Site-facing slopes of hills within the Pentlands; • Upland Fringes – Lothians (LCT 269): extensive theoretical visibility across Auchencorth Moss, within 10 km and within the SLA; and • Lowland River Valleys – Lothians (LCT 270): some theoretical visibility from sections of this LCT within the SLA, at distances of over 10 km, however actual visibility will be largely screened by mature vegetation. The assessment of effects on landscape character identified significant effects on the key characteristics of the Dissected Plateau Moorland (LCT 90), Rolling Farmland – Borders (LCT 99) and Upland Fringes – Lothians (LCT 269), with the remaining LCTs identified as having not significant effects. Assessment viewpoints located within the SLA include: • VP 12: A702, approach to West Linton, represents easterly views experienced by road receptors travelling southbound along the A702, and for which a **low** magnitude of change was identified; and • VP 22: Carnethy Hill, represents southerly views experienced by recreational receptors at the popular hill summit, and for which a **low** magnitude of change was identified. The introduction of the Development has the potential to affect some of the special qualities of the SLA, notably the *"distinct sense of wildness".* Furthermore, the introduction of wind turbines in views towards Auchencorth Moss may intrude on and affect the *"simple and uncluttered views"* and diminish its juxtaposition with the contrasting Pentland Hills. Additionally, the Development will be a noticeable feature in views to and from the Pentland Hills. In terms of effects on the perceptual special qualities and views throughout the designated landscape, operational wind farms are present in the surrounding landscape, particularly to the west of the SLA where there are clusters of wind farms including Pearie Law, Harburnhead, Black Law and its extensions, Pates Hill, Tormywheel and the schemes at Muirhall. Furthermore, the operational turbines of Bowbeat and Carcant are visible in the distance to the south-east, with Glenkerie to the south. The Development will introduce further turbines in views to the south and south-east, and will result in some limited effects on the *"sense of wildness"* and *"key views"* from the hills experienced from some parts of the SLA. There will be no direct effects on key landscape features within the SLA, and given that existing wind farms are present in views from the SLA, notably to its west and some in closer proximity than the Development, the overall effects on the Pentland Hills SLA is considered to be **not significant (minor).** It is considered that the Development will not significantly affect the integrity of the SLA by adversely impacting on the qualities for which it was designated.

[103] Midlothian Council (2017) Supplementary Guidance – Special Landscape Areas [Online] Available at: https://www.midlothian.gov.uk/downloads/file/3204/statement_of_importance_pentland_hills_sla (Accessed 29/03/2021) (pg. 4)

Pentland Hills SLA
Potential for Cumulative Effects Although there are a number of consented domestic scale turbines within the SLA, there are no commercial scale wind farms. Due to the largely elevated nature of the SLA, the Development will be seen in successive views with the consented Glenkerie Extension in the south-west of the Study Area and the consented Camilty scheme to the west of the Pentland Hill ridge, although these wind farms will extend existing wind farm clusters. The Development will appear of a similar scale and distance to that of Camilty when seen from the hill tops within the SLA. Unlike Glenkerie Extension and Camilty, which will appear to form part of a cluster with other wind farm, the Development will appear as an isolated group of turbines. Given the intervening distance between the Development and both consented wind farms and that they will appear to extend existing wind farm groups, it is considered that overall there will be a **small-scale** change experienced at localised areas within the SLA. As such, the cumulative magnitude of change will be **low** and the additional and total cumulative visual effect will be **not significant (minor)** across the majority of the SLA. The Development will not significantly affect the integrity of the SLA when considered in this cumulative scenario. As such, it is considered that the Development **will not significantly affect the integrity of the SLA by adversely impacting on the qualities for which it was designated.**

Table 5.70:Operational Effects on the Pentland Hills and Black Mount SLA

Pentland Hills and Black Mount SLA
Location and baseline description The Pentland Hills and Black Mount SLA is within South Lanarkshire, covering the most south-westerly extents of the Pentland Hills. The Site is located approximately 8 km to the east of the SLA. The SLA comprises high rolling moorland which drops steeply to more sheltered valleys and farmland. The SLA includes a number of locally important hills, including Dunsyre Hill and Black Mount (516m AOD). The designation statement for the SLA notes that "much of the landscape remains unfarmed with expanses of heather and peat moorland" which creates a "sense of wildness"[104]. A key consideration identified within the SLA statement is to "conserve the sense of wildness" by "discouraging the development of large scale wind energy developments"[105].
Potential for the Development to affect the Special Qualities of the SLA The Development is not located within the SLA, therefore potential effects will be indirect. The ZTV on Figure 5.1.7 indicates theoretical visibility across the SLA. Figure 5.1.5 indicates theoretical visibility across the LCTs within the SLA which include the following: • Undulating Farmland and Hills (LCT 210): some theoretical visibility from the areas of this LCT within the SLA, including the summit of Black Mount; • Plateau Farmland – Glasgow Clyde Valley (LCT 201): limited theoretical visibility is indicated from the areas of this LCT within the SLA. Visibility is likely to be further reduced by the presence of intervening vegetation; and • Moorland Hills – Glasgow Clyde Valley (LCT 212): some theoretical visibility indicated on Site-facing slopes, at distances of over 10 km. The assessment of effects on landscape character identified no significant effects on the key characteristics of these LCTs. Assessment viewpoints located within the SLA include:

[104] Ironside Farrar (2010) South Lanarkshire Validating Local Landscape Designations [Online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/factsheet/2018/06/south-lanarkshire-council-planning-authority-core-documents/documents/renewable-energy/landscape-designations-report/landscape-designations-report/govscot%3Adocument/SLC_Landscape_Designations_Report_-_Nov_2010.pdf (Accessed 29/03/2021)
[105] Ibid.

Pentland Hills and Black Mount SLA
• VP 18: A702, Dolphinton, represents easterly views experienced by road users and residents at Dolphinton on the edge of the SLA, for which a **low** magnitude of change was identified; and • VP 24: Bleak Law, represents easterly views experienced by recreational receptors at the hill summit, and for which a **low** magnitude of change was identified. The introduction of the Development has the potential to compromise some of the special qualities of the SLA, notably the *"sense of wildness".* However, views of the Development will be limited to elevated, Site-facing slopes and summits, from which existing wind farms are already visible, including Muirhall Wind Farm along the western boundary of the SLA. Bowbeat Wind Farm is also visible in the same direction as the Site to the east, albeit that the Development will be closer. The ZTVs in Figure 5.1.7 indicate limited visibility in the most westerly half of the SLA, with visibility limited largely limited due to intervening landform including Mid Hill, Bleak Law and Darlees Rig. There will be no direct effects on key landscape features within the SLA, and given that existing wind farms are present in views from the SLA, some in closer proximity than the Development, the overall effects on the Pentland Hills and Black Mount SLA is considered to be **not significant (minor)**. It is considered that the Development will not significantly affect the integrity of the SLA by adversely impacting on the qualities for which it was designated.
Potential for Cumulative Effects There are no consented proposals within the SLA. Due to the largely elevated nature of the SLA, the Development will be seen in successive views with the consented Glenkerie Extension in the south-west of the Study Area and the blades of Camilty Wind Farm in the north-west of the Study Area, although these wind farms will extend existing wind farm clusters. Due to the closer proximity of the Development and the elevated nature of views towards the Site, the Development will appear more prominent than the consented wind farms. Given the intervening distance between the Development and both consented wind farms and considering the limited visibility of these consented wind farms, it is considered that overall, there will be a **small-scale** change experienced at localised areas within the SLA. As such, the cumulative magnitude of change will be **low** and the additional and total cumulative visual effect will be **not significant (minor)** across the majority of the SLA. The Development will not significantly affect the integrity of the SLA when considered in this cumulative scenario. As such, it is considered that the Development **will not significantly affect the integrity of the SLA by adversely impacting on the qualities for which it was designated.**

5.10 MITIGATION AND RESIDUAL EFFECTS

Measures to reduce effects upon the landscape resource and visual amenity were predominantly achieved through the design of the wind farm. The appearance of the Development in views from the Upper Tweeddale NSA, formed a key consideration in the design development.

Measures to reduce cumulative landscape and visual effects have been embedded into the design of the wind farm and the Site restoration proposals. All residual effects are therefore as predicted in the assessment sections above.

5.11 SUMMARY OF EFFECTS

Table 5.71 provides a summary of the effects detailed within this chapter.

Table 5.71: Summary of Effects

Receptor	Sensitivity of Receptor	Magnitude of Change	Residual Effect	Cumulative Effect
Construction Effects				
The Site	Medium	High	Significant (major)	Not significant
Operational Effects on Landscape Character				
The Site	Medium	High	Significant (major)	Not significant
LCT 92: Plateau Outliers	Medium	High	Significant (major)	Not significant
LCT 90: Dissected Plateau Moorland	Medium	Medium	**Significant (moderate)** within the Moorfoot unit up to 7 km, reducing to Not significant (minor) in the Pentland Hills unit and Not significant (negligible) elsewhere.	Not significant
LCT 93: Southern Uplands with Scattered Forest – Scottish Borders	Medium	Low	Not significant (minor)	Not significant
LCT 95: Southern Uplands - Borders	High	Low	Not significant (minor)	Not significant
LCT 99: Rolling Farmland - Borders	Medium	Medium	Significant (moderate)	Not significant
LCT 102: Upland Fringe with Prominent Hills	Medium	Low	Not significant (minor)	Not significant
CT 104: Upland Fringe Rough Grassland	Medium	Medium	Significant (moderate)	Not significant
LCT 113: Upland Valley with Pastoral Floor	High	Low	Not significant (minor)	Not significant
LCT 114: Pastoral Upland Valley	Medium	High	**Significant (moderate)** in Eddleston unit, but no effect in other units	Not significant

Receptor	Sensitivity of Receptor	Magnitude of Change	Residual Effect	Cumulative Effect
LCT 116: Upland Valley with Woodland	High	Low	Not significant (minor) to the north of Peebles, reducing to Not significant (negligible) elsewhere.	Not significant
LCT 210: Undulating Farmland and Hills	Medium	Low	Not significant (minor)	Not significant
LCT 212: Moorland Hills – Glasgow & Clyde Valley	High	Low	Not significant (minor)	Not significant
LCT 266: Plateau Moorlands - Lothians	Medium	Low	Not significant (minor)	Not significant
LCT 268: Upland Hills - Lothians	High	Low	Not significant (minor)	Not significant
LCT 269: Upland Fringes - Lothians	Medium	Medium	Significant (moderate) within 5 -10 km of the Site, not significant (negligible) elsewhere	Not significant
LCT 270: Lowland River Valleys - Lothians	Medium	Low	Not significant (minor)	Not significant
Operational Effects on Views and Visual Amenity				
VP1: Cross Borders Drove Road (west)	High	High	Significant (major)	Not significant
VP2: Cross Borders Drove Road (east)	High	High	Significant (major)	Not significant
VP3: Old Post Road Core Path (east of Observatory)	Medium	High	Significant (major)	Not significant
VP4: Black Meldon	High	High	Significant (major)	Not significant
VP5: Meldon Valley	Medium-High	Low	Not significant (negligible)	Not significant
VP6: Core Path 154 near Eddleston	High	High	Significant (major)	Not significant
VP7: Minor Road near Spylaw and Wester Deans	Medium	High	Significant (moderate)	Not significant
VP8: B7059 between Boghouse/Kaimhouse	Low	Medium	Not significant (minor)	Not significant
VP9: Portmore House	High	Medium	Significant (moderate)	Not significant
VP10: A701 Mountain Cross	Medium	Low	Not significant (minor)	Not significant
VP11: A703 near Langside Farm (North of Peebles)	Medium	Low	Not significant (minor)	Not significant
VP12: A702, approach to West Linton	Medium	Low	Not significant (minor)	Not significant

Receptor	Sensitivity of Receptor	Magnitude of Change	Residual Effect	Cumulative Effect
VP13: A703 Lay-by	Low	Medium	Not significant (minor)	Not significant
VP14: B712 / Stobo Road	Medium	Low	Not significant (negligible)	Not significant
VP15: Path near Wester Happrew Burn	High	Low	Not significant (minor)	Not significant
VP16: Haswellskyes	Medium	Medium	Significant (moderate)	Not significant
VP17: Glentress Forest, Makeness Kipps	Medium	Medium	Significant (moderate)	Not significant
VP18: A702, Dolphinton	High	Low	Not significant (minor)	Not significant
VP19: Cademuir Hill Fort	High	Medium	Significant (moderate)	Not significant
VP20: Blackhope Scar	Medium	Low	Not significant (minor)	Not significant
VP21: Gladhouse Reservoir	High	Low	Not significant (minor)	Not significant
VP22: Carnethy Hill	High	Low	Not significant (minor)	Not significant
VP23: Stob Law	High	Low	Not significant (minor)	Not significant
VP24: Bleak Law	High	Low	Not significant (minor)	Not significant
VP25: Lee Pen	High	Low	Not significant (minor)	Not significant
VP26: B7007 (northern edge of Moorfoot Hills)	Medium	Low	Not significant (minor)	Not significant
Operational Effects on Settlements				
Eddleston	High	Medium	Significant (moderate)	Not significant
Romannobridge	High	Low	Not significant (minor)	Not significant
West Linton	High	Low	Not significant (minor)	Not significant
Dolphinton	High	Low	Not significant (minor)	Not significant
Peebles	High	Low	Not significant (minor)	Not significant
Operational Effects on Routes				
A701	Medium	Low between Mountain Cross and Leadburn, reducing to barely perceptible elsewhere.	Not significant (minor) between Mountain Cross and Leadburn, reducing to Not significant (negligible) elsewhere.	Not significant
A702	Medium	Low between Dolphinton and West Linton, reducing to barely	Not significant (minor) between Dolphinton and West Linton, reducing to Not significant (negligible) elsewhere.	Not significant

Receptor	Sensitivity of Receptor	Magnitude of Change	Residual Effect	Cumulative Effect
		perceptible elsewhere.		
A703	Medium	Medium	**Significant (moderate)**, reducing to Not significant (negligible) further north.	Not significant
B7059	Low	Medium in the eastern extents, and low elsewhere	Not significant (minor) in the eastern extents, Not significant (negligible) elsewhere.	Not significant
B712	Medium	Low	Not significant (negligible) closer to the Site, and no effect elsewhere.	Not significant
Meldons Road	Medium	Medium	**Significant (moderate)**, reducing to no effect within the Upper Tweeddale NSA.	Not significant
Cross Borders Drove Road	High	High in proximity to the Site, reducing to low elsewhere	**Significant (major)** within 4 km of the Site, reducing to Not significant (minor) between 4-15 km and no effect elsewhere.	Not significant
John Buchan Way	High	Medium	**Significant (moderate)** to the south of the Site between 8-10 km, reducing to no effect elsewhere.	Not significant
Operational Effects on Designated Landscapes				
Upper Tweeddale NSA	N/a	-	The special quality which describes "*expansive, open hills with panoramic views*"[106] will be affected by the Development. A **significant (moderate)** level of effect is recorded for this special quality, with other special qualities experiencing effects which are Not Significant. It is not considered that the Development will significantly affect the integrity of the NSA	Not significant (minor)

[106] SNH (2010) The special qualities of the National Scenic Areas. Commissioned Report No. 374 [Online] Available at: https://www.nature.scot/naturescot-commissioned-report-374-special-qualities-national-scenic-areas (Accessed 29/03/2021) (pg. 54)

Receptor	Sensitivity of Receptor	Magnitude of Change	Residual Effect	Cumulative Effect
			given the broad context of the elevated views, but the adverse impact on one special quality is noted.	
Tweed Valley SLA	N/a	-	Significant (major) in the Meldon area, reducing to Not significant (minor) elsewhere.	Not significant - Will not compromise reasons for designation
Tweedsmuir Uplands SLA	N/a	-	Not significant (minor)	Not significant - Will not compromise reasons for designation
Gladhouse Reservoir and Moorfoot Scarp SLA	N/a	-	Not significant (minor)	Not significant - Will not compromise reasons for designation
Pentland Hills SLA	N/a	-	Not significant (minor)	Not significant - Will not compromise reasons for designation
Pentland Hills and Black Mount SLA	N/a	-	Not significant (minor).	Not significant - Will not compromise reasons for designation

5.12 STATEMENT OF SIGNIFICANCE

5.12.1 Primary Landscape and Visual Assessment

Landscape Effects

The Development will introduce wind turbines into the Plateau Outliers LCT, a large-scale undulating landscape of moorland and coniferous forest. There are no operational wind turbines within this LCT, however the landscape is influenced by human development including wind farms outside of the LCT, forestry and development in neighbouring valleys. Overall sensitivity of the Plateau Outliers is considered to be medium.

Significant effects are predicted on the landscape resource of the Site itself (Major) during construction and operation. Significant effects on landscape character are predicted for the Plateau Outliers (host LCT), Dissected Plateau Moorland, Rolling Farmland – Borders, Upland Fringe Rough Grassland and Pastoral Upland Valley LCTs. Although existing wind farms (notably Bowbeat to the east of the Site) have influenced the character of some of these LCTs, the Development will extend this influence within the following area: northwards to Auchencorth Moss; eastwards across the Eddleston Valley as far as the summit of Dundreich; southwards as far as the summits of Black Meldon and White

Meldon; and westwards to Whiteside Hill, Hag Law and Wether Law. A significant effect on landscape character will be experienced within this area.

The Site is not within a designated landscape but is in proximity to several including the Upper Tweeddale NSA and Tweed Valley SLA to the south. Although significant effects on landscape character will be experienced from the fringes of these designated areas, the overall integrity and reasons for their designation are not anticipated to be affected.

Visual Effects

Significant effects on views are predicted at 10 of the 26 representative viewpoints, all of which are located within 10 km of the Development. Major effects are predicted from Viewpoint 1: Cross Borders Drove Road (West) and Viewpoint 2: Cross Borders Drove Road (East), which are both locations on the long-distance route, immediately west and east of the Site, respectively, where close views of the Development can be experienced. Major effects are also predicted from Viewpoint 3: Old Post Road Core Path (east of Observatory), from a view which is representative of residents and walkers. In addition, major effects are predicted from Viewpoint 4: Black Meldon and Viewpoint 6: Core Path 154 near Eddleston which both represent views experienced by recreational receptors to the south and east of the Site, respectively.

Significant (moderate) effects are predicted from: Viewpoint 7 Minor Road near Spylaw and Wester Deans; Viewpoint 9 Portmore House; Viewpoint 14 Haswellsykes; Viewpoint 17 Glentress Forest, Makeness Kipps; and Viewpoint 19: Cademuir Hill Fort.

In terms of settlements, significant effects are identified at Eddleston, where properties in the more elevated eastern areas would have views of the turbines across the Eddleston Valley. No significant effects were identified at Romannobridge, West Linton, Dolphinton or Peebles.

Significant effects will be experienced from localised sections of the A703, Meldons Road and the John Buchan Way. A significant (major) effect will be experienced from localised sections of the Cross Borders Drove Road which passes through the Site.

All these significant visual effects will be experienced within 10 km of the Site. From some receptors the Development will be seen in successive views with Bowbeat Wind Farm in the Moorfoot Hills to the east of the Site.

5.12.2 Cumulative Landscape and Visual Assessment

Operational wind farms and those under construction are included as part of the baseline for the LVIA and considered as part of the primary LVIA assessment. Scenario 1 of the CLVIA considers the addition of the Development to a landscape with operational, under construction and consented wind farms.

The CLVIA focused on consented wind farms within 20 km of the Development, of which there are two: Glenkerie Extension, a 6-turbine scheme (100 m to tip) located approximately 21 km to the south-west of the Development, alongside the operational Glenkerie Wind Farm; and Camilty, a 6-turbine scheme (149.9 m to tip) located approximately 17.5 km to the north-west.

Glenkerie Extension will be perceived to extend the influence of an existing wind farm across a small part of the Southern Uplands. Camilty will be perceived to extend the influence of other wind farms, notably Harburnhead and Pearie Law, across the upland fringes between the Pentland Hills and settled West Lothian lowlands. Given this, as well as the distance between the Development and both of these cumulative schemes, no significant cumulative landscape or visual effects have been identified.

5.13 GLOSSARY

Table 5.72: Glossary

Acronym	Definition
AOD	Above Ordnance Datum
CLVIA	Cumulative Landscape and Visual Impact Assessment
CZTV	Cumulative Zone of Theoretical Visibility
EIA	Environmental Impact Assessment
GDL	Garden and Designed Landscape
GLVIA3	Guidelines for Landscape and Visual Impact Assessment Third Edition
LCA	Landscape Character Assessment
LCT	Landscape Character Type
LVIA	Landscape and Visual Impact Assessment
NCN	National Cycle Network
NSA	National Scenic Area
SLA	Special Landscape Area
SNH	Scottish Natural Heritage (now NatureScot)
WLA	Wild Land Area
ZTV	Zone of Theoretical Visibility

CLOICH FOREST WIND FARM

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Chapter 6

Archaeology and Cultural Heritage

ARCUS

6 ARCHAEOLOGY AND CULTURAL HERITAGE

6.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the effects of the Cloich Forest Wind Farm ('the Development') on the archaeological and cultural heritage resource.
2. This assessment was undertaken by Arcus Consultancy Services Limited (Arcus).
3. This Chapter of the EIA Report is supported by the following figures and wirelines provided in Volume 2a: Figures excluding LVIA:
    - Figure 6.1: Core Study Area with Site Infrastructure;
    - Figure 6.2: Designated Heritage Assets 5 kilometres (km) with ZTV;
    - Figure 6.3: Designated Heritage Assets Beyond with ZTV; and
    - Figure 6.10: Cumulative Wind Farm Developments;
    - Figure 6.11: Wireline from SM2755 Whaup Law Cairn;
    - Figure 6.12: Wireline from SM3051 Woodhouse Hill Fort; and
    - Figure 6.13: Wireline from SM2738 Wether Law Cairn.
4. This Chapter of the EIA Report is also supported by the following visualisations in Volume 2c LVIA Visualisations:
    - Chapter 5: Landscape and Visual Impact Assessment (LVIA) Visualisations
        - Figure 5.2.1: LVIA VP 1: Cross Borders Drove Road (west) (representative of SM2734 Green Knowe);
        - Figure 5.2.4: LVIA VP 4: Black Meldon (SM2703);
        - Figure 5.2.5: LVIA VP 5: Meldon Valley (between SM2703 Black Meldon and SM114 White Meldon);
        - Figure 5.2.8: LVIA VP 8: B7059 between Boghouse and Kaimeshouse (representative of Category A Listed Spitalhaugh House LB3861)
        - Figure 5.2.9: LVIA VP 9: Portmore House (Garden and Designed Landscape); and
        - Figure 5.2.19: LVIA VP 19: Cademuir Hill Fort (SM2441).
    - Chapter 6: Archaeology and Cultural Heritage Visualisations
        - Figure 6.4: Heritage VP 1: Milkieston Ring Forts (SM2416);
        - Figure 6.5: Heritage VP 2: White Meldon (SM114);
        - Figure 6.6: Heritage VP 3: Easter Dawyck Fort and Settlement (SM3049);
        - Figure 6.7: Heritage VP 4: Whiteside Hill Fort (SM2955);
        - Figure 6.8: Heritage VP 5: MacBeth's Castle (Wood Hill Fort, SM3056); and
        - Figure 6.9: Heritage VP 6: Camp Hill Fort (SM1163).
5. This Chapter of the EIA Report is also supported by the following Technical Appendix documents provided in Volume 3 Technical Appendices:
    - A6.1: Desk-Based Assessment (DBA);
    - A6.2: Pre-Application Consultation and Responses; and
    - A6.3: Setting Assessment.
6. This Chapter includes the following elements:
    - Legislation, Policy and Guidance;
    - Assessment Methodology and Significance Criteria;
    - Baseline Conditions;
    - Assessment of Potential Effects;
    - Mitigation and Residual Effects;

- Summary of Effects; and
- Statement of Significance.

6.2 LEGISLATION, POLICY AND GUIDANCE

7. A detailed review of the relevant heritage legislation and guidance is provided within the DBA in Appendix A6.1. A summary of the relevant legislation and guidance used within the EIA Report is provided below. Further details of energy and planning policy is found in the Planning Statement that accompanies the application.

6.2.1 Legislation

8. Heritage legislation of relevance includes:

- The Historic Environment Scotland Act 2014[1];
- The Ancient Monuments and Archaeological Areas Act 1979[2] as amended;
- The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997[3] as amended; and
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended)[4] ('the EIA Regulations').

6.2.2 Policy and Guidance

9. In addition to the aforementioned legislation, the following is a summary of the key heritage policy and guidance that informed the assessment:

- Scotland's Third National Planning Framework (NPF3)[5];
- Scottish Planning Policy (2014)[6]: Valuing the Historic Environment, Paragraphs 135-151;
- EIA Handbook[7];
- Historic Environment Policy for Scotland (HEPS)[8];
- Our Place in Time: The Historic Environment Strategy for Scotland[9];
- The Highland-Wide Local Development Plan 2012, Policy 57: Natural, Built and Cultural Heritage[10];

[1] Scottish Government (2014) The Historic Environment Scotland Act [Online] Available at https://www.legislation.gov.uk/asp/2014/19/pdfs/asp_20140019_en.pdf (Accessed 26/01/2021)
[2] UK Government (1979) The Ancient Monuments and Archaeological Areas Act [Online] Available at: https://www.legislation.gov.uk/ukpga/1979/46 (Accessed 26/01/2021)
[3] Scottish Government (1997) The Planning (Listed Buildings and Conservation Areas) (Scotland) Act [Online] Available at: https://www.legislation.gov.uk/ukpga/1997/9/contents (Accessed 26/01/2021)
[4] The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 http://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 26/01/2021)
[5] Scottish Government (2014) National Planning Framework 3. Available at https://www.gov.scot/publications/national-planning-framework-3/ (Accessed 26/01/2021)
[6] Scottish Government (2014) Scottish Planning Policy [Online] Available at https://www.gov.scot/publications/scottish-planning-policy/ (Accessed 26/01/2021)
[7] SNH and HES (May 2018). EIA Handbook. Available at https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=6ed33b65-9df1-4a2f-acbb-a8e800a592c0 (Accessed 26/01/2021)
[8] HES (2019) Scottish Environment Policy for Scotland [Online] Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=1bcfa7b1-28fb-4d4b-b1e6-aa2500f942e7 (Accessed 26/01/2021)
[9] Scottish Government (2014) Our Place in Time: The Historic Environment Strategy for Scotland [Online] Available at: https://www.gov.scot/publications/place-time-historic-environment-strategy-scotland/ (Accessed 26/01/2021)
[10] The Highland Council (2012) Highland-Wide Local Development Plan [Online] Available at https://www.highland.gov.uk/info/178/local_and_statutory_development_plans/199/highland-wide_local_development_plan (Accessed 26/01/2021)

- Planning Advice Note (PAN) PAN 2/2011: Planning and Archaeology[11];
- CIfA Standards and Guidance for Desk-Based Assessments[12]; and
- HES (2016) Managing Change in the Historic Environment Series, specifically 'Managing Change in the Historic Environment: Setting'[13].

6.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

6.3.1 Scoping Responses and Consultations

10. Consultation for this EIA Report topic was undertaken with the organisations shown in Table 6.1.

Table 6.1 Consultation Responses

Consultee	Summary of Consultation Response	Response to Consultee
Historic Environment Scotland (HES) Scoping Response 1st November 2019	HES were broadly content with the scope of assessment and recommended that where assets are outside the ZTV consideration should still be given on views of these assets where they make a contribution to cultural significance. HES also recommended that the 10 km search area should be agreed with other relevant consultees.	Further consultation was undertaken on 11th February 2021 (Appendix A6.2) to agree the final selection of heritage assets for inclusion in the EIA Report which was based on the ZTV and a sieving exercise to identify heritage assets likely to receive a change in setting that affects cultural significance.
	HES identified the scheduled hillforts of Black and White Meldon as being particularly sensitive to the Development as well as the scheduled monument Cademuir Hill and the Category A Portmore House and its Inventory Garden and Designed Landscape. HES recommended that further visualisations be provided in the cultural heritage assessment, particularly for those identified above. Draft wirelines would allow HES to provide further advice on the level of impact and identify whether or not photomontages are required.	Shortly after issuing this consultation, there was a change in design and an updated ZTV figure was issued to HES. A response was received on 1/3/2021 where HES requested inclusion of scheduled forts on the south of the Tweed along the hills between Stobo and Cademuir including Cademuir Hill fort (SM2715), Easter Dawyck Fort and settlement (SM2950), Woodhouse Hill fort (SM3051), Kerr's Knowe fort (SM3059) and Syke Hill fort (SM3068) with a focus upon intervisibility of these forts with turbines behind the Meldons. Consideration has been given to these forts in Appendix A6.3. As requested by consultees, photomontages have been provided in Volume 2c for the following heritage assets: • Figure 5.2.4: Black Meldon; • Figure 5.2.5: Meldon Valley; • Figure 5.2.9: Portmore House;

[11] The Scottish Government (2011) Planning Advice Note 2/2011 [Online] Available at https://www.gov.scot/publications/pan-2-2011-planning-archaeology/ (Accessed 26/01/2021)
[12] Chartered Institute for Archaeologists (2017) Standard and Guidance for Historic Environment Desk-Based Assessment, Published December 2014, Updated January 2017 [Online], updated October 2020 [Online]. Available at: http://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_4.pdf (Accessed 26/01/2021)
[13] HES (2016, updated February 2020) Managing Change in the Historic Environment: Setting [Online] Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=80b7c0a0-584b-4625-b1fd-a60b009c2549 (Accessed 26/01/2021)

Consultee	Summary of Consultation Response	Response to Consultee
		• Figure 5.2.19: Cademuir Hill Fort; • Figure 6.4: Milkieston Ring Forts (SM2416); • Figure 6.5: White Meldon (SM114); • Figure 6.6: Easter Dawyck Fort and Settlement (SM3049); • Figure 6.7: Whiteside Hill Fort (SM2955); • Figure 6.8: MacBeth's Castle (Wood Hill Fort SM3056); and • Figure 6.9: Cam Hill Fort (SM1163).
Scottish Borders Council ('the Council') Scoping Response 15th November 2019	The Council archaeologist has requested that a viewpoint from Macbeth's Castle, in the Manor Valley, as the forts, castles, and later settlement/landscape features in the Manor, Meldon, and Tweed valleys all form part of the same historic landscape where setting impacts are predicted. They have also requested that LiDAR data is assessed as part of the EIA for the purpose of identifying unknown archaeological features.	An assessment of available LiDAR data is contained within the corresponding DBA within Technical Appendix A6.1. The viewpoint from Macbeth's Castle in the Manor Valley has been included in Figure 6.8. Further consultation was undertaken on 11th February 2021 (Appendix A6.2) to agree the final selection of heritage assets for inclusion in the EIA Report which was based on the ZTV and a sieving exercise to identify heritage assets likely to receive a change in setting that affects cultural significance. Shortly after issuing this consultation, there was a change in design and an updated ZTV figure was issued. On 22nd February 2021 a comparative figure showing the consented layout and the gatecheck layout was sent to the Council Archaeologist at his request, no further response was received.

6.3.2 Scope of Assessment

11. The assessment of potential cultural heritage effects relating to the Development is focused upon direct effects and changes to setting (indirect) effects.

12. A direct effect is an effect upon features of cultural heritage interest, where sites or potential sites / buried archaeology are in danger of being disturbed or destroyed. Physical effects are likely to occur during the construction and are permanent and irreversible.

13. An indirect effect is any change to the setting of a heritage asset that affects its cultural significance or the way in which it is valued by both specialists and the wider public.

14. The potential effects from the Development to cultural heritage assets are:
    - Permanent direct effects due to land take by wind farm infrastructure;
    - Temporary indirect effects arising from the construction phase, such as noise and higher vehicular and pedestrian activity, which may cause reduced access to and / or reduced appreciation of the historical environment; and
    - Indirect effects, including changes to the settings of cultural heritage assets, which may affect cultural significance. These are largely visual effects and are likely to occur as a consequence of the height and breadth of the Development. They are especially likely to occur on cultural heritage assets located on high ground where their historical significance lies in the wider landscape setting including long-distance views to and from the asset.
15. As part of the scoping exercise, several heritage specific viewpoints were selected in consultation with HES and Scottish Borders Council Archaeologist to represent heritage assets that were identified as being the most likely to receive a change in setting that affects cultural significance. These include:
    - Figure 5.2.1: LVIA VP 1: Cross Borders Drove Road (west)
      (representative of SM2734 Green Knowe);
    - Figure 5.2.4: LVIA VP 4: Black Meldon (SM2703);
    - Figure 5.2.5: LVIA VP 5: Meldon Valley
      (between SM2703 Black Meldon and SM114 White Meldon as requested by HES);
    - Figure 5.2.8: LVIA VP 8: B7059 between Boghouse and Kaimeshouse
      (representative of Category A Listed Spitalhaugh House LB3861)
    - Figure 5.2.9: LVIA VP 9: Portmore House (Garden and Designed Landscape); and
    - Figure 5.2.19: LVIA VP 19: Cademuir Hill Fort (SM2441).
    - Figure 6.4: Heritage VP 1: Milkieston Ring Forts (SM2416);
    - Figure 6.5: Heritage VP 2: White Meldon (SM114);
    - Figure 6.6: Heritage VP 3: Easter Dawyck Fort and Settlement (SM3049);
    - Figure 6.7: Heritage VP 4: Whiteside Hill Fort (SM2955);
    - Figure 6.8: Heritage VP 5: MacBeth's Castle (Wood Hill Fort, SM3056); and
    - Figure 6.9: Heritage VP 6: Camp Hill Fort (SM1163).
16. Additionally, significant effects were identified at three other locations and wirelines have been provided for the following:
    - Figure 6.11: SM2755 Whaup Law Cairn as located with forestry with views currently obstructed by trees;
    - Figure 6.12: SM3051 Woodhouse Hill Fort; and
    - Figure 6.13: SM2738 Wether Law Cairn.

6.3.2.1 Elements Scoped Out of Assessment

17. All undesignated heritage assets were scoped out of the indirect effect assessment as part of the scoping exercise (Technical Appendix A4.1).
18. All designated assets within a 5 km radius of the Site are to be assessed for indirect effects regardless of whether they fall within the Zone of Theoretical Visibility (ZTV). For the heritage assets between 5 and 15 km, a sieving exercise was undertaken to determine those heritage assets for which their cultural significance relies on long distance views and distant landscape context, and as such, may receive a change in setting as a result of the Development. Consultation (as detailed in Section 6.3.1 and in Appendix A6.2) was undertaken to agree the heritage assets selected for inclusion with the final selection of heritage assets considered detailed in Appendix A6.3.

6.3.2.2 Cumulative Effects

19. A cumulative effect is considered to be an additional effect upon cultural significance arising from the Development in combination with other consented or proposed developments likely to affect the cultural heritage environment. Existing operational wind farms and those under construction as detailed in Table 5.7 within **Chapter 5: Landscape and Visual Impact Assessment** have been considered as part of the baseline.

20. Cumulative effects in relation to turbines under 50 m to blade tip height, single turbines beyond 5 km from the outermost wind turbines of the Development and schemes at Scoping stage are excluded from the assessment as detailed in Section 5.7.2 of **Chapter 5: Landscape and Visual Impact Assessment** of this EIA Report.

21. For the purposes of the assessment of cumulative effects assessment, only wind farm developments (in planning or consented) within a 15 km Study Area are considered for the potential to create a significant effect. At the time of writing, there were no in-planning or consented wind farms within the 15 km Study Area with the closest being Camilty Wind Farm approximately 18 km north-west on the other side of the Pentland Hills and Glenkerie Extension 20 km to the south-west. A review of the Zone of Theoretical Visibility (ZTs) (Figure 6.10) for these three developments indicates that there are limited areas where wind turbines would be simultaneous visible. Camilty's location on the western side of the Pentland Hills means it has little to no visibility on the eastern side of the hills beyond the Pentland summits towards Eddleston Valley, so no compound effects upon heritage assets are likely. For Glenkerie, there is some limited combined visibility with the Development along the eastern margins of the Eddleston Valley and western margins of the Lyne Water Valley but this would be in the context of the operational Glenkerie scheme with significant compound effects unlikely. As such, cumulative effects upon heritage assets are not considered further within this EIA Report.

6.3.3 Study Area / Survey Area

22. To inform the assessment, Study Areas were defined based upon the likelihood of potential significant effects upon archaeology and cultural heritage, as summarised in Table 6.2.

Table 6.2: Study Areas

Effect	Name	Range	Description
Direct (Known Archaeology)	Core Study Area (CSA)	The Site Boundary	Area within which the Development may have direct effects upon known and unknown archaeological remains. Further details are provided in the DBA in Appendix A6.1.
Direct (Informing Archaeological Potential)	1 km Study Area	1 km radius surrounding the CSA	Area used to ensure a full understanding of the archaeological potential for unknown subsurface archaeology to survive within the CSA. Further details are provided in the DBA in Appendix A6.1.
Indirect	5 km Study Area	5 km radius from CSA	Area that has the highest potential for the Development to cause changes to setting that affect cultural significance. All heritage assets within 5 km are included in the assessment regardless of whether they fall within the ZTV.

Effect	Name	Range	Description
Indirect	Beyond 5 km Study Area	Beyond 5 km surrounding the CSA.	With distance, the potential for changes to setting that affect the cultural significance generally lessens. The selection of heritage assets is based on the location within the ZTV or where long-distance views and distant landscape context contribute to their cultural significance. The final selection of designated heritage assets assessed for changes to setting is detailed in Appendix A6.3.

6.3.4 Design Parameters

23. The parameters of the design that will influence the archaeological and cultural heritage assessment in relation to physical effects has been based on the turbine layout and associated infrastructure as shown in Figure 6.1. No additional design parameters, other than those set out in **Chapter 2: Site Selection & Design** of this EIA Report, are required for the assessment presented in this Chapter.

24. As set out in **Chapter 2: Site Selection & Design**, the turbines and associated infrastructure may be microsited up to 50 metres (m), where constraints allow. Such relocations have been considered when undertaking the assessment, with mitigation recommended, where appropriate.

6.3.5 Baseline Survey Methodology

25. An Archaeological Desk-Based Assessment (DBA) was undertaken reviewing available documentary, cartographic, and photographic evidence to establish the baseline of the Core Study Area as well as its archaeological potential in lines with best practice and guidance. The DBA is provided in Appendix A6.1.

26. A site visit was undertaken 16 May 2020 to identify and (where possible) record any previously unrecorded cultural heritage features within the CSA. A general walkover of the area around the Development infrastructure and known archaeological sites were conducted, with access limited by dense forestry with limited ingress as well as active felling operations. Full details are provided in the DBA within Appendix A6.1.

6.3.6 Methodology for the Assessment of Effects

27. The assessment of effects is based on the final design of the Development detailed in **Chapter 2: Site Selection & Design** of this EIA Report. The assessment considers the sensitivity of a cultural heritage feature and the magnitude of any potential change, to conclude whether the effect is significant. The assessment conclusions are informed by professional judgement.

6.3.6.1 Sensitivity

28. The value of a heritage asset reflects the relative importance of an asset as reflected in the designation process[14]. As a starting point, the value of the cultural heritage assets/receptors has been initially equated with designation status, as shown in Table 6.3.

[14] Historic Environment Scotland, 2019 Historic Environment Policy for Scotland (HEPS). Available at https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=1bcfa7b1-28fb-4d4b-b1e6-aa2500f942e7 (Accessed on 26/01/2021)

Table 6.3: Framework for Determining the Value (Sensitivity) of Heritage Assets as Equated with Designation Status

Sensitivity Receptor	**Definition**
High	Heritage Assets valued at an international or national level. These may include World Heritage Sites, Scheduled Monuments, Category A Listed Buildings, Registered Battlefields, Gardens and Designed Landscapes, historic marine protected areas and nationally important archaeological features and conservation areas (as defined in The Scottish Border Council's Historic Environment Record (HER).
Medium	Heritage Assets valued at a regional level. These may include Category B and some Category C Listed Buildings as well as regionally important archaeological features and conservation areas.
Low	Heritage assets valued at a local level. These may include Category C Listed Buildings, some conservation areas and undesignated assets of local value.
Negligible	Badly preserved and/or damaged or very common archaeological features and buildings of little or no value at local or any other scale.

29. The key aspects in defining the value and sensitivity of a heritage asset are how these, along with setting, contribute to the cultural significance of the heritage asset.

30. Cultural significance is the aesthetic, historic, scientific or social value for past, present or future generation which can be embodied in a place itself, its fabric, setting, use, associations, meanings, records, related places and related objects[15]. Cultural significance stems from an understanding of place. This involves 'physical and material elements – how much of it has survived or how much of it has changed through time, as well as its wider context and setting'[16].

31. Due to the unique qualities of each heritage asset, the sensitivity of a heritage asset's setting to change is variable and must be determined on a case-by-case basis for each receptor in lines with setting[17] and EIA[18] guidance as per the following methodology:

- Identification of heritage assets that might be affected by the Development to include a summary of their cultural significance;
- Definition of the setting of the heritage assets and how this contributes to its cultural significance to determine its sensitivity to change; and
- Assessment of the way in which the Development may change the setting and affect the cultural significance of the heritage asset (magnitude of change as discussed in Section 6.3.6.2).

[15] Australia ICOMOS Burra Charter 2013. Available at http://australia.icomos.org/wp-content/uploads/The-Burra-Charter-2013-Adopted-31.10.2013.pdf (Accessed on 26/01/2021)
[16] Historic Environment Scotland, 2019 Historic Environment Policy for Scotland (HEPS). Available at https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=1bcfa7b1-28fb-4d4b-b1e6-aa2500f942e7 (Accessed on 26/01/2021)
[17] Historic Environment Scotland, 2016 Updated 2020, Managing Change in the Historic Environment: Setting [Online] Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=80b7c0a0-584b-4625-b1fd-a60b009c2549 (Accessed on 26/01/2021)
[18] SNH and HES (May 2018). EIA Handbook. Available at https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=6ed33b65-9df1-4a2f-acbb-a8e800a592c0 (Accessed 26/01/2021)

6.3.6.2 Magnitude of Change

32. Magnitude is the measure of change to a heritage asset's cultural significance as a result of the Development. In relation to cultural heritage, these changes are generally negative and are classified, for both direct and indirect effects, as detailed in Table 6.4.

Table 6.4: Framework for Determining Magnitude of Change

Level of Magnitude	Description
Substantial	Changes to the fabric or setting of a heritage asset resulting in the complete or near complete loss of its cultural significance, such that it may no longer be considered a heritage asset. Substantial changes to the understanding, appreciation or experience of the heritage asset.
Moderate	Changes to the elements of the fabric or setting of the heritage asset that contribute to its cultural significance such that this is substantially altered. Appreciable changes to the understanding, appreciation or experience of the heritage asset.
Slight	Changes to the elements of the fabric or setting of the heritage asset that contribute to its cultural significance such that this is slightly altered. Slight changes to the understanding, appreciation or experience of the heritage asset.
Negligible / None	Changes to fabric or setting that leave significance unchanged or do not affect the understanding, appreciation or experience of the heritage asset.

33. For purposes of assessing indirect effects resulting from a change to setting, distance to the Development is considered the initial determinant in the degree of magnitude of any change that might be caused. Simple intervisibility with the Development is not necessarily considered to be harmful, unless this affects the cultural significance of the heritage asset so as to diminish its understanding, appreciation or experience. Where considered appropriate, consideration has been given to the effect that the Development will have on the settings of historical assets in views towards and across the asset when moving through the landscape, as well as in views towards the Development from the asset.

6.3.6.3 Significance of Effect

34. The significance of the potential effect is broadly determined by correlating the sensitivity of the asset against the magnitude of the expected change to cultural significance as detailed in Table 6.5, with the final statement on the significance of effect informed by professional judgement.

35. Effects that are major or moderate are considered significant, in terms of the EIA Regulations. Where a range of effect is predicted (i.e. Major/Moderate, Moderate/Minor, or Minor/Negligible), both professional judgement as well as consideration of cultural significance and the range of factors that could affect cultural significance, as detailed in the previous sections, are used to inform the final evaluation of the significance of effect.

Table 6.5 Framework for Assessment of the Significance of Effects

Magnitude of Change	Sensitivity of Resource or Receptor			
	High	**Medium**	**Low**	**Negligible**
Substantial	Major	Major / Moderate	Moderate / Minor	Minor
Moderate	Major / Moderate	Moderate / Minor	Minor	Minor / Negligible
Slight	Moderate / Minor	Minor	Minor / Negligible	Negligible
Negligible	Minor / Negligible	Negligible	Negligible	Negligible

6.3.7 Assessment Limitations

36. The assessment has been aided by site walkovers and visits to heritage assets. No intrusive survey has been carried out.

6.3.8 Embedded Mitigation

37. The final layout of the Development as shown in Figure 6.1 has taken into account the consultation responses received from HES and has sought to minimise the impact of any potential setting effects on cultural heritage receptors.
38. Minimising and avoiding direct effects, setting effects and cumulative effects on archaeological features were important drivers of the design process, as requested by HES in their Consultation Reponses (Section 6.3.1). A key driver in the design process was maintaining views between Scheduled Monuments where this contributed to their setting as well as the potential impact on Portmore House (LB2037) and its associated Inventory Garden & Designed Landscape (GDL00318).
39. In addition, the design of the layout has sought to avoid archaeological sites recorded within the Site, where feasible, in order to avoid direct impacts upon known archaeological features and securing preservation *in situ*. Full details of the site evolution are provided in **Chapter 2: Site Selection and Design** of this EIA Report.

6.4 BASELINE CONDITIONS

6.4.1 Core Study Area and 1 km Study Area Baseline

40. Full detail of the baseline conditions can be found within the DBA in Appendix A6.1, which includes a brief description of the wider study area's archaeological and historical sites within the context of the area's background history, presented by period. A summary of the baseline conditions is provided in the following section.

41. The CSA comprises of the land within the Site Boundary, covering approximately 1,080 hectares (ha) and is located 5.5 km north-west of Peebles, as shown on Figure 6.1. The CSA comprises of commercial forestry in various states of felling and regrowth with a full description of the CSA is provided within the DBA in Appendix A6.1.

42. There are no World Heritage Sites, Listed Buildings, Inventory Battlefields or Garden and Designed Landscapes within the CSA. There are three prehistoric Scheduled Monuments recorded within the CSA as shown on Figure 6.1 and detailed in Table 6.6.

Table 6.6: Designated assets within the CSA

Reference	Name	Description	Period
SM2755	Whaup Law, cairn	Funerary cairn	Prehistoric
SM2756	Ring enclosures 550m and 595m WNW of Kilrubie Hill	Ring enclosures	Prehistoric
SM3998	Nether Stewarton, settlement 850m W of	Settlement	Prehistoric

43. In addition, there are a further 15 undesignated features identified within the CSA as shown on Figure 6.1 and detailed in Table 6.7. These predominantly include prehistoric enclosures and isolated undesignated buildings associated with post medieval agriculture.

Table 6.7: Undesignated Heritage Assets within the CSA

Reference	Name	Description	Period
51406	Peat Hill	Cairn (Period Unassigned)	Prehistoric-presumed
51413	Cloich Rig	Ring Enclosure(S) (Period Unassigned)	Prehistoric-presumed
51417	Early Burn	Ring Enclosure(S) (Period Unassigned)	Prehistoric-presumed
51418	Cloich	Cairns (two)	Prehistoric
51424	Shiplaw	Findspot, Scraper (Tool)	Prehistoric
51667	Grassfield	Ring Enclosure (Period Unassigned)	Prehistoric
181784	Greenside	Field System(S) (Period Unassigned)	Prehistoric
296428	Eddleston	Burnt Mound	Prehistoric
343618	Cloich	Findspot, Scraper (Tool) (Prehistoric)	Prehistoric
343634	Greenside	Building	Post medieval
343657	Crailzie Hill	Quarry (Post Medieval)	Post-medieval
343658	Upper Stewarton	Road (Post Medieval)	Post-medieval
343662	Greenside or Courhope	Village (Medieval)	Medieval

Reference	Name	Description	Period
343792/ 343790	Drove Road	Road (Period Unassigned)	Medieval - presumed
4030014	Cloich	Three funerary ring ditches	Prehistoric

44. A total of 108 additional heritage features were identified within the 1 km study area including seven Scheduled Monuments, three Listed Buildings, one Garden and Designed Landscape and 97 undesignated archaeological records (full details are provided in Appendix A6.1 DBA). The undesignated remains are predominantly settlement and agricultural features, dating from the prehistoric to present day and are mostly found on the south-eastern slopes of the Cloich Hills leading towards the Eddleston Valley or in and around Meldon Valley.

45. Within the CSA, there are 13 features identified as prehistoric in date. Three of these are scheduled monuments: Whaup Law Cairn (SM 2755), Kilrubie Hill ring enclosures (SM 2756) and Nether Stewarton settlement (SM 3998) with the other ten undesignated records representing settlement evidence in the form of find spots, cairns, burnt mounds and field systems.

46. Within the 1 km Study Area, there are a further 26 features identified as prehistoric in date, predominately relating to settlement and agriculture. This is evidence of a rich prehistoric landscape with elevated hillforts and settlement within the valleys so that the archaeological potential to encounter further unknown prehistoric features is considered high. However due to the modern forestry plantation that covers the CSA, there is a strong possibility that many archaeological sites may have been damaged or destroyed, lessening the potential to encounter unrecorded discrete prehistoric archaeological remains.

47. Evidence of patterns of land use during the prehistoric period indicates that there is a strong trend of hillforts with supporting settlement and agricultural land use along the lower elevations and waterways especially on the south-eastern slopes of the Cloich Hills towards Eddleston and Meldon Valleys as well as Flemington Burn.

48. Later settlements formed within the wider area from the early medieval to medieval periods onwards, such as Peebles to the south-east with evidence of a drove road, settlement and rig and furrow recorded within the CSA. The archaeological potential of the CSA for unknown medieval remains to survive is considered moderate and these are likely to be features related to agricultural use. However due to the modern forestry plantation that covers the CSA, there is a strong possibility that many archaeological sites may have been damaged or destroyed.

49. During the post-medieval period, historic mapping indicates that the CSA was still primarily rough upland grazing land with whinstone quarrying and sheepfold enclosures recorded within the 1 km Study Area. This is supported by the Statistical Accounts in where much coverage was given to agricultural practices. This period also saw the addition of stately homes and estates along the valleys with Portmore House (GDL 00318, and LB 2037 and LB 2038) to the east of the CSA. There is good cartographic coverage of the area during this period and any substantial post-medieval remains will have likely been recorded. As such, the potential for any unknown post-medieval remains to survive within the CSA are considered low.

50. The latter half of the twentieth century saw the change of use of the Cloich Hills from primarily rough upland grazing to modern commercial forestry operations. Due to the introduction of forestry, there is very low potential for unknown modern remains of significance to exist within the CSA.

51. A detailed baseline interpretation can be found within the DBA, Appendix A6.1.

6.4.2 5 km Study Area and Beyond Baseline

Within the 5 km Study Area, there are 55 Scheduled Monuments, which includes the three within the CSA, one Park and Garden, 66 Listed Buildings, and one Conservation Area, as shown on Figure 6.2. Full details of these heritage assets are provided in Appendix A6.3.

Beyond the 5 km Study Area, there are a further 28 Scheduled Monuments, nine Listed Buildings, and five conservation areas that have been selected for further consideration. These are shown on Figure 6.3 with full details of the selected heritage assets provided in Appendix A6.3.

6.5 ASSESSMENT OF POTENTIAL EFFECTS

6.5.1 Potential Construction Effects

6.5.1.1 Direct Effects

52. Direct effects are only likely to occur as a result of construction of the Development within the Development footprint. Within the CSA, there are three Scheduled Monuments and 15 undesignated heritage assets (as detailed in Section 6.4.1), all of which have been avoided in the design of the Development.

53. An undated ring-enclosure (HER 51667) in the northern portion of the CSA is located 20 m west of an existing track that would be upgraded for the Development. The Scheduled Monument Ring enclosures 550m and 595m WNW of Kilrubie Hill (SM2756) is also located approximately 20 m west of an existing track that would be upgraded for the Development in the south-east of the CSA. Whilst both assets are within the 50 m micrositing, the proposed track infrastructure follows an existing forestry track in both of these locations with minor upgrading required. These assets could potentially be affected by construction traffic vibration and/or micrositing, causing damage which could be **significant** in the absence of mitigation. As archaeology is a finite and irreplaceable resource, mitigation is proposed in Section 6.6.

54. The potential for direct effects upon unknown subsurface archaeology ranges from high to low across the CSA as detailed in the DBA (Appendix A6.1). Should any unknown subsurface archaeological deposits survive within the Development footprint, these have the potential to be damaged which is unlikely to be significant due to their undesignated status and disturbance of forestry operations. Whilst **not significant**, further mitigation is proposed in Section 6.6 to ensure preservation by record for any unknown archaeology.

6.5.1.2 *Indirect Effects*

55. Any indirect effects on heritage assets during the construction phase will generally be limited to construction infrastructure (e.g. visual impact from cranes). Any effects would be short term and no greater than during the operational phase. As such, indirect construction effects are considered as part of the potential operational effects.

6.5.2 Potential Operational Effects

6.5.2.1 Direct Effects

56. There are no anticipated direct effects during the operational area outside the infrastructure zone affected by construction. As such, no direct effects are anticipated during operation.

6.5.2.2 Indirect Effects

57. The assessment of indirect effects considers changes to setting to designated and regionally significant heritage assets within the CSA, 5 km Study Area, and selected designated assets beyond 5 km. The full assessment for changes to setting is presented in Appendix A6.3 supported by Figures 6.2 and 6.3 with a summary presented overleaf in Tables 6.8 – 6.13.

Table 6.8: Designated assets within the CSA Assessment Summary

HES Ref.	Name	Sensitivity	Magnitude of Change	Significance of Effect
SM2755	Whaup Law, cairn	High	Moderate	**Moderate and Significant**
SM2756	Ring enclosures 550m and 595m WNW of Kilrubie Hill	High	Slight	Minor and Not Significant
SM3998	Nether Stewarton, settlement 850m W of	High	Negligible	Negligible and Not Significant

Table 6.9: Scheduled Monuments within 5 km Study Area Assessment Summary

Assessment Order (in Appendix A6.3) and Group	HES Ref.	Title	Sensitivity	Magnitude of Change	Significance of Effect
White Meldon Forts	SM114	Cairn and hill fort, White Meldon	High	Moderate	**Moderate and Significant**
	SM3075	Upper Kidston, fort & settlement NNW of			
White Meldon Settlement and Enclosures	SM2711	White Meldon, platform settlement 640m NW of	High	Slight	Minor and Not Significant
	SM2712	White Meldon, platform settlement 730m NNW of			
	SM3165	White Meldon, enclosures W of			
NA	SM731	Northshield Rings, fort, The Camps	High	Slight	Minor and Not Significant
Lyne Water	SM1492	Lyne, Roman fort, annexes and fortlet	High	Negligible	Negligible and Not Significant
	SM1493	Easter Happrew, Roman fort			
	SM1494	Lyne, Roman temporary camp			
NA	SM1495	Drochil Castle	High	Negligible	Negligible and Not Significant
NA	SM2393	Terrace Wood, cultivation terraces	High	Negligible	Negligible and Not Significant
NA	SM2416	Milkieston Rings, fort	High	Slight	Minor and Not Significant
Harehope	SM2677	Harehope Rings, fort, Harehope Hill	High	Slight	Minor and Not Significant
	SM2759	Harehope, palisaded settlement 730m NNE of			
	SM3237	Harehope, earthwork SW of			

Assessment Order (in Appendix A6.3) and Group	HES Ref.	Title	Sensitivity	Magnitude of Change	Significance of Effect
	SM3790	Harehope, earthwork 550m NNE of			
Whitfield / Deepsykehead	SM2678	Old Deepsykehead, enclosed cremation cemetery 270m SSE of	High	Negligible	Negligible and Not Significant
	SM4624	Upper Whitfield, enclosures 375m SE and 350m ESE of			
	SM2789	Old Deepsykehead long cairn			
NA	SM2703	Black Meldon, fort	High	Moderate	**Moderate and Significant**
NA	SM2737	Black Meldon, settlement and scooped homestead 550m E of	High	Negligible	Negligible and Not Significant
South Hill Head	SM2713	South Hill Head, homestead	High	Slight	Minor and Not Significant
	SM3212	South Hill Head, settlement WNW of			
Sheriff Muir	SM2718	Sheriff Muir Cottages, standing stones 520m W of	High	Negligible	Negligible and Not Significant
	SM3171	Sheriff Muir, cairn			
Romanno Mains	SM2728	Romanno Mains, two barrows 550m SE of	High	Slight	Minor and Not Significant
	SM2730	Romanno Mains, barrow 910m SE of			
Fingland/Flemington Burn	SM2732	Drum Maw, settlement 780m SE of	High	Slight	Minor and Not Significant
	SM2733	Romanno Hope, barrow & enclosures S of			
NA	SM2734	Green Knowe, two ring enclosures & barrow 550m SSE of	High	Moderate	**Moderate and Significant**
Whiteside Hill Ring Enclosures	SM2735	Whiteside Hill, ring enclosures 820m SE of	High	Slight	Minor and Not Significant
	SM2821	Flemington, ring enclosures 840m NE of			
NA	SM2955	Whiteside Hill, fort & enclosure	High	Moderate	**Moderate and Significant**
Hamildean Hill	SM2736	Hamildean, homestead 1140m NE of	High	Slight	

Assessment Order (in Appendix A6.3) and Group	HES Ref.	Title	Sensitivity	Magnitude of Change	Significance of Effect
	SM2957	Hamildean Hill, fort			Minor and Not Significant
NA	SM2738	Wether Law, cairn	High	Moderate	**Moderate and Significant**
Green Knowe	SM2760	Green Knowe, platform settlement	High	Slight	Minor and Not Significant
	SM2912	Harehope, cairn 1510m ESE of			
	SM3158	Green Knowe, cairn NE of			
NA	SM2774	Cavarra Hill, settlement	High	Slight	Minor and Not Significant
Dundreich and Jeffries Corse	SM2777	Dundreich, cairn	High	Slight	Minor and Not Significant
	SM3527	Jeffries Corse, cairn			
Henderland and Bordland	SM2840	Henderland Hill, fort	High	Negligible	Negligible and Not Significant
	SM3010	Bordland Rings, fort, Bordlands Hill			
NA	SM2940	Wormiston, cairn 360m NNW of	High	Negligible	Negligible and Not Significant
Happrew and Torbank	SM3027	Tor Hill, fort 600m WNW of Torbank	High	Slight	Minor and Not Significant
	SM2944	Wester Happrew, fort 360m NW of			
Drochil and Callands	SM2956	Drochil Castle, fort & enclosure 1190m NNW of	High	Slight	Minor and Not Significant
	SM3074	Callands House, earthwork S of			
NA	SM3071	Newlands Church and graveyard, 50m SW of Newlands House	High	Negligible	Negligible and Not Significant
NA	SM3269	Meldon Bridge, pit alignment 250m W of	High	Negligible	Negligible and Not Significant
NA	SM6065	Bents Quarry, lime kilns and quarry	High	Negligible	Negligible and Not Significant

Table 6.10: Selected Scheduled Monuments Beyond 5 km Study Area Assessment Summary

Assessment Order and Group	HES Ref.	Title	Sensitivity	Magnitude of Change	Significance of Effect
NA	SM1157	The Gowk Stane	High	Negligible	Negligible and Not Significant
NA	SM1163	Camp Hill Fort	High	Negligible	Negligible and Not Significant
Cademuir Forts	SM2441	Cademuir Hillfort	**High**	**Moderate**	**Moderate and Significant**
	SM2715	Cademuir Hillfort			
	SM3045	Bellanrig settlement, fort & enclosures			
Cademuir Settlement	SM3044	Kirkton Manor, enclosures 550m SE of	High	Slight	Minor and Not Significant
	SM3166	Bellanrig, settlement SE of			
Forts East of Peebles	SM2681	Horsburgh Castle Farm, settlement 930m NNW of Castle Hill	High	Negligible	Negligible and Not Significant
	SM3028	Janet's Brae, fort 750m E of Peebles			
	SM3029	Janet's Brae, fort 550m E of Peebles			
	SM3061	SM3061 Tor Hill, fort			
Castlehill	SM2787	Castlehill Tower	High	Slight	Minor and Not Significant
	SM2959	Castlehill, fort 250m WSW of			
	SM3170	Canada Hill, scooped homestead WSW of			
Tarth Water	SM2905	Blyth cairn	High	Slight	Minor and Not Significant
	SM2990	Blyth Hillfort			
	SM3069	Newmill, enclosures SW of			
	SM3236	Shaw Hill, cairn			
	SM3256	West Mains, enclosure 200 m NE of			
Dawyck (south tweed valley)	SM2950	Easter Dawyck, fort & settlement	High	Slight	Minor and Not Significant
	SM3059	Kerr's Knowe Fort			
	SM3068	Syke Hill fort			
NA	SM3039	Venlaw Castle Hotel settlement	High	Negligible	Negligible and Not Significant
NA	SM3051	Woodhouse, Hill Fort	High	Moderate	**Moderate and Significant**

Assessment Order and Group	HES Ref.	Title	Sensitivity	Magnitude of Change	Significance of Effect
NA	SM3056	Wood Hill, fort & enclosure	High	Negligible	Negligible and Not Significant
Roman Road Group	SM3247	Cock Rig to Linton Muir Roman Road	High	Negligible	Negligible and Not Significant
	SM3263	Hardgatehead Roman road and turnpike road			
NA	SM5742	South Slipperfield, barrows	High	Negligible	Negligible and Not Significant

Table 6.11: Garden and Designed Landscapes Assessment Summary

Assessment Order and Group	HES Ref.	Title	Sensitivity	Magnitude of Change	Significance of Effect
Portmore	GLD00318	Portmore DGL	High	Slight	Minor and Not Significant
Portmore	LB2037	Category A Listed Portmore House	High	Moderate (localised from one VP)	**Moderate and Significant**
Portmore	LB2038	Category C Listed Entrance Gateway and Lodge, Portmore	Medium	Slight	Minor and Not Significant

Table 6.12: Listed Buildings and Conservation Areas within the 5 km Study Area Assessment Summary

Assessment Order and Group	HES Ref.	Title	Cat.	ZTV	Sensitivity	Magnitude of Change	Significance of Effect
Eddleston CA	157	The Horse Shoe Inn, Eddleston	C	Y	Medium	Slight	Minor and Not Significant
Eddleston CA	2020	Eddleston Parish Church and Graveyard	B	Y	Medium	Slight	Minor and Not Significant
Eddleston CA	2021	Moredun, And Adjoining 2 Cottages (Glen Nevis and Old School House)	B	Y	Medium	Slight	Minor and Not Significant
Eddleston CA	2022	Eddleston Village Nos. 1-23 And 2-22. Station Road	B	Y	Medium	Slight	Minor and Not Significant
Eddleston CA	2023	Eddleston Bridge Eddleston	C	Y	Medium	Slight	Minor and Not Significant
NA	2035	Cringletie House, Including Lodges, Walled Garden, Sundial and Dovecot	B	N	Medium	Negligible	Negligible and Not Significant

Assessment Order and Group	HES Ref.	Title	Cat.	ZTV	Sensitivity	Magnitude of Change	Significance of Effect
NA	2039	Old Harehope	B	Y	Medium	Slight	Minor and Not Significant
Barony Castle	2040	Black Barony Hotel	B	Y	Medium	Negligible	Negligible and Not Significant
Barony Castle	2041	Ice House, Black Barony.	B	Y	Medium	Negligible	Negligible and Not Significant
Barony Castle	2042	Summerhouse, Black Barony	B	N	Medium	Negligible	Negligible and Not Significant
Barony Castle	2043	Bellevue Temple In Former Policies of Black Barony.	C	Y	Medium	Negligible	Negligible and Not Significant
Barony Castle	51957	Barony Castle Hotel, The Great Polish Map of Scotland	B	Y	Medium	Negligible	Negligible and Not Significant
Spitalhaugh	8334	Paulswell Farmhouse and Steading	C	Y	Medium	Slight	Minor and Not Significant
Spitalhaugh	8361	Spitalhaugh House Including Stable and Bridge	A	Y	High	Slight	Minor and Not Significant
Spitalhaugh	51628	Spitalhaugh, Doocot House	C	Y	Medium	Slight	Minor and Not Significant
Scotstoun	8337	Castlecraig, Entrance Gates and Twin Lodges.	B	N	Medium	Negligible	Negligible and Not Significant
Scotstoun	15169	Scotstoun House	B	N	Medium	Negligible	Negligible and Not Significant
Scotstoun	15170	Stable Square, Scotstoun	C	N	Medium	Negligible	Negligible and Not Significant
Newlands	13862	Newlands Parish Church	B	N	Medium	Negligible	Negligible and Not Significant
Newlands	15136	Newlands Manse	B	N	Medium	Negligible	Negligible and Not Significant
Newlands	15137	Newlands Old Kirk	B	N	Medium	Negligible	Negligible and Not Significant
Newlands	15138	Mackay Of Scotstoun Tomb in Kirkyard	B	N	Medium	Negligible	Negligible and Not Significant

Assessment Order and Group	HES Ref.	Title	Cat.	ZTV	Sensitivity	Magnitude of Change	Significance of Effect
Newlands	15139	Bridgend Cottage and Camitswalls	B	N	Medium	Negligible	Negligible and Not Significant
Newlands	15140	Newlands Bridge	B	N	Medium	Negligible	Negligible and Not Significant
Hallyne	13896	Hallyne House	B	N	Medium	Negligible	Negligible and Not Significant
Hallyne	15357	Lyne Parish Church	B	N	Medium	Negligible	Negligible and Not Significant
Hallyne	15358	The Beggar Path Bridge	B	N	Medium	Negligible	Negligible and Not Significant
Hallyne	19742	Five Mile Bridge	B	N	Medium	Negligible	Negligible and Not Significant
Whim	13898	Smithy Cottages, Near Whim	C	Y	Medium	Slight	Minor and Not Significant
Whim	15150	Cistern, In Policies of Whim House	C	N	Medium	Slight	Minor and Not Significant
Whim	15151	Cowden Lodge at Drive Entrance to Whim House	B	Y	Medium	Slight	Minor and Not Significant
Whim	15180	Whim House (Now the White House Hotel)	B	Y	Medium	Slight	Minor and Not Significant
Whim	15181	Ice House, In Policies of Whim House	B	Y	Medium	Slight	Minor and Not Significant
Whim	15182	Dovecot, Whim House	C	Y	Medium	Slight	Minor and Not Significant
Whim	19724	Ed Court of Offices, Whim House	A	Y	High	Slight	Minor and Not Significant
Romanno	15141	Old Romanno Bridge Over the Lynne Water	B	Y	Medium	Slight	Minor and Not Significant
Romanno	15166	Romanno Bridge Hotel and Adjoining House and Two Cottages	B	N	Medium	Slight	Minor and Not Significant
Romanno	19717	Romanno Toll	B	N	Medium	Slight	Minor and Not Significant

Assessment Order and Group	HES Ref.	Title	Cat.	ZTV	Sensitivity	Magnitude of Change	Significance of Effect
Romanno	19722	Romanno Post Office and Adjoining Range	B	N	Medium	Slight	Minor and Not Significant
NA	15152	Flemington Tower	B	Y	Medium	Slight	Minor and Not Significant
Drochil Castle	15171	Drochil Castle Farm House	C	N	Medium	Negligible	Negligible and Not Significant
Drochil Castle	15172	Tarth Bridge Over Tarth Water	C	N	Medium	Negligible	Negligible and Not Significant
Macbiehill	15173	Macbiehill Gateway And Lodge	B	Y	Medium	Negligible	Negligible and Not Significant
Macbiehill	15174	Beresford Burial Vault	C	Y	Medium	Negligible	Negligible and Not Significant
Lamancha	15175	Lower Grange	C	N	Medium	Negligible	Negligible and Not Significant
Lamancha	15176	Lamancha	B	N	Medium	Negligible	Negligible and Not Significant
Lamancha	15177	Sundial, Lamancha	A	N	High	Negligible	Negligible and Not Significant
Lamancha	15178	Entrance Gateway, Lamancha	B	N	Medium	Negligible	Negligible and Not Significant
Lamancha	15179	Madrisa Farmhouse and Steading, Lamancha	C	N	Medium	Negligible	Negligible and Not Significant
Lyne Station	15208	Edston Toll (Also Known as Lyne Toll)	C	N	Medium	Negligible	Negligible and Not Significant
Lyne Station	19665	Lyne Viaduct	B	N	Medium	Negligible	Negligible and Not Significant
Lyne Station	19741	Lynesmill Bridge	B	N	Medium	Negligible	Negligible and Not Significant
Rosetta	15209	Rosetta House	B	N	Medium	Negligible	Negligible and Not Significant
Rosetta	15210	Rosetta, Walled Garden and Garden Building	C	N	Medium	Negligible	Negligible and Not Significant

Assessment Order and Group	HES Ref.	Title	Cat.	ZTV	Sensitivity	Magnitude of Change	Significance of Effect
Rosetta	19728	Rosetta Stables	B	N	Medium	Negligible	Negligible and Not Significant
Rosetta	48932	Standalane Cottage	C	N	Medium	Negligible	Negligible and Not Significant
Chapelhill	15211	Chapelhill Farmhouse and Courtyard Farm Buildings	B	Y	Medium	Negligible	Negligible and Not Significant
Chapelhill	15212	Chapel Hill Bridge	B	Y	Medium	Negligible	Negligible and Not Significant
Winkston	15213	Winkston Farm House	B	Y	Medium	Negligible	Negligible and Not Significant
Winkston	15214	Winkston Tower House	B	Y	Medium	Negligible	Negligible and Not Significant
NA	15215	Redscarhead, George Meikle Kemp Memorial (At Moy Hall)	B	Y	Medium	Negligible	Negligible and Not Significant
Wester Happrew and Brownsland	15375	Brownsland	C	Y	Medium	Negligible	N Negligible and Not Significant
Wester Happrew and Brownsland	19744	Wester Happrew	C	N	Medium	Negligible	Negligible and Not Significant
NA	19723	Halmyre House	B	N	Medium	Negligible	Negligible and Not Significant

Table 6.13: Selected Listed Buildings and Conservation Areas beyond 5 km Study Area Assessment Summary

Assessment Order and Group	HES Ref.	Title	Cat.	ZTV	Sensitivity	Magnitude of Change	Significance of Effect
Neidpath	13857	Neidpath Castle, Entrance Gateway to Courtyard, Courtyard Buildings (South Range), Walled Garden	A	N	High	Negligible	Negligible and Not Significant
NA	15348	Haswellsykes	B	Y	Medium	Negligible	Negligible and Not Significant
NA	15359	Kirkton Manor, Manor Parish Church	C	Y	Medium	Negligible	Negligible and Not Significant
Barns	15361	Barns House	B	N	Medium	Negligible	Negligible and Not Significant

Assessment Order and Group	HES Ref.	Title	Cat.	ZTV	Sensitivity	Magnitude of Change	Significance of Effect
Barns	15363	Barns Tower	B	N	Medium	Negligible	Negligible and Not Significant
Hallyards	15368	Hallyards	B	N	Medium	Negligible	Negligible and Not Significant
Hallyards	15369	Hallyards, Sundial	B	N	Medium	Negligible	Negligible and Not Significant
Hallyards	15370	Hallyards, Statue	B	N	Medium	Negligible	Negligible and Not Significant
NA	19729	Peebles, Edinburgh Road, Venlaw Castle Hotel	B	Y	Medium	Negligible	Negligible and Not Significant
NA		Peebles Conservation Area			Medium	Negligible	Negligible and Not Significant
NA		West Linton Conservation Area			Medium	Negligible	Negligible and Not Significant
NA		Howgate Conservation Area			Medium	Negligible	Negligible and Not Significant
NA		Carlops Conservation Area			Medium	Negligible	Negligible and Not Significant
NA		Penicuik Conservation Area			Medium	Negligible	Negligible and Not Significant

6.5.3 Potential Decommissioning Effects

58. Decommissioning of the Development will involve similar processes to the construction effects but involve the dismantling and removal of the majority of the above ground infrastructure of the Development. As no direct effects upon any known features of cultural heritage interest are anticipated during construction, no direct effects are likely from the decommissioning phase of the Development. Any effects arising from this phase are therefore considered to be **not significant** in terms of the EIA Regulations.

6.6 MITIGATION AND RESIDUAL EFFECTS

6.6.1 Construction

59. All recorded archaeological features have been avoided and no significant effects have been identified as shown on Figure 6.1; however, SM2756 and HER51667 lie in close proximity to the existing access track which would be subject to improvements for the wind farm. Mitigation should include full survey of these features prior to construction, tool box talks highlighting the archaeology within the Development Site, fencing (if required) and a watching brief during construction in the vicinity of SM2756. This can be secured via an appropriately worded planning condition.

60. In regards to enhancement mitigation, SM2756 Kilrubie Hill Ring Enclosures and the top of Whaup Law would be felled and not replanted as part of the wind farm forestry plan in order to end the planting disturbance to SM2756 and to open up viewsheds from Whaup Law Cairn (SM2755) which currently do not exist due to surrounding forestry.

61. There is high archaeological potential for prehistoric archaeological remains to be present albeit these are likely disturbed from forestry practices so it is unlikely that the effects would be significant in terms of the EIA Regulations.

62. Previous enhancement measures identified for the Consented Scheme included Light Detection and Ranging (LIDAR) survey which has been successful at identifying archaeological features within forestry plantation and is recommended here. The full details of the specification for this survey could be resolved with key consultees and secured via an appropriately worded planning condition. Tool Box Talks on the type of archaeology likely to be present will also be part of the site orientation to ensure that construction personnel are made aware of the archaeology sensitivities and what to do if they encounter potential archaeology.

6.6.2 Operation

63. Significant effects upon the cultural significance of designated heritage assets have been identified at 12 Scheduled Monuments at nine locations generally focused around hillforts where long distance views contribute to cultural significance and at one localised view across Category a Listed Portmore House as detailed in Table 6.14 with full details provided in Appendix A6.3

Table 6.14: Summary of Significant Effects Identified for Operation

Reference	Group / Location	Name	Sensitivity	Magnitude of Change	Significance of Effect
SM2734	On Western boundary outwith CSA	Green Knowe, two ring enclosures & barrow 550m SSE of	High	Moderate	Moderate and Significant
SM2755	In CSA	Whaup Law, cairn	High	Moderate	Moderate and Significant
SM114	White Meldon forts	Cairn and hill fort, White Meldon	High	Moderate	Moderate and Significant
SM3075		Upper Kidston, fort & settlement NNW of			
SM2703	Black Meldon	Black Meldon, fort	High	Moderate	Moderate and Significant
SM2738	West of CSA	Wether Law Cairn	High	Moderate	Moderate and Significant
SM2955	Whiteside Hill	Whiteside Hill, fort & enclosure	High	Moderate	Moderate and Significant
SM2441	Cademuir	Cademuir Hillfort	High	Moderate	Moderate and Significant
SM2715		Cademuir Hillfort			
SM3045		SM3045 Bellanrig, settlement, fort & enclosures 870m SE of			
SM3051	Manor Water Valley opposite Cademuir hillforts	Woodhouse, Hill Fort	High	Moderate	Moderate and Significant

Reference	Group / Location	Name	Sensitivity	Magnitude of Change	Significance of Effect
LB2037	Portmore GDL	Category A Listed Portmore House	High	Moderate (localised at one viewpoint)	Moderate and Significant

6.6.2.1 Mitigation

64. Mitigating the effect of constructing a wind farm when there are significant effects identified upon cultural significance is not straightforward. The options for reducing visual effects are limited to redesigning the layout or in a relatively small number of cases, screening sensitive views.

65. In the case of the Development, the number of the turbines was reduced from the 18-turbine Consented Scheme (up to 115 m to tip) to a 14 turbine Scoping layout and further reduced to a 12-turbine scheme albeit with slightly taller turbines of up to 149.9 m to tip (see **Chapter 2: Site Selection and Design** of the EIA Report).

66. For designated heritage assets within the Site, the wind farm forestry plan includes embedded enhancement mitigation for SM2756 Kilrubie Hill Ring Enclosures and SM2755 Whaup Law Cairn. SM2756 Kilrubie Hill Ring Enclosures is currently covered in forestry with this area to be felled and not replanted in order to preserve surviving elements of the monument. The top of Whaup Law would be felled and not replanted as part of the wind farm forestry plan in order to open up viewsheds from Whaup Law Cairn (SM2755) towards the wider landscape, most notably SM2738 Wether Law Cairn to the north-west, which currently does not exist due to surrounding forestry.

67. Other heritage assets affected are not within the Site. Given that many of the most sensitive receptors are elevated prehistoric monuments such as hillforts, screening is not a viable option for mitigation. Nevertheless, significant effects resulting from changes to cultural significance have been identified at 12 heritage assets located across nine locations, as detailed in Table 6.14, and some form of mitigation strategy is needed to address these effects, in this case a LiDAR survey. Whilst this mitigation strategy may not reduce the effect of the Development, it provides an opportunity to enhance the appreciation and understanding of heritage assets as part of the overall planning balance.

6.6.2.2 Enhancement - Light Detection and Ranging Survey (LIDAR)

68. In lines with the recommendation for the Consented Scheme, the main proposal in terms of 'balancing mitigation' is that an aerial Light Detection and Ranging (LIDAR) survey should be carried out over the most important and sensitive areas of historic landscape that would be affected by the Development. This would include the Meldon Valley, the valley of Flemington Burn and the Cademuir hillforts, where access is permitted.

69. In selected areas, the LIDAR would be collected at ultra-high resolution (to at least c. 0.25 m) alongside detailed vertical aerial photographs. These areas would include:

- White Meldon and Black Meldon;
- Upper and Lower Cademuir hillforts; and
- Whiteside Hill hillfort.

70. The full details of the specification for this survey would be resolved in discussions with Historic Scotland, the Council Archaeological Officer and Forestry Scotland senior archaeologist.

71. Critical to the success of this mitigation strategy are a clearly prescribed and a limited set of aims and objectives for the LIDAR survey. The following key objectives are recommended in lines with the consented wind farm recommendations:

- To carry out a detailed digital transcription of the LIDAR survey in selected areas to be agreed with the key consultees;
- To create detailed 3D contour models of the hillforts with serial photographic imagery overlain which could be rendered to produce a suite of oblique terrain images;
- To pass on the results of this transcription survey to the Borders Council Historic Environment Record and Historic Environment Scotland datasets in GIS format (to be agreed with the relevant parties);
- To pass on the processed LIDAR dataset HES Canmore as a resource for future archaeological research (formats to be agreed with HES);
- To support an appropriate archaeological contractor to work with local organisations, including the Peebles Archaeological Society, to pursue a defined programme of follow-up landscape investigation within in the area of the proposed LiDAR survey with objectives and programme to be agreed with the SBC archaeological officer; and
- To support the development of a local learning resource based on these surveys for use by local schools within the Curriculum for Excellence.

6.6.2.3 Residual Effect

72. While the mitigation strategy set out above would not directly reduce the effect of the Development upon the cultural significance of individual heritage assets, it would offer a benefit to improve understanding, appreciation and public awareness of the historic environment through documentation, research and education, as part of the overall planning balance.

6.7 SUMMARY OF EFFECTS

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Construction Phase				
Known archaeological remains	No direct effect though SM2756 and HER51667 lie in close proximity to existing access track which would be upgraded	Not Significant	Survey of SM2756 and HER51667 prior to construction, tool box talks highlighting the archaeology within the Development Site, fencing (if required) and a watching brief during construction in the vicinity of SM2756 SM2756 to not be replanted with trees to end forestry disturbance	Not Significant

Unknown (buried) archaeological remains	Archaeological potential for unknown remains to survive is high, particularly for the prehistoric period, though disturbance from forestry operations is likely.	Not Significant	LiDAR Survey and Tool Box Talks	Not Significant
Operational Phase				
Designated Heritage Assets	Changes to setting that affect cultural significance have been identified for 12 heritage assets at nine locations as detailed in Table 6.14.	Significant	Whaup Law to not be replanted with forestry to open up viewshed from SM2755 Whaup Law Cairn. Enhancement measures to include LiDAR Survey, Community Outreach and Local Learning Resource	Significant
Designated Heritage Assets	For all other heritage asset, changes to setting that affect cultural significance are negligible or minor.	Not Significant	No mitigation is proposed	Not Significant
Decommissioning Phase				
Restoration of existing site conditions (visual)	None	No effect	None	None – Existing setting will be restored

6.8 STATEMENT OF SIGNIFICANCE

73. Effects are considered to be significant for the purposes of the EIA Regulations where the effect is classified as being of 'major' or 'moderate' significance.

74. There are considered to be no direct effects likely upon known archaeological features though two assets (SM2756 and HER51667) lie within close proximity to known infrastructure and mitigation is recommended to ensure avoidance or preservation by record. This would include adequate recording of all nearby features prior to construction, toolbox talks to construction personnel, and fencing of assets throughout construction.

75. The archaeological potential of the site is high around known records and along the waterways, and a programme of archaeological work is recommended to include watching brief for all works in proximity to SM2756. This would ensure direct effects are not significant for the Development. In addition, enhancement mitigation is embedded within the wind farm forestry plan to remove trees from SM2756 Kilrubie Hill Ring Enclosures in order to preserve surviving elements of the monument along with proposals for LiDAR survey over the Site.

76. There is considered to be 12 significant indirect (settings) effects at nine locations, generally concentrated at elevated hill forts at White Meldon (SM114, SM3075), Black Meldon (SM2703), Milkieston Rings fort (SM2416), Whiteside Hill (SM2955), Cademuir (SM3044, SM3045), and Woodhouse (SM3051) with other significant effects in close proximity either within the site at Whaup Law Cairn (SM2755) or adjacent at Green Knowe enclosures and barrows (SM2734). A localised significant effect in one view looking across Category A Portmore House (LB2037) was also identified. Other effects as a result of changes to setting were negligible to slight, resulting in negligible to minor effects that are not significant.

77. For designated heritage assets within the Site, the wind farm forestry plan includes embedded enhancement mitigation for SM2756 Kilrubie Hill Ring Enclosures and SM2755 Whaup Law Cairn. SM2756 Kilrubie Hill Ring Enclosures is currently covered in forestry with this area to be felled and not replanted in order to preserve surviving elements of the monument. The top of Whaup Law would be felled and not replanted as part of the wind farm forestry plan in order to open up viewsheds from Whaup Law Cairn (SM2755) towards the wider landscape, most notably SM2738 Wether Law Cairn to the north-west, which currently does not exist due to surrounding forestry.

78. Other heritage assets affected are not within the Site. Given that many of the most sensitive receptors are elevated prehistoric monuments such as hillforts, screening is not a viable option for mitigation. Light Detection and Ranging Survey (LIDAR) over key hill forts in the area provides an opportunity to enhance the appreciation and understanding of heritage assets though would not reduce the effect of the Development in consideration of the overall planning balance.

79. No additional significant cumulative indirect (setting effects) from the Development and other wind farm developments is likely so that any effect would result from the Development as assessed in isolation. All cumulative effects are considered to be not significant.

CLOICH FOREST WIND FARM

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Chapter 7

Ecology

7 ECOLOGY

7.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the effects of the Cloich Forest Wind Farm ('the Development') on the ecological resource.

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

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

- Figure 2.1: Ecological Designations;
- Figure 7.1a-b: Habitat Survey Results;
- Figure 7.2: Protected Species Survey Results; and
- Figure 7.3: Remote Static Survey Locations.

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

- Technical Appendix A7.1: Habitat Surveys;
- Technical Appendix A7.2: Protected Species Surveys;
  - Confidential Annex: Protected Species Surveys;
- Technical Appendix A7.3: Bat Surveys; and
- Technical Appendix A7.4: Fisheries Surveys.

5. This Chapter includes the following elements:

- Legislation, Policy and Guidance;
- Assessment Methodology and Significance Criteria;
- Scoping Opinion and Consultation;
- Baseline Methods;
- Baseline Conditions;
- Embedded Mitigation;
- Determination of Ecological Importance;
- Assessment of Potential Effects;
- Assessment of Residual Effects;
- Assessment of Cumulative Effects;
- Summary of Effects; and
- Statement of Significance.

7.2 LEGISLATION, POLICY AND GUIDANCE

6. The following sections outline the guidance, legislation, and information sources which have been considered in carrying out this assessment.

7.2.1 Legislation

- Council Directive 92/43/EEC ('the Habitats Directive')[1,2];
- Council Directive 2000/60/EC ('Water Framework Directive')[3,4];
- Wildlife and Countryside Act 1971 (as amended)[5];
- Conservation (Natural Habitats, & c) Regulations 1994 ('the Habitat Regulations')[6];
- Wildlife and Natural Environment (Scotland) Act 2011[7];
- Protection of Badgers Act 1992[8];
- Nature Conservation (Scotland) Act 2004[9];
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended)[10] ('the EIA Regulations'); and
- Salmon and Freshwater Fisheries Act 2003[11].

7.2.2 Policy and Guidance

- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine[12];
- General Pre-application/ Scoping Advice to Developers of Onshore Wind Farms[13];

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[1] European Commission (1992) Council Directive 92/43/EEC the Conservation of Natural Habitats and of Wild Fauna and Flora. [Online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0043&from=EN. (Accessed 04/02/2021).
[2] These Regulations were amended by the Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019 to interpret the Habitats Directive in light of Brexit, in order to address failures of retained EU law to operate effectively. The Habitats Directive is retained and still applies in Scotland subject to the amending Regulations.
[3] European Commission (2000) Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 Establishing a Framework for Community Action in the Field of Water Policy [Online] Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:5c735afb-2ec6-4577-bdf7-756d3d694eeb.0004.02/DOC_1&format=PDF. (Accessed 04/02/2021).
[4] This legislation was amended by the Environment (EU Exit) (Scotland) (Amendment etc.) Regulations 2019 to interpret the Water Framework Directive in light of Brexit, in order to address failures of retained EU law to operate effectively. The Water Framework Directive is retained and still applies in Scotland subject to the amending Regulations.
[5] UK Government (1971) Wildlife and Countryside Act 1971, Chapter 69. Part 1. [Online] Available at: http://www.legislation.gov.uk/ukpga/1971/69/section/1. (Accessed 04/02/2021).
[6] Scottish Government (1994) The Conservation (Natural Habitats, &c.) Regulations 1994. [Online] Available at: http://www.legislation.gov.uk/uksi/1994/2716/contents/made. (Accessed 04/02/2021).
[7] Scottish Government (2011) Wildlife and Natural Environment (Scotland) Act 2011. [Online] Available at: http://www.legislation.gov.uk/asp/2011/6/contents/enacted. (Accessed 04/02/2021).
[8] UK Government (1992) Protection of Badger Act 1992. [Online] Available at: http://www.legislation.gov.uk/ukpga/1992/51/contents. (Accessed 04/02/2021).
[9] Scottish Government (2014) Nature Conservation (Scotland) Act 2004. [Online] Available at: http://www.legislation.gov.uk/asp/2004/6/contents. (Accessed 04/02/2021).
[10] The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 [Online] Available at: http://www.legislation.gov.uk/ssi/2017/101/contents/made. (Accessed 04/02/2021).
[11] Scottish Government (2003) Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003. [Online] Available at: http://www.legislation.gov.uk/asp/2003/15/contents. (Accessed 04/02/2021).
[12] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1 Chartered Institute of Ecology & Environmental Management, Winchester. [Online] Available at: https://cieem.net/wp-content/uploads/2017/07/ECIA-Guidelines-Sept-2019.pdf. (Accessed 04/02/2021).
[13] NatureScot (2020) General pre-application/ scoping advice to developers of onshore wind farms. [Online] Available at: https://www.nature.scot/general-pre-application-and-scoping-advice-onshore-wind-farms. (Accessed 04/02/2021).

- Decommissioning and Restoration Plans for wind farms[14];
- Good Practice During Wind Farm Construction[15];
- Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems[16],
- Planning Guidance on On-shore Windfarm Developments[17];
- Guidance on Advising on carbon-rich soils, deep peat and priority peatland habitat in development management[18];
- European Union (EU) Biodiversity Strategy[19];
- 2020 Challenge for Scotland's Biodiversity[20];
- Scottish Biodiversity List (SBL)[21]; and
- EU Exit: habitat regulations in Scotland[22].

7. In addition to the above, guidance relating to the ecology of species and habitats and to survey and assessment methods are cited in full, where appropriate, in the relevant parts of this Chapter and associated Technical Appendices. Work has been carried out in accordance with BS 42020:2013 Biodiversity – Code of Practice for Planning and Development[23] by ecologists working to the Chartered Institute of Ecology and Environmental Management (CIEEM) Code of Professional Conduct[24].

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[14] NatureScot (2016) Decommissioning and Restoration Plans for Wind Farms. [Online] Available at: https://www.nature.scot/guidance-decommissioning-and-restoration-plans-wind-farms-february-2016. (Accessed 04/02/2021).

[15] Scottish Renewables, NatureScot, SEPA, Forestry Commission Scotland, Historic Environment Scotland (2019). Good Practice during Wind Farm Construction. [Online] Available at: https://www.nature.scot/guidance-good-practice-during-wind-farm-construction. (Accessed 04/02/2021).

[16] SEPA (2017) Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Land Use Planning System SEPA Guidance Note 31. Version 3. [Online] Available at: https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf. (Accessed 04/02/2021).

[17] SEPA (2014) Planning guidance on on-shore windfarm developments. Land Use Planning System SEPA Guidance Note 4. Version 9. [Online] Available at: https://www.sepa.org.uk/media/136117/planning-guidance-on-on-shore-windfarms-developments.pdf. (Accessed 04/02/2021).

[18] NatureScot (2020) Advising on carbon-rich soils, deep peat and priority peatland habitat in development management. [Online] Available at: https://www.nature.scot/advising-carbon-rich-soils-deep-peat-and-priority-peatland-habitat-development-management. (Accessed 04/02/2021).

[19] European Commission (2011) EU Biodiversity Strategy. [Online] Available at: http://ec.europa.eu/environment/nature/biodiversity/strategy/index_en.htm. (Accessed 04/02/2021).

[20] Scottish Government (2015) Scotland's Biodiversity, a Route Map to 2020. [Online] Available at: https://www.gov.scot/publications/scotlands-biodiversity-route-map-2020/ (Accessed 04/02/2021).

[21] Scottish Government (2013) Scottish Biodiversity List. [Online] Available at: https://www2.gov.scot/Topics/Environment/Wildlife-Habitats/16117/Biodiversitylist/SBL. Accessed on 4 February 2021.

[22] Scottish Government (2020) EU Exit: habitat regulations in Scotland. [Online] Available at: https://www.gov.scot/publications/eu-exit-habitats-regulations-scotland-2/. (Accessed 04/02/2021).

[23] BSI Group (2013). BS 42020:2013 – a code of practice for biodiversity in planning and development. BSI.

[24] CIEEM (2019). Code of Professional Conduct. [Online] Available at: https://cieem.net/resource/code-of-conduct/ (Accessed 04/02/2021).

7.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

7.3.1 Scoping Responses and Consultations

8. Consultation for this EIA was carried out with the organisations shown in Table 7.1.

9. A Scoping Request was submitted to the Scottish Government's Energy Consents Unit (ECU) in December 2019.

Table 7.1 Consultation Responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
NatureScot	Scoping Response – 21/11/2019	Content with the habitat and species surveys set out in the Ecology section of the scoping report.	Habitat and species survey methods, as detailed in scoping report are provided in Section 7.3.5.
Scottish Environmental Protection Agency (SEPA)	Scoping Response – 30/10/2019	A map demonstrating that all groundwater dependent terrestrial ecosystems (GWDTE) are outwith a 100m radius of all excavations shallower than 1m and outwith 250m of all excavations deeper than 1m and proposed groundwater abstractions. If micro-siting is to be considered as a mitigation measure the distance of survey needs to be extended by the proposed maximum extent of micro-siting. The survey needs to extend beyond the site boundary where the distances require it.	A GWDTE assessment was carried out during habitat surveys in accordance with SEPA guidance[25], as detailed in Section 7.3.5.1. Habitats with potential to be GWDTEs were identified, these were mainly along forestry rides and within low lying grassland in the southern section of the Site. These were almost all considered to be surface water fed. Section 10.4.5 of Chapter 10: Hydrology and Hydrogeology provides further detail on this as well as providing a map showing the location of potential GWDTEs in relation to Development infrastructure.
Scottish Borders Council (SBC)	Scoping Response – 15/11/2019	Advise National Vegetation Classification (NVC) surveys should also be carried out for priority habitats on the Scottish Biodiversity List (SBL). Clarification needed on risk level of site for bats – stated as low but medium might be more appropriate. The EIA should include the relevant information to inform the Appropriate Assessment for fisheries (in a separate section or report), such as details of mitigation proposed.	NVC surveys undertaken in accordance with SEPA guidance[25] and detailed in Section 7.4.2.1. Letter sent to SBC clarifying justification for site risk level on 15/04/2020. Also discussed in TA7.3. Section 7.7.7.1 provides information to inform an Appropriate Assessment for the River Tweed SAC, including fisheries.

[25] SEPA (2009) Land Use Planning Systems SEPA Guidance Note 4 Planning Guidance on on-shore windfarms developments. [Online] Available at: https://www.sepa.org.uk/media/136117/planning-guidance-on-on-shore-windfarms-developments.pdf (Accessed 04/02/2021).

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		Otter surveys should follow the guidance[26] for large extensive development.	Otter surveys were undertaken following the guidance[26], with further information detailed in TA7.2.
Marine Scotland Science (MSS)	Scoping Response - 23/10/2019	Advise to carry out fisheries surveys, including fully quantitative electrofishing surveys.	Fisheries surveys (including electrofishing) designed and undertaken by the Tweed Foundation, as detailed in TA7.4.
		Advise to consider the potential cumulative impacts on the water quality and fish populations associated with adjacent developments (operational and consented).	Potential cumulative impacts assessed in Section 7.8.
		Advised to consider the potential impacts on the water quality and fish populations associated with any proposed felling operations.	Potential effects of proposed felling operations of water quality and fish populations are discussed in Section 7.7.5
		Advised to contact the Tweed Commission and the Tweed Foundation, if not already done so, for further information on local fish populations.	Tweed Commission were contacted and Tweed Foundation were consulted regarding suitability of surveys and also carried out the Fisheries Surveys (see Sections 7.3.5.6 and 7.4.2.4).
Fisheries Management Scotland (FMS)	Scoping Response - 25/10/2019	The proposed development falls within the district of the River Tweed Commission, and the catchments relating to the Tweed Foundation, so it is important that the proposals are conducted in full consultation with these organisations.	See comment above.

7.3.2 Scope of Assessment

10. This Chapter considers the effects of construction, operation, and decommissioning (including cumulative effects) of the Development upon those ecological features identified during the review of desk-based information and field surveys. Effects upon the following features are assessed:

- Designated sites: effects include direct (i.e. derived from land-take or disturbance to habitats or protected species) and indirect (i.e. changes caused by effects to supporting systems such as groundwater);
- Terrestrial habitats: effects include direct (i.e. derived from land-take) and indirect (i.e. changes caused by effects to supporting systems such as groundwater or overland flow);

[26] Scottish Borders Council (2017) Otters Technical Advice Note 2. [Online] Available online at; https://www.scotborders.gov.uk/downloads/file/2961/otters_technical_advice_note (Accessed 04/02/2021).

- Aquatic habitats: effects are limited to the ecological impacts of changes in water conditions through potential pollution effects; hydrological effects are considered in **Chapter 10: Hydrology and Hydrogeology**; and
- Protected species: effects considered include direct (i.e. loss of life as a result of the Development; loss of key habitat; displacement from key habitat; barrier effects preventing movement to/from key habitats; and general disturbance) and indirect (i.e. loss/changes of/to food resources; population fragmentation; degradation of key habitat e.g. as a result of pollution).

7.3.3 Elements Scoped Out of Assessment

11. On the basis of the professional judgement of the EIA team, experience from other relevant projects and policy guidance or standards, generally common and widely distributed habitats or species have been scoped out, with the exception of those listed in the following categories:

- Habitats on Annex I or the Habitats Directive, species on Schedule 2 of the Habitats Regulations, and plant species on Schedule 4 Habitats Regulations;
- Scottish Biodiversity List (SBL) Priority Habitats; and
- Habitats or species protected by other legislation such as The Wildlife and Countryside Act 1981 (as amended), the Nature Conservation (Scotland) Act 2004 (as amended), or The Protection of Badgers Act 1992.

12. Further effects have subsequently been scoped out based on the result of the desk-based study and survey work undertaken for the Development. Details of ecological features scoped out post survey are provided in Section 7.6.1.

7.3.4 Desk Study Methods

13. A Desk Study was conducted in September 2019 and updated in February 2021 to obtain information about relevant designated nature conservation sites and records of habitats and species. The desk study searched for records of statutory and non-statutory sites of nature conservation, protected species, and priority habitats and species for nature conservation listed in the Scottish Biodiversity List (SBL)[21]. The Desk Study Area (DSA) comprised of a variety of areas surrounding the Site. Search distances were chosen based on the level of protection and/or ecological range of the different ecological receptors, detailed as follows:

- A radius of 5 km from the Site was searched for internationally and nationally designated statutory sites for nature conservation (e.g. a Special Area of Conservation (SAC) or Site of Special Scientific Interest (SSSI)). The search radius was extended to 10 km to include any Sites designated for mobile species (i.e. bats);
- A radius of 2 km from the Site was searched for non-statutory sites;
- A radius of 5 km (extending to 10 km for rare bat species) from the Site was searched for records of notable or protected species; and
- A radius of 2 km from the Site was searched for records of invasive, non-native species.

14. Information on the above was provided from The Wildlife Information Centre (TWIC). Additional information was obtained from publicly available sources[27] and is cited in the relevant parts of this Chapter and technical appendices.

[27] NBN Atlas. [Online] Available at: http://www.nbnatlas.org (Accessed 04/02/2021).

7.3.5 Baseline Survey Methods

15. Baseline ecology surveys were undertaken between September 2019 and October 2020. An overview of the survey methods is provided below and full details are presented in Technical Appendices A7.1 through A7.4.

7.3.5.1 Phase 1 Habitat Survey

16. A Phase 1 Habitat Survey of the Site was undertaken across several Site visits in September 2019 and June 2020, following standard Joint Nature Conservation Committee (JNCC) survey methods[28] (Technical Appendix A7.1). Phase 1 Habitat Survey is a standard method for classifying and mapping British habitats.

17. The Phase 1 Habitat Survey recorded habitats within 'the Habitat Survey Area' (HSA), an area covering the Infrastructure Layout with an additional 250 m surrounding buffer.

18. In addition, the Phase 1 Habitat Survey aimed to identify wetland habitats in accordance with the habitat's descriptions given in 'A Functional Wetland Typology for Scotland' guidance[29]. Where wetland habitats were identified, further detailed surveys were undertaken for identification of vegetation communities with potential groundwater dependency in accordance with Scottish Environment Protection Agency (SEPA) guidance[17].

Survey Limitations

19. Access was not permitted to some small pockets of land lying outside of the Site Boundary but within the HSA. These areas included land surrounding Kilrubie Hill and land surrounding the eastern access road. In such cases it was possible to assess the vegetation from the Site Boundary and thus was not considered to be a major limitation.

7.3.5.2 National Vegetation Classification Survey

20. A National Vegetation Classification (NVC) Survey was undertaken on all wetlands and habitats of conservation value recorded during the Phase 1 Habitat survey. The NVC Survey involved mapping distinct areas of homogenous vegetation within the HSA and recording detailed descriptions of the vegetation communities, with reference to published community descriptions[30,31,32]. Full methods are presented in Technical Appendix A7.1.

Survey Limitations

21. Access was not permitted to some small pockets of land lying outside of the Site Boundary but within the HSA. These areas included land surrounding Kilrubie Hill and land surrounding the eastern access road. In such cases it was possible to assess the vegetation from the Site Boundary and thus was not considered to be a major limitation.

[28] JNCC (2010) Handbook for Phase 1 Habitat Survey: A technique for environmental audit. 5th Edition
[29] SNIFFER (2009) WFD95: A Functional Wetland Typology for Scotland – Field Survey Manual. Version 1.
[30] Rodwell, J. S (ed.) (1991 *et seq.*). *British Plant Communities. Vol 1–5.* Cambridge University Press
[31] Elkington, T., Dayton, N., Jackson, D. L. and Strachan, I. M. (2001). *National Vegetation Classification: Field Guide to Mires and Heaths.* Joins Nature Conservation Committee, Peterborough
[32] Averis, B., Birks, J., Horsefield, D., Thompson, D. and Yeo, M. (2004). *An Illustrative Guide to British Upland Vegetation,* JNCC, Peterburgh

7.3.5.3 Protected Species Survey (excluding bats)

22. Protected Species Surveys were carried out between February and September 2020 (Technical Appendix A7.2). The Protected Species Surveys encompassed all land within the Site and extended up to a 250 m radius ('the Ecology Survey Area'), in line with NatureScot guidance[33]. The 250 m radius included suitable habitats for all protected species considered, but the area surveyed for each species varied depending on species-specific survey guidelines and best practice[33], as outlined below:

- Badger (*Meles meles*): Suitable habitats within the Site and extending up to 100 m from the Site Boundary;
- Pine marten (*Martes martes*): Suitable habitats within the Site and extending up to 250 m from the Site Boundary;
- Red squirrel (*Sciurus vulgaris*): Suitable habitats within the Site and extending up to 50 m from the Site Boundary;
- Otter (*Lutra lutra*): Suitable riparian habitats within the Site and extending up to 200 m up- and downstream of watercourses potentially impacted by the Development; and
- Water vole (*Arvicola amphibius*): Suitable riparian habitats within the Site and extending up to 50 m up- and downstream of watercourses potentially impacted by the Development.

7.3.5.4 Great Crested Newt Surveys

23. All suitable freshwater habitats within the Site and extending up to 500 m from the Site Boundary were surveyed for their potential to support great crested newt (*Triturus cristatus*).

Habitat Suitability Index

24. Five ponds were surveyed for their suitability for supporting great crested newt (GCN) in 2020. One pond was identified within 500 m of the Development from OS mapping prior to the survey for GCN taking place. Four additional ponds were recorded during the field survey visit, which looked to be recently established.

25. The suitability of the habitat provided for GCN at each pond was determined using the GCN Habitat Suitability Index (HSI). Details of the HSI methods is provided in Appendix A7.2, but in summary HSI allocates a score against various suitability factors, including geographic location, pond size, presence of fish, and availability of suitable terrestrial habitat. The HSI scores are calculated as the geometric mean of the ten individual habitat suitability scores, and lie between 0 and 1. These scores provide an indication as to the likelihood of a pond supporting GCN. In general, ponds with high scores are more likely to support GCN than those with low scores.

26. Ponds that scored average, good, or excellent, were then surveyed for GCN presence or absence using Environmental Deoxyribonucleic Acid (eDNA) Analysis.

eDNA Analysis

27. Water samples were taken for eDNA analysis on 18th June 2020 during the breeding season in accordance with NatureScot guidance[34]. Water samples were collected from the perimeter of the waterbodies in accordance with Department for Environment, Food

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[33] NatureScot (2021) Protected Species Advice for Developers. Guidance on Planning and Protected Animals. [Online] Available at: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/planning-and-development-protected-species. (Accessed 14/02/2021).
[34] NatureScot (2021). Standing advice for planning consultations – Great Crested Newts. [Online] Available at: https://www.nature.scot/standing-advice-planning-consultations-great-crested-newts. (Accessed 21/02/2021).

and Rural Affairs (DEFRA) technical advice note[35] and were analysed by SureScreen Scientifics in accordance with eDNA analytical protocols.

7.3.5.5 Bats

28. Bat Surveys were carried out with reference to NatureScot guidelines published in 2019[36], between April and October 2020 ('the Bat Survey Season'), with all survey work undertaken by Arcus. The Development consists of 12 turbines which categorises the project size as 'Medium' in line with the guidance[36]. In terms of habitat quality for bats, the Site was suboptimal being relatively isolated and dominated by commercially stocked Sitka spruce (*Picea sitchensis*) conifer plantation. However, some features were identified with suitability for foraging (such as glades, burns and forestry edge), and commuting (burns). Furthermore, there were a small number of potential roost features, and those that were present were of low quality. Overall suitability of the Site for bats was assessed to fall within the 'Low' habitat risk category.

29. Survey methods reflected those recommended in the guidelines[36] for a low-risk site and is described in further detail below in the following sections, and fully detailed in Technical Appendix A7.3: Bat Surveys.

Automated Static Surveys

30. The Survey Season comprises of the following three seasonal Survey Sessions, which current NatureScot guidance[36] defines as follows:

- Survey Session 1: April/May (Spring);
- Survey Session 2: June-mid-August (Summer); and,
- Survey Session 3: Mid-August-October (Autumn).

31. A total of 10 full spectrum Anabat Swift bat detectors (hereafter referred to as 'Anabats'), were deployed at ground level (detectors secured to 1 m high posts) for a minimum of 10 consecutive nights across a range of habitat types, as per NatureScot guidance[36]. The Anabats were set to record from approximately half an hour before sunset until approximately half an hour after sunrise.

32. In order to collect comparative data, Anabats were deployed at the same 10 Remote Static Survey Locations across the three Survey Sessions, as shown in Figure 7.3:

- Survey Session 1: 30/04/2020 – 13/05/2020;
- Survey Session 2: 08/07/2020 – 22/07/2020; and
- Survey Session 3: 25/09/2020 – 09/10/2020.

Roost Surveys

33. Walkovers of the Ecology Survey Area (ESA) during Bat Surveys and Protected Species Surveys identified a very low number of features with suitability to support roosting bats within the ESA and Access Route, as detailed in Technical Appendix A7.3. These consisted largely of mature broadleaved trees.

Survey Limitations

34. Two Anabats were stolen from their Remote Static Survey Locations (RSSLs). One during Survey Session 1 (RSSL E) and one during Survey Session 2 (RSSL D). This resulted in a loss of data for these respective Survey Sessions at these RSSLs. The remaining nine

[35] Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P, and Dunn F (2014) *Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA*. Freshwater Habitats Trust, Oxford.

[36] NatureScot, Natural England, Natural Resources Wales, Renewable UK, ScottishPower Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (2019): Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation. Version: January 2019.

Anabats were positioned to capture bat activity across a range of habitat types and so the loss of data from one Anabat from a single Survey Session is perceived to be a relatively minor limitation.

7.3.5.6 Fisheries Surveys

35. Fisheries Surveys were carried out by the Tweed Foundation (Scottish Fisheries Co-ordination Centre (SFCC) qualified surveyors) on 3rd October 2019.

Fish Habitat Assessment

36. Based on local knowledge and historical data, a fish habitat assessment of the Site (excluding eastern access road) was provided by the Tweed Foundation, detailing the suitability of watercourses to provide habitat for key fish species, as detailed below. Further detail is provided in Appendix A7.4.

Electro-fishing Survey

37. Based on local knowledge and historical data (electro-fishing and obstructions to fish migration), Fisheries Survey Sites (FSS) were located outside of the Site, in a watercourse where the following key species could be found: Atlantic salmon (*Salmo salar*), brown trout (*Salmo trutta*), brook lamprey (*Lampetra planeri*), river lamprey (*Lampetra fluviatilis*), sea lamprey (*Petromyzon marinus*) and European eel (*Anguilla anguilla*). Surveys were carried out across six FSS along the Flemington Burn. Further information, as well as detailed survey methods, are presented in Technical Appendix A7.4.

38. Following SFCC guidance[37] single run, semi-quantitative electro-fishing method was chosen as the most appropriate balance of attaining coverage and a reasonable level of accuracy. Sampling was carried out in fast-flowing, relatively shallow areas, which are the preferred habitat of juvenile salmon and trout. Juvenile salmon are usually more common in main channels while trout, by contrast, dominate the smaller burns where adult trout spawn. Patches of fine sediment, if present, were also sampled to assess the distribution and abundance of larval lamprey. Further information is presented in Technical Appendix A7.4.

7.3.6 Determining Importance

39. One of the key challenges in Ecological Impact Assessment (EcIA) is to decide which ecological features are sufficiently important to justify a detailed assessment. Such ecological features will be those that are considered to be most important and potentially affected by the project. Some examples of the criteria used to determine importance are defined in Table 7.2.

40. Habitats and species of nature conservation importance are identified through policies and legislation. For example, habitats and species of international importance are listed on Annex I of the Habitats Directive. Where these are considered of principal importance for biodiversity in Scotland, these features are also listed in the Nature Conservation (Scotland) Act. Other features of importance may be listed on the SBL or as Local Biodiversity Action Plan (LBAP) priorities. These elements provided a crucial starting point for the identification of IEFs requiring consideration in EcIA, however they did not solely determine the level of importance assigned (with the exception of internationally designated European sites).

41. Expert judgement was applied to determine the level of importance and to identify IEFs. When determining the importance in the context of EcIA, contextual information regarding distribution and abundance of a given species was essential, and included population trends based on historical records.

[37] SFCC (2007). *Electro-fishing team leader training manual. Fisheries management SVQ 3.* Manage electrofishing operations.

42. The scale within which importance is determined may also relate to a particular population and thus was considered when determining importance.

43. Additionally, in accordance with CIEEM guidance[12], where a legally protected species was present within the zone of influence and there is potential for a breach of legislation, such species was considered to be an IEF.

Table 7.2: Determination Criteria for Ecological Importance

Importance of Receptor	Determination Criteria Examples
International	The population has little or no ability to absorb change without fundamentally altering its present character (i.e. the population of a rare and sensitive species in significant decline). An internationally designated site (e.g. a SAC) or a site meeting criterion for international designations. Species present in internationally important numbers (>1% of biogeographic populations).
National (i.e. Scotland)	The population has low ability to absorb change without fundamentally altering its present character (i.e. the population of an uncommon or rare species in decline, or a common species in significant decline). A nationally designated site (e.g. a SSSI) or a site meeting criterion for national designations. Species present in nationally important numbers (>1% Scottish population). Large areas of priority habitats listed on Annex I of the Habitats Directive and smaller areas of such habitats that are essential to maintain the viability of that ecological resource.
Regional Importance (i.e. Scottish Borders)	The population has moderate capacity to absorb change without significantly altering its present character. (i.e. an uncommon or rare but stable species, or a common/widespread but declining species). Species present in regionally important numbers (>5% Scottish Borders population). Sites not meeting criteria for SSSI selection but of greater than the local criteria below. Priorities within the LBAP, where they occur in sufficient abundance to maintain the local resource.
Local Importance (i.e. within 10 km of the Site)	The population is tolerant of change without detriment to its character (a common/widespread species that is stable, or an uncommon species is improving). A species or habitat of low conservation value. Scottish Wildlife Trust (SWT) Reserves and Local Nature Reserves (LNRs). Areas of habitat or species considered to appreciably enrich the ecological resource within the area local to the Site.
Less than Local Importance (Site wide)	The population is resistant to change (any population that is improving its range and abundance). Population of little conservation value. Usually widespread and common habitats and species. Loss of such a species from the Site would not be detrimental to the ecology of the local area.

7.3.6.1 Characterisation of Potential Effects

44. In line with the CIEEM EcIA guidance12 where possible, consideration is given to the following characteristics when identifying potential effects of the Development on IEFs:

- **Nature of effect**: whether it is positive (beneficial) to IEFs, e.g. by increasing species diversity or extending habitat, or negative (detrimental), e.g. by loss of, or displacement from, suitable habitat;
- **Extent**: the spatial or geographical area over which the effect may occur;
- **Duration**: the duration of an effect as defined in relation to ecological characteristics (such as a species' life cycle) as well as human timeframes. Impacts may be described as short-, medium-, long-term, permanent or temporary;
- **Frequency**: the number of times an activity occurs may influence the resulting effect;
- **Timing**: this may result in an impact on an ecological feature if it coincides with critical life stages or seasons; and
- **Reversibility**: an irreversible impact is one from which recovery is not possible within a reasonable timescale, or there is no reasonable chance of action being taken to reverse it. A reversible impact is one from which spontaneous recovery is possible or which may be counteracted by mitigation.

7.3.7 Magnitude of Effect

45. The magnitude of potential effects will be identified through consideration of the above effect characteristics, to determine the degree of change to baseline conditions predicted as a result of the Development. The criteria for assessing the magnitude of an effect are presented in Table 7.3.

Table 7.3: Framework for Determining Magnitude of Effects

Magnitude of Effects	Definition
High	A fundamental change to the baseline condition of the asset, leading to total loss or major alteration of character.
Medium	A material, partial loss or alteration of character.
Low	A slight, detectable, alteration of the baseline condition of the asset.
Negligible	A barely distinguishable change from baseline conditions.

7.3.8 Significance of Effect

46. Significance is a concept related to the weight that should be attached to effects when decisions are made. A significant effect is simply an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. A significant effect does not necessarily equate to an effect so severe that consent for the project should be refused.

47. To determine significance in other chapters within this EIAR a matrix approach has been used. This is widely used in EIA to provide consistency across all the topics and clarity to decision makers. However, as CIEEM guidance[12] discourages the use of the matrix approach it has not been used within this chapter.

48. For the purposes of the EcIA, the significance of effect was defined as an effect that either supports or undermines biodiversity conservation objectives for IEFs, or for biodiversity in general. Conservation objectives may be specific, broad or wide-ranging; therefore, effects can be considered as significant at a wide range of scales from international (major) to local (negligible). Significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems, and the conservation status of habitats and species, including their distribution and abundance.

49. The importance of the IEF and the magnitude of the predicted effects will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects.

50. Where significant effects are identified they will be qualified with reference to an appropriate geographic scale. It is important to note that the scale of a significant effect, may not be the same as the geographic context in which the feature is considered important. This enables consistency in scale when determining appropriate mitigation or compensation solutions.

7.3.9 Cumulative Effects

51. Cumulative effects can result from individually not significant but collectively significant actions taking place over a period of time or concentrated in a location. Within EcIA, cumulative effects are particularly important as many ecological features are exposed to background levels of threat or pressure and may be close to reaching critical thresholds where further impact could cause irreversible decline. It is recognised that different actions can cause cumulative effects as follows:

- Additive/incremental effects: multiple activities/projects may give rise to a significant effect due to their proximity in time and space. These may be additive or synergistic effects; and
- Ancillary: ancillary developments may include different aspects of the project which may be authorised under different consent processes, these will be included as part of the cumulative assessment.

7.3.10 Residual Impacts

52. Following the assessment of effects, including incorporation of embedded mitigation and enhancement commitments, all attempts will be made to avoid and mitigate significant ecological impacts, through specific, applied mitigation, whereupon an assessment of residual effects will be undertaken to determine their significance.

7.4 BASELINE CONDITIONS

7.4.1 Desk Study Results

7.4.1.1 Statutory Designated Sites

53. Four statutory designated sites were recorded within the Desk Study Area. Information relating to these statutory designated sites is provided in Figure 2.1 of **Chapter 2: Site Selection and Design** and in Table 7.4 below.

Table 7.4: Statutory Designated Sites within Desk Study Area

Name	**Designation**	**Proximity to Site**	**Relevant Key Designated Features**
River Tweed	SAC	Adjacent to eastern access road. 0.4 km west of western Site Boundary.	• Atlantic salmon (*Salmo salar*) • Brook lamprey (*Lampetra planeri*) • River lamprey (*Lampetra fluviatilis*) • Sea lamprey (*Petromyzon marinus*) • Otter • Rivers with floating vegetation often dominated by water-crowfoot
	SSSI	5 km south	• Atlantic salmon • Brook lamprey • River lamprey • Sea lamprey • Otter • Beetle assemblage • Fly assemblage

Name	**Designation**	**Proximity to Site**	**Relevant Key Designated Features**
			• Vascular plant assemblage • Trophic range river/stream
Whim Bog	SSSI	2 km north	• Raised bog
Dundreich Plateau	SSSI	3.3 km east	• Blanket bog • Subalpine flushes
Auchencorth Moss	SSSI	3.4 km north	• Raised bog

7.4.1.2 Non-statutory Sites

54. Four non-statutory designated sites were recorded within 2 km of the Site, information relating to these is provided in Table 7.5 below.

Table 7.5: Non-Statutory Designated Sites within 2 km of the Site

Name	**Designation**	**Proximity to Site**	**Relevant Key Features**
Cloich Bog	Local Biodiversity Site (LBS)	Adjacent to eastern Site Boundary	• Modified bog, burns and marsh habitats • Small pearl-bordered fritillary (*Boloria selene*), small heath (*Coenonympha pamphilus*), Brown Hare (*Lepus europaeus*)
Shiphorn Quarry	LBS	0.3 km north-east	• Plantation woodland on former quarry pits. • Badger and common frog (*Rana temporaria*) named as notable species
Nether Stewarton Pools (Loch Potts)	LBS	0.6 km east	• Ponds, marsh and swamp habitats.
Portmore Birchwoods	LBS	1.2 km north-east	• Semi-natural, moderately species-rich birch woodland on the banks of Portmore Loch. • Several moss species named as notable; including Blunt-leaved Bog-moss (*Sphagnum palustre*), A Bog-moss (*Sphagnum recurvum*) and Lustrous Bog-moss (*Sphagnum subnitens*)

7.4.1.3 Protected and Notable Species Records

55. Table 7.6 provides a summary of recent (2000-2020) records of protected species within the DSA identified in the TWIC data and publicly available data resources. This included recent records of internationally protected species of conservation priority, as well as other notable, protected or invasive species.

Table 7.6: Recent Records of Protected and Notable Species within the DSA

Species	**Conservation Status**	**Closest Record from Site**	**Year of Record(s)**
Mammals			
Mountain Hare (*Lepus timidus*)	WCA[38], EPS[39], SBL[40]	3.6 km east	2013 - 2017 (3 records)
Brown Hare (*Lepus europaeus*)	WCA, EPS, SBL	0.2 km east	2000 - 2015 (31 records)
Red squirrel	WCA, SBL	2.4 km east	2004 -2013 (14 records)
Pine marten	HR[41], SBL	2.6 km east	2004 - 2013 (3 records)
Otter	HR, SB	0.3 km south	2002 – 2019 (27 records)
Badger	PBA[42]	In the centre of Site near Courhope	2000 – 2019 (272 records)
West European Hedgehog (*Erinaceus europaeus*)	SBL	Where the access road meets the A703	2001 – 2019 (30 records)
Amphibians and Reptiles			
Common Toad (*Bufo bufo*)	WCA, SBL	1.2 km east	2004 – 2015 (11 records)
Great Crested Newt	WCA, HR, SBL	Within 1 km north-west	2006 (1 record)
Common Lizard (*Zootoca vivipara*)	WCA, SBL	In the west of Site	2000 – 2016 (13 records)
Fish			
European Eel (*Anguilla Anguilla*)	SBL	River where the access road meets the A703	2000 – 2006 (17 records)
Atlantic Salmon	SBL	River where the access road meets the A703	2000 – 2012 (31 records)
Brown Trout (*Salmo trutta*)	SBL	In Shiplaw Burn in the north-east of Site	2000 -2006 (29 records)

[38] Wildlife and Countryside Act (1981). [Online] Available at http://www.legislation.gov.uk/ukpga/1981/69. (Accessed 04/02/2021).
[39] European Protected Species, Habitats Regulations (1994). [Online] Available at http://www.legislation.gov.uk/uksi/1994/2716/contents/made. (Accessed 04/02/2021).
[40] Scottish Biodiversity List. [Online] Available at http://www.gov.scot/Topics/Environment/Wildlife-Habitats/16118/Biodiversitylist/SBL. (Accessed 04/02/2021).
[41] Habitats Regulations (1994). [Online] Available online at http://www.legislation.gov.uk/uksi/1994/2716/contents/made (Accessed 04/02/2021).
[42] Protection of Badgers Act (1992). [Online]. Available online at: https://www.legislation.gov.uk/ukpga/1992/51/contents (Accessed 04/02/2021).

Species	**Conservation Status**	**Closest Record from Site**	**Year of Record(s)**
Plants			
Juniper (*Juniperus communis*)	SBL	2.55 km north	2013 (2 records)
Black-grass (*Alopecurus myosuroides*)	SBL	3.1 km west	2013 (1 record)
Clustered Bellflower (*Campanula glomerata*)	SBL	1 km south	2006 (1 record)
Cornflower (*Centaurea cyanus*)	SBL	0.13 km from access road	2015 (1 record)
Greater Celandine (*Chelidonium majus*)	SBL	4.8 km west	2013 (1 record)
Sun Spurge (*Euphorbia helioscopia*)	SBL	0.5 km north-west	2009 – 2018 (7 records)
Black-bindweed (*Fallopia convolvulus*)	SBL	In north of Site	2009 – 2018 (15 records)
Purple Ramping-fumitory (*Fumaria purpurea*)	SBL	4 km south-east	2009 (1 record)
Large-flowered Hemp-nettle (*Galeopsis speciosa*)	SBL	0.95 km east	2009 – 2015 (5 records)
Field Gentian (*Gentianella campestris*)	SBL	2.1 km east	2003 – 2005 (4 records)
Corn Mint (*Mentha arvensis*)	SBL	4.4 km north	2017 (2 records)
Woolly Willow (*Salix lanata*)	SBL	5 km north-west	2017 (1 record)
White Mustard (*Sinapis alba*)	SBL	Within 1 km grid square overlapping access road	2009 – 2017 (5 records)
Charlock (*Sinapis arvensis*)	SBL	In north of Site	2009 – 2018 (15 records)
Wood Bitter-vetch (*Vicia orobus*)	SBL	0.8 km north-east	2005 – 2015 (4 records)
Wild Pansy (*Viola tricolor*)	SBL	0.23 km west	2011 – 2015 (2 records)
Insects			
Northern Brown Argus (*Aricia artaxerxes*)	SBL	0.54 km west	2000 – 2014 (10 records)
Small Pearl-bordered Fritillary (*Boloria selene*)	SBL	0.45 km east	2008 – 2016 (12 records)
Small Heath (*Coenonympha pamphilus*)	SBL	In the south-west of Site near Courhope	2000 – 2017 (63 records)
Large Heath (*Coenonympha tullia*)	SBL	3.2 km north-east	2001 – 2016 (15 records)
Bilberry Bumblebee (*Bombus monticola*)	SBL	1.7 km east	2016 (1 record)

Species	Conservation Status	Closest Record from Site	Year of Record(s)
Knot Grass (*Acronicta rumicis*)	SBL	3.3 km north	2003 – 2016 (5 records
Brown-spot Pinion (*Agrochola litura*)	SBL	1.8 km north-west	2010 – 2017 (8 records)
Green-brindled Crescent (*Allophyes oxyacanthae*)	SBL	4.9 km south-east	2010 (1 record)
Ear Moth (*Amphipoea oculea*)	SBL	1.8 km north-west	2011 (1 record)
Dusky Brocade (*Apamea remissa*)	SBL	1.75 km east	2010 – 2016 (3 records)
Garden Tiger (*Arctia caja*)	SBL	3.1 km west	2007 (2 records)
Centre-barred Sallow (*Atethmia centrago*)	SBL	1.8 km north-west	2010 – 2011 (2 records)
Haworth's Minor (*Celaena haworthii*)	SBL	1.8 km north-west	2011 – 2017 (3 records)
Broom Moth (*Ceramica pisi*)	SBL	1.8 km north-west	2016 – 2017 (4 records)
Latticed Heath (*Chiasmia clathrata*)	SBL	0.35 km south	2010 – 2018 (5 records)
Sallow (*Cirrhia icteritia*)	SBL	1.8 km north-west	2010 – 2017 3 records)
Small Square-spot (*Diarsia rubi*)	SBL	3.5 km south-east	2010 – 2012 (4 records)
Small Phoenix (*Ecliptopera silaceata*)	SBL	3.2 km north	2010 – 2018 (7 records)
Autumnal Rustic (*Eugnorisma glareosa*)	SBL	1.9 km north-west	2011 – 2017 (4 records)
Garden Dart (*Euxoa nigricans*)	SBL	2.5 km north-west	2016 (1 record)
Ghost Moth (*Hepialus humuli*)	SBL	0.5 km east	2007 – 2015 (3 records)
Rosy Rustic (*Hydraecia micacea*)	SBL	1.75 km north-west	2010 – 2017 (17 records)
Dark Brocade (*Mniotype adusta*)	SBL	3.3 km north	2016 (2 records)
Powdered Quaker (*Orthosia gracilis*)	SBL	3.6 km south-east	2011 – 2012 (5 records)
Shaded Broad-bar (*Scotopteryx chenopodiata*)	SBL	3.25 km north	2010 – 2018 (5 records)
Heath Rustic (*Xestia agathina*)	SBL	2.5 km north-west	2016 (3 records)
Neglected Rustic (*Xestia castanea*)	SBL	2.5 km north	2016 (2 records)
Lichens			

Species	Conservation Status	Closest Record from Site	Year of Record(s)
River jelly-lichen (*Collema dichotomum)*	WCA, SBL	5 km south	2004 (1 record)
Lecania cyrtella lichen	SBL	3.5 km north-west	2007 (1 record)
Ramalina fraxinea lichen	SBL	1.2 km south-east	2013 (1 record)
Invasive Species			
Eastern Grey Squirrel (*Sciurus carolinensis*)	INNS	1.4 km east	2011 – 2014 (4 records)
Sika Deer *(Cervus nippon)*	INNS	0.3 km east	2014 (1 record)
Fallow Deer *(Dama dama)*	INNS	0.2 km east	2001 – 2018 (16 records)
Rainbow Trout *(Oncorhynchus mykiss)*	INNS	1.9 km north-east in Portmore Reservoir	2002 (2 records)
Key: EPS: European Protected Species HR: The Conservation (Natural Habitats, &c.) Regulations 1994 (European Protected Species) INNS: Invasive Non-native Species PBA: Protection of Badgers Act 1992 SBL: Scottish Biodiversity List WCA: Wildlife and Countryside Act 1981			

7.4.2 Baseline Survey Results

7.4.2.1 Habitats & Botany

56. Full survey results and detailed, large-scale figures of Phase 1 habitats and NVC communities, are provided in Technical Appendix A7.1. A summary of the Habitat & Botany survey results is presented below in Table 7.7.

Table 7.7: Summary of the Phase 1 Habitats and their Areas within the Habitat Survey Area[43]

Phase 1 Code and Title	Summary Description	Associated NVC Communities	Area of Habitat (ha)
A1.2.2 Conifer Plantation Woodland	The majority of the Site is an actively managed conifer plantation where the dominant species is Sitka spruce (*Picea sitchensis*) with lesser amounts of Douglas fir (*Pseudotsuga menziesii*), Norway spruce (*Picea abies*), larch (*Larix* sp.), lodgepole pine (*Pinus contorta*) and Scots pine (*Pinus sylvestris*). The age structure of conifers varies throughout the Site as conifer blocks are clear-felled and replanted at different times and range in age from newly planted to mature. Beneath mature stands of conifer plantation there is generally an absence of ground flora due to lack of light penetration and the acidic conditions created by the conifers. A belt of coniferous woodland is also located to the north and south of the local road linking Whim to Shiplaw.	N/A	539.82
A3.1 Scattered Trees	The main area of scattered trees mapped along the access road runs parallel to the Whim to Shiplaw local road which leads off the main road A703. The line of mature broadleaved trees, which have been planted in the road verge and within the field boundary to the north, form two sheltered tree lines which run from the junction to the field boundary adjacent to Signal Cottage. Additional scattered mixed deciduous trees are located adjacent to the track running alongside Cloich Farm.	N/A	0.61
A4.2 Recently Felled Coniferous Plantation Woodland	A relatively large area of clearfell was present on Site, with the largest continuous area present in the south of the Site, south of Courhope. Other stands were noted in the northwest of the Site and buffer.	N/A	2.29
B1.2 Acid grassland – semi-improved	Semi-improved, species-poor grasslands were primarily found on the drier, sloped, well-drained areas around Courhope Farm, and included species such as heath bedstraw (*Galium saxatile*), sheep's fescue (*Festuca ovina*) and mat grass (*Nardus stricta*) in places, although many areas on flatter ground had been subject to some improvement.	U4b	31.19
B2.1 Neutral grassland - unimproved	A linear swathe of coarse, unmanaged neutral grassland sides the Eddleston Water north of the bridge at Signal Cottage. This was dominated by false-oat grass with some cock's foot. Viewing this from the bridge, the grassland lacked any bulky herbs that would have been flowering. This together with the even, homogenous sward indicated relatively recent origin. The riverside was more diverse with reed canary grass (*Phalaris arundinacea*),	N/A	0.78

[43] Note that this area includes the Site and a 250 m buffer.

Phase 1 Code and Title	Summary Description	Associated NVC Communities	Area of Habitat (ha)
	common valerian (*Valeriana officinalis*), meadowsweet (*Filipendula ulmeria*) and monkeyflower (*Mimulu guttatus*) readily identifiable.		
B2.2 Neutral grassland – semi-improved	This included stands of species-poor tufted hair-grass and soft rush with Yorkshire fog (*Holcus lanatus*), which occurred in the south of the Habitat Survey Area in the enclosed fields around Courhope Farm.	N/A	2.59
B4 Improved grassland	These grasslands comprised areas where the sward was species-poor and which lacked any indicator species of either acid or base-rich grassland. This habitat was present in fields used for grazing, located in the centre of the southern section of the Site. Further fields used for grazing sheep were located throughout the buffer of the access road and was botanically unremarkable.	MG6	48.73
B5 Marsh/marshy grassland	Marshy grassland was the commonest habitat of the open ground (such as rides) within the plantation. It varied from stands of species-rich rush-pasture (M23a), which supported a good range of herbs in with the sharp-flowered rush (*Juncus acutifloris*) including yellow pimpernel (*Lysimachia nemorum*), angelica (*Angelica archangelica*), meadowsweet, marsh thistle (*Cirsium palustre*), bugle (*Ajuga reptans*), devil's bit scabious (*Succisa pratensis*) and Grass of Parnassus (*Parnassia palustris*) to species-poor stands (M23b), dominated by soft rush (*Juncus effusus*), and purple moor-grass (*Molinia caerulea*) (M25) dominated areas by the Courhope Burn. The species-rich areas were often associated with watercourses although a large patch was present at Courhope. At Courhope, there were also large areas of species-poor M23a/b marshy grassland. Elsewhere, more disturbed stands which were dominated by soft rush with tufted hair-grass (*Deschampsia cespitosa*) and Yorkshire fog were mapped as marshy grassland. These were similar to the vegetation mapped as semi-improved neutral grassland except they were wetter underfoot and had more soft rush.	M23a, M23b, M25	22.32
C1.2 Tall herb and fern - bracken	There were several areas of either continuous or scattered bracken (*Pteridium aquilinium*) in several sections of the more open ground between forestry blocks.	U20	5.54
D1.1 Dry dwarf shrub heath - acid	This habitat was limited in extent, with relatively small stands found, sometimes merging into dry modified bog habitat.	H21, H12	0.06
E1.8 Dry modified bog	This vegetation was similar to the dry heath except that there was a greater cover of hare's-tail cottongrass (*Eriophorum vaginatum*) mixed in with the heather (*Calluna vulgaris*) and bilberry (*Vaccinium myrtillus*), with small areas of red bogmoss (*Sphagnum capillifolium*), heath rush (*Juncus squarrosus*), wavy hair grass (*Deschampsia flexuosa*) and purple moor grass.	M19	0.39

Phase 1 Code and Title	Summary Description	Associated NVC Communities	Area of Habitat (ha)
E2.1 Flush/spring – acid/neutral	Tiny areas of acid flush were found in the south of the Site near Courhope Farm. These were dominated by mixes of soft and sharp-flowered rushes with *Sphagnum*.	M6	0.12

7.4.2.2 Protected Species (excluding Bats)

57. A summary of the Protected Species Survey results is presented below. Full survey results are presented Technical Appendix A7.2.

Badger

58. Evidence of badger was recorded within the ESA, with three active setts recorded and numerous badger fields signs, including prints, fresh bedding, guard hairs, paths and latrines.

59. Habitats within the ESA varied in their suitability to support badger. Active setts were only recorded in a small pocket of woodland located adjacent to pasture. However, there are numerous opportunities for foraging provided by the surrounding farmland habitat and pockets of woodland located to the east of the ESA. There is also good habitat present for commuting between the ESA and the surrounding area.

60. The results of the badger survey are presented in a Confidential Annex to Appendix A7.2.

Pine marten

61. Numerous pine marten scats were recorded within the ESA, along forestry tracks and animal paths. No pine marten dens were recorded.

62. The ESA was dominated by mature and semi-mature Sitka spruce commercial forestry, and some scattered areas of younger broadleaved woodland which are well connected to wider swathes of forestry outwith the ESA, allowing for species dispersal. The woodland habitats within the ESA provide suitable resources for pine marten, which are associated with coniferous plantation woodland. Further, a mosaic of habitats is optimal for pine marten with mature forest providing cover and denning habitat with open areas of grassy vegetation providing habitat for small mammals, an important prey resource[44].

Red Squirrel

63. No evidence of red squirrel was recorded within the ESA.

64. Habitats within the ESA were considered suitable for red squirrel, having a mix of coniferous plantation of various ages offering good foraging, commuting and shelter to red squirrel.

Otter

65. Evidence of otter was recorded within the ESA, with several spraints recorded. Most of these were associated with the Flemington Burn, in the west of the ESA. A spraint was also recorded under a disused bridge, approximately 170 m from the proposed western access track adjacent to a pond and the upper reaches of the Cowieslinn Burn. Although potentially suitable, no evidence was present to indicate that this was in use as a holt.

66. The ESA therefore offers some suitable habitat for otters. Several of the watercourses within the ESA offered suitable foraging opportunities and the habitats in the surrounding area were suitable for supporting amphibian species and juvenile fish (see Section 7.4.2.4). The watercourses present on Site, however, offer less suitability, given their limited size. These watercourses increase in suitability as they flow downstream where they offer greater foraging and commuting potential. The watercourses on Site feed into the River Tweed SAC, which lists otter as a qualifying feature (see Section 7.4.1.).

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[44] Caryl, F.M. (2008). *Pine marten diet and habitat use within a managed forest environment*. PhD Thesis, University of Stirling, Stirling.

Water vole

67. No evidence of water vole was recorded within the ESA.

68. Watercourses within the ESA varied in their suitability to support water vole. Most were fast-flowing and lacked vegetated banks associated with typical water vole habitat[45], however, there were some limited stretches that were considered to have a suitably flow rate and suitable bankside habitat that could provide suitable habitat to support water vole.

Great Crested Newt

69. HSI surveys were undertaken on all five ponds, four of which were found to have 'average' habitat suitability for GCN and one pond having 'good' suitability.

70. All five ponds were subsequently surveyed using eDNA analysis to determine presence, however no evidence of GCN was recorded.

Other species

71. Woodland edge, bracken-covered slopes and quarries were present throughout the ESA, all of which offer foraging, refuge and hibernation resources for reptiles, including adder (*Vipera berus*) and common lizard[46]. Despite this, no sightings of reptiles were recorded within the ESA. Several common frogs were recorded during the Protected Species Surveys, indicating that the ponds present within the ESA provide ample breeding habitat for common amphibian species, such as common frog and common toad (*Bufo bufo*)[47].

7.4.2.3 Bats

72. A summary of the Bat Survey results is presented below. Full survey results and supporting data are provided Technical Appendix A7.3.

73. The majority of the Site consisted of plantation forest – commercially stocked mature Sitka spruce interspersed with areas of clearfell. Sitka spruce does not typically produce gaps or cavities in its trunk or bark, features that would be used by roosting bats[48]. Studies have shown that all bat species tend to avoid dense stands of commercial plantation[49]. However, the extensive ride and forest track system provide woodland edge habitats and areas of clearfell provide open areas within the Site. Such habitats have been shown to be of higher value to a variety of bat species, with edge-adapted species (such as *Pipistrellus* sp.) favouring forest edge and open-adapted species (such as *Nyctalus* sp.) favouring recently felled plantation.

74. The numerous small watercourses may also provide commuting and foraging potential across the Site and provide some connectivity with the wider area. The majority of the forestry in the local area is commercial in nature, with only a scattering of stands of mixed woodland or broad leaf woodland habitats. The open farmland habitats are largely poor upland grazing with little potential for bats.

75. There were no known records of any hibernaculum (winter hibernation roosts) within the Site or the wider local area. Pipistrelle bats have a tendency to hibernate in trees and

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[45] The Mammal Society. Water Vole Species Profile. [Online] Available at: https://www.mammal.org.uk/species-hub/full-species-hub/discover-mammals/species-water-vole/. (Accessed 27/02/2021).

[46] The Herpetological Conservation Trust (2007). National Amphibian and Reptile Recording Scheme, Habitat Recording Guide

[47] Joint Nature Conservation Committee (2014) Common Standards Monitoring Guidance for Reptiles and Amphibians, Version February 2004. JNCC, Peterborough.

[48] Andrews, H. (2018) Bat Roosts in Trees: A Guide to Identification and Assessment for Tree-Care and Ecology Professionals. Pelagic Publishing.

[49] Kirkpatrick L, Maher SJ, Lopez Z, Lintott PR, Bailey S, Dent D & Park K (2017) Bat use of commercial coniferous plantations at multiple spatial scales: Management and conservation Implications, Biological Conservation, 206, pp. 1-10.

buildings[50]. Roosting opportunities for bats within the Site were limited to mature broadleaved trees. In total, eight potential bat roost trees were identified, all of which were recorded as having low potential roost features. All of these potential bat roost trees are situated along the proposed access road to the east of the Site. No roost sites were recorded.

76. A total of 689 bat passes were recorded over a total of 3968.3 survey hours across the Survey Season, giving a total mean BAI of 0.17 passes per hour (pph) for the Site.

77. In total, three bat species and two genus classifications were recorded within the Site during the bat surveys. Species recorded were common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), and brown long-eared bat (*Plecotus auritus*). Bat registrations identified to genus level were *Nyctalus* spp. and *Myotis* spp.

78. High collision risk species recorded comprised common pipistrelle, soprano pipistrelle, and *Nyctalus* spp. All other bat species recorded are categorised as low collision risk (*Myotis* sp. and brown long-eared bat).

79. Of the activity recorded, the majority (85.62%) was attributed to soprano pipistrelle, with 11.18% attributed to common pipistrelle. *Nyctalus* sp. accounted for 1.45% of the total. *Myotis* sp. and brown long-eared were recorded infrequently, making up 0.73% and 0.15% of activity recorded, respectively. The remaining 0.87% was made up of calls of *Pipistrellus* sp. that could not be identified to species level.

80. Activity was recorded at all survey locations, however, notable spatial variation in the level of activity was evident. Approximately 78% of all bat passes were recorded at three locations situated within woodland edge habitat in close proximity to watercourses.

81. Ecobat[51] was used to gain estimates of relative bat activity recorded at the Site, as recommended per NatureScot Bat Survey guidance[36]. This guidance explains that "*The tool compares data entered by the user with bat survey information collected from similar areas at the same time of year. Ecobat generates a percentile rank for each night of activity and provides a numerical way of interpreting the levels of bat activity recorded at a site across regions in Britain*". Data from the Site was compared with data within a range of 100km of the Site and within 30 days of the survey date.

82. Based on Ecobat assessment[51], applied as per NatureScot guidance, activity recorded across all survey locations varied greatly between the low activity category (0-20th median percentiles and the moderate to high activity category (61st-80th median percentile). With the exception of common pipistrelle and soprano pipistrelle, all bat species fell within the low and low to moderate categories with respect to their relative activity levels. Both common pipistrelle and soprano pipistrelle fell within the category of moderate to high activity levels.

83. The risk assessment concluded a 'Medium' overall risk for common pipistrelle and soprano pipistrelle and a 'Low' overall risk for *Nyctalus spp*. However, at a finer scale this risk varies greatly by survey location, time of year and species, and this is highlighted in further detail in Appendix A7.3.

[50] Dietz, c & Keifer, A. (2016). Bats of Britain and Europe, Bloomsbury Publishing Plc, London ISBN: PB:977-1-4729-2202-1
[51] http://www.ecobat.org.uk/

7.4.2.4 Fisheries

84. Full details of the fish surveys are provided in Technical Appendix A7.4 with a summary provided below.

Habitat Assessment

85. Most of the watercourses within the Site Boundary were too small to contain fish and these are detailed within Technical Appendix A7.4. The watercourses of the Middle Burn and Cowieslinn Burn, located at the north of the Site are slightly larger near the Site Boundary but both have waterfalls located further downstream that are impassable to migratory fish. Due to the known absence of salmonids within the Site, sampling was undertaken outside of the Site, on the Flemington Burn, which is the principal tributary that flows along the western boundary of the Site and down into the Lyne Water.

Electro-fishing Survey

86. Salmon fry were present at five out of six FSS and parr were present at all of the FSS, albeit in relatively low numbers. Salmon fry densities were highest at the bottom of the Flemington Burn with 18 and 21 individuals per 100 m^2 recorded at FSS 1 and 2 respectively.

87. Relatively high numbers of trout fry were found at all FSS, with trout parr being much more variable, with results ranging from low to high with no obvious spatial pattern in abundance.

88. A single eel was found at three FSS and larval lamprey were detected at one FSS at the bottom of the Flemington Burn. There was no suitable habitat for sampling (fine sediment) in close proximity to any of the other FSS.

7.5 EMBEDDED MITIGATION

89. Application of the 'mitigation hierarchy' has been achieved throughout the Development design process, with the identification and incorporation of methods for the avoidance of impacts and application of embedded mitigation. Measures to avoid or reduce potential ecological effects have been incorporated into the design of the Development ('embedded mitigation'). This includes 'mitigation by design' whereby aspects of the Development have been re-designed to avoid or reduce ecological effects. This type of mitigation is particularly beneficial for ecological resources as there is greater certainty that it will be delivered.

90. Embedded mitigation also includes 'mitigation by practice' whereby mitigation is actively implemented during the Development process. Embedded mitigation is taken into consideration when undertaking the assessment of significant effects. If significant effects are predicted further mitigation is detailed.

7.5.1 Mitigation by Design

91. Ecological features have been considered at all stages of the Development design, from initial feasibility to final layout. This has helped to avoid or greatly reduce impacts on IEFs and other ecological features. A critical design consideration has been the avoidance of habitats with high conservation value or sensitivity, which has been largely achieved by siting the majority of the Development infrastructure in coniferous plantation and making use of existing forestry tracks. Furthermore, track design has largely avoided the need for felling mature deciduous trees (e.g. the scattered mixed deciduous trees adjacent to the track at Cloich Farm).

92. The sensitive designs (e.g. of watercourse crossing and culverts) presented in **Chapter 10: Hydrology and Hydrogeology** of this EIA Report have been developed to

safeguard the water environment, which will also help effectively mitigate construction-related direct and indirect impacts to fish and other aquatic features.

93. Good practice design mitigation measures will be adopted to minimise the risk of bats colliding with operational turbines, in accordance with NatureScot published guidance[36]. Turbines will have a 50 m separation distance between blade tips and high-value bat habitats, such as woodland, riparian habitats, and forest edges.

7.5.2 Mitigation by Practice: Construction

94. In addition to the incorporation of effective mitigation through Development design, the following Sections outline mitigation of Development impacts through practice, particularly with the aim of safeguarding of protected species during Development construction and operation and to restore and enhance peatland habitats.

7.5.2.1 Environmental Clerk of Works (ECoW)

95. A suitably qualified and experienced Environmental Clerk of Works (ECoW) will be appointed to provide appropriate ecological and environmental advice during construction, including the monitoring of compliance with conservation legislation, the recommendations of this EIA Report and any subsequent planning conditions.

96. Before construction begins, the ECoW and the project hydrologist will undertake a review of design and drainage plans to inform the requirement for micro-siting, to minimise the potential for effects to sensitive habitats such as mature broadleaved trees (e.g. at Cloich Farm), and to assist in the identification of appropriate locations for commencement of reinstatement works. Where possible, the ECoW will advise on the drainage design to minimise hydrological disruption and reduce the risk of scour and erosion. The ECoW will also monitor and advise on the implementation of pollution prevention and good working practices throughout construction, to protect both terrestrial and aquatic ecosystems from accidental pollution.

7.5.2.2 Mitigation for Protected Species

97. Pre-construction surveys for protected species, such as otter and badger, will be undertaken to provide up-to-date information about the distribution and abundance of the protected species identified in the baseline. The results of the surveys will inform the need for Species Protection Plans and associated mitigation and licencing requirements, all of which will be developed in line with NatureScot guidance.

7.5.2.3 Mitigation for Aquatic Habitats & Species

98. Mitigation presented with in **Chapter 10: Hydrology and Hydrogeology** of this EIA Report to safeguard the water environment, will also effectively mitigate construction-related impacts to fish such as the direct and indirect effect of pollution and sedimentation form instream works and surface water run- off.

7.5.3 Mitigation by Practice: Operation

99. To minimise the risk of bats colliding with operational turbines, the 50 m separation distance between blade tips and high-value bat habitats implemented during construction, will be maintained throughout the operational life of the Development by ensuring that tree regeneration does not encroach on the buffer.

7.5.4 Mitigation by Practice: Decommissioning

100. Decommissioning activities are anticipated to be of a similar character to those of Development construction and so the construction phase embedded mitigation outlined above is considered appropriate to the decommissioning phase.

7.5.5 Enhancement

7.5.5.1 Outline Habitat Management Plan

101. Habitat Management will be implemented in accordance with a Habitat Management Plan (HMP). A detailed HMP will be written and developed in full following consent, and in consultation with NatureScot, SBC, RSPB and the Tweed Forum, where relevant, however a high-level summary is outlined below.

102. Upon consent, the development of the HMP will be informed, where necessary, by further site appraisal to ensure the appropriate methods and plans are to be implemented.

103. Once developed, the HMP will remain an active document and will be reviewed on a regular basis by appropriate stakeholders.

Enhancement Measures for Bats

104. No bat roosts were identified during the bat surveys. However, it is probable that a small number of common and soprano pipistrelle are roosting nearby due to the activity recorded during the surveys.

105. In order to increase and enhance the bat roosting habitat, dead trees with suitable roost features will be retained where possible. Additionally, certain high-value areas (i.e. areas with broadleaved trees) will be enhanced with the provision of 15 bat boxes (i.e. three boxes on each of five trees).

106. It is important to strike a balance between potentially enhancing the value of the Site for bats and potentially increasing the risk to these bats due to turbine operation. Accordingly, the enhancement suggested above avoids attracting bats towards turbines with enhancement areas lying over 500 m from turbines.

107. Exact specifications will be provided in the HMP.

7.6 DETERMINATION OF ECOLOGICAL IMPORTANCE

Table 7.8 evaluates the importance of ecological features associated with Development, and determines which ecological features, based on both their intrinsic value and their potential to be affected by wind farm development, are considered to be IEFs. Each ecological feature has been assigned a level of importance in accordance with the geographical scale outlined in Table 7.2.

Features of Local or Less than Local value, and those to which impacts can be categorically ruled out, are scoped out of further assessment. However, if impacts to such features – even if not significant in terms of EcIA – may result in legal offences then suitable safeguards will be presented in Section 7.7.

Table 7.8: Evaluation of Ecological Importance

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
Nationally and Internationally Designated Statutory Sites			
River Tweed SAC	• The eastern access road (an existing public road) crosses the Eddleston Water which is considered part of the River Tweed SAC; • Located 400 m west of the western Site Boundary where it is connected to the Site via the Flemington Burn. Also connected with the Site via the Harehope Burn along a 3 km pathway. • Otter was recorded within the Site so this feature of the SAC is also scoped in to the HRA. • The location of the SAC at the western boundary of the Site suggests a high degree of hydrological and ecological connectivity between the related habitats. • As this is an internationally designated site, it is considered of international importance, and therefore is scoped in for further assessment. • Furthermore, as a European site, a Habitat Regulations Appraisal (HRA) is required to determine if the development will have a '’likely significant effect' on the SAC), and whether an Appropriate Assessment (AA) is required to determine if the Development will result an 'adverse effect' in on the integrity of the SAC or its qualifying features (QFs).	**International**	**Yes.** **Scoped into assessment & HRA Screening.**
River Tweed SSSI	• Located 5 km south of the Site and connected via the Flemington Burn and Lyne Water along a 12 km pathway. • Otter was recorded within the Site, a notified natural feature of the SSSI.	**National**	**Yes.** **Scoped into assessment.**
Whim Bog SSSI	• Located 2 km north of the Site and designated for its raised bog habitats. • Water inputs into raised bog habitats tend to be from precipitation alone, therefore there is no perceived connectivity with the Site.	National	No. Scoped out of assessment.
Dundreich Plateau SSSI	• Located 3.3 km east of the Site and designated for its blanket bog subalpine flush habitats. • No perceived connectivity with the Site.	National	No. Scoped out of assessment.
Auchencorth Moss SSSI	• Located 3.4 km north of the Site and designated for its raised bog habitats. • Water inputs into raised bog habitats tend to be from precipitation alone. • There is no perceived connectivity with the Site.	National	No. Scoped out of assessment.
Cloich Bog LBS	• Directly adjacent to the eastern Site Boundary. • Noted for its modified bog, burns and marsh habitats. • Potential connectivity with the Site.	Local	No. Scoped out of assessment.

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
Shiphorn Quarry LBS	• 0.26 km northeast of the Site Boundary. • Noted for its breeding birds. • No perceived connectivity with the Development.	Local	No. Scoped out of assessment.
Nether Stewarton Pools (Loch Potts) LBS	• 0.62 km east of the Site Boundary. • Noted for its ponds, marsh and swamp habitats which support breeding wetland birds. • No perceived connectivity with the Site.	Local	No. Scoped out of assessment.
Portmore Birchwoods LBS	• 1.15 km northeast of the Site Boundary. • Noted for its semi-natural, moderately species-rich birch woodland. • No perceived connectivity with the Site.	Local	No. Scoped out of assessment.
Phase 1 Habitats within the Site			
B1.2 Acid grassland – semi-improved	• Habitat included within the SBL. • Common and widespread habitat across Scotland. • Habitat on site species-poor and associated with grazing. • In light of the above, the habitat is considered of Less than Local Importance.	Less than Local	No. Scoped out of assessment.
B5 Marsh/marshy grassland	• Habitat included within the SBL. • Common and widespread habitat internationally to locally. • Associated with NVC communities with potential groundwater dependence. • Areas of purple moor grass rush pasture (M25) indicative of peat and could be equivalent to Annex I habitat. • In light of the above, the habitat is considered of Local Importance.	Local	No. Scoped out of assessment.
D1.1 Dry dwarf shrub heath – acid	• Habitat included within the SBL & Habitats Directive. • The habitat is widespread and common in Scotland, especially in the uplands where it dominates very large areas. • In light of the above, the habitat is considered of Local Importance.	Local	No. Scoped out of assessment.
E2.1 Flush and spring: acid/neutral	• Habitat included within the SBL. • Some of these habitats are listed as having high potential to be groundwater dependent, however, there were no floristic elements that suggested base-enrichment derived from groundwater and were all concluded to be fed by surface water.	Local	No. Scoped out of assessment.

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
GWDTEs	• As GWDTE designation is related to groundwater dependency and not nature conservation value, GWDTE status has not been used as criteria to determine a habitat's nature conservation value. There is however a statutory requirement to consider GWDTEs and the data gathered during the NVC surveys has been used to inform this assessment. • Several communities were identified with the potential to be GWDTEs: M6, M23 (both potentially highly groundwater dependent) and M25 (potentially moderately groundwater dependent). However, there were few floristic elements that suggested base-enrichment derived from groundwater and most were concluded to be fed by surface water. • One location at NT 20863 46105 has been treated as a GWDTE on a precautionary basis due to hydrogeological factors and its proximity to a private water supply. See **Chapter 10: Hydrology and Hydrogeology** for further detail.	Less than Local	No. Scoped out of assessment.
Protected and Notable Species within the Site			
Badger	• Badgers are present within the Site, as discussed in the Confidential Annex, Appendix A7.2. The badgers are not reliant on food resources or habitats associated with watercourses or other habitat deemed likely to experience the effects of pollution during construction. • This species is protected under the Protection of Badgers Act 1992. In Scotland, this legislation was updated by the Nature Conservation (Scotland) Act 2004. • The species is at risk of persecution but is not recognised as a high conservation priority. • Badger is a widespread species throughout the UK with a stable and inclining estimated population of 562,000. In Scotland, the population has shown a similar rate of increase. • The species is listed on the IUCN Red list as of 'Least Concern' in mainland UK. • In light of the above, badger therefore is considered of Local Importance.	**Regional**	**Yes** **Scoped into assessment.**
Pine marten	• Pine marten is legally protected under the Wildlife and Countryside Act 1971 (as amended). Pine marten is also a priority species in the SBL. • Although the status on the species in England and Wales in poor, in Scotland the species is favourable and can now be found in all regions of Scotland with the exception of the south east coast. • The species is listed on the IUCN Red list and 'Least Concern' in Scotland, but 'Critically Endangered' elsewhere in the mainland UK. • Scotland's population is estimated at 3,700 adult pine martens, which represent approximately 99% of the known UK population[52]. • Evidence of pine marten was found on Site. • In light of the above, the species is considered of Local Importance.	Local	No. Scoped out of assessment.

[52] Croose, E., Birks, J.D.S. & Schofield, H.W. 2013. Expansion zone survey of pine marten (Martes martes) distribution in Scotland. NatureScot Commissioned Report No. 520.

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
Red squirrel	• Red squirrel is protected under the Wildlife and Countryside Act 1981 (as amended) and is a priority species on the SBL. • Although declining across the UK, the Scottish population is stable in most parts of Scotland[53]. • The species is listed on the IUCN Red list as 'Near Threatened' in Scotland, but 'Endangered' elsewhere in the mainland UK. • Although suitable habitat was recorded, no evidence of red squirrel was recorded. • In light of the above, the species is considered of Less than Local Importance	Local	No. Scoped out of assessment.
Otter	• Otter was recorded as active within the Site and associated watercourses, notably the Flemington Burn. • One potential resting site was found, however no confirmed active holts confirmed. • Habitat within the Site was generally • Otter is listed in Annex IV of the Habitats Directive and are on the Scottish Biodiversity List. • They are listed as a designated feature of the River Tweed SAC and River Tweed SSSI.	**Regional**	**Yes** **Scoped into assessment.**
Water vole	• Water vole is legally protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and is a priority species in the SBL. • Although the current UK population (132,000) is believed to have declined by 50% since 1998, and the species are in decline in both England and Wales, the Scottish population, which is largely genetically and phenotypically distinct, is in fact increasing in size with a stable range. • The species is listed on the IUCN Red list and 'near threated in Scotland, but 'endangered' elsewhere in the UK. • No water vole burrows or latrines were found within the Site, and riparian habitat largely provided limited opportunity for water vole burrow construction. • In light of the above, the species is considered of Less than Local Importance.	Less than Local	No. Scoped out of assessment.
Great crested newt	• Great crested newt, a European Protected Species, was not found during the baseline surveys and no recent records were identified during the Desk Study. • In light of the above, this species considered of Less than Local Importance.	Less than Local	No. Scoped out of assessment.
Reptiles	• Only common and widespread species are found on mainland Scotland. • Common reptiles' species; the common lizard, slow-worm (Anguis fragilis), and adder are protected under the Wildlife and Countryside Act 1981 (as amended) against intentional or reckless killing and injuring. The aforementioned reptile species are all included on the SBL. • No reptiles were recorded within the Site, although small pockets of habitat offering foraging, refuge and hibernation were identified within the Site. • In light of the above, reptiles are considered of Less than Local Importance.	Less than Local	No. Scoped out of assessment.

[53] Tipple, N., & Tonkin, M., 2019. Evaluation of Spring 2019 Squirrel Surveys. Saving Scotland's Red Squirrels, Scottish Wildlife Trust.

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
Bats	• Overall bat activity on Site was moderate, however, activity levels were highly variable depending on species, location and time of year. • All Scottish bat species are listed in Annex II of the Habitats Directive and are listed as priority species on the Scottish Biodiversity List. • Common pipistrelle, soprano pipistrelle and *Nyctalus* spp. are classified as at high risk of collision with wind turbines. Myotis spp. and brown long-eared bat are classified as at low risk of collision[36]. • Myotis spp. and brown long-eared bat are classified as having low population vulnerability. Common pipistrelle and soprano pipistrelle are classified as having a medium population vulnerability. *Nyctalus spp*. are classified as having high population vulnerability[36].	**Regional**	**Yes** **Scoped into assessment.**

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
Atlantic salmon	• Atlantic salmon is legally protected (in freshwater only) under the Schedule 3 of the Conservation (Natural Habitats, and c.) Regulations 1994 and is noted as a qualifying feature of the River Tweed SAC, River Tweed SSSI and listed on the SBL. • The Scottish salmon population has seen a decline in recent years as a result of numerous pressures, the key pressure being climate change which may affect both the marine and freshwater phases of the species[54]. In addition, the Scottish Government have published twelve high level pressure on the Scottish salmon population, six of which occur in the riparian (freshwater) environment, the remainder are marine based[55]. • When viewed in the context of long-term trends over several decades (1952-2019), the numbers of adult salmon returning to Scottish rivers have in fact slightly increased[56,57] , however the total reported rod catch (retained and released) for 2018 was the lowest since records began in 1952[58], and despite an improvement in 2019, declines since 2010 have been notable. • Watercourses within the Site are connected to the River Tweed, which under the Conservation of Salmon (Scotland) Regulations 2016, is categorised as a Grade 1 river. Within Grade 1 rivers exploitation is considered sustainable and no management action is currently required, as existing non-statutory local conservation management has been effective[5960]. • According to MSS it is not yet clear whether salmon population declines are part of a longer-term trend or a short-term fluctuation, however, it is understood that this long-term increase reflects an acknowledged decline in marine survival being offset by positive management measures, such as the significant reduction in the netting industry[61,]. • The Flemington Burn, adjacent to the western Site Boundary, was found to support juvenile and spawning salmonids (including salmon). • Salmonids are considered absent from the Site with barriers to migration noted further downstream. • Although the species is widespread, and the salmon population is historically high both across Scotland and locally, recent declines locally and nationally mean that the species should be considered of Regional Importance.	**Regional**	**Yes** **Scoped into assessment.**

[54] https://onlinelibrary.wiley.com/doi/abs/10.1002/9781444327755.ch16
[55] https://www2.gov.scot/Topics/marine/Salmon-Trout-Coarse/fishreform/licence/status/Pressures
[56] Marine Scotland Science Report 01/15 (2015): Status of Scottish Salmon and Sea Trout Stocks
[57] Marine Scotland. 2020. Salmon and Sea Trout fishery statistics: 2019 Season - reported catch and effort by method. DOI: 10.7489/12280-1
[58] https://www.gov.scot/publications/salmon-fishery-statistics-2018-season/
[59] Scottish Government (2016) The Conservation of Salmon (Scotland) Regulations 2016. [Online] Available at: https://www.legislation.gov.uk/ssi/2016/115/contents/made (Accessed 04/02/2021).
[60] Marine Scotland Science Data. [Online] Available at: https://scotland.shinyapps.io/sg-salmon-conservation/ (Accessed 04/02/2021).

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
Brown trout	• Neither form of trout (sea trout or brown trout) receives much protection within conservation legislation, however some protection exists in the form of exploitation controls exist within fisheries legislation, and the species is listed on the SBL. • Brown trout is a common, widespread and adaptable species found across a wide variety of watercourses, either as part as a resident population, or the migratory anadromous forms, however the species has been in decline across Scotland for many decades as result of numerous pressures such as changes in land use, and more recently climate change. • Based on rod catch data, catches across Scotland have declined by two thirds since recorded began in 1952, and the total reported rod catch (retained and released) of sea trout in Scotland for 2019 was the third lowest on record and 88% of the previous five year average[62]. • Although the species is widespread, notable national declines mean that the species should be considered of Regional Importance.	**Regional**	**Yes** **Scoped into assessment.**
Lamprey species	• Three lamprey species can be found using aquatic habitats in Scotland and the UK, these are; the brook lamprey, the river lamprey and the sea lamprey. • River lamprey are listed on Schedule 3 of the Conservation (Natural Habitats, and c.) Regulations 1994 (as amended). • All three species noted as qualifying features of the River Tweed SAC and River Tweed SSSI. • The Flemington Burn, adjacent to the western Site Boundary, was found to support juvenile lamprey. • Lamprey are considered absent from the Site with barriers to migration noted further downstream. • In light of the above, the species is considered of Regional Importance.	**Regional**	**Yes** **Scoped into assessment.**

[61] Todd, C.D., Hughes, S.L., Marshall, C.T., MacLean, J.C., Lonergan, M.E. and Biuw, E.M. (2008), Detrimental effects of recent ocean surface warming on growth condition of Atlantic salmon. Global Change Biology, 14: 958-970.
[62] https://www.gov.scot/publications/sea-trout-fishery-statistics-2019/

Ecological Feature	Evaluation Rationale	Scale of Importance	IEF/Action
European eel	• The European eel is widely distributed within European freshwaters and can be found in a wide variety of freshwater and estuarine habitats in the UK. The European eel hasn't been heavily exploited in Scotland, yet eel numbers in Scotland are thought to have fallen by more than 90% since the 1990s[63]. • The IUCN Red List now regards the species as 'Critically Endangered'. • Although not a protected species, the widespread decline in European eels has led the European Commission to develop an eel recovery plan, which has been incorporated in Scotland since 2008. • 17 records of European eel were identified in the Desk Study, and one was recorded during baselines surveys the species can potentially be found across a wide variety of aquatic habitat, including poor quality, polluted watercourses, so presence within the Site cannot be ruled out. • In light of the above, the species is considered of Local Importance.	Local	No. Scoped out of assessment.

[63] NatureScot. *European Eel Information Page*. [Online] Available at: https://www.nature.scot/plants-animals-and-fungi/fish/freshwater-fish/european-eel. (Accessed 04/02/2021).

7.6.1 Scoped Out of the Assessment of Potential Effect

108. Following the systematic evaluation of importance outlined in Table 7.8, the following ecological features are not considered to be IEFs, and therefore have been scoped out of inclusion with Section 7.7: Assessment of Potential Effects:

- Whim Bog SSSI;
- Dundreich Plateau SSSI;
- Auchencorth Moss SSSI;
- Cloich Bog LBS;
- Shiphorn Quarry LBS;
- Nether Stewarton Pools (Loch Potts) LBS;
- Portmore Birchwoods LBS;
- GWDTEs;
- Pine marten;
- Red squirrel;
- Water vole;
- Great crested newt;
- Reptiles; and
- European eel.

109. Although the above IEFs have been scoped out of further assessment within this Chapter, measures to mitigate or avoid potential effects on these IEFs have been included within Embedded Mitigation to help ensure legislative compliance of works as well as adherence to accept industry good practice (see Section 7.5).

7.6.2 Scoped into the Assessment of Potential Effect

110. Following the systematic evaluation of importance outlined in Table 7.8, the following ecological features are considered to be IEFs, and have therefore have been scoped in to Section 7.7: Assessment of Potential Effects:

- River Tweed SAC;
- River Tweed SSSI;
- Badger;
- Otter;
- Bats;
- Atlantic salmon;
- Brown trout; and
- Lamprey species.

7.7 ASSESSMENT OF POTENTIAL EFFECTS

7.7.1 Habitats

111. The construction of the Development will cause the loss of and disturbance to habitats during construction and the effects may be both permanent and temporary. Permanent losses are calculated based on the Development layout but estimates of temporary losses, such as those caused by construction activities (e.g. vehicle movements and stockpiling) in the areas surrounding built infrastructure, are more difficult to quantify. However, temporary losses will be relatively limited in extent, based on experience of the construction of similar developments, and so are assumed, on a precautionary principle, to equate to approximately 20% of the areas permanently lost.

112. In total, an estimated 71.48 ha of habitats will be lost, equating to 6.54% of the Site. Of this loss, the majority (98%) will consist of conifer plantation woodland. Further detail on habitat loss is presented in Table 7.9 below. No IEF habitats will be impacted by habitat loss and so habitats are scoped out of further assessment.

Table 7.9: Summary of Phase 1 Habitat Loss

Phase 1 Habitat Type recorded in Survey Area	Area Lost within Site (Ha)	% of Site Lost
A1.2.2 Conifer Plantation Woodland	70.6144	6.54
A3.1 Scattered Trees	0.0004	<0.01
B1.1 Acid grassland – unimproved	0.0019	<0.01
B4 Improved grassland	0.2356	0.02
B5 Marsh/marshy grassland	0.0056	<0.01
C1.2 Tall herb and fern - bracken	0.0019	<0.01
I2.1 Quarry	0.5217	0.05

7.7.2 Bats

7.7.2.1 Construction Phase Impacts

113. There is potential for displacement and/or disturbance to foraging and commuting bats during the construction of Development infrastructure and the forest felling required to accommodate the infrastructure.

114. Most turbines and infrastructure will be located within forested areas and will be in proximity to edge habitats such as forest rides. Felling for this infrastructure will take place. Despite the felling that will be undertaken, displacement or disturbance to foraging and commuting bats during construction is considered negligible given the abundance of edge habitats available within the Site that will remain unaffected. Linear watercourse features are also largely avoided due to the 50 m watercourse buffer for any infrastructure or construction activity, except where a minimal number of watercourse crossings and tracks are required.

115. Felling and the loss of habitat to the Development may marginally reduce the foraging and roosting opportunities within the Site; however, due to the abundance of these habitat types in the surrounding area and the small extent of their loss, it is not considered to be significant. Additionally, felling for infrastructure will create new edge habitats that may be utilised by bats within otherwise solid blocks of conifer forest, and thus overall, the abundance of edge habitat will increase. Forestry restocking will also create new habitats and edge features in the longer term.

116. No bat roosts were recorded during baseline surveys. However, standard embedded mitigation[64] requires that if felling and/or lopping of a tree with potential to support roosting bats is required, cavities must be checked prior to these activities taking place to ensure bats are not impacted. Several potential bat roost trees were recorded within 30 m of the proposed access road to the east of the Site (see Appendix A7.3), some of which are expected to be felled to allow vehicle access to the Site.

117. A pre-construction tree climbing survey of the trees identified to have low bat roost potential will be completed to locate any evidence of roosting bats. The tree climbing survey would ideally be complete during the active bat season from May to September which would increase the likelihood of finding bat signs. If a tree cannot be climbed then dusk and dawn bat roost activity surveys would be required to be carried out during the active bat season.

118. Although some bat foraging, commuting and roosting behaviour may be altered as a result of construction and forestry restructuring, this is likely to be of negligible spatial magnitude and short-term temporal magnitude.

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[64] Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1.

119. As a result, construction effects are considered to be negligible and therefore **not significant** in terms of the EIA Regulations.

7.7.2.2 Operational Impacts

120. During the operational phase, there is potential for collision to occur between commuting and foraging bat species and wind turbines, resulting in injury or mortality to individual bats. In addition, bats may be injured or killed by barotrauma when flying in close proximity of the turbine blades. For the purposes of this assessment, the potential effects from barotrauma are assumed to be the same as for turbine collision. This is due to the lack of published empirical evidence in causes of bat fatalities around wind farms and the difficulties in determining whether bat fatalities are due to collisions with turbines blades or barotrauma.

121. Further details on the conservation status of the high collision risk bat species recorded within the Site are provided below. Data for both noctule (*Nyctalus noctula*) and Leisler's bat (*Nyctalus leisleri*) are provided, however these bats were only recorded to genus level (i.e. *Nyctalus* spp.). The low population estimates for *Nyctalus* spp. in Scotland are likely due to under-recording and an underestimate of the population occurring here[65]. Both common and soprano pipistrelle are widespread in southern Scotland, with Leisler's bat distributed mainly in the south and west of the region and noctule mainly to the south and east of the region, with some scattered predicted occurrence to the west[65].

122. Population estimates of common pipistrelle in 2013 were 1,390,000 in the UK and 352,000 in Scotland[66]. In 2019, Article 17 of the UK Habitats Directive Report UK estimates the population range to be from 1,100,600 to 7,843,000[67], however a best single value has not been provided due to the uncertainty around the population estimate. Matthews *et al* (2018)[68] provided a UK estimate of 3,040,000 for common pipistrelle; population estimates for Scotland were not provided.

123. Population estimates of soprano pipistrelle in 2013 were 774,000 in the UK and 198,000 in Scotland[66]. In 2019, Article 17 of the UK Habitats Directive Report UK estimates the population range to be from 2,024,000 to 8,563,000[67], however, a best single value has not been provided due to the uncertainty around the population estimate. Matthews *et al* (2018)[68] provided a UK estimate of 4,670,000 for soprano pipistrelle; population estimates for Scotland were not provided.

124. Population estimates of Leisler's bat in 2013 were 28,000 in the UK and 250 in Scotland[66]. There is no recent population estimate available for this species in the UK[67], and there is limited accurate data on trends, and population changes, meaning that the population status of this species in the UK and Scotland is currently unknown.

125. Population estimates of noctule in 2013 were 50,000 in the UK and 250 in Scotland[66]. Current UK estimates for this species are unknown, but countrywide estimates provided by Matthews *et al* (2018)[68], and referred to in Article 17 of the UK Habitats Directive Report[67], with 565,000 individuals reported in England and 91,900 in Wales; there is no current estimate for Scotland.

126. Evaluating the overall site risk of a bat population to wind farms is based on two factors: Ecobat activity level recorded and initial site risk level. These factors are multiplied to generate an overall risk assessment score per species of either Low (0-4), Moderate (5-

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[65] Newson, S.E., Evans, H.E., Gillings, S., Jarrett, D. & Wilson, M.W. 2017. A survey of high risk bat species across southern Scotland. NatureScot Commissioned Report No. 1008.
[66] JNCC (2013). Individual Species Reports - 3rd UK Habitats Directive Reporting 2013.
[67] https://jncc.gov.uk/our-work/article-17-habitats-directive-report-2019-species/#regularly-occurring-species-vertebrate-species-mammals-terrestrial
[68] Mathews F, Kubasiewicz LM, Gurnell J, Harrower CA, McDonald RA, Shore RF. (2018) A Review of the Population and Conservation Status of British Mammals: Technical Summary. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and NatureScot. Natural England, Peterborough.

12) or High (15 – 25)[36]. Appendix A8.3 presents the results of this risk assessment for each high collision risk species and provides detailed results of the Ecobat analysis. A summary is provided below to inform the assessment.

127. The following average site activity levels (median and maximum percentiles) were recorded for the following high collision risk bat species:

- Common pipistrelle: Moderate to High;
- Soprano pipistrelle: Moderate to High; and
- *Nyctalus* spp: Low to Moderate.

128. Due to having a 'high' collision risk and a 'common' population abundance rating, common and soprano pipistrelle are classified as having 'medium' population vulnerability.

129. *Nyctalus* spp. have a 'high' collision risk and the 'rarest' population abundance resulting in this species having a 'high' population vulnerability. The Site has been categorised as a 'Low' (level 2)[36] site risk to bats due to its 'Medium' project size and 'Low' habitat risk (see Technical Appendix A8.3). Although the Site has been categorised as having 'Low' habitat risk, it is acknowledged that small pockets of higher value habitat (such as broadleaved trees and riparian corridors) do exist within the Site, the presence of which has been taken into account in the following assessment.

130. The following risk assessment score for 'Median' and 'Maximum' percentiles was obtained for the following bat species.

- Common pipistrelle: Medium (6) to Medium (10);
- Soprano pipistrelle: Medium (6) to Medium (10); and
- *Nyctalus* spp: Low (2) to Medium (6).

131. The risk level varied between May and October with September and October being the months with the greatest bat activity across the Site (Technical Appendix A7.3). Further context on each high collision risk species is provided below.

Common pipistrelle

132. Using results from the Ecobat assessment, 'Moderate' or 'Moderate to High' levels of activity of common pipistrelle were recorded at two locations within the Site during the surveys, all of which were associated with forest edge habitats. Conifer plantation edges are known to offer suitable commuting and foraging habitat[49]. The remaining eight locations recorded 'Low' and 'Low to Moderate' levels of activity. The highest levels of activity at these locations were recorded in July, with activity levels dropping slightly into September and October. Very low activity levels were recorded during early May. Overall, the effect of this impact is considered to be of low magnitude for common pipistrelle.

Soprano pipistrelle

133. Using results from the Ecobat assessment, 'Moderate' or 'Moderate to 'High' levels of activity of soprano pipistrelle were recorded at four locations within the Site during the surveys, all of which were associated with conifer plantation edge habitats, known to offer suitable commuting and foraging habitat. The remaining six locations recorded 'Low to Moderate' levels of activity. The lowest levels of activity at these locations were recorded in May, rising into July, with September and October providing the highest activity levels. Overall, the effect of this impact is considered to be of low magnitude for soprano pipistrelle.

Nyctalus spp.

134. Using results from the Ecobat assessment, 'Low to Moderate' levels of activity were recorded for *Nyctalus* spp. at one location within the Site during the surveys, which was associated with conifer plantation edge habitats, known to offer suitable commuting and foraging habitat. Four other locations recorded 'Low' levels of activity with the remaining

five locations recording no activity. Activity was recorded during every survey month; however, the majority of activity was during July, September and October with very low activity recorded in May. Overall, the effect of this impact is considered to be of low magnitude for *Nyctalus* spp.

135. In accordance with the recent guidance[36], embedded mitigation (see Section 7.5) will ensure that a 50 m separation distance between high-value bat habitats (such as woodland edges) and blade tips is established. If micrositing of turbines is required during construction, the 50 m separation distance would be maintained accordingly. Furthermore, this off set buffer would also be sustained throughout operation via routine maintenance, if required.

136. To calculate the necessary stand-off distance between the centre of the turbine (the turbine location) guidance advises the use of the following equation:

$b = \sqrt{(50+bl)^2 - (hh-fh)^2}$

137. Based on turbine parameters detailed in **Chapter 3: Project Description**, the calculation uses blade length (bl) and hub height (hh) alongside feature height (fh) to calculate a stand-off distance (b) from the base of the turbine within which no habitats that could encourage bat activity should be allowed to develop (i.e. trees). The equation assumed to represent a 'worst case' scenario of 40 m for the tree heights within the Site. Table 7.10 provides the values and stand-off distances required for the selected turbine model.

Table 7.10: Stand-off buffer required for bats

Turbine Model	Hub Height (m)	Blade Length (m)	Equation	Stand-off Distance Required (m)
Vestas 136	82	68	$b = \sqrt{(50+68)^2 - (82-40)^2}$	110

138. Therefore, based on the above equation the minimum turbine stand-off distance to be implemented during construction and maintained through operation for the turbines is 110 m.

139. Further to the above, the typical flight height for common pipistrelle and soprano pipistrelle (the dominant species recorded on site) is 2-10 m above the ground[69]. Therefore, with a minimum rotor sweep height of 14 m, the majority of bats continuing to utilise the Site are unlikely to fly at rotor height, and are therefore at less risk from turbine collision.

140. Bat activity was generally moderate across the Site with most activity localised to five locations. Where the risk of bat interaction with turbines currently exists, the risk of collision will be notably reduced through the implementation of embedded mitigation to ensure turbines are located outwith areas likely to be used by bats.

141. Due to the overall moderate levels of bat activity recorded, and the benefits of embedded mitigation recommendations, the magnitude of effects of turbine collision on the local bat population is likely to be minor. Despite this, due to the lack of data regarding bat interactions with turbines, impacts on low numbers of bats cannot be ruled out. As a result, operational effects are considered to be of low magnitude, and therefore **not significant** in terms of the EIA Regulations.

[69] Bat Conservation Trust: Species Factsheets. [Online] Available at: https://www.bats.org.uk/about-bats/what-are-bats/uk-bats. (Accessed 04/02/2021).

7.7.2.3 Decommissioning Phase Effects

142. Decommissioning activities are considered to be of a similar nature to those of Development construction; however, as no habitats used by bats are likely to be impacted, the potential for detrimental impact to bats is on a significantly notably smaller scale, and therefore effects are **not significant** in terms of the EIA Regulations.

7.7.3 Otter

143. Although otter was confirmed as being present within the Site, the level of activity was considered to be low with only one spraint located within the Site during surveys. Due to this, the watercourses on Site are likely to be of relatively low value to otter, used occasionally or seasonally.

7.7.3.1 Construction Phase Effects

Habitat Loss, Disturbance and Degradation.

144. During the construction phase there are potential impacts that may result from the occurrence of ground works in close proximity to watercourses and ponds used by otters. These include the detrimental impacts of habitats loss and disturbance, siltation, sedimentation and accidental pollution. These impacts could detrimentally affect the local otter population indirectly by reducing habitat suitability for prey species, thus reducing prey availability, or by directly damaging habitats used to otters for resting and commuting. Both effects could result in the displacement of otters from the Site, reduction of connectively to the wider local area, and a minor reduction of fitness in members of the otter population, due to decreased resources and the subsequent increase in completion for resources.

145. The overwhelming majority of construction will take place in woodland habitats of limited to no value to otter, and outwith close proximity to watercourses and ponds. However, there will be several watercourse crossings constructed as part of the Development. All watercourses and ditches are likely to be suitable for commuting otters.

146. Following the application of Embedded Mitigation measure outlined in Section 7.5, and construction phase pollution prevention measures (as detailed in **Chapter 10: Hydrology and Hydrogeology**) which will form part of Pollution Prevention Plan (PPP), it is anticipated the current low value of watercourses to otter will not be notably detrimentally impacted by construction activities and will be short-term, and so effects to critical prey resources and general habitat quality are unlikely.

147. The construction phase effects of habitat loss, disturbance and degradation are predicted to be adverse and temporary, and thus of low magnitude, and therefore are **not significant** in terms of the EIA Regulations.

Disturbance and Displacement

148. Under the Habitat Regulations (the Conservation (Natural Habitats, &c.) Regulations 1994) otter resting sites are protected from deliberate or reckless disturbance. Potential development related disturbance and displacement may result from an increase in noise, vibration, traffic and the presence of people, in close proximity to areas used by otter. In accordance with NatureScot guidance[70], disturbance is likely to constitute any construction activity taking place within 30 m of holts and shelters where otters are not breeding, but up to 200 m for breeding holts. Otters using freshwater habitats typically establish resting areas in close proximity to the riparian corridor, and therefore watercourses represent the areas of greatest risk to disturbance.

[70] NatureScot (2020) *Protected Species Advice for Developers: Otter.* [Online] Available at: https://www.nature.scot/species-planning-advice-otter. (Accessed 27/02/2021).

149. Otters typically breed in areas where there is access to an abundant food supply, where disturbance is minimal and where more than one resting area suitable to be used as a natal holt is already available[71]. As established above, habitats within the Site are largely of limited value to the species, and otter has only been recorded at one location, therefore the Site is considered to be unlikely to support a breeding holt. Although the presence of other future non-breeding holt or shelter cannot be ruled out, with the exception of the water crossings, the vast majority of Development is located no closer than 50 m to watercourses (and in many areas considerably further away), outwith the likely range of disturbance.

150. Based on the existing baseline, Development-related construction work will not impact any known resting area for otter. Although the likelihood of a resting area becoming established in the future ahead of construction within 30 m of the water crossing works is considered low, with adherence to embedded mitigation such as pre-construction surveys and ECoW supervision of works, the risk is considered to be negligible. As discussed, habitats within the Site are largely of limited value to the species, and the vast majority of works are outwith proximity of watercourses.

151. Through the implementation of embedded mitigation measures, including pre-works ECoW monitoring and surveys, the implementation of 50 m riparian buffers from working areas, and the adoption of best practice working practices and emergency procedures, the risk of detrimental effects of disturbance and displacement on both the existing and future baseline is negligible. Therefore, the effects of disturbance and displacement impacts are of low magnitude, and are therefore **not significant** in terms of the EIA Regulations.

Interaction with Construction Traffic and Plant

152. In addition to construction phase disturbance, the direct increase of traffic and plant movements and operation from Development construction have the potential to result in a temporary increase in the risk of accidental collisions and otter injury and fatality.

153. As otter are largely crepuscular and nocturnal, the risk is largely limited to periods when construction is taking place at night, or during low light levels during the winter months. Additionally, as habitats are largely of low value to otter and works will largely take place outwith proximity to watercourses, the risk is considered to be low.

154. This risk is likely to be further reduced through the implementation of embedded mitigation measures, such as pre-construction surveys, the implementation of good practice working measures, and monitoring of works by the ECoW. As a result, it is considered that a potential impact is of negligible risk. Therefore, the effect of this impact is of low magnitude, and is therefore **not significant** in terms of the EIA Regulations.

Entrapment in Construction Excavations.

155. Construction phase excavations if left uncovered and unattended have the potential to injure or entrap wildlife including otters which could result in injury or mortality. As habitats are largely of low value to otter, activity is limited to one watercourse within the Site and works will largely take place outwith proximity to watercourses, the risk is considered to be very low.

156. Through the implementation of embedded mitigation measures, such as the implementation of good practice working measures such as covering excavation or leaving a suitable means of escape when unattended, as well as monitoring of works by the ECoW, the potential impact is of negligible risk. Therefore, the effect of this impact is of low magnitude, and is therefore **not significant** in terms of the EIA Regulations.

[71] Liles G (2003). Otter Breeding Sites. Conservation and Management. Conserving Natura 2000 Rivers Conservation Techniques Series No. 5. English Nature, Peterborough

7.7.3.2 Operation Phase Impacts

Interaction with Operational Traffic and Personnel Presence

157. Development maintenance is likely to result in occasional vehicle movements and personnel presence throughout the operation of the Development; however, this activity will be limited to the Development infrastructure, with no disturbance of the surrounding environment (including riparian habitats) expected. Due to the infrequency and localised nature of operational activities, and the low value and use of the Site by otters, the potential detrimental effect is of negligible magnitude, and is therefore **not significant** in terms of the EIA Regulations.

7.7.3.3 Decommissioning

158. Decommissioning activities are considered to be of a similar nature to those of Development construction, therefore potential exists for direct and indirect effects to otters, where decommissioning works may take place in close proximity to riparian habitats. Decommissioning activities may result in a localised increase in noise, vibration, traffic and presence of people, potentially causing disturbance to commuting and foraging otters. However, this effect of low magnitude and is therefore **not significant** in terms of the EIA Regulations.

7.7.4 Badger

7.7.4.1 Construction Phase Impacts

159. Construction activities have the potential to require the destruction of badger setts and badger foraging areas which could result in injury or death to badgers. Noise and human presence also have the potential to disturb badgers that are present within the Site.

Habitat Loss, Disturbance and Degradation.

160. There will be a loss of a maximum of 70.98 ha of potential foraging habitat for badgers as a result of Site Infrastructure construction, although it should be noted that most of this is currently Sitka spruce plantation, a habitat that is likely to provide little value for foraging. The habitats of most value to badgers for foraging and sett creation are broadleaved woodland and grassland habitats, of which 0.24 ha is predicted to be permanently lost. There is an abundance of similar habitat for badgers in the wider area and therefore the effect is of low magnitude and is therefore **not significant** in terms of the EIA Regulations.

161. No badger setts are predicted to be destroyed as a result of construction activities. Infrastructure has been sited away from active badger setts recorded on Site (in excess of 100 m from Site infrastructure). However, there remains the chance that newly formed setts will be excavated in close proximity to areas in which infrastructure is planned. The risk of disturbance to badgers using these setts will be minimised through the implementation of embedded mitigation measures, such as pre-construction surveys, the implementation of good practice working measures, and monitoring of works by the ECoW. As a result, it is considered that a potential impact is of low risk. Therefore, the effect of this impact is of low magnitude, and is therefore **not significant** in terms of the EIA Regulations.

Interaction with Construction Traffic and Plant

162. In addition to construction phase disturbance, the direct increase of traffic and plant movements and operation from Development construction have the potential to result in a temporary increase in the risk of accidental collisions and badger injury and fatality.

163. As badgers are largely crepuscular and nocturnal, the risk is largely limited to periods when construction is taking place at night, or during low light levels during the winter months. This risk will be minimised through the implementation of embedded mitigation

measures, such as pre-construction surveys, the implementation of good practice working measures, and monitoring of works by the ECoW. As a result, it is considered that a potential impact is of low risk. Therefore, the effect of this impact is of low magnitude, and is therefore **not significant** in terms of the EIA Regulations.

Entrapment in Construction Excavations.

164. Construction phase excavations if left uncovered and unattended have the potential to injure or entrap wildlife including badgers which could result in injury or mortality. However, through the implementation of embedded mitigation measures, such as the implementation of good practice working measures including covering excavations or leaving a suitable means of escape when unattended, as well as monitoring of works by the ECoW, the potential impact is of low risk. Therefore, the effect of this impact is of low magnitude, and is therefore **not significant** in terms of the EIA Regulations.

7.7.4.2 Operation Phase Impacts

Interaction with Operational Traffic and Personnel Presence

165. Development maintenance is likely to result in occasional vehicle movements and personnel presence throughout the operation of the Development; however, this activity will be limited to the Development infrastructure, with no disturbance of the surrounding environment expected. Due to the infrequency and localised nature of operational activities, the potential detrimental effect is of negligible magnitude, and is therefore **not significant** in terms of the EIA Regulations.

7.7.4.3 Decommissioning Phase Impacts

166. Decommissioning activities are considered to be of a similar nature to those of Development construction, therefore potential exists for direct and indirect effects to badgers, where decommissioning works may take place in close proximity to existing or newly established setts. Decommissioning activities may result in a localised increase in noise, vibration, traffic and presence of people, potentially causing disturbance to badgers. However, this effect is of low magnitude and is therefore **not significant** in terms of the EIA Regulations.

7.7.5 Salmonid Fish (Atlantic salmon/brown trout)

167. As discussed in Section 7.6, although trends in the Scottish salmonid (salmon and trout) population can fluctuate spatially and temporally, and declines are less marked on a long-term scale, it is important to acknowledge that recent salmonids populations across Scotland (and the wider North Atlantic) are in notable decline, and the reasons for this are not yet fully understood.

168. The Scottish salmon population has seen a decline in recent years which is likely to be the result of numerous marine and freshwater pressures. A key pressure is climate change, which is known to affect freshwater phases of salmon by increasing water temperatures. As a result of climate change, water temperatures are expected to rise, and may already be having consequences for Scotland's salmonid populations. In addition, the Scottish Government have identified further high-level pressures on the Scottish salmon population[72], these are:

- Changes in habitat and water quality as a result of acidification, point-source and diffuse pollution, changing rainfall patterns, eutrophication and oligotrophication;
- Changes in habitat and water quality as a result of abstraction, flow regulation, upland / agriculture land-use and drainage, and forestry drainage;

[72] Scottish Government (2019). *Conservation of wild salmon – High level pressures on Atlantic Salmon*. [Online] Available at: https://www.gov.scot/publications/conservation-of-wild-salmon/pages/high-level-pressures-on-atlantic-salmon/. (Accessed 27/02/2021).

- Changes to instream habitats as a result of over sedimentation or the loss of sediment transfer, canalisation and dredging;
- Loss of riparian habitat as a result of afforestation and habitat loss/change; and
- Prevention of upstream/downstream migration and the access to spawning habitats, due to man-made barriers such as dams or other river modifications.

169. The Development has the potential to, at least in the short term, negatively contribute to some of these pressures, particularly those related to changes in habitat and water quality.

7.7.5.1 Construction Phase Effects

Habitat Loss, Disturbance, Degradation and Contamination

170. During the construction phase, there are potential impacts that may result from the occurrence of ground works in close proximity to watercourses used by salmonids. These include the detrimental impacts such as spawning habitat loss and disturbance, siltation, sedimentation and accidental pollution, accelerated or exacerbated erosion, and hydrological changes. The effects of these impacts could detrimentally impact the local salmon population indirectly via the reduction of productivity by reducing the population's ability to utilise spawning areas, or directly through injury and mortality, which could also have an impact of population productivity.

171. Watercourses within the Site are connected to the River Tweed, which is categorised as a Grade 1 river (highest grade possible)[60], and thus salmonid populations present are likely to have more tolerance to detrimental effects than less sustainable populations, particularly if the effects are temporary.

172. Due to migration barriers further downstream, as confirmed by the Tweed Foundation (Technical Appendix A7.4), no watercourses within the Site Boundary are known to support salmonid populations. With the exception of an existing watercourse crossing on the eastern access road (a public road with no upgrade works required) which crosses the River Tweed SAC, there is no potential for direct impacts to occur, and all other watercourses are located at least 50 m outwith proximity of all Development related construction. As these potential impacts are likely to be relatively localised to their point source within the Site and their magnitude, and thus effects on salmonid fish, is likely to dissipate with increasing distance from source, the risk from direct and indirect effects are low.

173. As stated in Section 7.5, mitigation presented with in **Chapter 10: Hydrology and Hydrogeology** to safeguard the water environment, will also effectively mitigate construction-related impacts to fish such as the direct and indirect effect of pollution and sedimentation from surface water run-off. Furthermore, the sensitive design of watercourse crossings and culverts as presented in **Chapter 3: Project Description**, was developed to safeguard the water environment, which will be constructed in accordance with statutory regulations for instream works, further reducing the risk of construction-related direct and indirect impacts to fish and other aquatic features.

174. Through the implementation of embedded mitigation measures, such as the implementation of good practice pollution prevention measures and monitoring of works by the ECoW, the risk of detrimental impacts is low. Therefore, the effect of construction phase impact is of low magnitude, and is **not significant** in terms of the EIA Regulations.

7.7.5.2 Operational Phase

175. Operational impacts of onshore wind farms on salmonids are not widely held to be a cause of concern, and as such, consideration for operational effects is not included within any published statutory guidance or advice. Although MSS acknowledge in their published scoping advice[73], that onshore wind farm developments have the potential to adversely affect diadromous fish (such as Atlantic salmon and sea trout), the ecological impacts should be given consideration are related to effects resulting from the construction of turbine foundations and associated infrastructure, as assessed in Section 7.7.5.1 above. The only operational impact stated as having the potential to effect diadromous fish is physical obstruction to migration, which is not an impact associated with the Development. Therefore, the effect of operational phase impact is of negligible magnitude, and is therefore **not significant** in terms of the EIA Regulations.

7.7.5.3 Decommissioning

176. Decommissioning activities are considered to be of a similar nature to those of Development construction. Through the implementation of embedded mitigation measures, such as the implementation of good practice pollution prevention measures, adherence to statutory regulations for instream works and monitoring of works by the ECoW, the risk of detrimental impacts is low. Therefore, the effect of decommissioning phase impact is of negligible magnitude, and is **not significant** in terms of the EIA Regulations.

7.7.6 Lamprey Species

177. Although there are significant ecological differences among the three British species of lamprey, many of their ecological requirements and environmental sensitivities are very similar, so for the purposes of this assessment and to avoid repetition in the text, they have been grouped together.

178. There is a lack of data concerning the water quality requirements of lamprey, although they are recognised as being sensitive to water pollution[74]. Lampreys have declined in Britain over the last hundred years and, though not distinctly threatened, is in need of general conservation measures to restore populations to their former status. Similarly, to salmonids, the following pressures have been identified as negatively effecting lamprey populations[74]:

- Changes in habitat and water quality as a result of acidification, point-source and diffuse pollution, changing rainfall patterns, eutrophication and oligotrophication;
- Changes in habitat and water quality as a result of abstraction, flow regulation, upland / agriculture land-use and drainage, and forestry drainage;
- The increasing threat of climate change is likely to produce similar problems as point above, potentially increasing periods of heavy rain in the autumn and winter, and drought in the summer.
- Changes to instream habitats as a result of over sedimentation or the loss of sediment transfer, canalisation and dredging;
- Loss of riparian habitat as a result of afforestation and habitat loss/change; and
- Prevention of upstream/downstream migration and the access to spawning habitats, due to man-made barriers such as dams or other river modifications.

179. The Development has the potential to, at least in the short term, negatively contribute to some of these pressures, particularly those related to changes in habitat and water quality.

[73] MSS (2018) Scoping advice on information required in Environmental Impact Assessment reports in relation to assessing risk to freshwater and diadromous fish associated fisheries. April 2018
[74] Maitland PS (2003). *Ecology of the River, Brook and Sea Lamprey*. Conserving Natura 2000 Rivers Ecology Series 5. English Nature, Peterborough.

7.7.6.1 Construction Phase Effects

Habitat Loss, Disturbance, Degradation and Contamination

180. During the construction phase, there are potential impacts that may result from the occurrence of ground works in close proximity to watercourse used by lamprey. These include the detrimental impacts such as spawning habitat loss and disturbance, siltation, sedimentation and accidental pollution, accelerated or exacerbated erosion, and hydrological changes. The effects of these impacts could detrimentally impact the local lamprey population indirectly via the reduction of productivity by reducing the population's ability to utilise spawning areas, or directly through injury and mortality, which could also have an impact of population productivity.

181. Due to migration barriers further downstream, as confirmed by the Tweed Foundation (Technical Appendix A7.4), no watercourses within the Site Boundary are known to support lamprey populations. With the exception of an existing watercourse crossing on the eastern access road (a public road with no upgrade works required) which crosses the River Tweed SAC, there is no potential for direct impacts to occur, and all other watercourses are located at least 50 m outwith proximity of all Development related construction. As these potential impacts are likely to be relatively localised to their point source within the Site and their magnitude, and thus effects on lamprey, is likely to dissipate with increasing distance from source, the risk from direct and indirect effects are low.

182. As stated in Section 7.5, mitigation presented with in **Chapter 10: Hydrology and Hydrogeology** to safeguard the water environment, will also effectively mitigate construction-related impacts to fish such as the direct and indirect effect of pollution and sedimentation from surface water run-off. Furthermore, the sensitive design of watercourse crossings and culverts as presented in **Chapter 3: Project Description**, was developed to safeguard the water environment, which will be constructed in accordance with statutorily regulations for instream works, further reducing the risk of construction-related direct and indirect impacts to fish and other aquatic features.

183. Through the implementation of embedded mitigation measures, such as the implementation of good practice pollution prevention measures and monitoring of works by the ECoW, the risk of detrimental impacts is low. Therefore, the effect of construction phase impact is of low magnitude, and is **not significant** in terms of the EIA Regulations.

7.7.6.2 Operational Phase

184. Operational impacts of onshore wind farms on lamprey are considered of a very similar nature to impacts on salmonids, and are not widely held to be a cause of concern, and as such, consideration for operational effects is not included within any published statutory guidance or advice. Although MSS acknowledge in their published scoping advice[73], that onshore wind farm developments have the potential to adversely affect diadromous fish (such as river lamprey and sea lamprey), the ecological impacts that should be given consideration are related to effects resulting from the construction of turbine foundations and associated infrastructure, as assessed in Section 7.7.6.1 above. The only operational impact stated as having the potential to effect diadromous fish is physical obstruction to migration, which is not an impact associated with the Development. Therefore, the effect of operational phase impact is of negligible magnitude, and is therefore **not significant** in terms of the EIA Regulations.

7.7.6.3 Decommissioning

185. Decommissioning activities are considered to be of a similar nature to those of Development construction. Through the implementation of embedded mitigation measures, such as the implementation of good practice pollution prevention measures, adherence to statutory regulations for instream works and monitoring of works by the

ECoW, the risk of detrimental impacts is low. Therefore, the effect of decommissioning phase impact is of negligible magnitude, and is **not significant** in terms of the EIA Regulations.

7.7.7 Designated Sites

7.7.7.1 River Tweed SAC

Habitat Regulations Appraisal Screening

186. In accordance with the requirements of the Habitats Directives, where a project is likely to have a significant effect on an SAC (or any European Sites[75]), while not directly connected with, or necessary to the nature conservation management of the SAC, that project shall be subject to HRA. This identifies any implications for the SAC in the respect of its conservation objectives.

187. The Development is not associated with the management of the SAC, and therefore must undergo HRA screening. The intention of this screening is to assist the consenting authority in their assessment of the potential for likely significant effects on the integrity of the SAC. Should a likely significant effect be determined, the Development is statutorily required to be subject to an Appropriate Assessment (AA) by a relevant competent authority.

188. Part of HRA screening involves establishing the likely 'Zone of Influence' (ZoI) of the Development. The ZoI will vary depending on the nature of the project as well as the character and ecology of the Qualifying Features (QF). For floral and habitat QFs, given the fixed nature of these features, potential effects are likely to be limited to those associated with direct impacts, such as construction related habitat loss and pollution on habitats, on, directly adjacent, or with direct connectivity to the Site, for example hydrologically. In light of this, it is considered that the ZoI should be limited to land with the potential to be directly affected by the Development and therefore the ZoI is limited to within 2 km of the Site boundary.

189. The only European Site which falls within the ZoI of the Development is the River Tweed SAC. As a result, 'likely significant effects' on the SAC are predicted in the context of an HRA, and the SAC has been scoped into Stage 2 of the HRA process (AA).

190. As the River Tweed SAC is designated for a number of QFs, each of which have a different ZoI, an assessment of effects on each of these QFs has been carried out, and is presented in Table 7.11.

Table 7.11 Habitats Regulation Appraisal Screening Assessment

Qualifying Feature	Screening Assessment	Likely Significant Effect
Atlantic salmon	Atlantic salmon are present downstream of the Site, but not within the Site itself (TA 7.4). However, as they are present downstream of the Site, the Development is within the likely ZoI.	Yes
Brook lamprey River lamprey Sea lamprey	Larval lamprey were present downstream of the Site, but not within the Site itself (TA 7.4). However, as they are present downstream of the Site, the Development is within the likely ZoI.	Yes

75 Previously termed "Natura Sites".

Qualifying Feature	Screening Assessment	Likely Significant Effect
Otter	Otter was recorded within the Site. In riparian environments otter can inhabit territories of between 20-32 km[76], so it is considered likely that otter utilising the Site comprise part of the River Tweed SAC population. Development within likely ZoI.	Yes
Rivers with floating vegetation often dominated by water-crowfoot	This habitat was not recorded onsite, although it is part of the River Tweed SAC designation, which indicates it is present downstream of the Site. Therefore, the Development lies within likely ZoI.	Yes

191. There is potential for likely significant effects on all QFs of the River Tweed SAC and, therefore, these have been scoped into the AA.

192. Although an AA must be carried out by a relevant competent authority, information to inform the AA (often referred to as a Shadow AA) has been provided below.

Shadow Appropriate Assessment

193. As established in Section 7.6, the only European Site which falls within the ZoI of the Development is the River Tweed SAC. The SAC lies approximately 400 m west of the western boundary of the Site, directly connected via the Flemington Burn at the nearest point. It is also connected to the Site via the Harehope Burn, lying approximately 3 km downstream of the Site Boundary. The eastern access road also crosses the SAC (the Eddleston Water) at an existing bridge on a public road. No works are proposed to this public road or bridge.

194. QFs to be scoped into the AA phase of the HRA are presented in Table 7.11 and, based on this, it is considered that detailed assessment of adverse effects will be required for all QFs of the River Tweed SAC, as detailed below.

Atlantic Salmon

195. As stated above, salmon were not present within the Site Boundary and so only indirect effects from the Development on salmon are considered. Section 7.7.3 provides a detailed assessment of all perceptible Development related effects, and no further effects are required to be assessed in the context of an AA.

196. Following the implementation of embedded mitigation and good practice measures, no adverse effects on the integrity on the River Tweed SAC salmon population are predicted.

Brook lamprey, river lamprey and sea lamprey

197. As stated above, lamprey species were not present within the Site Boundary and so only indirect effects are considered. Such indirect effects consist of potential siltation and/or pollution-related adverse effects, changes of flow regime and physical blockages to migration. However, with the adoption of detailed embedded mitigation and good practice measures, the magnitude of these effects is considered to be negligible, and no adverse effects on the integrity on the River Tweed SAC lamprey population are predicted.

[76] Chanin, P., (2003). Ecology of the European Otter. Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature, Peterborough.

Otter

198. As stated above, it is assumed that the otter utilising the Site are part of the SAC population. Section 7.7.3 provides a detailed assessment of all perceptible Development related effects, and no further effects are required to be assessed in the context of an AA.

199. Otter was only recorded on one watercourse within the Site, the Cowieslinn Burn, and although the species may potentially utilise other lower value watercourses within the Site, it is likely to only be on an occasional basis. Although very minor Development related effects on otter cannot be ruled out, the risk is very low, and given the limited value of the Site for otter, the extensive availability of more suitable habitats in the wider local area, and the large extent of the SAC boundary, no adverse effects on the integrity on the River Tweed SAC otter population are predicted.

Rivers with floating vegetation often dominated by water-crowfoot

200. As stated above, this habitat was not recorded within the Site Boundary and so only indirect effects are considered. Such indirect effects consist of potential siltation and/or pollution related adverse effects upon floating river vegetation and the change of flow regimes. Following the adoption of detailed embedded mitigation and good practice measures, no adverse effects on the integrity of this River Tweed SAC habitat are predicted.

Conclusion of Shadow Appropriate Assessment

No adverse effects are predicted for any of the QFs of the River Tweed SAC, therefore no adverse effects on the integrity of the River Tweed SAC are predicted, in the context of the HRA.

EIA Context of Assessment

201. In addition to the prediction of no adverse effects on the integrity of the River Tweed SAC in the context of the HRA, no significant effects (in terms of the EIA Regulation) on the SAC or its QFs in terms of the EIA regulations are predicted to occur from the Development.

7.7.7.2 River Tweed SSSI

202. The River Tweed SSSI is located 5 km south of the Site and is connected via the Flemington Burn and Lyne Water along a 12 km pathway.

203. It has been demonstrated in the preceding section that environmental measures incorporated into the scheme to protect water quality receptors will protect downstream water quality resulting in effects of negligible magnitude on the River Tweed SAC QFs, therefore it is also predicted that effects will be of negligible magnitude relating to the River Tweed SSSI QFs, and therefore, no significant effects in terms of the EIA Regulations are predicted.

7.7.7.3 Cloich Bog LBS

204. Cloich Bog LBS is located directly to the east of the Site. The nearest turbines (turbines 5 and 9) are located approximately 300 m from the edge of the LBS boundary. A borrow pit is planned to be adjacent to the southwestern boundary of the LBS. None of the five proposed watercourse crossings affect the watercourse flowing beside the LBS (i.e. the Early Burn). In consideration of the environmental measures incorporated into the Development to protect water quality receptors (as described in Section 7.7.7.1), it is predicted that effects will be of negligible magnitude, and therefore no significant effects in terms of the EIA Regulations are predicted.

7.8 CUMULATIVE EFFECT ASSESSMENT

205. The EIA Regulations require the cumulative effects of the Development with other relevant projects or plans to be assessed. In considering cumulative effects, it is necessary to identify any effects that may be not significant in isolation but that may be significant in combination with other developments.

206. This assessment considers that cumulative effects can result from effects that were individually assessed as non-significant, but in combination with effects or actions taking place over time, or across a wider spatial range (such as where the zone of influence of other developments or actions may overlap the with Development) non-significant effects may cumulatively be considered significant.

207. Cumulative effects are particularly important in EcIA as ecological features may be already exposed to background levels of threat or pressure and may be close to critical thresholds where further impact could cause irreversible decline.

208. The main projects likely to cause similar effects to those associated with the Development are other operational wind farms, those under construction or those consented.

209. Wind farm projects at scoping stage have been scoped out of the cumulative assessment because they generally do not have sufficient information on potential effects to be included, as the baseline survey period is ongoing, or results have not been published. Projects that have been refused or withdrawn have also been scoped out.

210. Small projects with three or fewer turbines have also been excluded from the cumulative assessment as often these projects are not subject to the same level of detail of assessment, and so there are no directly comparable data. Due to the small scale of such projects, effects are likely to be negligible on the IEFs assessed here.

211. Only one wind farm was considered within the cumulative effect assessments for IEFs below: Bowbeat Wind Farm, an operational 24-turbine wind farm with turbine heights of 80 m to tip, lying 8.6 km east of the Site.

7.8.1 Bats

212. Bats are most likely to be affected by cumulative wind farm development because of the foraging distances travelled by some species of bat and the cumulative risks to bat populations as a result of collision with wind turbines during operation.

213. Given the potential foraging and commuting range for bats; the Site lies within the ZoI of one wind farm: Bowbeat Wind Farm,

214. The implementation of standard good practice measures regarding buffer distances of turbines from forestry edges to minimise effects on commuting and foraging bats reduces the extent of cumulative effects (Section 7.7.2.2).

7.8.1.1 Common Pipistrelle and Soprano Pipistrelle

215. No information was available on the presence and activity levels of common and soprano pipistrelle for Bowbeat Wind Farm. However, both common pipistrelle and soprano pipistrelle are widespread in southern Scotland, with distributions of these species reaching into northern parts of Scotland. They are also common species with large population sizes and lower population sensitivity or population risk.

216. Taking into account the low risk assessment score at the Development for both species and considering their distribution, population size and sensitivity, whilst applying the precautionary principle, cumulative effects on common pipistrelle and soprano pipistrelle are of negligible magnitude and **not significant** in the context of the EIA Regulations.

7.8.1.2 Nyctalus spp.

217. With no information available on the activity levels of *Nyctalus* spp. at Bowbeat Wind Farm, and the lack of species population data in the UK and Scotland, information from the published report on high-risk bat species across southern Scotland[65] has been taken into account to provide additional data and context for a cumulative assessment.

218. The study examines the likelihood of *Nyctalus* species being present at wind farms in the region, using spatial modelling. The ranges occupied by these species in southern Scotland were found to be restricted with little overlap. For both noctule and Leisler's bat, occupancy and activity patterns were found to be particularly aggregated, indicating that smaller areas where the species are found may be of particular importance for the overall population. It was estimated that 16% to 24% of the populations of *Nyctalus* spp. are exposed to existing and approved wind farms. An analysis of spatial patterns of distribution and activity was undertaken to produce a map of core areas for these species, where they are likely to be at highest risk from wind farm development, with both the Development and Bowbeat Wind Farm falling outwith these core areas.

219. Taking into account the low to moderate risk assessment score at the Development for *Nyctalus* spp. and the currently available data on these species as detailed above, cumulative effects on *Nyctalus* spp. are of negligible magnitude and **not significant** in the context of the EIA Regulations.

7.8.2 Otter

220. Given the potential foraging and commuting range for otter; the Site lies within the ZoI of one wind farm: Bowbeat Wind Farm.

221. No information was available regarding otter for Bowbeat Wind Farm. However, extensive local habitat suitability outwith the Site exists for the species which is abundant and in an inclining status in Scotland. Therefore, due to the low magnitude of predicted non-significant effects, **no significant** cumulative effects in terms of the EIA Regulations are predicted.

7.8.3 Salmonid Fish (Atlantic salmon/brown trout)

222. No information was available regarding salmonid fish for Bowbeat Wind Farm. Furthermore, Bowbeat Wind Farm is located in a different catchment to the Development (see Section 10.8 of **Chapter 10: Hydrology and Hydrogeology**) and thus is not hydrologically connected. Therefore, no cumulative effects are predicted for Salmonid fish and due to the low magnitude of non-significant effects predicted for the Development alone, **no significant** cumulative effects in terms of the EIA Regulations are predicted.

7.8.4 Lamprey Species

223. No information was available regarding lamprey for Bowbeat Wind Farm. As stated in the section above, Bowbeat Wind Farm is located in a different catchment to the Development (see Section 10.8 of **Chapter 10: Hydrology and Hydrogeology**) and thus is not hydrologically connected. Therefore, no cumulative effects are predicted for lamprey and due to the low magnitude of non-significant effects predicted for the Development alone, **no significant** cumulative effects in terms of the EIA Regulations are predicted.

7.9 MITIGATION AND RESIDUAL EFFECTS

Embedded mitigation is described in Section 7.5. No significant effects were predicted and therefore no requirement for further mitigation is required.

No significant residual effects are predicted following the implementation of embedded mitigation.

7.10 SUMMARY OF EFFECTS

Table 7.12 provides a summary of the effects detailed within this chapter.

Table 7.12: Summary of Effects

Receptor	Potential Effect	Significance of Effect*	Mitigation Proposed**	Significance of Residual Effect
Construction Phase				
Bats	Habitat change.	Not Significant.	N/A	Not Significant.
	Roost loss.	Not Significant.	N/A	Not Significant.
Otter	Habitat loss, disturbance and degradation.	Not Significant.	N/A	Not Significant.
	Disturbance and displacement of breeding otters.	Not Significant.	N/A	Not Significant.
	Interaction with traffic, plant and personnel.	Not Significant.	N/A	Not Significant.
	Otter entrapment in excavations.	Not Significant.	N/A	Not Significant.
Badger	Habitat loss, disturbance and degradation.	Not Significant.	N/A	Not Significant.
	Interaction with traffic, plant and personnel.	Not Significant.	N/A	Not Significant.
	Badger entrapment in excavations.	Not Significant.	N/A	Not Significant.
Salmonid fish	Habitat loss, disturbance and degradation.	Not Significant.	N/A	Not Significant.
Lamprey species	Habitat loss, disturbance and degradation.	Not Significant.	N/A	Not Significant.
River Tweed SAC	Otter habitat loss, disturbance and degradation.	Not Significant.	N/A	Not Significant.
	Disturbance and displacement of breeding otters.	Not Significant.	N/A	Not Significant.
	Otter interaction with traffic, plant and personnel.	Not Significant.	N/A	Not Significant.

Receptor	Potential Effect	Significance of Effect*	Mitigation Proposed**	Significance of Residual Effect
	Otter entrapment in excavations.	Not Significant.	N/A	Not Significant.
	Atlantic salmon habitat loss, disturbance and degradation	Not Significant.	N/A	Not Significant.
	Lamprey species habitat loss, disturbance and degradation.	Not Significant.	N/A	Not Significant.
	Indirect effects of pollution, sedimentation and flow regime change on habitats with floating vegetation often dominated by water-crowfoot.	Not Significant.	N/A	Not Significant.
River Tweed SSSI	Potential effects identical to those stated above for the River Tweed SAC.	Not Significant.	N/A	Not Significant.
Cloich Bog LBS	Indirect effects of pollution and sedimentation of noted features such as bog and marsh habitats.	Not Significant.	N/A	Not Significant.
Operational Phase				
Bats	Turbine related mortality.	Not Significant.	N/A	Not Significant
Otter	Interaction with traffic, plant and personnel.	Not Significant.	N/A	Not Significant
Badger	Interaction with traffic, plant and personnel.	Not Significant.	N/A	Not Significant
Salmonid fish	Habitat degradation.	Not Significant.	N/A	Not Significant.
River Tweed SAC	Otter interaction with traffic, plant and personnel.	Not Significant.	N/A	Not Significant.
	Atlantic salmon habitat degradation.	Not Significant.	N/A	Not Significant.
	Lamprey species habitat degradation.	Not Significant.	N/A	Not Significant.

Receptor	Potential Effect	Significance of Effect*	Mitigation Proposed**	Significance of Residual Effect
	Degradation habitats with floating vegetation often dominated by water-crowfoot.	Not Significant.	N/A	Not Significant.
River Tweed SSSI	Potential effects identical to those stated above for the River Tweed SAC.	Not Significant.	N/A	Not Significant.
Decommissioning Phase				
Decommissioning activities are considered to be of a similar nature to those of Development construction.				
*The significance of effect assumes that the embedded mitigation described in Section 7.5 is fully implemented. **Where this is additional to the embedded mitigation described in Section 7.5.				

7.11 STATEMENT OF SIGNIFICANCE

No significant ecological effects have been identified for the Development on IEFs, either alone or in combination with other developments, and therefore these are **not significant** in relation to the EIA Regulations. Embedded Mitigation has been proposed to ensure the low or negligible magnitude of effects of the Development on IEFs and to reduce the likelihood of legal offences and comply with good practice.

CLOICH FOREST WIND FARM

EIA Report – Volume 1 – EIA Report Text

Chapter 8

Ornithology

ARCUS

8 ORNITHOLOGY

8.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment (EIA) Report evaluates the effects of the Cloich Forest Wind Farm ('the Development') on the Ornithology resource.

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

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

- Appendix A8.1: Cloich Forest Wind Farm Baseline Ornithology Report 2019-20;
- Appendix A8.2: Cloich Forest Wind Farm Baseline Ornithology Report 2019-20 – Confidential Annex;
- Appendix A8.3: Cloich Forest Wind Farm Collision Risk Modelling;
- Appendix A8.4: Cloich Forest Wind Farm Ornithology Consultation Report 2019; and
- Appendix A8.5: Cloich Forest Wind Farm Ornithology Consultation Report 2020[1].

4. This Chapter includes the following elements:

- Legislation, Policy and Guidance;
- Assessment Methodology and Significance Criteria;
- Scoping Responses and Consultations;
- Baseline Conditions;
- Evaluation of Ornithological Features;
- Assessment of Potential Effects;
- Cumulative Effect Assessment;
- Mitigation, Monitoring, and Residual Effects;
- Summary of Effects; and
- Statement of Significance.

5. English (British) vernacular and scientific names of bird species referred to in this report follow the British List maintained by the British Ornithologists' Union (BOU)[2].

[1] Appendix A8.5 Figures 4 and 5 are confidential.
[2] *British Ornithologists' Union. (2017) The British List: A Checklist of Birds of Britain (9th edition). Ibis 160, 190-240.*

8.2 LEGISLATION, POLICY AND GUIDANCE

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

8.2.1 Legislation

- Directive 2009/147/EC on the Conservation of Wild Birds ('Birds Directive')[3];
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (The Habitats Regulations)[4];
- The Wildlife and Countryside Act 1981 (as amended)[5];
- The Nature Conservation (Scotland) Act 2004 (as amended)[6]; and
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended)[7] (the EIA Regulations).

8.2.2 Planning Policy

- UK Post-2010 Biodiversity Framework (2012)[8];
- Scottish Biodiversity Strategy: It's in Your Hands (2004)9/2020 Challenge for Scotland's Biodiversity (2013)[10];
- PAN 60: Planning for Natural Heritage (Scottish Government 2000)[11];
- Scottish Government (2017). Planning Advice Note 1/2013-Environmental Impact Assessment, Revision 1.0[12];
- Scottish Borders Council Local Biodiversity Action Plan[13]; and
- Scottish Borders Council Local Development Plan (2016).

8.2.3 Guidance and Information

- Developing field and analytical methods to assess avian collision risk at wind farms (Band *et al*., 2007)[14];

[3] European Parliament (2009) Directive 2009/147/EC [Online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0147&from=EN (Accessed 12/03/21)
[4] European Parliament (1994) the Conservation (Natural Habitats, &c.) Regulations 1994 [Online] Available at: http://www.legislation.gov.uk/uksi/1994/2716/contents/made (Accessed 12/03/21)
[5] UK Government (1981) The Wildlife and Countryside Act 1981 (as amended) [Online] Available at: http://www.legislation.gov.uk/ukpga/1981/69 (Accessed 12/03/21)
[6] UK Government (2004) Nature Conservation (Scotland) Act 2004 [Online] Available at: http://www.legislation.gov.uk/asp/2004/6/contents (Accessed 12/03/21)
[7] The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 http://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 12/03/21)
[8] Four Countries' Biodiversity Group (2010) UK Post-2010 Biodiversity Framework [Online] Available at: http://data.jncc.gov.uk/data/587024ff-864f-4d1d-a669-f38cb448abdc/UK-Post2010-Biodiversity-Framework-2012.pdf (Accessed 12/03/21)
[9] Scottish Executive (2004) Scotland's Biodiversity It's in your Hands [Online] Available at: https://www.webarchive.org.uk/wayback/archive/20180515152802/http://www.gov.scot/Publications/2004/05/19366/37250 (Accessed 12/03/21)
[10] Scottish Government (2013) 2020 Challenge for Scotland's Biodiversity [Online] Available at: https://www2.gov.scot/Resource/0042/00425276.pdf (Accessed 12/03/21)
[11] Scottish Government (2000) PAN 60: Planning for Natural Heritage [Online] Available at: https://www.webarchive.org.uk/wayback/archive/20150218224848/http://www.gov.scot/Publications/2000/08/pan60-root/pan60 (Accessed 12/03/2021)
[12] Scottish Government (2013) PAN 1/2013: EIA [Online] Available at: https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/ (Accessed 12/03/2021)
[13] Scottish Borders Council Local Biodiversity Action Plan https://www.scotborders.gov.uk/downloads/file/928/local_biodiversity_action_plan (Accessed 21/03/2021)
[14] Band, W., Madders, M. & Whitfield, D.P. (2007) Devel*oping field and analytical methods to assess avian collision risk at wind farms*. In: de Lucas, M., Janss, G. & Ferrer, M. (eds.) *Birds and Wind Power*. Quercus, Madrid.

- Scottish Raptor Monitoring Scheme Report 2018 (Challis *et al.*, 2019)[15];
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018)[16];
- Birds of Conservation Concern (BoCC) 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man (Eaton *et al.*, 2015)[17];
- Wind Energy Developments and Natura 2000 (European Commission, 2011)[18];
- The Birds of Scotland (Forrester *et al.*, 2007)[19].
- Bird Monitoring Methods (Gilbert *et al.*, 1998)[20];
- Raptors: a field guide to survey and monitoring, 3rd edition (Hardey *et al.*, 2013)[21];
- A Review of Disturbance Distances in Selected Bird Species (Ruddock & Whitfield, 2007)[22];
- The Scottish Biodiversity List (SBL)[23];
- Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action. (NatureScot, 2000) [24];
- Recommended bird survey methods to inform impact assessment of onshore wind farms (NatureScot, 2017) [25];
- Assessing connectivity with Special Protection Areas (SPAs) (NatureScot, 2016a)[26];
- Environmental Statements and Annexes of Environmentally Sensitive Bird Information; Guidance for Developers, Consultants and Consultees (NatureScot, 2016b)[27];
- Wind farm proposals on afforested sites – advice on reducing suitability for hen harrier *Circus cyaneus*, merlin *Falco columbarius* and short-eared owl *Asio flammeus* (NatureScot, 2016c)[28];
- Assessing significance of impacts from onshore wind farms on birds out with designated areas (NatureScot, 2018a)[29];
- Assessing the cumulative impacts of onshore wind farms on birds (NatureScot, 2018b)[30];

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[15] Challis, A., Eaton, M., Wilson, M.W., Holling, M., Stevenson, A. & Stirling-Aird, P. (2019). *Scottish Raptor Monitoring Scheme Report 2018*. BTO Scotland, Stirling.

[16] CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine* version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.

[17] Eaton M.A., Aebischer N.J., Brown A.F., Hearn R.D., Lock L., Musgrove A.J., Noble D.G., Stroud D.A. and Gregory R.D. (2015). Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds* 108, 708–746.

[18] European Commission (2011). Natura 2000 Guidance Document 'Wind Energy Developments and Natura 2000'. European Commission, Brussels.

[19] Forrester, R.W., Andrews, I.J., McInerny, C.J., Murray, R.D, McGowan, R.Y, Zonfrillo, B., Betts, M.W., Jardine, D.C., & Grundy, D.S. (eds) (2007) *The Birds of Scotland*. The Scottish Ornithologists Club, Aberlady.

[20] Gilbert, G., Gibbons, D.W. & Evans, J. 1998. *Bird monitoring methods*. RSPB, Sandy.

[21] Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). *Raptors: a field guide to survey and monitoring*, 3rd edition. The Stationery Office, Edinburgh

[22] Ruddock, M. & Whitfield, D.P. (2007). *A Review of Disturbance Distances in Selected Bird Species*. A report from Natural Research (Projects) Ltd to NatureScot

[23] https://www.webarchive.org.uk/wayback/archive/20160402063428/http://www.gov.scot/Topics/Environment/Wildlife-Habitats/16118/Biodiversitylist/SBL (Accessed 21/03/2021)

[24] NatureScot (NS) (2000). Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action. NS Guidance Note.

[25] NatureScot (2017). *Recommended bird survey methods to inform impact assessment of onshore wind farms*, Version 2.

[26] NatureScot (2016a). *Assessing connectivity with Special Protection Areas (SPAs)*, Version 3.

[27] SNH (2016b). *Environmental Statements and Annexes of Environmentally Sensitive Bird Information; Guidance for Developers, Consultants and Consultees*, Version 2.

[28] SNH (2016c). *Wind farm proposals on afforested sites – advice on reducing suitability for hen harrier, merlin and short-eared owl*.

[29] SNH (2018a). *Assessing significance of impacts from onshore wind farms on birds outwith designated areas*, Version 2.

[30] SNH (2018b). *Assessing the cumulative impacts of onshore wind farms on birds*. SNH Guidance Note.

- Environmental Impact Assessment Handbook (NatureScot, 2018c)[31];
- Natural Heritage Zone Bird Population Estimates (Wilson *et al.*, 2015)[32].

7. Note that additional sources of information used only occasionally are referenced in the text where relevant.

8.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

8.3.1 Scoping Responses and Consultations

8. Consultation for this EIA was carried out with the organisations shown in Table 8.1.

9. Two consultation reports were sent (Appendices A8.4 and A8.5) by Arcus to NatureScot (formally Scottish Natural Heritage) during ornithological surveys, to discuss ornithological sensitivities at the Site and the proposed survey scope.

10. A Scoping Request was submitted to the Scottish Government's Energy Consents Unit (ECU) in October 2019.

Table 8.1 Consultation Responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
NatureScot	Consultation Report 2019 Response, 12/03/19	NatureScot confirmed that they were satisfied with the survey approach in general, and agreed that the vantage points for the Flight Activity Surveys (FAS) are well located and that passerine surveys are not a requirement. NatureScot commented that the Development is well within connectivity range of both the Westwater and Gladhouse SPAs and an Appropriate Assessment may be required.	Additional FAS effort during goose migration periods and targeted foraging goose surveys were undertaken, as detailed in Sections 8.3.5.1, 8.3.5.2, 8.4.2.1 and 8.4.2.2. Further detail on survey methods and results is available in Appendix A8.1.
NatureScot	Consultation Report 2019 Response, 14/03/19	Due to the habitats and species known to be present, NatureScot advised that Moorland Breeding Bird Surveys (MBBS) should be carried out in the open parts of the study area. They stated there was no requirement to do this within the forested areas.	This was incorporated into the survey programme and is detailed in Sections 8.3.5.5 and 8.4.2.5. Further detail on survey methods and results is available in Appendix A8.1.
Scottish Borders Council	Scoping Request Response, 15/11/19	Satisfied with the proposed updated surveys and updated impact assessment.	N/A
NatureScot	Scoping Request Response, 21/11/19	Advised that a second year of bird surveying would be required to inform the EIA.	N/A
NatureScot	Consultation Report 2020	Agreed that a second year of bird surveying would not be	N/A

[31] SNH (2018c). *Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland*.
[32] Wilson, M.W., Austin, G.E., Gillings S. & Wernham, C.V. (2015) *Natural Heritage Zone Bird Population Estimates*. SWBSG Commissioned report number SWBSG_1504.

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
	Response, 15/04/20	required based on the results of the first year and records from previous surveys.	

8.3.2 Scope of Assessment

11. The key issues for the assessment of potential ornithological effects relating to the Development are:

- Direct loss of breeding, foraging and/or roosting habitat through construction of the Development;
- Habitat modification due to the change in land use (e.g., forestry removal by keyholing) and consequent effects on bird populations and activity;
- Displacement of birds through direct and indirect loss of habitat as a result of disturbance associated with construction or decommissioning activity, turbine operation and maintenance, or visitor disturbance;
- Death or injury through collision with turbine blades or other types of infrastructure associated with the Development; and
- Cumulative effects on Natural Heritage Zone (NHZ) populations, resulting from construction, operation and decommissioning of the Development in conjunction with other developments that may also impact on the same populations.

8.3.3 Study Area / Survey Area

12. The Ornithology Survey Areas are defined in Section 8.3.5 and shown in Figure 8.1.1 of Appendix A8.1.

8.3.4 Desk Study Methods

13. A Desk Study was undertaken to provide information on the ornithological interest of the Site and its surrounds. This included identifying statutory sites designated for ornithological interests with potential connectivity to the Site and existing records of ornithological features.

8.3.4.1 Statutory Sites

14. A search was completed for the following statutory protected nature conservation sites designated for ornithological features:

- Sites of international importance (SPAs and Ramsar sites) within 20 km of the Site; and
- Sites of national importance (Sites of Special Scientific Interest [SSSIs] and National Nature Reserves [NNRs]) within 10 km of the Site.

15. Information on statutory designated sites was obtained from the NatureScot SiteLink[33] website.

8.3.4.2 Existing Records

16. Ornithology surveys were carried out at the Site between 2011 and 2012 to inform the 2012 Environmental Statement[34] for the consented Cloich Forest Wind Farm ('the Consented Scheme') as follows:

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[33] https://sitelink.nature.scot/home (Accessed on 19/02/2021)
[34] Partnerships for Renewables. (2012). Cloich Forest Wind Farm Environmental Statement. Planning application reference 12/01283/S36. Available on the Scottish Borders Council planning application search page: https://eplanning.scotborders.gov.uk/online-applications/

- Flight Activity Surveys (FAS);
- Black Grouse Surveys;
- Breeding Bird Territory Mapping Surveys;
- Breeding Season Point Count Surveys;
- Breeding Raptor Surveys;
- Non-breeding Season Point Count Surveys;
- Car Transect Surveys for Foraging Geese; and
- Westwater Reservoir SPA Goose Roost Surveys.

17. The results of previous surveys were used to refine the scope of 2019/20 ornithology surveys, which comprised the following:

- FAS;
- Black Grouse Surveys;
- Foraging Goose Surveys;
- Breeding Raptor Surveys; and
- Moorland Breeding Bird Surveys (MBBS).

18. A request for the following data, recorded within 2 km of the Site in the last ten years, was made to The Wildlife Information Centre in March 2021, including records of

- All protected bird species (i.e. species listed on Schedule 1 of the Wildlife and Countryside Act 1981[5] (as amended) and/or Annex I of the Birds Directive[3] including locations of nest/roost sites where possible;
- Red-listed and Amber-listed species[17], including recording period (breeding or non-breeding season) and breeding status if known; and
- Local Biodiversity Action Plan (LBAP)[13] priority species.

19. A request was also made to the Lothian and Borders Raptor Study Group for any records of nest/roost sites of protected raptor species within 2 km of the Site.

8.3.5 Baseline Survey Methodology

20. Baseline Ornithology Surveys were completed over a year-long period between March 2019 and February 2020 (inclusive). Details of ornithology survey methods and Survey Areas are provided in Appendix A8.1.

21. During each survey, signs and observations of the relevant species were recorded in the field on large-scale maps. An overview of the methods followed for each survey is provided below; further details are included in Appendix A8.1.

8.3.5.1 Flight Activity Surveys

22. Flight Activity Surveys (FAS) were carried out between March 2019 and February 2020, using a series of watches from four VPs overlooking the Site, to record flight activity of target bird species and allow collision risk to be estimated.

VP Locations

23. The VP locations and viewsheds used during the FAS are shown in Appendix A8.1 - Figure 8.1.2.

Target Species

24. Target species included the following:

- All wild swan, goose, heron and duck species;
- All raptors and owls listed on Schedule 1 of the Wildlife and Countryside Act 19815 (as amended) and/or Annex I of the Birds Directive[3];
- All heron species;
- All wader species; and
- Black grouse.

25. In accordance with NatureScot guidance[25], flight lines of all target species passing through the VP viewshed (see below) were mapped in the field. Each recorded flight line was numbered and cross-referenced to the following flight information, which was recorded on standardised survey forms:

- Species, age and sex (where identification of age/sex was possible);
- Number of birds;
- Time (when first seen);
- Duration of flight within the viewshed; and
- Flight height on detection and at 15 second intervals, recorded in the following height bands:
    1. < 20 m;
    2. 20 m to < 150 m; and
    3. > 150 m.

26. Height bands 1 and 2 fall within PCH, which is between 14-150 m.

Secondary Species

27. In addition to recording target species flights, the number and activity of 'secondary' species was summarised every 5-minutes during each FAS. Secondary species included the following: cormorant (*Phalacrocorax carbo)*, sparrowhawk (*Accipiter nisus*), buzzard (*Buteo buteo*), kestrel (*Falco tinnunculus*), all gull species and raven (*Corvus corax*). Recording of target species took priority over that of secondary species.

Survey Details

28. Surveys were stratified to cover all times of day including dawn and dusk periods, to record to record any geese flying between roost sites and day time foraging grounds. Each watch lasted up to three hours with a minimum 30-minute break in between watches. During the 2019/20 non-breeding season a minimum of 45 hours of survey was completed from each VP, while during the 2019 breeding season 36 hours was carried out from each VP, meeting or exceeding the minimum recommendation of 36 hours' survey from each VP in each season[25]. The additional nine hours per VP undertaken during the non-breeding season was completed between September to November 2019 as this is a key period for migrating geese.

8.3.5.2 Foraging Goose Surveys

29. Foraging Goose Surveys were undertaken between late September 2019 and February 2020 (inclusive) to assess use of the Site and a 3 km Buffer Area[35] by foraging geese. The surveys involved the surveyor driving or walking the Survey Area and stopping regularly to scan visually for birds using binoculars and/or a telescope.

8.3.5.3 Black Grouse Surveys

30. Black Grouse Surveys were completed in April and May 2019, based on standard methods[20]. Surveys covered all potentially suitable lekking habitat within the Site and a surrounding 1.5 km Buffer Area[35].

8.3.5.4 Breeding Raptor Surveys

31. In line with NatureScot guidance[25], walkover surveys and additional VP watches of suitable areas of breeding habitat were undertaken between March and July 2019 (inclusive) to detect the presence of target raptor species, primarily focusing on goshawk. Surveys followed standard methods[21] and the Survey Area comprised suitable habitat in accessible areas within 1 km of the Site for barn owl (*Tyto alba*) and goshawk, and within 2 km for all other target raptor species[35].

[35] Note that a survey buffer of the access track was not included in the various ornithology survey areas.

8.3.5.5 Moorland Breeding Bird Surveys

32. A Moorland Breeding Bird Survey (MBBS) was undertaken between April and July 2019 (inclusive) to identify breeding wader territories. In line with NatureScot guidance[25], the survey followed an adapted Brown and Shepherd (1993) method (designed to census upland breeding waders) and the Survey Area covered areas of open moorland within the Site and a surrounding 500 m Buffer Area[35]. Four survey visits were completed, at least seven days apart.

8.3.6 Collision Risk Modelling Methodology

33. As recommended in NatureScot guidance[25], the CRM method is based on the Band *et al.* (2007)[14].

34. Following an initial screening to select species for assessment, data collected during the 2019-20 FAS were used to predict the number of individuals per species, per year, expected to collide with the turbine rotors.

35. FAS height band 2 (20-150 m) falls entirely within the RSH, while height band 1 (< 20 m) partly overlaps it. FAS height band 3 (> 150 m) lies outwith the RSH. Therefore, a 'worst-case scenario' approach was adopted and all target species flights recorded within height bands 1 and 2 that passed within the Collision Risk Zone (CRZ) were considered to be at potential risk of collision and included in the CRM (where sufficient flight activity was recorded).

36. CRM was completed for goshawk and curlew (*Numenius arquata)*. All other target species listed in the NatureScot guidance29 as '*Priority Species for Assessment*' or as qualifying species of statutory designed sites listed in Table 8.5 were scoped out due to very low levels of flight activity[36] within the CRZ.

37. Full details of CRM are provided in Appendix A8.3.

[36] Defined as species with fewer than three flights or 10 individuals recorded within the CRZ.

8.3.7 Methodology for the Assessment of Effects

38. The approach used for the Ecological Impact Assessment (EcIA) process is in line with guidance produced by CIEEM[16] and NatureScot[31], and comprises the following stages:

- Evaluation of the importance of ornithological features through Desk Study and Baseline Ornithology Surveys – those considered to be Important Ornithological Features[37] (IOFs) are scoped into the assessment, while species not present, or considered to be of local or less than local importance are scoped out;
- Identification and characterisation of potential effects on IOFs;
- Assessment of potential effects on IOFs, both from the Development alone and in combination with other developments in the surrounding area (cumulative effects);
- Identification of any measures required to avoid and mitigate (reduce) these effects; and
- Assessment of the significance of any residual effects after mitigation.

39. Further details relating to the methods used for evaluating the importance of ornithological features, characterising potential impacts, and assessing the significance of residual effects are provided below.

8.3.7.1 Sensitivity of Receptors

40. Ornithological features can be important for a variety of reasons and may relate, for example, to statutory designations (for protected sites), or (for species) to rarity, the extent to which they are threatened throughout their range, or to their rate of population decline.

41. The level of importance of ornithological features identified during the Desk Study and Baseline Ornithology Surveys has been determined using the criteria in Table 8.2. These criteria have been determined with reference to CIEEM guidance[16]. For protected sites, this includes a consideration of statutory designations and relevant legislation, as well as potential connectivity to the Site. For species, this includes a consideration of relevant legislation, conservation status, population size and distribution, level and type of Site use and, where not a designated feature of an SPA or Ramsar site (with potential connectivity to the Site), whether the species is identified in NatureScot guidance[29] as a priority for assessment when considering the development of onshore wind farms in Scotland.

42. Note that, in some cases, information relating to the size (and distribution) of local and regional populations can be limited or unavailable. Where this is the case and it is not clear whether a population is present in locally versus regionally (or regionally versus nationally) important numbers, a precautionary approach is used and the population is assessed as being of the higher level of importance.

43. In addition to the importance of each bird species in terms of relevant legislation and conservation listings, the evaluation of species importance levels also considers the value of the Site and immediate surroundings for that species, in terms of the number of individuals using it and the nature and level of use. For example, if one or more pairs of birds listed on Schedule 1 of the Wildlife & Countryside Act 1981 (as amended)[5] was found to be breeding within the Site, the species would likely be assigned a regional or higher importance level (depending on population status and trends). However, if one to two Schedule 1 birds flew across the Site very occasionally, and the species was not considered to be using it regularly[38], it would likely be assessed as being of low importance. Similarly, for protected sites, in addition to the statutory designations, the

[37] CIEEM guidance[16] recommends defining Important Ecological Features (IEFs), but for the purpose of this chapter, IEFs will be referred to as IOFs since only avian species are considered.
[38] Regular presence is based on professional judgement but is broadly defined as breeding, or more than occasional commuting, foraging or roosting.

potential for connectivity with the Site is taken into account when determining its importance in the context of the assessment. Thus, a statutory site identified during the Desk Study and designated as being of national or higher importance, but with no potential connectivity to the Site, would likely be evaluated as being of no more than local importance in the context of the assessment, because there is no pathway for the Development to have an effect.

Table 8.2 Framework for Determining Importance of Ornithological Receptors

Importance of Receptor	Examples
International	• Statutory sites of international ornithological importance (SPAs and Ramsar sites) with potential connectivity to the Site. • The regular presence[38] within or around the Site of a cited interest of an existing or proposed statutory site of international ornithological importance, i.e., SPA or Ramsar site, with potential connectivity to the Site. Cited means mentioned in the citation text for the protected site as a species for which the site is designated. Numbers of birds making use of the Site and/or surrounding area are also taken into account. • The regular presence within or around the Site of other bird species that contribute to the integrity of an existing or proposed SPA or Ramsar site (such as part of an assemblage where this is a designated feature), where there is potential connectivity with the Site. Numbers of birds making use of the Site and/or surrounding area are also taken into account.
National (Scotland)	• Statutory sites of national ornithological importance (SSSIs and NNRs) with potential connectivity to the Site. • The regular presence within or around the Site of a designated feature of an existing or proposed statutory site of national ornithological importance, i.e. SSSI or NNR, with potential connectivity to the Site. Numbers of birds making use of the Site and/or surrounding area are also taken into account. • The regular presence within or around the Site of a species listed on Annex I of the Birds Directive, where the species is not a cited interest of a statutory site of international ornithological importance, but is present in nationally important numbers. • The regular presence within or around the Site of a breeding species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), where the species is not a cited interest of a statutory site of international ornithological importance but is present in nationally important numbers. • The regular presence within or around the Site of nationally important numbers of a species of conservation concern[39], where this is identified in NatureScot guidance[29] as a priority for assessment. • The regular presence within or around the Site of nationally important numbers of a migratory species which is either rare or vulnerable, or warrants special consideration on account of the proximity of migration routes, or breeding, moulting, wintering or staging areas in relation to a proposed development, and which is identified in NatureScot guidance[29] as a priority for assessment.
Regional	• A cited interest of an existing or proposed SPA or Ramsar site, with potential connectivity to the Site, which is present within or around the Site infrequently or in relatively low numbers, but could use the Site more regularly post-construction. • Other bird species that contribute to the integrity of an existing or proposed SPA or Ramsar site, with potential connectivity to the Site, which is present within or around the Site infrequently or in low numbers, but could use the Site more regularly post-construction. • Other species listed on Annex I of the Birds Directive, or breeding species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), that are present within or around the Site infrequently or in low numbers (regionally or

[39] An SBL priority species or Red/Amber-listed BoCC

Importance of Receptor	Examples
	locally important numbers), but could use the Site more regularly post-construction. • A regionally (i.e. at the NHZ scale) important population/assemblage of a species of conservation concern[39] that regularly occurs within or around the Site, where this is identified in NatureScot guidance[29] as a priority for assessment.
Local	• Statutory sites of international or national ornithological importance (SPAs, Ramsar sites, SSSIs and NNRs) with no potential connectivity to the Site. • Sites of local ornithological importance (e.g., Local Nature Reserves (LNRs)). • A cited interest of an existing or proposed SPA or Ramsar site, with potential connectivity to the Site, but which is present within or around the Site infrequently or in low numbers, and Site use is not expected to increase significantly post-construction. • Other bird species that contribute to the integrity of an existing or proposed SPA or Ramsar site, with potential connectivity to the Site, but which are present within or around the Site infrequently or in low numbers, and Site use is not expected to increase significantly post-construction. • Other species listed on Annex I of the Birds Directive, or breeding species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), that are present within or around the Site infrequently or in low numbers, and Site use is not expected to increase significantly post-construction • Other species identified in NatureScot guidance[29] as a priority for assessment, but which are present within or around the Site infrequently or in low numbers, and Site use is not expected to increase significantly post-construction. • A locally important population/assemblage of a species of conservation concern[39] that regularly occurs within or around the Site, but is not identified in NatureScot guidance[29] as a priority for assessment and is unlikely to be at significant risk of impact from the Development.
Less than Local	• All other species that are widespread and common and of low conservation concern (e.g., included on the UK BoCC Green-list) and which are not present in locally important (or greater) numbers.

8.3.7.2 Identifying and Characterising Potential Effects

44. In line with the CIEEM EcIA guidance[16], where possible, consideration is given to the following characteristics when identifying potential effects of the Development on IOFs:

- **Nature of effect**: whether it is positive (beneficial) to the IOF, e.g. by increasing species diversity or extending habitat, or negative (detrimental), e.g. by loss of, or displacement from, suitable habitat;
- **Extent**: the spatial or geographical area over which the effect may occur;
- **Magnitude**: the size, amount, intensity, and volume of the effect;
- **Duration**: the duration of an effect as defined in relation to IOF characteristics (such as a species' life cycle) as well as human timeframes. It should also be noted that the duration of an activity may differ from the duration of the resulting effect; e.g., if short-term construction activities cause disturbance to breeding birds, there may be long-term implications from failure to reproduce that season;
- **Frequency**: the number of times an activity occurs may influence the resulting effect;
- **Timing**: this may result in an impact on an IOF if it coincides with critical life stages or seasons (e.g. the breeding season); and
- **Reversibility**: a reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation (within a reasonable timescale).

45. The criteria for assessing the magnitude of a potential effect are presented in Table 8.3.

Table 8.3 Framework for Determining Magnitude of Potential Effects

Magnitude of Effects	Definition
High	A fundamental change to the baseline condition of the IOF, leading to total loss or major alteration of the relevant population.
Medium	A material change to the baseline condition of the IOF, leading to partial loss or alteration of the relevant population.
Low	A slight, detectable, alteration of the baseline condition of the IOF.
Negligible	A barely distinguishable change from baseline conditions.

8.3.7.3 Significance of Effect

46. Prevailing CIEEM EcIA guidance[16] avoids and discourages use of the matrix approach to determine significance, and describes only two categories: 'significant' or 'not significant'.

47. According to the CIEEM guidance, for the purpose of EcIA, a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for important ecological features (which in this case would be IOFs) or for biodiversity in general.

48. NatureScot guidance (2018a)[29] refers to maintaining the favourable conservation status of a bird species (or not affecting its recovery) when assessing the significance of any wind farm impact. Conservation status is defined in this guidance as:

> *"The sum of the influences acting on it which may affect its long-term distribution and abundance, within the geographical area of interest (which for the purposes of the Birds Directive is the EU)".*

49. Conservation status is considered to be "favourable" under the following circumstances:

- "*population dynamics indicate that the species is maintaining itself on a long-term basis as a viable component of its habitats;*
- *the natural range of the species is not being reduced, nor is likely to be reduced for the foreseeable future; and*
- *there is (and probably will continue to be) a sufficiently large habitat to maintain its population on a long-term basis*".

50. Effects can be considered significant at a wide range of scales from international to local. NatureScot (2018a)[29] recommends that:

> *"The concept of favourable conservation status of a species should be applied at the level of its Scottish population, to determine whether an impact is sufficiently significant to be of concern. An adverse impact on a species at a regional scale (within Scotland) may adversely affect its national conservation status".*

51. Thus,

> *"An impact should therefore be judged as of concern where it would adversely affect the existing favourable conservation status of a species or prevent a species from recovering to favourable conservation status, in Scotland."*

52. For all species, the most relevant scale for assessment of significant effects on conservation status of breeding populations is considered to be the appropriate NHZ.

53. The Site is located within the east of NHZ 20 (Border Hills)[32]. For wintering or migratory species that are not designated features of statutory sites, there is limited information on NHZ populations; in this situation effects on the conservation status of the Scottish

population have been considered when determining whether potential effects are likely to be significant.

54. In this assessment, all effects that could threaten the integrity of a statutory site designated for ornithological features or the favourable conservation status of a population have been scoped in.

8.3.8 Assessment Limitations

55. Minor limitations to the Baseline Ornithology Surveys are detailed in Appendix A8.1, but are not considered to have affected the robustness of the assessment.

8.3.9 Cumulative Effects

56. A cumulative ornithological assessment has been undertaken following NatureScot[30] guidance, and considering the favourable conservation status populations within the relevant NHZ (NHZ 20).

8.4 BASELINE CONDITIONS

8.4.1 Desk Study Results

8.4.1.1 Statutory Sites

57. Designated sites matching the search criteria are shown in Table 8.4.

Table 8.4 Summary of Statutory Sites Designated for Ornithological Interest

Site name	**Designation(s)**	**Designated features**	**Description**	**Approximate distance to the Site**
Gladhouse Reservoir	SPA, Ramsar and SSSI	Pink-footed goose (non-breeding)	Located 270 m above sea level (asl) in the Moorfoot Hills, Gladhouse Reservoir regularly provides a winter roost for many wildfowl, including large numbers of pink-footed geese.	6.7 km north-east
Westwater	SPA, Ramsar and SSSI	Pink-footed goose (non-breeding); and Waterfowl assemblage (non-breeding)	Located 320 m above sea level (asl) in the Pentland Hills. The site is an artificial reservoir and supports large numbers of wintering pink-footed geese and over 20,000 wintering waterfowl[40].	8.4 km to north-west
Moorfoot Hills	SSSI	Golden plover (*Pluvialis apricaria.* breeding); and breeding bird assemblage.	Upland breeding bird assemblage includes ring ouzel, black and red grouse and nine species of breeding wader. Moorfoot Hills is also notified on account of its upland	8.5 km to east

[40] NatureScot. (2018). Citation for Special Protection Area (SPA) Westwater (UK9004251). Available online at: https://gateway.snh.gov.uk/sitelink/siteinfo.jsp?pa_code=8591 (Accessed on 19/02/2021)

Site name	Designation(s)	Designated features	Description	Approximate distance to the Site
			birch and bog habitats. It also qualifies as a Special Area of Conservation (SAC) on account of its upland habitats.	

8.4.1.2 Existing Records of Protected Species

58. The Lothian and Borders Raptor Study Group provided records of a single active goshawk breeding territory within the Site which has been monitored over the past ten years. It was confirmed that this nest location was active in 2019 with two chicks successfully fledged. Due to the sensitivity of this information, further details on the territory and nest location are available in Confidential Appendix A8.2.

59. No further records of notable or protected bird species were obtained during the ornithological Desk Study.

8.4.1.3 Previous Baseline Surveys and Reporting

Field Surveys

60. Previous ornithology surveys were carried out at the Site between 2011 and 2012 to inform the 2012 Environmental Statement[34] for the Consented Scheme. Key results of these surveys are summarised below:

- A total of seven target species were recorded during the FAS. Goshawk (18 flights) were the species recorded most frequently, followed by merlin (13 flights), golden plover (nine flights), pink-footed goose (eight flights), osprey (*Pandion haliaetus*) and hen harrier (three flights each), peregrine (*Falco peregrinus*) goosander (*Mergus merganser*); and greylag goose (one flight each);
- A total of 16 species were recorded as present within the woodland habitats during the non-breeding season point count surveys, of which two are Red-listed BoCC: starling (*Sturnus vulgaris*) and fieldfare (*Turdus pilaris*);
- The car-transect surveys confirmed that small numbers of pink-footed geese roosting at the Westwater SPA feed in fields to the north and west of the Site (generally more than 3 km from the Site boundary);
- Notable numbers of pink-footed geese were recorded using off-Site habitats during the targeted VP surveys at Westwater Reservoir SPA. A maximum flock size of 5,300 individuals was observed feeding on improved grassland approximately 15 km west of the Site and 9 km south of Westwater Reservoir;
- Eleven target species were recorded during WWO surveys. This included one Annex I[3] species (golden plover) and one Schedule 1 species that could feasibly be breeding within the winter: crossbill;
- No black grouse were recorded during targeted surveys undertaken in 2011, or on any of the other surveys;
- A total of 10 species were recorded as breeding at the open area of habitat at Courhope or adjacent woodland, of which two are listed as NatureScot priority species[29] (lapwing, *Vanellus vanellus* (two territories) and curlew (three territories). Three species are included on the UK Birds of Conservation Concern (BoCC) Red list: lapwing, curlew and mistle thrush (*Turdus viscivorus*). Additionally, crossbill, a Schedule 1 species, was identified as breeding during the survey. A further 16 species were recorded as breeding within the woodland habitats during the point

count surveys, including two red listed BoCC: mistle thrush and tree pipit (*Anthus trivialis*).

- Two target raptor species were recorded during the breeding raptor surveys: goshawk and osprey.
  - Goshawk: an active goshawk territory was confirmed to be present within the Site, from which three chicks were successfully reared and fledged.
  - Osprey: the only observation was of a single bird circling over the southeast of the Site carrying a fish. No indication of breeding was recorded on any occasion.

CRM

61. Based on the results of the 2011-12 baseline FAS, CRM was carried out for five species, with the following estimated collision mortality estimates presented in the Ornithology Chapter of the 2012 Environmental Statement (ES)[34]

- Pink-footed goose: undetectable, likely to be no collisions;
- Golden plover: 1.7 birds per year;
- Merlin: 0.01 birds per year;
- Osprey: 0.02 birds per year; and
- Goshawk: 0.08 birds per year.

EcIA

62. No significant effects (including cumulative effects) were predicted for any bird species associated with the Site. However, slight (non-significant) impacts on goshawk were predicted; therefore, it was proposed that best practice measures would be followed during construction to protect breeding goshawk.

8.4.2 Baseline Surveys

63. Detailed Baseline Ornithology Survey results are presented in Appendices A8.1 and A8.2. A summary of key results during each survey is provided below.

8.4.2.1 Flight Activity Surveys

64. A total of 88 flights by nine target species were recorded during the FAS. Of these, grey heron was recorded most frequently, with 24 flights. Wader flight activity was relatively high for curlew, woodcock and snipe (22, 14 and 10 flights respectively). All other species were recorded infrequently, with fewer than 10 registrations of each species. A summary of all target species flights, broken down by species, is provided in Table 8.5. Full details of each target species flight are presented in Table A4.1, Appendix A8.1 and flight lines are shown in Figures 8.1.3 to 8.1.6, Appendix A8.1. As goshawk is a sensitive Schedule 1 species, flight lines are shown within the Confidential Annex (Appendix A8.2).

Table 8.5 Summary of Target Species Flights Recorded During the 2019-20 FAS

Species*	Scientific Name	Total no. of flights	No. of birds per flight	Total no. of individuals recorded
Greylag goose	*Anser anser*	1	1	1
Pink-footed goose	*Anser brachyrhynchus*	1	30	30
Mallard	*Anas platyrhynchos*	7	1-2	13
Grey heron	*Ardea cinerea*	24	1-2	27
Osprey	*Pandion haliaetus*	1	1	1
Goshawk	*Accipiter gentilis*	8	1-2	9

Species*	Scientific Name	Total no. of flights	No. of birds per flight	Total no. of individuals recorded
Curlew	*Numenius arquata*	22	1-2	27
Woodcock	*Scolopax rusticola*	14	1-2	17
Snipe	*Gallinago gallinago*	10	1-2	11
Total no. of flights		**88**	**N/A**	**136**
*Species names and order in which they are listed follow the British List maintained by the BOU[2]				

Secondary Species

65. A number of secondary species were recorded during the FAS, including gull and raptor species. Secondary species were generally recorded in low numbers, apart from gull species, with small flocks regularly recorded (peak count of 18 individuals).

8.4.2.2 Foraging Goose Surveys

66. No pink-footed geese were recorded during the Foraging Goose Surveys. Small groups (five to twenty-one individuals) of greylag geese were recorded on Portmore Loch (located over 2 km from the Site). Small numbers of mute swan (*Cygnus olors*), and one record of four whooper swan (*Cygnus cygnus*) were recorded incidentally loafing on the loch.

67. Greylag geese flocks were also recorded foraging with flocks of 36 and 68 individuals recorded immediately west of the A703 (north of Eddleston) an additional flock of 30 greylag geese adjacent to the A703 at Hattonknowe (all located approximately 2 km from the Site).

8.4.2.3 Black Grouse Surveys

68. There were no records of black grouse during targeted Black Grouse Surveys (and the species was not recorded during any of the other 2019/20 Baseline Ornithology Surveys). As noted in Section 8.6.1, this species was scoped out of the assessment and is not discussed further within this Chapter.

8.4.2.4 Breeding Raptor Surveys

Target Species

69. Goshawk and osprey were the only target species recorded during targeted raptor surveys. A goshawk pair was recorded in March and April of 2019, and a single male was also recorded during the same April survey. Liaison with the Lothian and Borders Raptor Study Group confirmed that there was an active territory within the Site which produced two chicks in 2020.

70. Two individual ospreys were recorded during April, both flying west over the Site. There was no evidence of this species breeding within the Survey Area, and no waterbodies or watercourses were present which could be used by foraging osprey.

71. A derelict cottage at Courhope was searched for evidence of barn owl during Breeding Raptor Surveys, however no signs of barn owl were recorded. No further buildings were intensively searched. There was a single record of a barn owl hunting north-east of VP1 following completion of an FAS survey, and this species is likely to be breeding in the wider area outwith the Breeding Raptor Survey Area.

72. Further details of target raptor species are provided in Confidential Appendix A8.2.

Secondary Species

73. Sparrowhawk, buzzard, kestrel and tawny owl (*Strix aluco*) were all considered likely to be breeding within the Survey Area.

8.4.2.5 Moorland Breeding Bird Surveys

74. The breeding wader species assemblage within the Site and surrounding 500 m Buffer Area was typical of the Site location and habitats present. Breeding waders were recorded at low density with two curlew territories, two woodcock territories and single territories of both lapwing and snipe (see Table 8.6). One mallard territory was recorded, which was the only breeding wildfowl species.

75. The Survey Area also supports a range of non-target breeding species typical of the habitats present. These include crossbill, which is a Schedule 1 species, and low numbers of several red-listed passerine (perching/songbird) species of conservation concern[17].

76. Full results of the MBBS are included in Appendix A8.1 and illustrated on Figure 8.1.7 of this Appendix.

Table 8.6 Summary of Wader Species of Conservation Concern Assessed as Breeding During the 2019 MBBS

Species*	Number of territories in MBBS Area			Conservation listings**
	Within Site Boundary	Within Buffer Area	Total	
Mallard	0	1	**1**	Amber
Lapwing	0	1	**1**	Red; SBL
Curlew	0	2	**2**	Red; SBL
Woodcock	2	0	**2**	Red; SBL
Snipe	0	1	**1**	Amber

*Species names and order follow the British List maintained by the BOU[2]

**Red = UK Red-listed BoCC[17]; Amber = UK Amber-listed BoCC[17]; SBL = listed on the Scottish Biodiversity List[39].

***As woodland habitats were not targeted during the MBBS, it is possible that further breeding woodcock are present, but were not detected during surveys.

8.4.3 Collision Risk Modelling Results

77. For each species for which CRM was completed, the annual risk of collision and number of years per collision, using species-specific avoidance rates recommended by NatureScot[41], are presented in Table 8.7. Full results of the CRM are provided in Appendix A8.3.

Table 8.7 Estimated Seasonal Collision Risk and Number of Years Per Collision for Species for Which CRM Was Completed

Species	Period	Annual collision risk (no. of birds killed)		No. of years per collision	
		Assuming no avoidance	Using species-specific avoidance rates	Assuming no avoidance	Using species-specific avoidance rates*
Goshawk	2019/20 non-breeding season	0.116	0.002	8.562	428.076
	2019 breeding season	0.254	0.005	3.939	196.967
	2019/20 whole year	**0.370**	**0.007**	**2.698**	**134.898**
Curlew	2019 breeding season	**2.486**	**0.050**	**0.402**	**20.116**

8.4.4 Future Baseline

78. Assuming a lag between the baseline assessment and the commencement of Development construction, it is necessary to consider possible changes to baseline conditions during this time. **Chapter 13: Forestry** provides detail regarding the forestry management that will occur during the life of the wind farm. The pattern of felling and re-planting detailed is typical and not notably different to the way in which the forest has been historically managed. Therefore no substantial habitat modifications or changes that could influence ornithological interest are foreseen, and therefore it is considered unlikely that the future baseline will change from that assessed within this Chapter.

8.4.5 Embedded Mitigation

79. Ornithological features have been considered at all stages of the Development design, from initial feasibility to final layout. Standard good practice measures will also be implemented during construction (including felling, where this takes place prior to other construction works) to ensure compliance with relevant legislation protecting all breeding wild birds. This has helped to avoid or greatly reduce impacts on IOFs and other ornithological features.

80. The key embedded mitigation with relevance to ornithological features is the implementation of a Breeding Bird Protection Plan (BBPP), as outlined below, to protect breeding birds.

[41] NatureScot (2016) Use of Avoidance Rates in the NatureScot Wind Farm Collision Risk Model https://www.nature.scot/sites/default/files/2018-09/Wind%20farm%20impacts%20on%20birds%20-%20Use%20of%20Avoidance%20Rates%20in%20the%20SNH%20Wind%20Farm%20Collision%20Risk%20Model.pdf (Accessed 12/03/21)

81. Subsequent sections of this chapter assume that the embedded mitigation described below will be fully implemented.

82. Under the Wildlife and Countryside Act 1981 (as amended)[5] it is an offence to kill or injure any bird, or to damage or destroy nests and eggs. Breeding species listed on Schedule 1 of the Act are afforded additional protection, and there was evidence of goshawk (which is a Schedule 1 species) establishing breeding territories within the Site (see Appendix A8.2). A BBPP will be developed to detail good practice measures aimed at ensuring the safeguarding of breeding birds and legislative compliance during all phases of the Development. Proposed measures are outlined below.

Construction Phase

83. **Timing of works**: where possible, site clearance works will take place outside the main breeding bird season (March to August inclusive).

84. **Pre-construction survey for breeding goshawk**: goshawk is a historic breeder within the Site, and there was one territory present during 2019 Baseline Ornithology Surveys (further details in Confidential Appendix A8.2). NatureScot defines the breeding season for this species as mid-March to mid-August[43]. As felling is required, precautions must be taken to avoid potential disturbance to nesting birds or destruction of active nests. A pre-construction survey of areas of suitable habitat for nesting goshawk within 500 m of works will be completed ahead of any operations, by a suitably experienced and qualified Ecological Clerk of Works (ECoW), to check for active nests (or other evidence of breeding).

85. **Pre-construction survey for breeding crossbill**: common crossbill (*Loxia curvirostra*) has a protracted breeding season, which NatureScot defines as January to mid-December[42]. Prior to any felling, precautions must be taken to avoid potential disturbance to nesting birds or destruction of active nests. A pre-construction survey of areas of suitable habitat for nesting crossbill within 150 m of works will be completed ahead of any operations, regardless of the time of year, by a suitably experienced and qualified ECoW, to check for evidence of breeding (such as active nests or territorial behaviour).

86. **Pre-construction survey for other breeding birds**: where construction works are required during the breeding bird season (March to August inclusive), the area within 500 m of works will be surveyed ahead of any operations, by a suitably experienced and qualified ECoW, to check for active nests of all bird species.

87. **Toolbox talk**: a 'toolbox talk' will be delivered by a suitably experienced ECoW to ensure that all contractors working on the Development are aware of ornithological sensitivities and relevant legislation.

88. **Protection of nesting birds**: if any nests (or breeding territories of Schedule 1 species) are identified during pre-construction surveys, an exclusion zone around the nest/breeding territory will be established (with the distance appropriate to the species and agreed through consultation with NatureScot). No works will be permitted within the exclusion zone and no personnel or vehicles will be allowed to enter or pass through until the ECoW has confirmed that the breeding attempt has reached a natural conclusion.

89. Where this is not feasible, NatureScot will be contacted and further mitigation measures agreed to ensure that nesting birds are not harmed and any breeding Schedule 1-listed species are not disturbed.

[42] https://www.nature.scot/sites/default/files/2017-07/A303080%20-%20Bird%20Breeding%20Season%20Dates%20in%20Scotland.pdf (Accessed 12/03/21)

90. **Minimising disturbance from site vehicles**: where construction works are required during the breeding bird season, further mitigation measures to limit the impact of vehicular disturbance will be considered and implemented where necessary.

Operational Phase

91. Routine maintenance required during operation is expected to be minimal, limited to small areas and of temporary duration. However, should significant operational works be required during the nesting bird season, or any Schedule 1 nesting birds be observed during the operational phase, it is recommended that the mitigation measures outlined above for the construction phase are implemented to protect breeding birds and ensure compliance with the relevant legislation.

Decommissioning Phase

92. As decommissioning works are likely to be of a similar nature and duration as construction activities, the mitigation outlined above for construction works should also be implemented during the decommissioning phase, in order to protect breeding birds.

8.5 EVALUATION OF ORNITHOLOGICAL FEATURES

93. An evaluation of the importance of each ornithological feature identified during the Desk Study or recorded during the Baseline Ornithology Surveys is provided in Table 8.8. As noted in Section 8.6.1, the assessment of effects upon all statutory sites identified during the Desk Study have been scoped out of the assessment. Species evaluated as being of Regional or higher importance are considered to be IOFs, while those of Local or lesser importance are not considered to be IOFs and have been scoped out of the assessment in the following sections.

Table 8.8 Evaluation of Importance of Ornithological Features

Importance level	**Ornithological feature**	**Justification**
International	No features using the Site and/or surrounding area were evaluated as being of international importance.	
National	No features using the Site and/or surrounding area were evaluated as being of national importance.	
Regional	Goshawk	A Schedule 1 species identified in NatureScot guidance[29] as a priority for assessment. The species was recorded frequently during FAS surveys undertaken in 2011/12 and in 2019/20, with successful breeding from a single nest site in the survey area confirmed in 2011 and one territory present in 2019. Based on the extent of suitable breeding habitat (mature forestry with sufficient space to allow flights between trees) present, it is considered unlikely that use of the Site will increase following construction. A population of a single pair nesting within the Site would equate to 1.8 % of the NHZ population (57 pairs as a minimum estimate)[19]. More recent information from the Scottish Raptor Monitoring Scheme[15] suggests that the population of Scottish goshawk is slowly expanding from two clusters within Southern Scotland and northeast Scotland[32]. A national population estimate of 174 pairs is given, and with extensive suitable habitat present within Scotland, it is likely that the national population will increase in the future. Using a conservative estimate of two breeding territories present on Site, this would equate to approximately1 % of the national population, which is likely to be an overestimate.
	Crossbill	As the Site is outside the known breeding distribution of Scottish crossbill (*Loxia scotica*)[43], it is considered that crossbill species breeding on Site are 'common' crossbill. Crossbill is a Schedule 1-listed species. Small numbers were recorded incidentally (no breeding was identified, however this was not a target species) during the MBBS, and based on the habitats present (as well as fact that the species was recorded during the 2011 Breeding Bird Surveys), crossbill is likely to breed within the Site. Crossbill is widespread in Scotland within coniferous forestry, and the national breeding population is very variable, between 5,000-50,000 pairs each year. As crossbill is not a priority species for assessment no targeted surveys were completed. Previous surveys carried out in 2011/12[34] recorded a peak of 26 individuals. Use of the Site and surrounding area is unlikely to increase following construction and the population using the Site has been evaluated as being of regional importance.

[43] Balmer, D.E., Gillings, S., Caffrey, B.J., Swann, R.L., Downie, I.S. and Fuller, R.J., (2013*) Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland.* Thetford: BTO.

Importance level	Ornithological feature	Justification
Local	Hen harrier	Listed on Annex I, Schedule 1/1A, the SBL and the BoCC Red list. However, there were only three registrations of single birds recorded during the 2011/12 FAS and this species was not recorded during the 2019/20 surveys. There are no records of nesting within 2 km of the Site. Use of the Site is unlikely to increase post-construction and habitat present within and adjacent to the Site is considered to be sub-optimal for breeding.
	Merlin	Listed on Schedule 1, the SBL and the BoCC Red list. There were eight registrations of single birds recorded during the 2011/12 FAS and this species was not recorded during the 2019/20 surveys. There are no breeding records within 2 km of the Site. There is the potential for merlin to breed on Site in future in low numbers, with suitable nesting habitat (disused corvid nests) and foraging activity could increase within keyholed areas post-construction.
	Osprey	Listed on Annex I, Schedule 1 and the SBL. There was a single osprey flight recorded during the 2011/12 surveys and three flights recorded during the 2019/20 FAS. There are no breeding records within 2 km of the Site. Use of the Site is unlikely to increase post-construction and habitat present within and adjacent to the Site is considered to be sub-optimal for breeding.
	Peregrine	Listed on Schedule 1 and Annex I. There was a single peregrine flight recorded during the 2011/12 surveys and no records of this species during the 2019/20 surveys. There are no breeding records within 2 km of the Site. Use of the Site is unlikely to increase post-construction and habitat present within and adjacent to the Site is considered to be of negligible suitability for breeding.
	Curlew	Listed on the SBL and BoCC Red list, LBAP and identified in NatureScot guidance[29] as a priority species for assessment. Curlew were recorded during the 2011/12 surveys (three territories) within the 500 m buffer and during the 2019/20 surveys (two territories). 22 curlew flights were recorded during the 2019/20 FAS. With an estimated breeding population of 58,800 breeding pairs, curlew is a common and widespread breeding bird in Scotland[19]. However, recent data from annual national monitoring surveys of breeding birds organised by the British Trust for Ornithology (BTO) found significant declines in numbers of breeding curlew in Scotland of 53% between 1995 and 2018[44]. Two-three curlew territories in the 500 m buffer equates to <0.01 % of the Scottish breeding population. At the regional level, data are not available for the Border Hills NHZ. The BTO Breeding Bird Survey map[45] indicates that the Border Hills NHZ is a stronghold for the species with a relatively high population density. Based on the national breeding population, the regional population is therefore likely to be at least 5,000 pairs, but due to historical and recent declines, is considered to be in unfavourable conservation status. Due to the low numbers of birds on or close to the Site, which is unlikely to increase post-construction, curlew is evaluated as being of local importance.

[44] Harris, S.J., Massimino, D., Balmer, D.E., Eaton, M.A., Noble, D.G., Pearce-Higgins, J.W., Woodcock, P. & Gillings, S. 2020. *The Breeding Bird Survey 2019*. BTO Research Report 726. British Trust for Ornithology, Thetford.
[45] https://www.bto.org/our-science/projects/bbs/latest-results/maps-population-density-and-trends

Importance level	Ornithological feature	Justification
		CRM was completed for this species as a precautionary measure; however, the predicted collision risk was low with a collision estimated approximately every 20 years.
	Lapwing	Listed on the SBL and BoCC Red list, LBAP and identified in NatureScot guidance[29] as a priority species for assessment. Lapwing were recorded during the 2011/12 surveys (two territories) within the 500 m buffer and a single territory present during the 2019/20 surveys. No lapwing flights were recorded during the FAS. With an estimated breeding population of 71,500-105,600 breeding pairs, lapwing is a common and widespread breeding bird in Scotland[19]. However, recent data from annual national monitoring surveys of breeding birds organised by the British Trust for Ornithology (BTO) found significant declines in numbers of breeding lapwing in Scotland of 59% between 1995 and 2018[46]. One breeding pair of lapwing within the MBBS Survey Area equates to <0.01 % of the Scottish breeding population. No NHZ population estimate is available for this species. Due to the low numbers of birds on or close to the Site, which is unlikely to increase post-construction, lapwing is evaluated as being of local importance.
	Golden plover	Listed on Annex I and the SBL, and in NatureScot guidance[29] as a priority species for assessment. Golden plover was regularly recorded during 2011/12 non-breeding season FAS in flocks (peak count of 130 individuals, mean count 33). Resulting in a CRM prediction of the loss of 1.7 non-breeding birds per annum. The wintering population of golden plover is estimated at between 25,000 – 35,000 birds[19]. As such, the loss of 1.7 birds per annum equates to <0.01 % of the Scottish population. The species was not recorded during the 2019/20 surveys. There are no records of any breeding birds within the MBBS Survey Area during any of the surveys. Use of the Site is unlikely to increase significantly post-construction, as habitats have negligible potential for supporting breeding birds. For this reason, golden plover is evaluated as being of local importance.
	Other wildfowl, raptor, wader, gull, near-passerine and passerine species of conservation concern	Species of conservation concern that are generally considered as being at low risk from wind farm developments. It is considered unlikely that the Development would have a significant impact on local populations.
Less than Local	All species not covered above (e.g., species of low conservation concern	Species that are generally common and widespread, of low conservation concern and which are considered as being at low risk from wind farm developments.
Note that good practice will be implemented during construction to protect all nesting birds (see Section 8.4.5), including species scoped out of the assessment.		

[46] Harris, S.J., Massimino, D., Balmer, D.E., Eaton, M.A., Noble, D.G., Pearce-Higgins, J.W., Woodcock, P. & Gillings, S. 2020. *The Breeding Bird Survey 2019*. BTO Research Report 726. British Trust for Ornithology, Thetford.

8.6 ASSESSMENT OF POTENTIAL EFFECTS

8.6.1 Elements Scoped Out of Assessment

94. Two internationally designated statutory sites were identified for consideration during the Desk Study (as detailed in Section 8.4.1): Westwater SPA, Ramsar and Site of Special Scientific Interest (SSSI); and Gladhouse Reservoir SPA, Ramsar and SSSI. Both sites are designated wholly for their pink-footed goose (*Anser brachyrhynchus)* populations. The Site lies well within the core foraging range (15-20 km[26]) of pink-footed goose populations associated with the Westwater and Gladhouse Reservoir SPAs, and accordingly NatureScot noted that an Appropriate Assessment may be required to assess the potential effects of the Development on these sites.

95. However, only a single pink-footed goose flight was recorded during 2019/20 surveys (a skein of 30 birds in February, 2020) and no pink-footed geese were recorded during any of the Goose Foraging Surveys in 2019/20. This is consistent with the results of the surveys undertaken for the Consented Scheme in 2011/12, which recorded pink-footed goose flight activity at such a low level that collision risk was considered to be undetectable[34] and that foraging birds were typically over 3 km from the Site Boundary.

96. In consideration of these results, it is logical to conclude that the SPA birds rarely overfly the Site as it does not lie between routes taken to the feeding areas used by the SPA birds. It is considered extremely unlikely there will be any adverse effect on the SPAs resulting from the Development and that an Appropriate Assessment is not necessary to support this conclusion. Therefore pink-footed geese and both SPAs have been scoped out of the ornithological impact assessment.

97. Moorfoot Hills SSSI lies 8.5 km east of the Site and is notified on account of its breeding golden plover population and its upland bird assemblage. As the Site lies outwith the core foraging range of its notified species, this designated site has also been scoped out of this assessment.

98. As agreed with NatureScot, most passerine species have been scoped out of the assessment.

99. Features not recorded and considered not present, or very unlikely to be present within the zone of influence of the Development, are scoped out of the assessment. For example, black grouse (*Lyrurus tetrix*) was not recorded during the Baseline Ornithology Surveys and no records of this species were identified during the Desk Study, this species was also scoped out of the assessment.

100. Grey heron, mallard, woodcock and snipe although included as target species during the FAS surveys are not regarded as NatureScot priority species for the assessment of wind farms[29]. Furthermore, they either bred in very low numbers (two or less territories), or were not recorded as breeding (grey heron). On this basis they have been scoped out of the assessment.

101. Ornithological features considered to be of local (or less than local) importance (based on the criteria in Section 8.3.7.1, Table 8) have been scoped out of the assessment.

8.6.2 Potential Effects on Birds

102. The main ways in which a wind farm may affect IOFs are via:

- Habitat loss due to land-take;
- Habitat modification;
- Disturbance/displacement; and
- Collision with turbines.

103. Each of these potential effects, during each phase of the Development life cycle (construction, operation and decommissioning) in which the effect could occur, is discussed in turn below.

104. In addition, as noted previously, cumulative effects may arise as a result of the combined effects of multiple developments affecting the same bird population. Cumulative effects are considered in Section 8.7.

8.6.2.1 Effects during Construction

Habitat Loss

105. Construction of turbine bases, associated infrastructure and forest keyholing will lead to direct habitat loss. The severity of potential effects is dependent on the extent of land-take, the type of habitat affected and the species using the Site and surrounding area. In this case, the extent of habitat loss will be relatively small (71.4 ha in total), and will largely (98%) comprise commercial conifer plantation. Keyholing will be used for clearance of coniferous plantation for turbines and associated infrastructure, which will minimise the impact of habitat loss. No species associated with nearby statutory sites will be impacted by habitat loss (identified in Section 8.4.1.1), and goshawk was the only species identified in NatureScot guidance[29] as priority species for assessment which made regular use of the Site for breeding, roosting or foraging. Other target raptors (osprey) were only occasionally recorded within/flying over the plantation and do not breed on Site or in the wider Breeding Raptor Survey Area. With the exception of woodcock (which have at least two territories within the forestry on Site), waders recorded (lapwing, curlew and snipe) are unlikely to breed within the forestry habitats and the flight activity recorded from these species, is considered to relate to locally breeding birds in adjacent open habitat. Crossbill is likely to be breeding within suitable habitat across the Site, but it is expected the will be plenty suitable habitat remaining following keyholing to readily accommodate any displaced birds.

106. Habitat loss is relatively small and largely comprises coniferous plantation. As most of the Site and the surrounding area is comprised of coniferous forestry, it is likely that the impacts of habitat loss on birds will be minimal.

Habitat Modification

107. Habitat modification due to felling of the plantation will likely result in minor changes in Site use by certain IOFs. For example, it is anticipated that species such as merlin and hen harrier could forage over the Site more frequently as more open habitat becomes available and could recolonise the Site (given they were not recorded during the 2019 breeding surveys and only in the historical 2011/12 surveys). As keyholing will be used (rather than clear-felling the Site) there will only be a minor increase in the extent of open habitats created (70.6 ha), this is unlikely to result in a significant change in Site use by IOFs.

Disturbance and Displacement

108. During the construction phase of the Development, there will be increased levels of activity by Site personnel, vehicles and machinery, resulting in increased levels of noise and visual disturbance. This could lead to displacement or disruption of breeding, foraging and/or roosting birds. The severity of potential effects depends on the following:

- The timing of works, with potential effects likely to be greatest during the breeding season;
- The magnitude of the disturbance (e.g., a vehicle driving slowly along the access track without stopping is likely to result in a relatively low or even negligible magnitude of disturbance, whereas a period of prolonged and noisy machinery operation involving numerous Site personnel is likely to be of high magnitude);

- The extent of displacement (both spatially and temporally);
- The availability of suitable habitats in the surrounding area for displaced birds to occupy; and
- The behavioural sensitivity of birds using the Site (which is likely to vary between species).

8.6.2.2 Effects during Operation

Disturbance and Displacement

109. The operation of turbines and increased human activity associated with maintenance of the Development has the potential to cause disturbance and displace birds from the Site. However, disturbance effects during the operational phase are likely to be of a lower magnitude than during construction, as some species may become habituated to turbines, and the level of human activity and associated disturbance on Site will be considerably reduced compared to the construction phase.

110. Individual turbines, or a wind farm as a whole, may present a barrier to the movement of birds, restricting or displacing birds from much larger areas. The effect this would have on a population is subtle and difficult to predict with any degree of certainty. If birds regularly have to fly over or around obstacles or are forced into suboptimal habitats, this may result in reduced feeding efficiency and greater energy expenditure. By implication, this will reduce the efficiency with which they accumulate reserves, potentially affecting survival during migration and/or breeding success. Based on the location and size of the Development, presence of other wind farms in the wider area, habitats within the Site and wider area, and target species flight activity, it is considered highly unlikely that there will be any barrier effects on any target species.

Collision with Turbines

111. The frequency and likelihood of a collision occurring depends on a number of factors. These include aspects of the size and behaviour of the bird (including their use of a site), the nature of the surrounding environment and the structure and layout of the turbines. Clearly, birds that tend to fly above or below RSH are likely to collide less frequently than species that regularly fly at RSH. Collision risk is also likely to be higher for birds that spend much of the time in the air, such as foraging raptors and species that regularly commute between feeding and breeding or roosting grounds (e.g., geese and whooper swans), where this involves frequent flights over a site. The risk of bird collisions at wind farms is also higher in areas where large concentrations of birds are present (e.g., on major migration routes or close to roost sites used by large numbers of birds).

112. It should be noted that operational disturbance and collision risk effects are mutually exclusive in a spatial sense, i.e., a bird that avoids a wind farm due to disturbance cannot be at risk of collision with the turbine rotors at the same time[47]. However, they are not mutually exclusive in a temporal sense; a bird may initially avoid a wind farm but subsequently habituate to it, and could then be at risk of collision.

8.6.2.3 Effects during Decommissioning

113. Turbine removal may cause disturbance to birds breeding, foraging or roosting on Site. The level of impact will depend on the bird species present at the time of decommissioning and cannot be reliably predicted at this stage. However, as decommissioning activities are generally of a similar type and intensity as construction activities, the assessment considers that the potential effects of decommissioning will be similar in nature to the potential effects of construction, with the exception that habitat

[47] Madders, M. & Whitfield, D.P. (2006). Upland raptors and the assessment of wind farm impacts. Ibis 148, 43-56

is likely to be restored and any displaced birds will be able to return to abandoned territories.

8.6.3 Assessment of IOFs

114. Potential effects of the Development on each IOF are assessed below. The assessment considers the significance of potential impacts following implementation of the embedded mitigation proposed in Section 8.4.5.

8.6.3.1 Species of Regional Importance

Goshawk

115. **Potential Construction Effects:** One pair is known to have successfully bred onsite during 2011/12 and one territory was present onsite during 2019/20. It is therefore considered likely that goshawk will nest on Site post-construction, and during construction, and there is the potential for breeding birds to be affected by both habitat loss and disturbance. Further details of activity, territory locations and historic nest locations are provided in Confidential Appendix A8.2.

116. There is the potential for historic nests to be lost if they are located in areas of coniferous plantation which are felled during construction (outwith the goshawk breeding season). Keyholing (and future forestry operations) will also result in loss of suitable breeding habitat (70.6 ha of coniferous plantation), which could limit the number of breeding goshawk in future. New nesting habitat will become available as areas of young plantation mature, which will offer long-term compensation for loss of nesting habitat.

117. Additionally, goshawk are known to move nest locations from year to year (Colin Nisbet pers. Obs.) and it is predicted that there will be sufficient suitable mature conifer stands remaining to accommodate the pair present within the Site. The impact of habitat loss on nesting resources is therefore likely to be low magnitude.

118. In addition, the construction of the Development will result in the loss of certain habitats which are expected to be part of the resident goshawks' traditional foraging grounds, including intact coniferous plantation woodland and open areas of clear-fell. Goshawk have a core range of 3 km, with a maximum range of 10 km, giving a core foraging range of 2,827 ha and a maximum foraging range of 31,415 ha[22]. The majority of the Site contains suitable habitat for foraging goshawk, with 765 ha of coniferous plantation and 119.8 ha of clear-fell.

119. Loss of foraging habitat within the Site amounts to 70.6 ha: 6,5 % of the habitats present within the Site. This is only 2.5 % of the core range, therefore loss of foraging habitat is considered to be negligible.

120. Works may deter goshawk from nesting within areas of the Site, which will be temporary, reversible, and of short-term duration, most likely only deterring breeding attempts for a single breeding season within the disturbance distance for nesting goshawk[22] (300-500 m).

121. Any works within 300-500 m of nesting goshawk have the potential to disturb the nest, which could constitute a legal offence and could adversely impact nesting success. This risk is addressed through the BBPP.

122. There is also the potential for disturbance to foraging goshawk, which could impact on their ability to hunt, thus impacting on their survival, or ability to provision young during nesting. As noted above, there is abundant foraging habitat present on Site, with construction only undertaken within small areas of the Site at any one time. Additionally, goshawk are likely to be less susceptible to disturbance during foraging compared to when incubating or visiting a nest.

123. The effects of construction of the Development on the NHZ 20 goshawk population are predicted to be of **low** magnitude and therefore **not significant**.

124. **Potential Operational Effects:**

125. There is the potential for turbines to deter goshawk from nesting nearby. However, as discussed above in relation to construction, it is anticipated that resident goshawks will be able to establish nest sites in alternative areas of suitable habitat within the Site, based on professional experience. Similar deterrence is thought to be regularly experienced by goshawks within commercial coniferous plantations with harvesting operations undertaken, with goshawks continuing to nest on active wind farm sites.

126. There is also the potential for displacement from foraging habitat during operation. Despite keyholing, which will minimise the loss of suitable foraging habitat, it is likely that goshawk will avoid foraging habitat in close proximity to turbines.

127. Potentially, goshawk could be deterred from foraging within 70.6 ha of habitat, which would constitute a very small proportion of the species core range of 3 km. Additionally, there is further suitable foraging habitat outwith the Site, with adjacent coniferous plantation to the west and northeast of the Site which could be used by foraging goshawk. Consequently, operational displacement on foraging goshawk is anticipated to be negligible.

128. Despite the presence of an active breeding territory, goshawk flight activity associated with the Site was relatively low, with the annual collision risk predicted as 0.007 birds killed per year, or one bird every 141 years.

129. Although the population within NHZ 20 is small, goshawk is likely to be under-recorded, and there is abundant suitable habitat within the NHZ which may be gradually colonised by the expanding population in the future. As such, collision risk to the NHZ 20 population from the Development is expected to decrease in magnitude as the population expands. Furthermore, there are no publicly available reports of goshawk collisions with turbines in the UK, and data collected from other European onshore wind farms[48] suggest that this species is not notably vulnerable to collision (although it is acknowledged that this data has limitations because the locations of monitored wind farms and extent of monitoring is not known).

130. The effects of the operational phase of the Development on the NHZ 20 goshawk population are predicted to be of **low** magnitude and therefore **not significant**.

131. **Potential decommissioning effects**: these are likely to be of the same nature as construction effects. Therefore, **no significant effects** during decommissioning are predicted for goshawk.

Crossbill

132. **Potential Construction Effects:** This species was recorded incidentally during MBBS and is likely to be breeding in areas of suitable habitat within the Site. Birds will lose nesting, roosting and foraging habitat following felling; however, it is considered likely that displaced birds will be accommodated within existing plantation woodland within the Site or wider area. The majority of the Site contains suitable habitat for crossbill, with 765 ha of coniferous plantation, therefore the impact of loss of suitable habitat (6.5 % of suitable habitat within the site) is likely to be negligible. Furthermore, the number of birds affected is likely to represent only a very small proportion of the regional population of breeding crossbills.

[48] Dürr, T. (2019). *Vogelverluste an Windenergieanlagen / Bird fatalities at wind turbines in Europe*; Daten aus der zentralen Fundkartei der Staatlichen Vogelschutzwarte im Landesamt für Umwelt Brandenburg zusammengestellt: Tobias Dürr; Stand vom: 07 January 2020 [Online] Available at: http://www.lfu.brandenburg.de/cms/detail.php/bb1.c.312579.de (Accessed 26/08/20).

133. The embedded mitigation described in Section 8.4.5 includes measures to avoid disturbance to breeding birds, which could constitute a legal offence. By following these, the risk of disturbance to breeding birds will be minimised.

134. As such, potential construction phase effects on the regional crossbill species population are assessed as being of **low** magnitude and **not significant**.

135. **Potential operational effects:** It is unlikely that any breeding birds will be disturbed during operation, with implementation of embedded mitigation measures listed in Section 8.4.5. Furthermore, it is generally considered that passerine species are not significantly adversely impacted by wind farms[25], and collision risk is thought to be negligible. As such, potential operation phase effects on the regional crossbill species are assessed as being of **negligible** magnitude and **not significant**.

136. **Potential decommissioning effects**: these are likely to be of the same nature as construction effects. Therefore, **no significant effects** during decommissioning are predicted for crossbill.

8.7 CUMULATIVE EFFECT ASSESSMENT

137. Potential cumulative effects can include direct habitat loss, disturbance and collision risk. The potential for each of these potential effects is considered in turn below.

8.7.1 Cumulative Habitat Loss

138. Forestry areas are dynamic habitats, often subject to management and areas of clearance on both a local and landscape scale. As such, it is likely that species breeding within them, such as goshawk and crossbill, are adapted to a degree of change. Areas of apparently suitable habitat within the wider Site Boundary and nearby forestry areas may be removed, altered, or replanted, but clearance of habitat is unlikely to be on a scale that will adversely affect NHZ populations of these species.

139. In relation to the Development, a total habitat loss of 70.6 ha is comparatively small, and the targeted nature of the felling, through keyholing, means the potential impacts are going to be lower than clear-fell operations. The abundance of comparable habitat locally and regionally is unlikely to change substantially and the impact of direct loss of habitat within the Site Boundary on IOFs is assessed as negligible magnitude and **not significant**.

8.7.2 Cumulative Disturbance

140. Disturbance effects are predicted to be of low to negligible magnitude for all IOFs. Potential disturbance effects during both construction and operation are localised to the Site, with no other comparable pressures that could be acting upon the same populations of birds known or predicted at the Site or in the wider area. It is likely that if any birds are displaced, they will breed in the wider area, either in less disturbed areas within the Site Boundary or nearby habitats, and birds will potentially return to breed on or around a development site post-construction. These birds would therefore only be temporarily loss from the breeding population. Disturbance during the construction, operational or decommissioning phases of the Development will be minimal and localised, and, with no other comparable pressures operating concurrently, cumulative impacts of disturbance on IOFs are assessed as negligible magnitude and **not significant**.

8.7.3 Cumulative Collision Risk

141. As a passerine species, crossbill is not considered to be at risk of collision with wind turbines.

142. A 1 in 141-year collision risk for goshawk is considered too low to result in any significant effects. A search for any relevant reports from wind farm applications within 10 km of the Site was conducted to assess the cumulative collision risk to goshawk. Just one operational wind farm was identified: Bowbeat Wind Farm, east of Eddleston. No proposed or consented wind farms were found. No information regarding goshawk was available from the Bowbeat Wind Farm ES and so it was assumed that this species was not present within the Site, or not considered an IOF. Based on a review of aerial imagery, there is apparently suitable goshawk habitat close to the windfarm; however, all turbines are in an elevated position in comparison, in open and exposed habitat. As such, the wind farm area is unlikely to form part of any goshawk core foraging areas and it is assumed that any collision risk was low or negligible.

143. Due to the low level of wind farm developments within 10 km of the Development, it is considered that cumulative collision effects are likely to be of negligible magnitude and **not significant**.

8.8 MITIGATION, MONITORING AND RESIDUAL EFFECTS

8.8.1 Mitigation

144. Embedded mitigation is described in Section 8.4.5. Mitigation relating to breeding goshawk is addressed in the BBPP. No requirements for further mitigation were identified.

8.8.2 Monitoring

145. It is proposed that ornithological monitoring should take place post-construction, in line with NatureScot guidance[49], as outlined below:

- Year-round collision monitoring, to determine whether actual bird collisions are in line with predicted values; and
- Goshawk nest monitoring, in liaison with the Lothian and Borders Raptor Study Group, to determine the operational impacts on breeding success.

146. In line with NatureScot guidance[50], monitoring should take place annually during construction, and after the Development becomes operational, during years 1-3, 5, 10 and 15 as a minimum, with the requirement for further surveys to be determined based on previous survey results.

[49] NatureScot (2009) *Monitoring the Impact of Onshore Wind Farms on Birds*. Guidance Note.
[50] NatureScot (2009) *Guidance on Methods for Monitoring Bird Populations at Onshore Wind Farms.* Guidance Note.

8.9 SUMMARY OF EFFECTS

147. Table 8.9 provides a summary of the effects detailed within this chapter.

Table 8.9 Summary of Effects on IOFs

IOF*	Potential Effect	Significance of Effect**	Mitigation Proposed***	Residual Effect
Construction Phase				
Goshawk and crossbill	Disturbance to nesting birds	Not significant	N/A	Not significant
	Habitat loss (foraging birds)	Not significant	N/A	Not significant
	Habitat loss (loss of nests)	Not significant	N/A	Not significant
	Disturbance to foraging birds	Not significant	N/A	Not significant
Operational Phase				
Goshawk and crossbill	Disturbance (nesting birds)	Not significant	N/A	Not significant
	Disturbance (foraging birds)	Not significant	N/A	Not significant
	Collision risk	Not significant	N/A	Not significant
*Species names and order in which they are listed follow the British List maintained by the BOU[2] **The significance of effect assumes that the embedded mitigation described in in Section 8.4.5 is fully implemented ***Where this is additional to the embedded mitigation described in Section 8.4.5; although no significant effects on goshawk are predicted, specific mitigation for this species (if breeding within 500 m of works) will be required to ensure compliance with legislation protecting breeding Schedule 1 species				

8.10 STATEMENT OF SIGNIFICANCE

148. An assessment has been made of the potential for significant effects of the Development on IOFs. Embedded mitigation measures detailed in Section 8.4.5 (BBPP) will be implemented. Accounting for this, the magnitude of effects of the Development on IOFs both alone and in combination with other schemes are assessed as being of low to negligible magnitude, and thus non-significant in terms of the EIA Regulations.

CLOICH FOREST WIND FARM

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Chapter 9

Geology, Ground Conditions and Peat

9 GEOLOGY, GROUND CONDITIONS & PEAT

9.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the effects of the Cloich Forest Wind Farm ('the Development') on the geology, ground conditions & peat resource.

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

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

- Technical Appendix A9.1: Peat Slide Risk Assessment (PSRA); and
- Technical Appendix A9.2: Outline Peat Management Plan (oPMP).

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

- Figure 9.1: Superficial Soils;
- Figure 9.2: Bedrock Geology;
- Figure 9.3: National Soils of Scotland;
- Figure 9.4: Extract from Carbon and Peatland 2016; and
- Figure 9.5: Interpolated Peat Depths.

5. This Chapter includes the following elements:

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

9.2 LEGISLATION, POLICY AND GUIDANCE

6. This Chapter is written with consideration given to The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the EIA Regulations) which establishes in broad terms what is to be considered when determining the effects of development proposals on Geology, Soils and Peat.

7. The Scottish Planning Policy (SPP)[1] was published in 2014 and sets out the Scottish Government's policy on how nationally important land use planning matters should be addressed.

8. In relation to peat and organic soils, paragraph 205 from SPP states that *"where peat and other carbon rich soils are present, applicants should assess the likely effects of development on carbon dioxide (CO2) emissions. Where peatland is drained or otherwise disturbed, there is liable to be a release of CO2 to the atmosphere. Developments should aim to minimise this release".*

9. In relation to minerals, PAN 50 states that part of the sustainable framework for mineral extraction was to encourage sensitive working practices during minerals extraction and

[1] The Scottish Government (2014) Scottish Planning Policy [Online] Available at: http://www.gov.scot/Publications/2014/06/5823 (Accessed 05/05/2021)

to preserve or enhance the overall quality of the environment once extraction has ceased. In addition to the SPP, guidance of relevance to this Chapter includes:

- Scottish Renewables et al. (2019) 4th Edition, Good Practice During Wind Farm Construction[2];
- The Scottish Government (2017), Peat Landslide Hazard and Risk Assessments – Best Practice Guide for Proposed Electricity Generation Developments[3];
- Scottish Government, SNH, SEPA (2017) Peatland Guidance on Development on Peatland, on-line-version-only[4];
- The Scottish Government (2009), The Scottish Soil Framework[5];
- The Construction Industry Research and Information Association (CIRIA) (2015), Environmental Good Practice on Site (C741)[6]; and
- Planning Advice Note PAN 50 Controlling the Environmental Effects of Surface Mineral Workings[7].

9.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

9.3.1 Scoping Responses and Consultations

10. Consultation for this EIA Report topic was undertaken with the organisations shown in Table 9.1 overleaf.

[2] SNH (2019) Good practice during windfarm construction, 4th Edition [Online] Available at: https://www.nature.scot/sites/default/files/2020-12/Good%20Practice%20during%20wind%20farm%20construction%20-%204th%20Ed.pdf (Accessed 05/05/2021)
[3] The Scottish Government (2017) Peat Landslide Hazard and Risk Assessments - Best Practice Guide for Proposed Electricity Generation Developments Guidance [Online] Available at: http://www.gov.scot/Resource/0051/00517176.pdf (Accessed 05/05/2021)
[4] Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland, on-line version only Available at: https://www.webarchive.org.uk/wayback/archive/3000/https://www.gov.scot/Resource/0051/00517174.pdf (Accessed 05/05/2021)
[5] The Scottish Government (2009) The Scottish Soil Framework [Online] Available at: http://www.gov.scot/Publications/2009/05/20145602/0 (Accessed 05/05/2021)
[6] The Construction Industry Research and Information Association (CIRIA) (2015) Environmental Good Practice on Site Guide (C741), CIRIA: London.
[7] Scottish Government (2017) Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments. Available at: http://www.gov.scot/Publications/2017/04/8868/0 (Accessed 05/05/2021)

Table 9.1 Consultation Responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
SEPA	Scoping Response 30/10/2019	SEPA have requested that the following key issues must be addressed in the EIA process: d) Peat depth survey and table detailing re-use proposals. f) Map and site layout of borrow pits. h) Quarry or Borrow Pit Site Management Plan of pollution prevention measures.	Details of peat depths and a table detailing re-use proposals are presented in Technical Appendix A9.2: oPMP. The location of proposed borrow pits is presented in Figure 3.1: Detailed Development Site Layout. Details of the management of borrow pits and pollution prevention measures are outlined in Technical Appendix A3.1: Borrow Pit Assessment.
SEPA	Scoping Response 30/10/2019	In relation to disturbance and re-use of excavated peat and other carbon rich soils, SEPA require: 3.1 Where peatland is drained or otherwise disturbed, there is liable to be a release of CO2 to the atmosphere. Developments must aim to minimise this release." 3.2 The planning submission must a) demonstrate how the layout has been designed to minimise disturbance of peat and consequential release of CO2 and b) outline the preventative/mitigation measures to avoid significant drying or oxidation of peat. 3.3 The submission must include: a) A detailed map of peat depths following the Scottish Government's Guidance on Developments on Peatland - Peatland Survey (2017) b) A table which details the quantities of acrotelmic, catotelmic and amorphous peat which will be excavated for each element and where it will be re-used during reinstatement. Details of the proposed widths and depths of peat to be re-used and how it will be kept wet permanently must be included. 3.4 For proposals to be in accordance with Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and Minimisation of Waste and our Developments on Peat and Off-Site uses of Waste Peat. 3.5 Consideration given on whether a full Peat Management Plan (as detailed in the above guidance) is required or whether	The design evolution is driven by avoidance of environmental constraints including deep peat. During preparation of the EIA Report, consultation has taken place to illustrate how site design has changed to avoid the deepest peat areas. See **Chapter 3: Project Description** for details. Technical Appendix A9.2: oPMP, and mitigation in Section 9.8 of this Chapter outlines the preventative measures and mitigation for avoiding the drying out or oxidisation of peat during construction. The oPMP has been prepared in accordance with Scottish Government guidelines and best practice guidance as listed in Section 9.2 of this Chapter. A Carbon Calculator, which takes into account loss of carbon through peat excavation is included in **Chapter 16: Climate Change and Carbon Balance.** Details of peat re-use and restoration would be presented in a Habitat Management Plan (HMP), further details are within **Chapter 7: Ecology.**

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		the above information would be best submitted as part of the schedule of mitigation. 3.6 Consideration for SEPA advice on the minimisation of peat disturbance and peatland restoration may need to be taken into account.	
SEPA	Scoping Response 30/10/2019	In relation to the planning and building of Borrow pits. SEPA Require: 7.1 Scottish Planning Policy states (Paragraph 243) that "Borrow pits should only be permitted if there are significant environmental or economic benefits compared to obtaining material from local quarries, they are time-limited; tied to a particular project and appropriate reclamation measures are in place." The submission must provide sufficient information to address this policy statement. 7.2 A Site Management Plan to be submitted in support of any application. The following information should also be submitted for each borrow pit: a) A map showing the location, size, depths and dimensions. b) A map showing any stocks of rock, overburden, soils and temporary and permanent infrastructure including tracks, buildings, oil storage, pipes and drainage, overlain with all lochs and watercourses to a distance of 250 metres. Evidence that a site-specific proportionate buffer can be achieved. On this map, a site-specific buffer must be drawn around each loch or watercourse proportionate to the depth of excavations and at least 10m from access tracks. If this minimum buffer cannot be achieved each breach must be numbered on a plan with an associated photograph of the location, dimensions of the loch or watercourse, drawings of what is proposed in terms of engineering works. c) Provide a justification for the proposed location of borrow pits and evidence of the suitability of the material to be excavated for the proposed use, including any risk of pollution caused by degradation of the rock.	Details of proposed borrow pits at the Site are presented in Technical Appendix A3.1: Borrow Pit Assessment.

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		d) A ground investigation report giving existing seasonally highest water table including sections showing the maximum area, depth and profile of working in relation to the water table. e) A site map showing cut-off drains, silt management devices and settlement lagoons to manage surface water and dewatering discharge. Cut-off drains must be installed to maximise diversion of water from entering quarry works. f) A site map showing proposed water abstractions with details of the volumes and timings of abstractions. g) A site map showing the location of pollution prevention measures such as spill kits, oil interceptors, drainage associated with welfare facilities, recycling and bin storage and vehicle washing areas. The drawing notes should include a commitment to check these daily. h) A site map showing where soils and overburden will be stored including details of the heights and dimensions of each store, how long the material will be stored for and how soils will be kept fit for restoration purposes. Where the development will result in the disturbance of peat or other carbon rich soils then the submission must also include a detailed map of peat depths (this must be to full depth and follow the survey requirement of the Scottish Government's Guidance on Developments on Peatland - Peatland Survey (2017)) with all the built elements and excavation areas overlain so it can clearly be seen how the development minimises disturbance of peat and the consequential release of CO_2. i) Sections and plans detailing how restoration will be progressed including the phasing, profiles, depths and types of material to be used. j) Details of how the rock will be processed in order to produce a grade of rock that will not cause siltation problems during its end use on tracks, trenches and other hardstanding.	

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
SEPA	Scoping Response (13/10/2020)	In relation to request for further guidance on peat survey and reporting following phase one survey results. SEPA require Arcus to carry out phase 2 targeted probing due to the potential variability of peat not recorded in the phase 1 methodology. Should peat be encountered, a Peat Management Plan should be produced.	Targeted phase 2 peat probing has been completed at the Site. An oPMP is included in TA9.2.
Eddleston District Community Council (EDCC)	Scoping Response (15/11/19)	Cloich is home to a number of peat mosses which for the good of our environment must be left undisturbed.	Both preliminary and detailed site surveys did not encounter any significant peat depths. In addition, the proposed site development is located on existing forestry tracks and commercial forestry mainly.

9.3.2 Scope of Assessment

11. The following effects on geology, ground conditions, and peat resources related to the Development will be considered within the EIA Report due to the potential for significant effects as agreed during consultation (Section 9.3.1).

- Potential for peat destabilisation and peat slide risk;
- Potential effects relating to peat disturbance and the subsequent effects from excavated peat and management of peat and peaty soils;
- Potential for compaction of superficial soils; and
- Potential for loss of important geological minerals.

9.3.3 Study Area / Survey Area

12. The Development is located on an area of land approximately 1,080 ha, located approximately 5.5 km north-west of Peebles ('the Site') and is shown on Figure 3.1 of this EIA Report. The Study Area for the purposes of this chapter and assessment relates to the redline boundary, as shown on Figure 3.1, however the peat surveys were focussed on an area defined as 'developable' which represented areas of the site which could potentially have infrastructure, where there were no significant other restricting environmental constraints. The Site boundary largely follows the Cloich Forest boundary which covers the Cloich Hills consisting of Peat Hill to the north-east, Ewe Hill in the central site area and Crailzie Hill in the south-west site area. The topography of the Site is typical of rolling hillside with varying conditions with elevations ranging from approximately 280 m Above Ordnance Datum (AOD) in the north-east Site area to approximately 476 m AOD at the peak of Crailzie Hill.

9.3.4 Elements Scoped Out of Assessment

13. Desk studies have not identified any areas of contaminated land within the Study Area. Should potentially contaminated land be encountered during excavations, appropriate action would be taken in accordance with The Environmental Protection Act 1990[8]. As a result, potential effects arising from contaminated land have been scoped out of this assessment.

9.3.5 Design Parameters

14. The parameters of the design that will influence the geology, ground conditions and peat assessment in relation to physical effects has been based on the turbine layout and associated infrastructure. No additional design parameters, other than those set out in **Chapter 3: Project Description** of this EIA Report, are required for the assessment presented in this Chapter.

15. As set out in **Chapter 3: Project Description**, the turbines and associated infrastructure may be micro-sited up to 50 m, where constraints allow. Such relocations have been considered when undertaking the assessment, and mitigation recommended, where appropriate.

9.3.6 Baseline Survey Methodology

16. The assessment of geology, ground conditions, and peat has included the review of publicly available information in relation to the current condition of the soils at the Site and the information is detailed in the baseline description. This was supported by detailed Site walkover surveys in line with peat probing activities between March 2020 and April 2021. The information has been reviewed in the context of the Development to evaluate both short and long-term impacts.

[8] https://www.legislation.gov.uk/ukpga/1990/43/contents

17. The assessment has involved a review of the following data sources detailed below:

- National Soils Map of Scotland[9];
- Carbon and Peatland 2016 Map[10];
- British Geological Survey (BGS) Geoindex – Superficial Soils Solid Geology[11].

18. The methodology employed for the PSRA is in accordance with Energy Consents Unit (ECU) Scottish Government guidance. Using experience from other wind farm projects, the assessment endeavours to assess the effects on geology and soils either affected directly or indirectly by construction or operation of the Development.

9.3.6.1 Stage One Peat Probing

19. Initial phase one peat probing was carried out in March 2020 in accordance with Scottish Government guidance[12] with probe points sunk in a 100 m grid carried out across the developable Site area and the information gathered to inform the preliminary Site layout design. Peat probe data is acquired using the GIS Collector Application and a group of extendable carbon-fibre rods, each measuring just under 1 m, one of which features a pointed end for effective entry into soil with overall measuring capabilities correlated to the length of rod that is able to be submerged and the visual evidence of peat once removed. On the Collector App a fishnet with squares measuring 100m^2 is overlain on a map showing the Site boundary and any other necessary features for effective GPS point data entry. Probing was limited to the developable area derived from key constraints mapping, the scoping layout turbine locations and a subsequent 250 m buffer of the scoping layout. This avoided areas of the Site with constraints and areas outwith influencing distance of proposed Development infrastructure, while still achieving a wide Site coverage.

9.3.6.2 Stage Two Peat Probing

20. Following design freeze, targeted peat probing was carried out across the locations for proposed infrastructure. This probing was generally at 50 m intervals along the centre line of the tracks with probes at 10 - 25 m on either side of the tracks to provide a corridor for micro-siting. In addition, probing at turbine locations were recorded at 10 m intervals. Peat probe points were gathered utilising the fishnet method discussed above, using targeted fishnets with different interval areas (10m^2 / 50m^2) allowing each infrastructure type to be probed in accordance with Scottish Government Guidance.

21. It should be noted that the PSRA was undertaken on the findings of all phases of probing with focus on the Phase two peat probe data, as this was within the proposed infrastructure envelope. Details of the assessment are included in Technical Appendix A9.1.

9.3.6.3 Peat Slide Risk Assessment and Peat Management Plan

22. A PSRA and OPMP are provided in Technical Appendices A9.1 and A9.2 respectively. These assess the potential for peat de-stabilisation and the potential for disturbance of peat, considering the impact on key sensitive receptors. These include:

- Existing infrastructure in the form of tracks and footpaths and dwellings;
- Proposed infrastructure in the form of turbine foundations, crane hardstandings, tracks and other infrastructure;
- Sensitive areas of GWDTEs, blanket bog and other sensitive habitats; and
- Major and minor watercourses.

[9] https://soils.environment.gov.scot/maps/soil-maps/national-soil-map-of-scotland/
[10] https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/
[11] https://mapapps2.bgs.ac.uk/geoindex/home.html
[12] https://www.gov.scot/publications/peat-landslide-hazard-risk-assessments-best-practice-guide-proposed-electricity/

23. Details of GWDTEs and the presence of blanket bog are discussed in further details in **Chapter 7: Ecology** while the impacts on watercourses are included in **Chapter 10: Hydrology & Hydrogeology**.

9.3.7 Methodology for the Assessment of Effects

24. The assessment of effects is based on the final design of the Development detailed in **Chapter 3: Project Description** of this EIA Report. The assessment considers the sensitivity of the receptor and the magnitude of any potential change, to conclude whether the effect is significant by assessing the potential for both peat slide risk assessment at the site, and the potential impact from peat disturbance.

9.3.7.1 Sensitivity of Receptors

25. Soil types are considered to be of high sensitivity where they are categorised as peat soils of high moisture content, such as those found in blanket bog.

26. The sensitivity of the receiving environment is defined as its ability to absorb an effect without perceptible change and can be classified as high, medium or low. These classifications are dependent on factors such as the nature and extent of peat, associated habitats, and soil characteristics as well as the Site geology and their purpose and existing influences, such as land-use.

27. Table 9.2 provides an overview of the different categories of sensitivity that are used within this chapter to inform the assessment of effects on existing geology, ground conditions, and peat, identifying whether the effects would be significant under Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[13] ('the EIA Regulations').

Table 9.2 Framework for Determining Sensitivity of Receptors

Sensitivity of Receptor	Definition
Very High	• The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.
High	• Soil type and associated land use are highly sensitive (e.g. peat/blanket bog); • Class 1 or 2 priority peatland, carbon-rich and peaty soils cover >20% of the development area; and • Receptor contains areas of regionally important economic mineral deposits.
Medium	• Soil type and associated land use are moderately sensitive (e.g. commercial forestry); • Class 1 or 2 priority peatland, carbon-rich and peaty soils cover <20% of the Development Area; • Class 3 and 5 peatland areas, carbon rich and peaty soils; and • Receptor contains areas of locally important economic mineral deposits.
Low	• Soil type and associated land use not sensitive to change in hydrological regime (e.g. intensive grazing); and • Receptor contains Class -2, -1, 0, and 4 non-peatland areas, with no carbon-rich and/or peaty soils.
Negligible	• The receptor is resistant to change and is of little environmental value.

13 The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 [Online] Available at: https://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 05/05/2021)

9.3.7.2 Magnitude of Change

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

29. The criteria for assessing the magnitude of a change can be classified as high, medium, low or negligible as presented in Table 9.3.

Table 9.3 Framework for Determining Magnitude of Change

Magnitude of Effects	Definition
High	• Major or total loss of or alteration to peatland resource such that post development characteristics or quality will be fundamentally or irreversibly changed; • Long term/permanent change to human or environmental health; • Catastrophic failure of site infrastructure due to ground instability; • Long term/permanent change to baseline resource; and • Major or total loss of a geological site or mineral deposit, where the value of the site would be severely affected.
Medium	• Loss of, or alteration to the baseline resource such that post development characteristics or quality will be partially changed; • Mid-term/permanent change to human or environmental health; • Ground failure that requires remediation but does not cause catastrophic failure of site infrastructure; • Mid-term/permanent change to baseline resource; and • Partial loss of a geological site or mineral deposit, with major effects to the settings, or where the value of the site would be affected.
Low	• Small loss of soils or peatland, or where soils will be disturbed but the value not impacted; • Short-term change to human or environmental health; • Ground settlement/subsidence that does not adversely affect site infrastructure or require remedial action; • Short-term change to baseline resource; and • Small effect on a geological site or mineral deposit, such that the value of the site would not be affected.
Negligible	• Minimal or no change to soils or peatland deposits; • Minimal or no change to human or environmental health; • Minimal or no change to ground stability; • A very slight change from the baseline conditions. The change is barely distinguishable, and approximates to the 'no-change' situation; and • Minimal or no change to a geological site or mineral deposit.

9.3.7.3 Significance of Effect

30. The sensitivity of the asset and the magnitude of the predicted effects will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects. Table 9.4 summarises guideline criteria for assessing the significance of effects.

Table 9.4 Framework for Assessment of the Significance of Effects

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

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

9.3.8 Assessment Limitations

32. There were no assessment limitations in relation to the geology, ground conditions and peat.

9.3.9 Embedded Mitigation

33. Embedded Mitigation comprises best practice methods and works as outlined in publication 'Good Practice during Wind Farm Construction'[14] that are established and effective measures to which the Applicant will be committed through the planning consent.

34. Mitigation also takes place through embedded design of the site layout avoiding key environmental constraints including avoidance of deepest peat (i.e. no turbines sited in peat > 1 m) or limiting the impacts on deep peat where possible, as well as taking cognisance of hydrological and ecological features and associated buffers.

35. The Site layout design was presented through pre-application consultation to SEPA to illustrate how the Site layout had considered the avoidance of deep peat where possible and how infrastructure sited in peat greater than 1.0 m was generally located within the shallowest peat possible. This consultation also illustrated the key constraints, such as watercourse buffers and GWDTEs.

[14] Scottish Renewables et al. (2019) Good Practice during Wind Farm Construction, 4th Edition 2019 [Online]. Available at: https://www.nature.scot/sites/default/files/2020-12/Good%20Practice%20during%20wind%20farm%20construction%20-%204th%20Ed.pdf (Accessed 04/05/2021)

9.4 BASELINE CONDITIONS

36. This section reports the findings from review of published geology, augmented by field survey and peat probing which provides a more detailed geological context of the local environs within the Site. Further details of baseline peatland habitats are also included in **Chapter 7: Ecology**.

9.4.1 Superficial Soils

37. Published geological mapping of superficial soils indicates a majority of the Site to be underlain by deposits of Diamicton Till of Devensian Age. No superficial deposits are recorded across the remainder of the Site other than small localised pockets of Peat and Alluvium in the central eastern areas and at the northern extent of the Site. The Superficial Soils at the Site is presented in Figure 9.1.

9.4.2 Bedrock Geology

38. Published bedrock geology mapping indicates the majority of the Site to be underlain by sandstone and siltstone of the Kirkcolm Formation, with wacke and siltstone of the Portpatrick Formation present in the south-western Site area. A thin lens of the Moffat Shale Group comprising mudstone is also present in the south-western Site area. Bedrock Geology is presented in Figure 9.2.

9.4.3 National Soils of Scotland

39. The following information is a summary of the information on soil units within Scotland's Soils, Scotland's Environment Website[15]

40. National Soils Map of Scotland mapping indicates the Site to consist of peaty gleys sustaining some peat in the northern Site area and peaty podzols in the central and southern Site areas, with non-calcareous mineral gleys and brown forest soils also present across central and eastern areas of the Site.

41. A brief description of the characteristics and formation of component soil groupings is detailed below, described by Scotland's Soils Map, although these do not include information on depths or engineering properties:

- Blanket Peat: Poorly drained upland soil with an organic surface layer generally greater than 50 cm thick, unconfined 'blankets' the landscape;
- Podzols: Podzols are acid soils with a grey leached layer just below the surface and bright orangey-brown coloured subsoils and/or dark brown to black, organic rich subsoils;
- Gleys: Soils that are periodically or permanently waterlogged; and
- Brown Soils: Brown Soils are moderately acid soils with brown mineral topsoils and brown or yellowish subsoils.

42. Figure 9.3 presents an Extract from the National Soils of Scotland.

9.4.4 Carbon-rich Soils, Deep Peat and Priority Peatland Habitats

43. The Carbon and Peatland Map (SNH, 2016) indicates the Carbon-rich soils and peatland importance categories to be:

- Class 1 - Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value;
- Class 2 - Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas of potentially high conservation value and restoration potential;

[15] Scotland's Environmental Website: http://soils.environment.gov.scot/ (Accessed 05/05/2021)

- Class 3 - Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat;
- Class 4 - Area unlikely to be associated with peatland habitats or wet and acidic type. Area unlikely to include carbon-rich soils;
- Class 5 - Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat;
- Mineral soil - Peatland habitats are not typically found on such soils (Class 0);
- Unknown soil type – information to be updated when new data are released (Class -1); and
- Non-soil (e.g. loch, built up area, rock and scree) (Class -2).

44. Figure 9.4 provides the Carbon and Peatland 2016 Map extract which indicates that at the macro level the Site is underlain by pockets of Class 4 soils in north, central and southern areas; these soils are unlikely to be associated with peatland habitats or to include carbon-rich soils. Numerous small pockets of Class 5 soils are also present at the Site, primarily in northern and central areas; these soils are not recorded as peatland habitat but there is potential for carbon-rich soils and deep peat. The remainder of the Site is recorded as Class 0 (Mineral Soils) where peatland habitats are not typically found, other than a small area of Class 3 soil which is recorded at the southern boundary of the site; these are soils where occasional peatland habitats can be found and most soils are carbon-rich with some areas of deep peat.

45. A summary of the peat survey is summarised below, and the details are included in Appendix A9.2: oPMP. The appendix provides Site-specific peat depth information which informed the design of the layout of the Development and the subsequent assessment of effects. Figure 9.4 provides the Carbon and Peatland 2016 Map extract.

9.4.5 Peat (Site Specific Environs)

46. Peat is a sedimentary material, which is dark brown or black in colour, and comprises partially decomposed remains of plants and organic materials preserved in anaerobic conditions, essentially within a waterlogged environment. There are two principal types of peat:

- Acrotelm is the upper layer, quite fibrous and contains plant roots. Acrotelmic peat is relatively dry, generally lying above the groundwater table and has some tensile strength; and
- Catotelm is the lower layer of peat which is highly amorphous and has a very high water content. Catotelm generally lies below the ground water table and has a very low tensile strength.

47. Interpretation of these principle types are discussed further in the Appendix A9.2: Outline Peat Management Plan.

9.4.5.1 Field Surveys

48. The desk-based assessment recorded the potential presence of peat and peaty soils in line with NatureScot data described above. Peat depths were consistent throughout the Site, with 92.5% of probes recording peat depths of 0.5 m or less. A small area of deep peat of up to 4.6 m was recorded in the eastern Site area in an area of flat topography, this is confirmed to be a localised pocket of deep peat in an area where no turbines, tracks or associated infrastructure are proposed. The average peat depth was recorded as 0.26 m.

49. The results of the peat probing indicated that peat was scarcely present across much of the Site, in line with the published geological data. A small area of deep peat of up to 4.6 m was recorded in the eastern site area in an area of flat topography, in a low-lying area

adjacent to the existing track being utilised for the southern access. This is a localised pocket of deep peat in an area where no turbines, new tracks or associated infrastructure is proposed.

50. During the course of the works, a total of 1081 probes were sunk within the study area. The peat probe locations and peat depth interpolation are shown in Figure 9.5 and further details on the peat probing included in Appendix A9.2: oPMP.

51. Table 9.5 below summarises the peat depth findings.

Table 9.1: Peat Depth Summary

Peat Depth Range (m)	No of peat probes	Percentage of Total (%)
0 – 0.50	1,000	92.5
0.51 – 1.00	50	4.6
1.01 – 1.50	12	1.1
1.51 – 2.00	8	<1.0
2.01 – 2.50	3	<1.0
2.51 – 3.00	0	0
3.01 – 3.50	4	<1.0
3.51 – 4.00	0	0
4.01 – 4.50	3	<1.0
4.51 – 5.00	1	<1.0

52. Recorded peat depths averaged 0.26 m, with 92.5% of probes recording peat depths of 0.5 m or less. A small area of deep peat of up to 4.6 m was recorded in the eastern Site area in an area of flat topography, in a low-lying area adjacent to the existing track being utilised for the southern access. This is a localised pocket of deep peat in an area where no turbines, new tracks or associated infrastructure is proposed.

53. A more detailed representation of peat within the Site is available in Appendix A9.1: Peat Slide Risk Assessment and Appendix A9.2: oPMP.

Table 9.6: Peat Depths Recorded at Turbines

Proposed Turbine No.	Average Peat Depths at 50 m Radius (m)
T1	0.15
T2	0.18
T3	0.29
T4	0.14
T5	0.21
T6	0.16
T7	0.06
T8	0.48

Proposed Turbine No.	Average Peat Depths at 50 m Radius (m)
T9	0.12
T10	0.13
T11	0.11
T12	0.11

9.4.5.2 Peat Stability and Peat Management

54. The recorded peat depths and existing slope information has been utilised to identify hazard areas in relation to peat slide risk. The assessment found that with only 7.5% of peat at the Site being recorded at depths >0.5 m and the severely fragmented nature of the majority of peat due to the afforested nature of the Site, the presence of peat with the potential to slide is minimal. Furthermore, where deep peat has been identified, it has been in isolated areas of low-lying ground, in depressions between the rolling hills which have been avoided through an iterative design process, further reducing the likelihood of peat slide occurring. Further details are provided in Appendix A9.1: Peat Slide Risk Assessment.

55. The peat depth data is utilised to calculate estimated peat excavation and re-use volumes based on an outline 3-D civil Site layout design. In this, rational options are provided for reuse of excavated material and guidance on good practice storage and management of excavated material, including peat. Further details are provided in Appendix A9.2: Outline Peat Management Plan.

9.5 ASSESSMENT OF POTENTIAL EFFECTS

56. The effect of the Development on soils and geological receptors has been considered for the duration of the construction and operation phases. Effects occurring during construction are considered to be short term effects, with those occurring as a result of the operation of the Development being considered as long-term.

9.5.1 Potential Construction Effects

9.5.1.1 Disturbance of Deep Peat

57. Construction activities including excavation of tracks, turbine foundations, crane hardstanding, and other infrastructure can lead to disturbance of peat. Beyond the main construction activities, other considerations include the temporary storage of soils and peat on Site. The details of peat disturbance through excavations and subsequent re-use methods are included in Appendix A9.2: oPMP**.** Figure 9.5 Interpolated Peat Depths illustrates the areas of deep peat.

58. The assessment of peat disturbance has not highlighted any areas of deep peat at risk from the Development, with the deepest peat recorded out with the footprint of the Development. All turbines are sited in areas where peat is <1.0 m, and only very short sections of proposed track are located in areas where peat is >1.0 m e.g. to the north of T8 (as detailed in Table 9.6).

59. On this basis and in the absence of mitigation, the Development is considered to result in a potential minor effect that would be **not significant**, in terms of the EIA Regulations.

9.5.1.2 Peat Stability

60. Peat instability is generally the result of a combination of causative factors. Several construction activities have the potential to increase the likelihood of peat slides in areas where peat is present at a sufficient depth and where gradients are sufficiently steep to result in a peat slide event.

61. Construction activities have the potential to increase the likelihood of peat slides by way of locating proposed infrastructure including track networks on sloping ground where peat is present. All construction activities involve the removal of surface vegetation and excavation of peat and other near surface soils from the bedding surface of the underlying rock which naturally increases potential for slide.

62. Peat slides can affect soils, local sensitive habitats and have the potential to affect surface water systems from soil inundation, leading to sedimentation. This can have an effect by slip materials sliding onto areas of sensitive habitat, or causing damage to local surrounding surface soils and can also reduce water quality and/or modify drainage patterns. Receptors identified across the Development area are:

- Existing major and minor watercourses;
- Localised peat soils; and
- Proposed Wind Farm Infrastructure.

63. The majority of peat was recorded at depths less than 1.0 m across the Site, however localised pockets of deep peat have also been recorded. Across the majority of the Site, infrastructure associated with the Development has avoided these pockets of deep peat, with all turbines being sited in areas where peat is <1.0 m, and only very short sections of proposed track are located in areas where peat is >1.0 m. The peat slide risk assessment analysis has highlighted the Site to be of negligible or low hazard rank in terms of slide risk.

64. Therefore, the Development is considered to result in a potential effect of minor and would therefore **not significant**, in terms of the EIA regulations.

9.5.1.3 Loss of Soils

65. In its regulatory position statement, SEPA states that:

"Developments on peat should seek to minimise peat excavation and disturbance to prevent unnecessary production of waste soils and peat".

66. The key items of infrastructure which influence this effect are the dimensions, location and type of new access tracks, turbine base foundations and crane hardstanding. Other features which should be considered for excavation requirements include the substation and temporary construction compound facilities.

67. The layout design process has sought to avoid areas where deep peat is recorded. This has been achieved due to 92.5% of probes recorded less than 0.5 m of peat, meaning that the Site layout design achieves a very low impact on peat. Furthermore, the design has utilised existing track which will significantly reduce the loss of soils that new tracks would cause. Further information on peat excavation is also included in Appendix A9.2: Outline Peat Management Plan which details the volumes estimated for excavated materials and re-use possibilities.

68. Given the limited amount of peat on the Site, and considering the design of the Site layout avoids any deep peat, it is considered that limited disturbance to peat will take place during construction and therefore, the Development will not have any significant environmental effects in relation to peat.

69. The significance of effects associated with the loss of soils is considered to be minor and **not significant**, in terms of the EIA regulations.

9.5.1.4 Compaction of Peat and Soils

70. In relation to compaction of soils, investigations at the Site have recorded pockets of deep peat in localised areas. The design process has sought to avoid the disturbance of deep peat where possible and peat depths are generally thin across the majority of the proposed Development area. Nonetheless, the construction of turbine hardstands, access tracks and movement of construction traffic, in the absence of construction good practice, could lead to the compaction of soil. This can reduce soil permeability, potentially leading to increased run-off and increased erosion.

71. The superficial soils underlying the Development are of a varying permeability, so the effects of compaction could result in a significant increase in a runoff from existing conditions. However, the total surface area affected by the footprint of the proposed layout equates to approximately 328,770 m^2, just over 3.0% of the total Site area and has a total of 4.3 km of existing tracks being utilised as part of the total 9.4 km of tracks. The Site contains sloping topography and as peat probing has proven, relatively thin soils onto rockhead or gravel (weathered rockhead). In addition the turbines are mainly situated in areas of commercial forestry.

72. Therefore, in the absence of mitigation, the significance of effects associated with the compaction of peat and soils is considered to be Negligible and **not significant**, in terms of the EIA Regulations.

9.5.1.5 Effects on Geology

73. The total excavation area at the proposed borrow pit locations is approximately 4.7 ha while the total site boundary equates to approximately 1,080 ha. Limited peat is anticipated and soils cover is expected to be thin as documented on published mapping and probing proved this across large areas of the site, and hence bedrock is near surface. Both borrow pits lie in areas of historical quarrying and so a degree of disturbance already exists at the selected locations. It should be noted however that there are environmental advantages of winning materials on Site and, each borrow pit should be suitably re-instated with topsoil and suitable quantities of peat, peaty soils and turves to re-establish where possible geological, hydrological and ecological conditions and reduce any potential visual impacts.

74. On this basis, the overall impact on geological resources at the site is considered to be negligible and **not significant**. Details on borrow workings is included in Appendix A3.1 Borrow Pit Assessment.

9.5.2 Operational Phase

75. There would be minimal or no impacts upon peat and soils during the operational phase, and significant effects are not anticipated.

9.5.3 Decommissioning Phase

76. During decommissioning, the turbine foundation bases would be broken out to below ground level. All cables would be cut off below ground level, de-energised, and left in the ground. Access tracks would be left for use by the landowner. No stone would be removed from the Site. The decommissioning works are estimated to take eight to twelve months. This approach is considered to be less environmentally damaging than seeking to remove foundations, cables and roads entirely.

77. Therefore, it is considered that decommissioning activities would be less intrusive with infrastructure in place for access meaning no or little requirement for further disturbance of peat, therefore **no significant** effects are anticipated.

9.6 CUMULATIVE EFFECT ASSESSMENT

78. A cumulative effect is considered to be an additional effect on peat and geology resources arising from the Development in addition to the combination of other developments likely to impact the peat and geological environment.

79. Peat was recorded to be 1.0 m or thinner at 92.5% of probing locations across the Site with one localised areas of deep peat, which has been avoided in the design of Development infrastructure. Any peat excavated during construction will be suitably re-used in reinstatement and restoration as detailed in Appendix A9.2: Outline Peat Management Plan.

80. Therefore, for the purposes of the assessment of potential cumulative effects Geology, soils and Peat is considered as a site-specific consideration and it is not considered that there will be cumulative effects.

9.7 MITIGATION AND RESIDUAL EFFECTS

9.7.1 Mitigation measures

81. Mitigation in relation to peat disturbance is initiated through embedded mitigation in design and adopting best practices during construction.

82. Mitigation proposed states that where infrastructure associated with turbines found to encroach on deep peat, this will be microsited (if possible) out with these areas in order to reduce the overall effect on peat disturbance, stability and loss of soils. Micrositing limits (of 50m) are discussed in **Chapter 3: Project Description**. Maintenance of existing drainage is critical to avoid compaction of soils, therefore, all existing drainage network channels would be maintained and, where necessary, channelled below the access track construction drainage ditches on the upslope of the track. Further details are provided in **Chapter 10: Hydrology and Hydrogeology**.

83. Intrusive site investigations will be undertaken across the infrastructure areas prior to construction, particularly at turbine locations, therefore further determining the extent and nature of any peat.

84. Slope stability monitoring will occur during pre-construction and construction phases of work, including for both peat stability and non-peat related stability. These would focus on locations highlighted as being of risk in Technical Appendix 9.1.

85. Best practice measures for managing excavated peat and peaty soils are detailed in Appendix A9.2.

9.7.2 Residual Effects

86. Following the incorporation of mitigation measures as detailed in Table 9.7, residual effect associated with peat disturbance, peat stability and peat and soil losses will all be negligible.

87. With the mitigation proposed, the magnitude of effects on peat disturbance can be reduced from minor to negligible, and are therefore remains **not significant** in terms of the EIA Regulations.

9.8 SUMMARY OF EFFECTS

88. Table 9.7 provides a summary of the effects detailed within this chapter.

Table 9.7 Summary of Effects

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Significance
Construction				
Peat and Peaty Soils	Disturbance of peat and peaty soils – Affect carbon-rich and peaty soils; Disturbance to an area <20% of the Development Area, the presence of class 5 peatland areas (carbon rich and peaty soils) Affecting commercial forestry.	Minor	Adoption of best practice measures for dealing with peat excavations, storage and subsequent backfilling.	Negligible
Peat and Peaty Soils	Peat Stability - Small loss of soils or peatland, or where soils will be disturbed but the value not impacted.	Minor	Adoption of best practice measures for dealing with peat excavations, storage and subsequent backfilling. Additional ground investigations following forestry felling. Slope stability monitoring will occur during pre-construction and construction phases of work.	Negligible
Operation				
Peat and Peaty Soils	Minimal impact anticipated	Negligible	None	Negligible
Decommissioning				
Peat and Peaty Soils	Works would be less intrusive and not considered to have a significant impact.	Negligible	None	Negligible

9.9 STATEMENT OF SIGNIFICANCE

89. This chapter has assessed the likely significance of effects relating to the Development on Geology, Ground Conditions and Peat. Given that only effects of moderate significance or greater are considered significant in terms of the EIA Regulations, the potential effects on Geology, Soils and Peat are considered to be **not significant**.

CLOICH FOREST WIND FARM

EIA Report – Volume 1 – EIA Report Text

Chapter 10

Hydrology and Hydrogeology

ARCUS

10 HYDROLOGY AND HYDROGEOLOGY

10.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the effects of the Cloich Forest Wind Farm ('the Development') on the hydrology and hydrogeology resources.

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

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

- Technical Appendix A10.1: Outline Water Construction Environmental Management Plan (WCEMP); and
- Technical Appendix A10.2: Private Water Supply Risk Assessment (PWSRA).

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

- Figure 10.1: Hydrology Study Areas;
- Figure 10.2: Hydrological Catchments;
- Figure 10.3: Solid Geology;
- Figure 10.4: Superficial Deposits;
- Figure 10.5: Watercourse Crossings; and
- Figure 10.6: Groundwater Dependent Terrestrial Ecosystems (GWDTE).

5. This Chapter includes the following elements:

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

10.2 LEGISLATION, POLICY AND GUIDANCE

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

- The Water Framework Directive (WFD) (2000/60/EC)[1] establishes a framework for the protection, improvement and sustainable use of all water environments. It is transposed within Scotland by the Water Environment and Water Services (Scotland) Act 2003[2] and subsidiary Regulations;
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the EIA Regulations')[3];
- The Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003[4];

[1] European Commission (2000) The Water Framework Directive (2000/60/EC) [Online] Available at: https://ec.europa.eu/environment/water/water-framework/index_en.html [Accessed 24/03/2021].
[2] Scottish Government (2003) The Water Environment and Water Services (Scotland) Act 2003 [Online] Available at: http://www.legislation.gov.uk/asp/2003/3/contents [Accessed 24/03/2021].
[3] Scottish Government. (2017) The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the EIA Regulations). Available at: https://www.legislation.gov.uk/ssi/2017/101/made. [Accessed 24/03/2021].
[4] Scottish Government (2003) Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 [Online] Available at: http://www.opsi.gov.uk/legislation/scotland/acts2003/asp_20030015_en_1 [Accessed 24/03/2021].

- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017[5]; and
- The Public and Private Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2017[6].

10.2.1 Scottish Planning Policy and Guidance

7. The Scottish Planning Policy (SPP)[7] was published in 2014, revised in 2020, and replaces the previous SPP (published in 2010). SPP is a non-statutory document which sets out the Scottish Government's policy on how nationally important land use planning matters should be addressed.

8. In paragraphs 255 to 268, the SPP sets out guidance for development within areas of flood risk, including the responsibilities of planning authorities in regulating and controlling development in such areas, in order to prevent increased risk of flooding in the future. SPP emphasises the need to apply sustainability principles to the prevention of flooding and the control of future development.

9. Local policy context is set out in the Planning Statement.

10.2.2 Pollution Prevention Guidelines (PPGs) and Guidance for Pollution Prevention (GPPs)

10. GPPs give advice on statutory responsibilities and good environmental practice. Each PPG and GPP addresses a specific industrial sector or activity. SEPA and Northern Ireland Environment Agency (NIEA) are in the process of replacing the PPGs with GPPs. The following guidance are of relevance principally to surface water, however as surface water has the potential to affect groundwater, they are also of relevance to the assessment of groundwater:

    - Netregs Pollution Prevention Guidelines (PPGs) and replacement Guidance for Pollution Prevention (GPPs)[8]:
        - GPP1: Understanding your environmental responsibilities – good environmental practices (October 2020);
        - GPP2: Above ground oil storage tanks (January 2018);
        - GPP4: Treatment and disposal of wastewater where there is no connection to the public foul sewer (November 2017);
        - GPP5: Works and maintenance in or near water (January 2017);
        - PPG6: Working at construction and demolition sites (2012);
        - GPP8: Safe storage and disposal of used oils (July 2017);
        - PPG18: Managing fire water and major spillages (June 2000);
        - GPP21: Pollution incident response planning (July 2017); and
        - GPP22: Dealing with spills (October 2018).

[5] Scottish Government (2017) the Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017 [Online] Available at: https://www.legislation.gov.uk/ssi/2017/282/note/made [Accessed 24/03/2021].)
[6] Scottish Government (2017) the Private and Public Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2017 [Online] Available at: http://www.legislation.gov.uk/ssi/2017/321/made [Accessed 24/03/2021].
[7] UK Government (2014) Scottish Planning Policy [Online] Available at: https://www.gov.scot/publications/scottish-planning-policy/ [Accessed: 24/03/2021].
[8] Guidance for Pollution Prevention (GPPs) – Full List [Online] Available at: https://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/ [Accessed: 24/03/2021].

10.2.3 Other Guidance

11. Other relevant guidance comprises the following:

- The Scottish Government (2001), PAN 61: Planning and Sustainable Urban Drainage Systems[9];
- SEPA (2010) Land Use Planning System Guidance Note 2, Version 8 (LUPS-GU2)[10];
- SEPA (2010) Engineering in the water environment: good practice guide: River crossings[11];
- SEPA (2015) Culverting of watercourses: position statement and supporting guidance[12];
- SEPA (2017), Land Use Planning System Guidance Note 31, Version 3, (LUPS-GU31)[13];
- SEPA (2019) Climate change allowances for flood risk assessment in land use planning (LUPS-CC1)[14];
- SEPA (2002), Managing River Habitats for Fisheries[15];
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (the CAR Regulations)[16];
- SEPA (2019), CAR - A Practical Guide, Version 8.4[17];
- The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013[18];
- SEPA (2009), River Basin Management Plan[19];
- Scottish Natural Heritage (SNH – now NatureScot) (2019), Good Practice During Wind Farm Construction[20];
- The Construction Industry Research and Information Association (CIRIA) (2015), Environmental Good Practice on Site (C741)[21];
- CIRIA (2001), Control of Water Pollution from Construction Sites (C532)[22];
- CIRIA (2015), The SuDS Manual (C753)[23];

[9] The Scottish Government (2001) PAN61 Planning and Sustainable Urban Drainage Systems [Online] Available at: https://www.gov.scot/publications/pan-61-sustainable-urban-drainage-systems/ [Accessed: 24/03/2021].
[10] SEPA (2010) Land Use Planning System Guidance Note 2, Planning advice on Sustainable Drainage Systems (SUDS), Version 8 [Online] Available at: https://www.sepa.org.uk/media/143195/lups-gu2-planning-guidance-on-sustainable-drainage-systems-suds.pdf [Accessed: 24/03/2021].
[11] SEPA (2010) Engineering in the water environment good practice guide: River Crossings, WAT-SG-25 [Online] Available at: http://www.sepa.org.uk/regulations/water/engineering/engineering-guidance/ [Accessed 24/03/2021].
[12] SEPA (2015) Culverting of watercourses: position statement and supporting guidance WAT-PS-06-02, Version 2.0 [Online] Available at: https://www.sepa.org.uk/media/150919/wat_ps_06_02.pdf [Accessed: 24/03/2021].
[13] SEPA (2017) Land Use Planning System Guidance Note 31. Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Version 3 [Online] Available at: https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf [Accessed: 24/03/2021].
[14] SEPA (2019) Climate Change Allowances for Flood Risk Assessment in Land Use Planning (LUPS-CC1) [Online] Available: https://www.sepa.org.uk/media/426913/lups_cc1.pdf [Accessed 24/03/2021].
[15] SEPA (2002) Managing River Habitats for Fisheries: a guide to best practice [Online] Available at: https://www.sepa.org.uk/media/151323/managing_river_habitats_fisheries.pdf [Accessed: 24/03/2021].
[16] Scottish Government (2011) the Water Environment (Controlled Activities) (Scotland) Regulations 2011 [Online] Available at: http://www.legislation.gov.uk/ssi/2011/209/pdfs/ssi_20110209_en.pdf [Accessed 24/03/2021].
[17] SEPA (2015a) Controlled Activities Regulations - A Practical Guide, Version 8.4 [Online] Available at: https://www.sepa.org.uk/media/34761/car_a_practical_guide.pdf [Accessed 24/03/2021].
[18] Scottish Government (2013) The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013 [Online] Available at: http://www.legislation.gov.uk/ssi/2013/29/introduction/made [Accessed 24/03/2021].
[19] SEPA (2009) River Basin Management Plan [Online] Available at: http://www.sepa.org.uk/water/river_basin_planning.aspx [Accessed 24/03/2021].
[20] SNH (2019) Good Practice During Wind Farm Construction [Online] Available at: https://www.nature.scot/guidance-good-practice-during-wind-farm-construction [Accessed: 24/03/2021].
[21] CIRIA (2015) Environmental Good Practice on Site [Online] Available at: https://www.ciria.org/Training/Training_courses/Environmental_good_practice_on_site.aspx [Accessed 24/03/2021].
[22] CIRIA (2001), Control of Water Pollution from Construction Sites (C532) [Online] Available at: https://www.ciria.org/ItemDetail?iProductCode=C649&Category=BOOK&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91 [Accessed 24/03/2021].
[23] CIRIA (2015) The SuDS Manual (C753) [Online] Available at: https://www.ciria.org/ItemDetail?iProductCode=C753&Category=BOOK&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91 [Accessed 24/03/2021].

- Forestry Commission (2011). Forests and Water. UK Forestry Standard Guidelines[24];
- Forestry Commission (2017). The UK Forestry Standard[25]; and
- Forestry Commission (2019) Managing forest operations to protect the water environment[26].

10.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

10.3.1 Scoping Responses and Consultations

12. Consultation for this EIA Report topic was undertaken with the organisations shown in Table 10.1.

Table 10.1 Consultation Responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
SEPA	Scoping Response 30/10/2019	Section 9.5.3 of the report states that a 50 m buffer zone will be established for all turbine bases and ancillary structures/infrastructure around the watercourses on the site, where possible. Micrositing should not occur which would decrease this minimum buffer.	A 50 m buffer has been established from natural watercourses and maintained during the design of the Development, with the exception of watercourse crossings and some new proposed access tracks. Details on design parameters are outlined in this Chapter in Section 10.3.9. Micrositing should not occur which would decrease this minimum buffer. A potential borrow pit location north of T5 is within 50 m of Courhope Burn and a commitment to not winning stone within 50 m of the watercourse will be adhered to.
		It would be urged that at this stage due consideration is given to the silt mitigation that will be required so that this can occur outside the buffer zones i.e. ensuing adequate space for mitigation is built into the layout design.	Noted. This has been taken into account during the design process. Information regarding silt mitigation is outlined in Appendix A10.1: WCEMP.
		The design should minimise water crossings not only	The Development has utilised existing forestry

[24] Forestry Commission (2011). Forests and Water. UK Forestry Standard Guidelines. [Online] Available at: https://www.forestresearch.gov.uk/documents/7668/The_UK_Forestry_Standard.pdf [Accessed 24/03/2021].
[25] Forestry Commission (2017). The UK Forestry Standard. [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/687147/The_UK_Forestry_Standard.pdf [Accessed 24/03/2021].
[26] Forestry Commission (2019). Managing forest operations to protect the water environment. [Online] Available at: https://www.forestresearch.gov.uk/documents/7113/FCPG025_u9Dw0bV.pdf [Accessed 24/03/2021].

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		from a morphology point of view but also avoid areas that can become a pinch point for pollution risk.	tracks where possible, reducing the need for new culverts. Information pertaining to culverts and watercourse crossings is outlined in Appendix A10.1.
		It is important that accurate information is obtained on Private Water Supply locations rather than just the locations of the properties or header tanks. The applicant can formally request information on private water supplies from SEPA via DataRequests@sepa.org.uk. Please note that SEPA does not have records for low scale supplies (less than 10m^3/day) as they fall under General Binding Rule 2. Scottish Borders Council should also be contacted regarding this.	A PWSRA, including on-site surveys, has been conducted as part of this EIA Report. The PWSRA is summarised in Section 10.4.7 and provided as Appendix A10.2. A response from SEPA regarding any information they hold on PWS has not been provided at the time of writing.
		Given the scale of the development it is likely that a Construction Site Licence will be needed.	A Construction Site Licence will be obtained for the Development.
Energy Consents Unit	Scoping Response 18/12/2019	Scottish Water provided information on whether there are any drinking water protected areas or Scottish Water assets on which the development could have any significant effect. Scottish Ministers request that the company contacts Scottish Water (via EIA@scottishwater.co.uk) and makes further enquiries to confirm whether there are any Scottish Water assets which may be affected by the development, and includes details in the EIA report of any relevant mitigation measures to be provided.	Consultation with Scottish Water has been undertaken as part of the EIA. Information regarding drinking water protected areas or Scottish Water assets are outlined in Section 10.4.7.
		"Scottish Ministers request an investigation into the presence of any private water supplies which may be impacted by the development. The EIA report should include details	A PWSRA, including on-site surveys has been conducted as part of this EIA Report. The PWSRA is summarised in Section

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		of any supplies identified by this investigation, and if any supplies are identified, the Company should provide an assessment of the potential impacts, risks, and any mitigation which would be provided.”	10.4.7 and provided as Appendix A10.2.
Eddleston & District Community Council	Scoping Response 15/11/2019	"EDF must identify, to the satisfaction of SEPA and of Local Government the source and pathway of each and every property’s water supply, into the borehole or holding tank from which each property draws its water. This is the only way to ensure that the development is designed and constructed to give full protection to PWS. Only by doing this analysis will EDF be sure that turbines and ancillary infrastructure are sited and constructed in such a way that PWS are fully protected. Contingency plans and mitigation of the loss of PWS are not enough; prevention of loss is required as an integral part of the scheme design."	A PWSRA, including on-site surveys has been conducted as part of this EIA Report. The PWSRA is summarised in Section 10.4.7 and provided as Appendix A10.2.
Manor, Stobo & Lyne Community Council	Scoping Response 21/11/2019	"With ample warning and a substantially larger amount of ground works proposed, it would be entirely unreasonable if the new EA does not (a) fully investigate the potential impact on private water supplies, (b) specify what steps will be taken to mitigate any potential impacts, and (c) clarify the measures that will be implemented if, notwithstanding (b), the wind farm does in fact compromise the quantity or quality of water from private water supplies."	A PWSRA, including on-site surveys has been conducted as part of this EIA Report. The PWSRA is summarised in Section 10.4.7 and provided as Appendix A10.2.
Scottish Water	Scoping Response 15/10/2019	There are no established Scottish Water Drinking Water catchments or water abstraction resources in the area that may be affected by the Development.	Noted and outlined in Section 10.4.7. Public water supplies scoped out of this assessment.

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		There are no public Scottish Water, Waste Water or Water infrastructure within the vicinity of this proposed development therefore we would advise applicant to investigate private treatment options.	Noted and outlined in Section 10.4.7. Public water supplies scoped out of this assessment.
Scottish Borders Council (the Council)	Scoping Response 15/11/2019	Although no response has yet been received from the Council's Environmental Health Service, it is expected that they will require the applicant to demonstrate that this development will not affect private water supplies in the vicinity. In this regard, I also draw your attention to the third party objections forwarded to you with this Scoping consultation response.	Arcus consulted the Council Environmental Health and SEPA to agree the approach and methodology for the PWSRA and the assessment is detailed in Appendix A10.2. The PWSRA is summarised in Section 10.4.7 and provided as Appendix A10.2.
SEPA and the Council	Consultation on PWSRA methodology SEPA 13/05/2020 SBC 27/05/2020	Made comments relating to assessment including properties served by Scottish Water mains in accordance with LUPS-GU31. Made comments in relation to continuity of supply needing to be incorporated into the methodology.	Comments received from statutory consultees on the methodology have been incorporated into Version 2 of the Method Statement, upon which the PWSRA at Appendix A10.2 is based.
Ms Burke, Stewarton Toll, Eddleston	Communication 01/11/2019	Condition 20 attached to extant consent must be addressed in full; resident extremely concerned with the methodology and approach to PWS assessment. Resident seeks a full assessment of pathway from source to supply.	Arcus consulted the Council Environmental Health, SEPA and local residents to agree the approach and methodology for the PWSRA. Relevant comments were considered and the methodology clarified where required. The PWSRA is detailed in Appendix A10.2 and summarised in Section 10.4.7 of this Chapter.

10.3.2 Scope of Assessment

13. The key issues for the assessment of potential hydrological effects relating to the Development include both short-term (construction and decommissioning) and long-term (operation) effects.

14. Short-term effects arising from the construction and decommissioning phases such as:

- Chemical pollution and sedimentation of watercourses and the wider hydrological environment as a result of construction works;
- Impediments to watercourse and near-surface water flow from turbine foundations and shallow excavation works, including changes in soil and peat interflow patterns;
- Potential changes to quality and / or quantity of PWS;
- Potential effects on the hydrological function of groundwater dependent terrestrial ecosystems (GWDTEs);
- Potential changes to groundwater body;
- Acidification of watercourses as a result of construction works and related tree felling;
- Increased run-off and flood risk from increased hardstanding including access tracks; and
- Compaction of soils and superficial deposits and reduction in ability of such deposits to store water.

15. Long-term effects arising from the operational phase potentially include:

- Increased run-off and flood risk from increased hardstanding including permanent access tracks;
- Severance or reduced quantity of water supplying PWS; and
- Potential effects on the hydrological function of groundwater dependent terrestrial ecosystems.

16. The key sensitive receptors are considered to be:

- Surface water and hydrologically connected designated receptors such as the River Tweed Special Area of Conservation (SAC);
- Groundwater receptors;
- Potential GWDTEs; and
- Water supplying PWS.

17. Effects during construction, operation and decommissioning have been assessed, as well as potential cumulative effects.

10.3.3 Elements Scoped Out of Assessment

18. The following effects are scoped out of the assessment:

- Public water supplies as Scottish Water have confirmed there are no drinking water protected areas (DWPA) hydrologically connected to the Development. A summary of the scoping response from Scottish Water can be found in Table 10.1; and
- Designated receptors not hydrologically connected to the Development.

10.3.4 Study Area / Survey Area

19. The hydrology and hydrogeology study area ('the Core Study Area') is defined by the Site boundary and is shown in Figure 10.1. A study area of 3 km from the Core Study Area has been defined to assess the potential effects on PWS ('the PWS Study Area'), and a wider study area of 10 km from the Core Study Area to assess potential effects on the downstream water environment ('the Wider Study Area'). All three study areas are shown in Figure 10.1. At distances greater than 10 km within upland catchments, it is considered

the Development is unlikely to contribute to a hydrological effect, in terms of chemical or sedimentation effects, due to dilution and attenuation of potentially polluting chemicals.

10.3.5 Design Parameters

20. A 50 m buffer zone has been established around the watercourses within the Core Study Area and those that bisect it. No turbine bases, ancillary structures / infrastructure (such as transformers *etc.*), compounds and borrow pits are located within the buffer zone.

21. The requirement for access tracks crossing watercourses has been minimised during the design stage, by utilising existing forestry tracks where possible.

22. A WCEMP (provided as Appendix A10.1) accompanies the EIA Report and forms part of the embedded development design. The WCEMP comprises methods and works that are established and effective measures to which the Applicant will be committed through the development consent. Accordingly, the assessment of significance of effects of the Development are considered with the inclusion of the WCEMP as standard mitigation procedure.

23. Measures in order to protect the water environment are outlined in the Appendix A10.1: WCEMP and are based on good construction practice outlined in the aforementioned guidance documents in Sections 10.2.2 and 10.2.3.

10.3.6 Baseline Survey Methodology

24. A desk-based assessment, consultation, and site walkover have been conducted to inform the hydrology and hydrogeology assessment.

10.3.6.1 Desk-based assessment

25. The desk-based assessment included:

- Identification of watercourses, surface water catchments and springs;
- Identification of underlying geology and hydrogeology and connectivity to the Development;
- Assessment of topography and slope to inform drainage patterns;
- Collation of data provided through consultation, including details on PWS and their sources;
- Assessment of flood risk data and mapping; and
- Assessment of potential for the presence of GWDTEs.

26. The following sources of information were used to inform the desk-based assessment:

- The Ordnance Survey (OS) 1:50,000 (Digital);
- OS 1:25,000 Map (Digital);
- National River Flow Archive (NRFA)[27];
- SEPA Flood Map 2019[28];
- Meteorological Office Rainfall Data[29];
- Scotland's Environment web-based maps[30]; and
- The British Geological Survey (BGS) GeoIndex onshore geology viewer[31].

[27] Centre for Ecology and Hydrology (undated) National River Flow Archive [Online] Available at: http://nrfa.ceh.ac.uk/ [Accessed 25/03/2021].
[28] SEPA (2019) Flood Maps [Online] Available at: http://map.sepa.org.uk/floodmap/map.htm [Accessed 25/03/2020]
[29] Met Office (2019) Climate Data [Online] Available at: http://www.metoffice.gov.uk/public/weather/climate [Accessed 24/03/2021].
[30] Scotland's Environment (n.d.) [Online] Available at: https://www.environment.gov.scot/legal/terms-and-conditions/ [Accessed: 24/03/2021]
[31] BGS (2019) GeoIndex Onshore [Online] Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html [Accessed 24/03/2021].

10.3.6.2 Consultation

27. In addition to the Scoping consultation outlined in Section 10.3.1. The following consultees were contacted to inform the hydrology, hydrogeology, and PWS assessment:

- The Council Environmental Health Officer (EHO) via email to obtain information on registered PWS within the PWS Study Area; and
- Residents and owners of properties which are identified as being supplied by a PWS to obtain information on the source and supply of the PWS (as detailed in Technical Appendix A10.2).

28. Further information on this consultation is provided as part of the PWSRA in Section 10.4.7 and Technical Appendix A10.2.

10.3.6.3 Site Walkover

29. A site walkover was conducted on 18th August 2020 to visually inspect surface water features, obtain an understanding of the local topography and drainage patterns and to ground-truth the information reviewed and collated in the desk-based assessment.

30. The site walkover focussed on hydrological receptors within the Core Study Area. Specifically, surface hydrology, hydrogeology and GWDTEs. The findings of the site walkover are detailed in Sections 10.4.3, Section 10.4.4 and Section 10.4.5, respectively.

31. Properties identified as being supplied by a PWS were visited between 17th August 2020 and 23rd September 2020, with a further visit on 21st October 2020. The PWS site visit is conducted to confirm the information provided by residents during the consultation process, obtain further information where required and identify the source and related infrastructure of the PWS, if possible.

10.3.7 Methodology for the Assessment of Effects

32. The significance of the potential effects of the Development has been classified by professional consideration of the sensitivity of the receptor and the magnitude of the potential effect.

33. The assessment follows the systematic approach outlined in **Chapter 4: EIA Methodology**.

34. The methodology outlined in Sections 10.3.7.1 to 10.3.7.3 has been developed by Arcus in consultation with SEPA, NatureScot (formerly SNH), Marine Scotland, Forestry and Land Scotland and various Councils across Scotland. The assessment is based on a source-pathway-receptor methodology, where the sensitivity of the receptors and the magnitude of potential change upon those receptors identified within the study areas outlined in Section 10.3.4.

10.3.7.1 Sensitivity of Receptors

35. The sensitivity of the baseline conditions – including the importance of environmental features on or near to the Site, or the sensitivity of potentially affected receptors – will be assessed in line with best practice guidance, legislation, statutory designation assessment guidance[32] and / or professional judgement.

36. Table 10.2 details the framework for determining the sensitivity of receptors.

Table 10.2 Framework for Determining Sensitivity of Receptors

Sensitivity of Receptor	**Definition**
Very High	• A large, medium or small waterbody with a SEPA water quality classification of 'High'. • The hydrological receptor is used for recreational use (e.g. bathing waters). • The hydrological receptor and downstream environment has no capacity to attenuate natural fluctuations in hydrochemistry and cannot absorb further changes without fundamentally altering its baseline characteristics / natural processes. • Local groundwater constitutes a valuable resource because of its high quality and yield. Aquifer classified by the British Geological Survey (BGS) as 'highly productive aquifer' and is of regional importance. Statutorily designated nature conservation sites dependent on groundwater. • Groundwater vulnerability class 5: vulnerable to most pollutants, with rapid impact in many scenarios. • The hydrological receptor will support abstractions for public water supply or private water abstractions for the production of mass-produced food and drinks. • The hydrological receptor will support abstractions for any public water supply, or private water abstractions which supply more than 25 people and / or 100 livestock (at any given point in the year) and / or is used for the mass-production of food and drinks. • Groundwater dependent terrestrial ecosystems (GWDTEs) which are classified by SEPA as "highly groundwater dependent" and are have no (<1 %) functional impairment by man-made influence (such as drainage or forestry). • The hydrological receptor is of high environmental importance or is designated as European or international importance, such as a Special Area of Conservation (SAC), Special Protections Areas (SPA) or Wetland of International Importance (Ramsar) with an Assessed condition of 'Favourable'. • The receptor acts as an active floodplain or other flood defence, in accordance with SPP 2014.

[32] NatureScot (2019) [Online] Available at: https://www.nature.scot/professional-advice/planning-and-development/environmental-assessment/habitats-regulations-appraisal-hra [Accessed 24/03/2021].

Sensitivity of Receptor	Definition
High	• Land use is highly sensitive to hydrological change (e.g. peat and blanket bog). • A large, medium or small waterbody with a SEPA water quality classification of 'Good'. • A Site of Special Scientific Interest (SSSI) or hydrological receptor is of high environmental importance designated as European or international importance, such as a Special Area of Conservation (SAC), Special Protections Areas (SPA) or Wetland of International Importance (Ramsar) with an Assessed condition of 'Unfavourable'. • The hydrological receptor and downstream environment has limited capacity to attenuate natural fluctuations in hydrochemistry and cannot absorb further changes without fundamentally altering its baseline characteristics / natural processes. • Aquifer of local importance. Groundwater body is classified by the BGS as a 'moderately productive aquifer', with moderate yield from secondary fractures and near-surface weathering. Exploitation of local groundwater is not far-reaching. Local areas of nature conservation known to be sensitive to groundwater effects. • Groundwater vulnerability class 4a – 4b: vulnerable to those pollutants not readily adsorbed or transformed. • The hydrological receptor supports abstractions for private water supply for up to 25 people and / or 100 livestock (at any given point in the year). • GWDTEs which are classified by SEPA as "highly groundwater dependent" have minor (1 - 25 %) functional impairment by man-made influence (such as drainage or forestry). • The hydrological receptor is designated as national environmental importance, such as a Site of Special Scientific Interest (SSSI) and National Nature Reserves (NNR). • The receptor is located within an active flood plain, in accordance with SPP 2014.
Medium	• Land use is moderately sensitive to hydrological change (e.g. commercial forestry). • A large, medium or small waterbody with a SEPA water quality classification of 'Moderate'. • The hydrological receptor and downstream environment will have moderate capacity to attenuate natural fluctuations in hydrochemistry but cannot absorb certain changes without fundamentally altering its baseline characteristics / natural processes. • Aquifer of limited value (less than local) and is classified by the BGS as a 'low productivity aquifer' as water quality does not allow potable or other quality sensitive uses. Exploitation of local groundwater is not far-reaching. Local areas of nature conservation known to be sensitive to groundwater effects. • Groundwater vulnerability class 2-3: vulnerable to some pollutants. • GWDTEs / wetlands which are classified by SEPA as "highly groundwater dependent" but have moderate (25 % - 50 %) functional impairment by man-made influence (such as drainage or forestry). • GWDTEs which are classified by SEPA as "moderately groundwater dependent" have no functional impairment by man-made influence (such as drainage or forestry). • The hydrological receptor does not act as an active floodplain or other flood defence but is considered to provide some degree of natural flood management (e.g. peat soils). • The hydrological receptor is of local environmental importance (such as Local Nature Reserves (LNR)).

Sensitivity of Receptor	Definition
Low	• Land use not sensitive to change in hydrological regime (e.g. intensive grazing). • The hydrological receptor is not used for recreational use. • A large, medium or small waterbody with a SEPA water quality classification of 'Poor' or 'Bad'. • The hydrological receptor and downstream environment will have capacity to attenuate natural fluctuations in hydrochemistry but can absorb any changes without fundamentally altering its baseline characteristics / natural processes. • Poor groundwater quality and / or very low permeability make exploitation of groundwater unfeasible. Changes to groundwater not expected to affect local ecology. • Groundwater vulnerability class 1: vulnerable to conservative pollutants. • The hydrological receptor does not support abstractions for public water supply or private water abstractions. • GWDTEs which are classified by SEPA as "highly groundwater dependent" but have major (>50%) functional impairment by man-made influence (such as drainage or forestry). • GWDTEs which are classified by SEPA as "moderately groundwater dependent" but have functional impairment by man-made influence (such as drainage or forestry). • GWDTEs which are classified by SEPA as "highly or moderately groundwater dependent" but are ombrotrophic. • The hydrological receptor does not act as an active floodplain or other flood defence. • The hydrological receptor is not of regional, national or international environmental importance. • The hydrological receptor is not designated for supporting freshwater ecological interest.
Negligible	The receptor is resistant to change and is of little environmental value.

10.3.7.2 Magnitude of Effect

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

38. The criteria for assessing the magnitude of an effect are presented in Table 10.3.

Table 10.3 Framework for Determining Magnitude of Effects

Magnitude of Effects	Definition
High	• A short or long-term major shift in hydrochemistry or hydrological conditions sufficient to negatively change the ecology of the receptor. This change will equate to a downgrading of a SEPA water quality classification by two classes e.g. from 'High' to 'Moderate'. • A sufficient material increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water (in accordance with SPP). • A major (greater than 50 %) or total loss of a geological receptor or peat habitat site, or where there will be complete severance of a site such as to fundamentally affect the integrity of the site (e.g. blocking hydrological connectivity). • A major loss of (greater than 50 % of study area) or total loss of highly dependent and high value GWDTE, or where there will be complete hydrological severance which will fundamentally affect the integrity of the feature. • A major permanent or long-term negative change to groundwater quality or available yield. • A major permanent or long-term negative change to geological receptor, such as the alteration of pH or drying out of peat. • Changes to groundwater quality or water table level that will negatively alter local ecology or will lead to a groundwater flooding issue.
Medium	• A short or long term non-fundamental change to the hydrochemistry or hydrological environment, resulting in a change in ecological status. This change will equate to a downgrading of a SEPA water quality classification by one class e.g. from 'High' to 'Good.' • A moderate increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water (in accordance with SPP). • A loss of part (approximately 5 % to 50 %) of a geological receptor or peat habitat site, major severance, major effects to its integrity as a feature, or disturbance such that the value of the site will be affected, but could still function. • A loss of part (approximately 10 % to 50 % of study area) of a moderately dependent and moderate value GWDTE – significant hydrological severance affects the integrity of the feature, but it could still function. • Changes to the local groundwater regime that may slightly affect the use of the receptor. • The yield of existing PWS may be reduced or quality slightly deteriorated. • Fundamental negative changes to local habitats may occur, resulting in impaired functionality.

Magnitude of Effects	Definition
Low	• A detectable non-detrimental change to the baseline hydrochemistry or hydrological environment. This change will not result in a downgrading of the SEPA water quality classification. • A marginal increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water (in accordance with SPP). • A detectable but non-material effect on the receptor (up to 5 %) or a moderate effect on its integrity as a feature or where there will be a minor severance or disturbance such that the functionality of the receptor will not be affected. • A detectable effect on a GWDTE (loss of between 5 % - 10 % of study area) or a minor effect on a GWDTE's integrity as a feature or where there will be a minor severance or disturbance such that the functionality of the receptor will not be affected. • Changes to groundwater quality, levels or yields do not represent a risk to existing baseline conditions or ecology.
Negligible	• No perceptible changes to the baseline hydrochemistry or hydrological environment. • No change to the SEPA water quality classification. • No increase in the probability of flooding onsite and offsite. • A slight or negligible change from baseline condition of geological resources. • Change hardly discernible, approximating to a 'no change' in geological condition. • Minimal detectable effect on a GWDTE (between to 0.1 % - 5 % of study area) or no discernible effect on its integrity as a feature or its functionality.

10.3.7.3 Significance of Effect

39. The sensitivity of the asset and the magnitude of the predicted effects will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects. Table 10.4 summarises guideline criteria for assessing the significance of effects. Effects predicted to be of major or moderate significance are considered to be 'significant' in the context of the EIA Regulations, and are shaded in light grey in the table.

Table 10.4 Framework for Assessment of the Significance of Effects

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

10.3.8 Assessment Limitations

40. Due to COVID-19 pandemic restrictions and absence of resident's agreement to undertake surveys, not all properties with PWS could be visited to verify desk studies and previous assessments. Given the extensive consultation and previous data sources / assessments, as outlined in Technical Appendix A10.2: PWSRA, it is considered that there is sufficient information to assess the risk to these supplies.

41. No intrusive works have been undertaken to date and therefore the exact locations of geological fault lines cannot be verified, as such the BGS mapping (1:10,000 scale) has been used to site located infrastructure away from linear geological features.

42. All other data considered necessary to identify and assess the potential significant effects resulting from the Development was available and was used in the assessment reported in this Chapter.

10.3.9 Embedded Measures

43. Embedded measures are set out within the WCEMP (provided as Appendix A10.1) which sets out specific measures which relates to this Development. They comprise good practice methods and works that are established and effective measures to which the Developer will be committed through the development consent.

44. Although the WCEMP is draft and will evolve to take account of consultee feedback and detailed design, there is sufficient confidence in the effectiveness of the measures set out in the WCEMP for them to be treated as part of the Development for the purposes of this assessment. Measures and procedures outlined in the WCEMP will be adopted and incorporated into a single working document to be agreed with statutory consultees and the planning authority following consent by way of an appropriately worded planning condition. For ease of reference through this Chapter, reference to specific sections in the WCEMP, detailing the appropriate embedded mitigation measures, are provided.

45. Accordingly, the identification of likely significant effects from the Development is considered following implementation of the measures in Appendix A10.1: WCEMP.

46. The WCEMP describes water management measures to control surface water run-off and drain hardstandings and other structures during the construction and operation of the Development. Additionally, a Pollution Prevention Plan (PPP) to be implemented for the Development. The measures discussed in the WCEMP are inherently part of all wind farm development design and should be treated as embedded mitigation.

47. This approach has withstood legal review on all hydrology EIA work undertaken by Arcus and has received positive comments from consultees for proposing appropriate embedded mitigation on a project specific basis.

48. A buffer distance of 50 m has been established between watercourses and Development infrastructure. Whilst the borrow pit location north of T5 is within 50 m of Courhope Burn, no stone winning will occur within 50 m of the watercourse.

49. A buffer zone distance of 250 m has been established from turbine bases and groundwater abstractions via boreholes, in accordance with LUPS-GU31. Beyond this, the separation of construction ground-works from watercourses has been maximised.

50. The 250 m buffer from turbine bases and boreholes, and the 50 m buffer zone of watercourses, in conjunction with the measures set out in the WCEMP will be sufficient to avoid potential effects on the hydrological and hydrogeological resource, as their effectiveness has been demonstrated on several wind farm construction sites for which Arcus have provided technical advice.

51. The conclusions of the assessment, therefore, state whether the residual significance will be major, moderate, minor or negligible, once appropriate mitigation (beyond measures specified in the WCEMP) has been implemented. This assessment relies on professional judgement to ensure that the effects are appropriately assessed.

52. A residual effect is considered to be a likely significant effect in accordance with the EIA Regulations if assessed as moderate or major following the preceding methodology.

53. The existing network of access tracks which serve the forestry operations within Cloich Forest have been utilised, where possible, limiting the requirement to disturb peaty soils

and limit felling operations to access the Development. Where new access tracks are required they have been designed to avoid crossing watercourses, where possible. Further description of this is provided in **Chapter 13: Forestry** and in Section 3 of Appendix A10.1: WCEMP.

54. Good practice will be followed in all aspects of construction, operation and decommissioning, specifically through a PPP, which will be incorporated into a full WCEMP as required to be submitted as part of a Construction Site Licence, to be agreed with SEPA prior to the construction phase. As the Development will be subject to a Construction Site Licence, for which a site-specific PPP and incident response plan will be detailed by the Construction Contractor.

55. The PPP will set out measures to be employed to avoid or mitigate potential effects for all phases of the Development, and will also include an Incident Plan to be followed should a pollution event occur. This plan will be produced following consultation and agreement with SEPA and all appropriate personnel working on the construction site will be trained in its use. The Construction Project Manager will have specific responsibility for implementation of the PPP.

56. Method statements will also be applied, which will follow the principles laid out in relevant SEPA Pollution Prevention Guidelines.

10.4 BASELINE CONDITIONS

10.4.1 Topography and Land Use

57. The Core Study Area is a commercial Forestry and Land Scotland (FLS) forestry site at Cloich Forest, located on the Cloich Hills. The Core Study Area has large areas of coniferous woodland plantation and improved grassland, and small areas of dry heathland, acid grassland bracken, as outlined in Figures 7.1a and 7.1b and discussed in greater detail in **Chapter 7: Ecology**.

58. The Core Study Area occupies an undulating upland area with elevated crags (non-rocky) and wet bog in lower areas. A topographic high of 476 m above ordnance datum (AOD) (Crailzie Hill) is located to the south of the Core Study Area with the site sloping to 300 m AOD at the south eastern extent and to 260 m AOD at the south western extent of the Core Study Area. The centre of the Site rises to 462 m AOD (Ewe Hill), 463 m AOD (Whaup Law) and 464 m AOD (Peat Hill). This results in a topographic low between Crailzie Hill and Ewe Hill where the Flemington Burn and Courhope Burn drain from. The Core Study Area falls to 280 m AOD in the north where Cowieslinn Burn originates.

59. The Site is bound to the west, south, and east by sloping rough grassland and mixed farmland as shown in Plate 01.

Plate 01: Sloping rough grassland and mixed farmland in the north and east NGR 322544 649724


60. There are a number of existing tracks within the Core Study Area associated with the forestry plantation, as shown in Plate 02.

Plate 02: Existing forestry tracks and watercourse crossings (various locations) 321275 648145, 320695, 645875 (looking west) and 320385, 646005 (looking southeast)



61. The main access track to the north east in the Early Burn valley is through mixed farmland and largely utilises an existing forestry track running within the Core Study Area.

62. Extensive clear felling has occurred in the southern section of the Core Study Area, as shown in Plate 03.

Plate 03: Clear felling of forestry in southern section of Core Study Area NGR 320520, 645975 (looking west)

63. Drainage channels were observed within the forested areas in the central section of the Core Study Area (Courhope Burn catchment), as shown in Plate 04.

Plate 04: Forestry drainage channels in central section of Core Study Area NGR 319955, 646755 (looking east)

64. Watercourses and their associated wider catchments are outlined in Table 10.6.

10.4.2 Climate

65. The closest SEPA gauging station[33] to the Development is on the Lyne Water at Lyne Station (Station 21018), which is located at National Grid Reference NT 209400, approximately 5 km to the south of the Core Study Area.

66. The station is located at an elevation of 168 m AOD, upstream and within the same wider catchment (River Tweed) as the Core Study Area. The Average Annual Rainfall (AAR 1961 – 1990) is recorded as ranging from 900.1 – 1,100 mm across the Core Study Area. Table 10.5 summarises the average annual rainfall for the Lyne Water.

67. Precipitation data from the Meteorological Office[34] is reviewed for the nearest climate station to the Development. The nearest climate station to the Development is located at Penicuik, approximately 10 km to the north of the Core Study Area. The climate station at Penicuik provided an average annual rainfall in the standard period (1981 – 2010) as 980.3 mm.

Table 10.5 Average rainfall for Lyne Water

Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Av. precipitation (mm)	100.4	73.4	73.5	59.1	65.3	76.2	80.4	80.4	83	105.8	92.1	90.7

10.4.3 Surface Hydrology

68. The Core Study Area lies within the catchments of the Lyne Water and Eddleston Water. A number of named and unnamed watercourses rise within the Core Study Area and flow south and west into the Lyne Water and east into the Eddleston Water. Courhope Burn and Fingland Burn join the Flemington Burn, which along with the How Burn and Lyne Burn all discharge to the Lyne Water and eventually the River Tweed approximately 5 km to the south of the Site. The Middle Burn, Cowieslinn Burn, Shiplaw Burn, Meldon Burn and Harehope Burn, Stewarton Burn and Wormiston Burn all discharge into the Eddleston Water which joins the River Tweed in Peebles, approximately 6 km southeast of the Core Study Area.

69. An unnamed tributary of Courhope Burn drains from north to south in the central section of the Site Boundary,) as shown in Plate 05.

[33] SEPA (2020) Water Level Data [Online] Available at: https://www2.sepa.org.uk/WaterLevels/ [Accessed 24/03/2021].
[34] Meteorological Office Climate Averages [Online] Available at http://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcvtwetn8 [Accessed 24/03/2021].

Plate 05: Historical crossing of Muirhope Burn NGR 320220, 646705 looking north

70. Figure 10.2 shows the main watercourses and their catchments, derived from GIS pour point analysis, using 1 m LIDAR data. The Lyne Water flows north west to south east approximately 1.5 km south west of the Core Study Area. The Eddleston Water flows north to south approximately 450 m west of the Core Study Area. The main access track to the Site is located within the Eddleston Water catchment.

71. As shown in Table 10.6, the Eddleston Water has a SEPA overall classification of 'Poor', while the Meldon Burn, Harehope Burn and Flemington Burn are classified by SEPA as having an overall classification of 'Good'. The Lyne Water is classified as two sections, from source to confluence with the Tarth Water as 'Moderate', from Tarth Water to confluence with the River Tweed as 'Good'.

72. Flemington Burn displays morphology that is relatively typical of dendritic drainage network watercourses, which are steeper in their upper reaches and become increasingly flatter as they progress down slope, as shown in Plate 06.

Plate 06: Flemington Burn at NGR 318365, 646237 and 317139, 645491 downstream of the Core Study Area

73. There are several named and unnamed watercourses within the Core Study Area that discharge either south or west into the Lyne Water and east into the Eddleston Water.

74. The turbines and associated infrastructure (such as crane pads, new access tracks and construction compound) are located within Courhope Burn, Flemington Burn, Shiplaw Burn and Middle Burn catchments. The upgraded access track is located in the Eddleston Water and tributary Shiplaw Burn catchments.

Table 10.6 Development Catchments

Primary Catchment	Catchment	Sub-catchment
River Tweed	Lyne Water	Courhope Burn
		Fingland Burn
		Flemington Burn
		Lyne Burn
	Eddleston Water	Cowieslinn Burn
		Early Burn
		Middle Burn
		Shiplaw Burn
		Stewarton Burn / Wormiston Burn
		Meldon Burn / Harehope Burn

75. Plate 07 shows Courhope Burn in the Lyne Water catchment, in the east of the Core Study Area and approximately 34 m distance from the existing site access track. Shallow waters approximately 1 m wide and <10 cm depth, however there is some evidence of spate on its banks. The riverbed was observed to consist of gravel and pebbles, with clear running water and no signs of discolouration.

Plate 07: Courhope Burn, East of the Core Study Area at NGR 321092 647467

76. Plates 08 and 09 shows Courhope Burn in the Lyne Water catchment, southeast of the Core Study Area. Upstream of disused track, existing culvert / watercourse crossing. The watercourse was observed to be fast flowing and drops steeply from this point.

Plate 08: Watercourse crossing at Courhope Burn, South West of Core Study Area at NGR 319245 646007

Plate 09: Existing watercourse crossing of Courhope Burn at NGR 320410 646358

77. An existing watercourse crossing of a moderate to fast flowing unnamed watercourse was observed at centre of Core Sudy Area, situated approximately 125 m north from the existing access track to serve wind turbines 2 to 5. The watercourse crossing is covered by varying areas of coniferous woodland plantation and improved grassland, and small areas of dry heathland, acid grassland bracken.

78. An unnamed tributary of Stewarton Burn was observed within a steeply incised channel draining from north to south at NGR 320789 647894, as shown in Plate 10. Flow was observed to be fast in the headwaters of the watercourse, suggesting limited infiltration in this section of the Core Study Area, which corelates with limited peat depths in the catchment.

Plate 10: Unnamed tributary of Stewarton Burn, draining north to south NGR 321115, 645980 (looking southeast)

10.4.4 Hydrogeology

79. The groundwater units underlying the Core Study Area are identified by Scotland's Environment mapping service as the Peebles, Galashiels and Hawick groundwater unit[35]. These units have an overall SEPA classification of 'Good'.

80. The solid geology underlying the Core Study Area consists of Kirkholm Formation, with a large area of Portptrick Formation to the South of the CSA, There is a small area of Moffat Shale Group at the South-eastern boundary line of the CSA and South-south-west of the CSA. The solid geology underlying the CSA is illustrated in Figure 10.3.

81. BGS 1:625,000 digital mapping and the BGS GeoIndex shows the bedrock aquifer underlying the majority of the Core Study Area to consist of greywackes (sedimentary rocks) of the Kirkcolm Formation, Moffat Shale Group, and Portpatrick Formations. These rocks are classified by the BGS as a "low productivity aquifer" with small amounts of groundwater in the near-surface weathered zone and secondary fractures[36].

82. Peat probing exercises showed peat depths to be consistent throughout the Site, with depths largely between 0.00 and 0.50 m, some instances of depths up to 1 m, and limited, isolated depths of up to 4.60 m in the eastern section of the Core Study Area (See **Chapter 9: Geology, Ground Conditions and Peat**). The average peat depth was recorded as 0.26 m, with 92.5% of probes recording peat depths of 0.5 m or less. Table 10.7 summarises the peat depth findings.

Table 10.7 Peat Survey Summary

Peat Depth Range (m)	No of peat probes	Percentage of Total (%)
0 – 0.50	1,000	92.5
0.51 – 1.00	50	4.6
1.01 – 1.50	12	1.1
1.51 – 2.00	8	<1.0
2.01 – 2.50	3	<1.0
2.51 – 3.00	0	0
3.01 – 3.50	4	<1.0
3.51 – 4.00	0	0
4.01 – 4.50	1	<1.0

83. The bedrock groundwater units are overlain by till and peat superficial deposits for the majority of the Core Study Area, as shown in Figure 10.4. These deposits are largely impermeable and significantly restrict the vertical flow of water. Superficial deposits are less prominent in the east and centre of the Core Study Area where steeper topography and higher ground is present.

84. The bedrock outcrops are overlain by thick (>0.5 m) peat deposits except in areas of steeper topography to the north-east of Sithean an Radhairc hill, where small groundwater springs and flushes are evident.

85. The BGS groundwater vulnerability[37] ranges between 4a to 5 defining the underlying rocks as vulnerable to pollutants not readily adsorbed.

[35] SEPA (undated) Groundwater classification [Online] Available at: https://map.environment.gov.scot/sewebmap/ [Accessed: 24/03/2021].
[36] BGS (2019) Hydrogeology 1:625,000 scale map [Online] Available at: http://mapapps2.bgs.ac.uk/geoindex/home.html [Accessed: 24/03/2021].
[37] BGS (2015) Groundwater Vulnerability (Scotland) GIS dataset, Version 2 [Online] Available at: http://nora.nerc.ac.uk/id/eprint/509618/1/OR15002.pdf [Accessed: 24/03/2021].

86. Groundwater vulnerability classes range from 1 to 5, with 5 being most vulnerable. Class 4 is subdivided into 4a and 4b. It is the hydrogeological characteristics within the pathway rather than the 'importance' of a particular aquifer that results in the final vulnerability classification. The methodology behind the classification assumes that where contaminants move through unsaturated fractured bedrock, no attenuation of pollutants can take place. Large parts of Scotland show areas of Classes 4 and 5, reflecting the widespread occurrence of rocks dominated by fracture flow. Rocks which are not exposed at the surface and are overlain by superficial deposits have a reduced potential for attenuation of contaminants.

10.4.4.1 Borehole Records

87. A borehole record at Darnhall Mains, Eddleston, located approximately 2.5 km east of the Core Study Area, is sunk to 15 m depth (available on BGS GeoIndex[38].), indicating a resting water level between 0.68 m below ground level (BGL) and 1.11 m BGL.

10.4.5 Groundwater Dependent Terrestrial Ecosystems

88. GWDTEs are specifically protected under the Water Framework Directive, and are sensitive receptors to the pressures that are potentially caused by the Development.

89. In accordance with SEPA guidance[39] a Phase 1 Habitat Survey was undertaken in September 2019 and June 2020, to identify wetland habitats occurring within the Core Study Area. Wetland habitats were identified in line with the criteria outlined in 'A Functional Wetland Typology for Scotland' (SNIFFER, 2009[40]). Where wetland habitats were identified in the Phase 1 Habitat Survey, further detailed habitat assessment was undertaken, with identification of National Vegetation Classification (NVC) communities. The survey methods employed for this assessment are outlined in **Chapter 7: Ecology** and Technical Appendix A7.1.

90. NVC Communities M23 and M25 (Phase 1 Habitat Survey code B5 Marsh/marshy grassland) were the most common habitat on the open-ground across the plantation within the Site.

91. There are smaller areas of potentially groundwater dependent communities identified in areas of lower lying topography where surface water and near-surface water drain and pool, and are considered to be fed by rain, surface run-off and near-surface throughflow. The hydrogeology unit outlined in Section 10.4.4 defines the groundwater unit (aquifer) as 'low productivity' underlying the majority of the Core Study Area, with small amounts of groundwater in the near-surface weathered zone and secondary fractures. The bedrock unit is overlain by relatively impermeable till (glacial) deposits and extensive areas of peat soil which is likely to significantly restrict the vertical flow of groundwater.

92. As shown in Table 10.9, small areas of M23 communities were identified north of the Core Study Area. Specifically, along the north-northwest Site Boundary, and the Middle Burn, which flows through forestry (coniferous woodland plantation) to the north-northeast of the Site Boundary. Some forest rides in the northern area of the Core Study Area have also been identified to support species-rich rush-pasture areas of M23. Other intermittent patches of M23 communities were along the access routes to the northeast of the Core Study Area, specifically at the confluence of the Early Burn and several unnamed tributaries which flow northeast before joining the Shiplaw Burn, as shown in

[38] BGS (undated) GeoIndex [Online] Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html [24/03/2021].
[39] SEPA (2017) Land Use Planning System Guidance Note 31. Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Version 3 [Online] Available at: https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf [Accessed: 24/03/2021].
[40] SNIFFER (2009) WFD95 A Functional Wetland Typology for Scotland Field Report 2009 [Online] Available at: https://www.sniffer.org.uk/wfd95-a-functional-wetland-typology-for-scotland [Accessed: 24/03/2021].

Table 10.9. As discussed in **Chapter 7: Ecology**, these areas are observed to be ombrotrophic (fed by rainwater) and therefore have a low groundwater dependency.

93. Less prominent superficial deposits in the east and centre of the Core Study Area are present in conjunction with steeper and higher topography. Areas of species rich M23, containing soft rush and purple moor-grass are present near Courhope. These habitats are identified in areas of north raised topography, fed by rain water (ombtotophic), and where nearby unnamed tributaries and near-surface water drains into Courhope Burn. On this basis these small areas of M23:M25 have little groundwater dependency.

94. As discussed in **Chapter 7: Ecology**, an area of M23:M25 has been identified at National Grid Reference NT 20863 46105 and has been treated as a GWDTE on a precautionary basis due to its proximity to a private water supply. However, as demonstrated in Table 10.9, this area is not situated within the Development infrastructure buffer in accordance with SEPA's Land Use Planning System Guidance Note 31. On this basis there is no significant impact anticipated on the aforementioned GWDTE communities.

95. As noted in Table 10.8, a small area of M6 (Phase 1 Habitat Survey code E2.1) was identified within the central area of the Core Study Area near Courhope. M6 communities are listed as having high groundwater dependency, however as per **Chapter 7: Ecology**, no floristic elements suggested base-enrichment derived from groundwater. Additionally, the area in question is not located within a Site Infrastructure buffer.

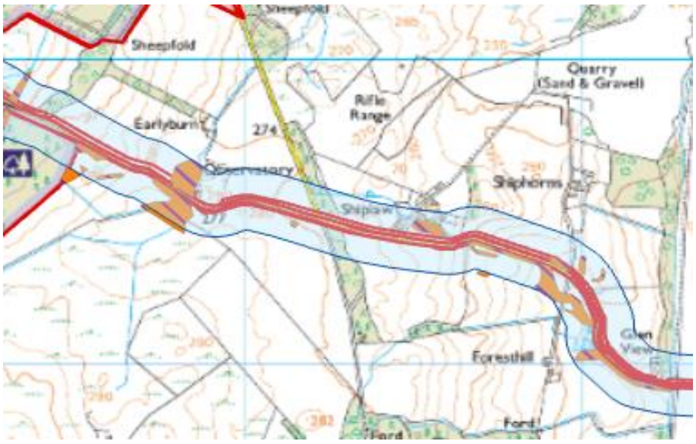
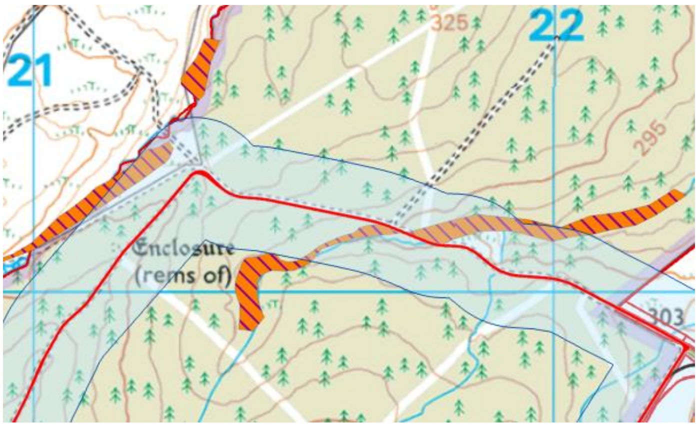
96. The NVC communities have been identified by the surveyor to have the potential to be moderately or highly groundwater dependent GWDTE, outlined in Table 10.8.

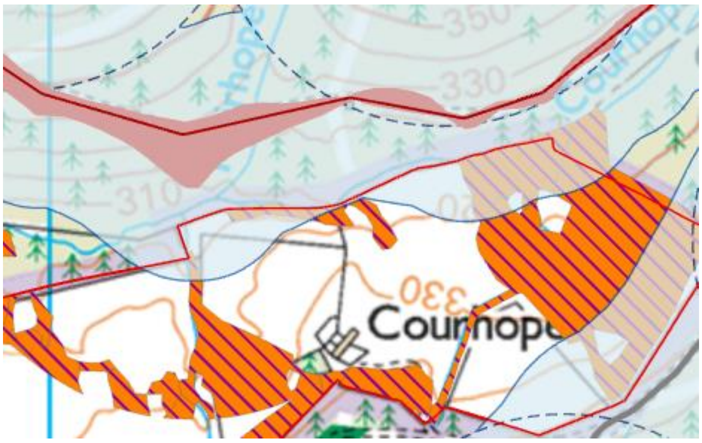
Table 10.8 Potential GWDTE communities

Recorded NVC Community	Groundwater dependency potential (according to SEPA LUPS-GU31)	Location and total coverage (% of Core Study Area)
M23:M25 (Species-rich rush-pasture, supporting sharp-flowered rush species (*Juncus acutifloris),* soft rush species (*Juncus effusus*) and (soft rush and Purple moor-grass (*Molinia caerulea*) dominated vegetation.	High Groundwater Dependency Potential (M23) and Moderate Groundwater Dependency Potential (M25)	Small isolated areas north of the Core Study Area. Specifically, Site Boundary (NNW), the Middle Burn and within coniferous forestry rides. Small isolated areas along the Eastern access track of the Core Study Area and at the confluence of the Early Burn, unnamed tributaries and Shiplaw Burn. Very small isolated areas present to the south east of the Core Study Area, adjacent to Stewarton House. Coverage of Core Study Area: 0.27 km^2 Total = 2.45% of Core Study Area.
M6 Flush/spring – acid/neutral. Mix of rushes with *Sphagnum*	High Groundwater Dependency Potential	Small areas of acid flush southwest of Courhope Farm. Coverage of Core Study Area: 0.0012 km^2 Total = 0.11% of Core Study Area.

97. Table 10.9 shows the location of the wetland habitats in relation to the Development infrastructure, as identified from the Phase 1 Habitat and National Vegetation Classification (NVC) surveys, in accordance with SNIFFER guidance and as required by SEPA.

Table 10.9 Potential of the Development to impact potential GWDTE communities

Recorded NVC Communities and buffer zone	**Location within the Site Boundary**	**Potential for impact from the Development**
M23 Marsh/marshy grassland Infrastructure buffer zone Existing track (subject to change) New Access track	Main access track situated northeast of the Core Study Area  	Upgrades to existing access track may obstruct water serving communities, or draw water from the area. Areas are observed to be ombrotrophic and therefore have a low groundwater dependency.
	Forest rides within coniferous plantation to the North of the Core Study Area and along the Middle Burn  	Upgrades to existing access track may obstruct water serving communities, or draw water from the area. Areas are observed to be ombrotrophic and therefore have a low groundwater dependency.

Recorded NVC Communities and buffer zone	**Location within the Site Boundary**	**Potential for impact from the Development**
	The centre of the Core Study Area near Courhope 	Upgrades to existing access track may obstruct water serving communities, or draw water from the area. Areas are observed to be ombrotrophic and therefore have a low groundwater dependency
	Location at NT 20863 46105, situated southwest of a private water supply 	This area is not situated within the Development infrastructure buffer and therefore no impact from the Development is anticipated.

10.4.6 Designated Hydrological Receptors

98. The statutory designated sites relating to water within the wider 10 km Study Area were identified through the use of NatureScot[41] and SEPA[42] GIS datasets. The statutory designations that are considered hydrologically connected to the Development are listed in Table 10.10. Statutory designations which were identified within the 10 km Study Area but were deemed not hydrologically connected to the Development are listed in Table 10.11, and have been scoped out of further assessment.

Table 10.10 Statutory Designated Sites hydrologically connected to the Development (within 10 km Study Area)

Designation	Approximate Distance from the Development	Qualifying Interest	Hydrologically Connected to the Development
River Tweed SAC	Access route crosses Eddleston Water, east of Signal Cottage.	Atlantic salmon (Salmo salar); Brook lamprey (Lampetra planeri); Otter (Lutra lutra); River lamprey (Lapetra fluviatilis). Favourable Maintained[43] condition.	Yes – The River Tweed runs alongside the south of the Core Study Area, and is connected via the Lyne Burn which drains into the Flemington Burn and several unnamed minor watercourses around the south west boundary of the Core Study Area.
River Tweed SSSI	5 km (S)	Atlantic salmon (Salmo salar); beetle assemblage; brook lamprey (Lampetra planeri), fly assemblage. Favourable Maintained[44] condition.	Yes – the River Tweed runs downstream of the Core Study Area, joins the Meldon Burn which splits into the Lyne Burn and Harehope Burn along with several minor unnamed watercourses towards the south of the Core Study Area.

Table 10.11 Statutory Designated Sites not hydrologically connected to the Development (within 10 km Study Area)

Designation	Approximate Distance from the Development	Qualifying Interest	Hydrologically Connected to the Development
Whim Bog SSSI	1.9 km (N)	Raised Bog	No – separated by river catchment boundary (Cowieslinn Burn).
Auchencorth Moss SSSI	3.5 km (N)	Raised Bog	No – separated by river catchment boundary (Cowieslinn Burn).
Black Burn SSSI	6.4 km (N)	Fen meadow; lowland acid grassland	No – upstream of the Development.

[41] SNH (2019) Natural Spaces [Online] Available at: http://gateway.snh.gov.uk/natural-spaces/index.jsp [Accessed 24/03/2021].
[42] SEPA (2019) Datasets [Online] Available at: https://www.sepa.org.uk/data-visualisation/water-classification-hub/ [Accessed 24/03/2021].
[43] https://sitelink.nature.scot/site/8369 - Atlantic salmon (Salmo salar); Brook lamprey (Lampetra planeri); Otter (Lutra lutra); River lamprey (Lapetra fluviatilis) [Online] Available at: https://sitelink.nature.scot/site/8369 [Accessed 24/03/2021]
[44] https://sitelink.nature.scot/site/1366 - Atlantic salmon (Salmo salar) and Brook lamprey (Lampetra planeri) [Online} Available at: https://sitelink.nature.scot/site/1366 [Accessed 24/03/2021].

Designation	Approximate Distance from the Development	Qualifying Interest	Hydrologically Connected to the Development
Dolphinton - West Linton Fens and Grassland SSSI	6.4 km (W)	Bryophyte assemblage; lowland calcareous grassland; valley fen	No – separated by the River Tweed.
Dundreich Plateau SSSI	5 km (E)	Blanket bog; subalpine flushes	No – separated by Eddlestone Water.
Gladhouse Reservoir SSSI & SPA	6.9 km (NE)	Pink-footed goose (non-breeding)	No – separated by Eddlestone Water.
Mount Bog SSSI	8.75 km (SE)	Basin fen; beetle assemblage	No – separated by the River Tweed.
Peeswit Moss SSSI & SAC	6.8 km (NE)	Active raised bog; degraded raised bog	No – separated by Eddlestone Water.
Moorfoot Hills SSSI	7.8 km (E)	Blanket bog; dry heaths	No – separated by Eddlestone Water.
Carlop Meltwater Channels SSSI	6.6 km (NW)	Geological (Quaternary of Scotland)	No – upstream of the Development.
North Esk Valley SSSI	7.5 km (NW)	Anthropoda (excluding insects and trilobites); Llandovery; Lowland acid grassland; valley fens	No – upstream of the Development.
Westwater Reservoir SSSI & SPA	8.4 km (NW)	Pink-footed goose (non-breeding); waterfowl assemblage (non-breeding)	No – upstream of the Development.

10.4.7 Private and Public Water Supplies

10.4.7.1 Public Water Supplies

99. Scottish Water confirmed there are no Scottish Water abstractions or Drinking Water Protected Areas (DWPA) in the area that may be affected by the Development, and as such Public Water Supplies are scoped-out of the assessment of potential effects.

10.4.7.2 Private Water Supplies

100. A total of 145 properties are identified to be supplied by private water supplies within the PWS Study Area, with a total of 68 sources. A list of the private water supply sources identified within the PWS Study Area is provided in Appendix A of Technical Appendix A10.2.

101. Private water supply sources as identified through the Council Environmental Health Officer (EHO) register are detailed in Table 8.1 of Appendix A of Technical Appendix A10.2. A total of 63 private water supply sources are registered with the Council, within the PWS Study Area. Three of these supplies were confirmed as being supplied by Scottish Water Mains during the consultation process.

102. An additional five private water supply sources as identified within the 2015 Private Water Supply Risk Assessment[45] and 2015 Hearing Statement Response[46] are listed in Table 8.2 of Appendix A of the PWSRA. One of the supplies is confirmed as being supplied by Scottish Water mains supply during the consultation process.

103. A further five private water supplies and sources identified during the mail shot resident consultation process, conducted in 2020 as part of this risk assessment, are listed in Table 8.3 of Appendix A of the PWSRA. The following PWS have the potential to be at risk from construction works associated with the Development:

- Earlyvale House;
- Upper Stewarton;
- Cloich Farm;
- Foresthill (Woodbank);
- Darnhall Mains (& Whitelawburn);
- Stewarton;
- Black Barony Home Farm;
- Earlyburn (Observatory);
- Shiplaw & Shiphorn; and
- Harehope A & B.

104. A detailed PWSRA is provided as Appendix A10.2 and a summary of the findings from the risk assessment are provided in Table 5.3 of the PWSRA.

10.4.8 Flood Risk

105. The Indicative River and Coastal Flood Map (Scotland)[47] produced by SEPA shows the areas of Scotland with a 0.5 % (1:200) or greater chance of flooding. These areas are known as medium to high-risk areas for flooding.

106. The SEPA Flood Map shows that minor isolated areas in the north of the Core Study Area are classified as having a 'High' and 'Medium' annual probability of flooding from surface water. Areas either side of the Flemington Burn, Courhope Burn and Middle Burn are also classed as having a 'High' annual probability of flooding.

107. Areas either side of the Cowieslinn Burn are classed as having a "High" and "Medium" annual probability of river flooding in any year.

108. The flood maps show flooding is restricted to the waterbodies and do not indicate widespread flooding across the Core Study Area.

10.5 SENSITIVITY OF RECEPTORS

109. The sensitivities of the identified receptors and their relationship to the potential effects from the construction of the Development, are outlined below in Table 10.12.

Table 10.12 Sensitivity of Receptors

Receptor	Potential Effects	Sensitivity	Sensitivity Description
Surface hydrology (watercourses)	Increased run-off, erosion and sedimentation, stream flow impediments and pollution as a result of construction groundworks and chemical handling and storage.	High	A large, medium or small waterbody with a SEPA water quality classification of 'High' or 'Good'.

[45] Wallingford HydroSolutions Limited (2015) Cloich Forest Wind Farm Private Water Supply Risk Assessment
[46] James Taylor (2015) Report and Response to: Hearing Statement on behalf of PfR on Consideration of Issues Relating to Private Water Supply by Dr Shaun Salmon, BSc
[47] Scottish Environment Protection Agency (SEPA) Flood Map [Online] Available at: https://map.sepa.org.uk/floodmap/map.htm [Accessed: 24/03/2021].

Receptor	Potential Effects	Sensitivity	Sensitivity Description
			The Lyne Water Catchment is classified as two sections between 'Moderate' and 'Good'.
Groundwater	Pollution as a result of erosion and sedimentation from construction activities and uncontained spills from chemical handling and storage.	High	Groundwater body is classified as a 'low quality aquifer'. Exploitation of local-groundwater is not far reaching. Local areas of nature conservation are thought to be sensitive to groundwater effects. Groundwater vulnerability is classified as 5 to 4a (high).
Near-surface Water	Diversion of near-surface flow as a result of track construction and the installation of turbine foundations / hardstanding.	High	Supports peaty soils
M23:M25 GWDTE (moderately groundwater dependent)	Pollution as a result of track construction and uncontained spills from chemical handling / storage. Changes to groundwater interflow patterns as a result of construction.	Low	GWDTEs which are classified by SEPA as "moderately groundwater dependent" but have functional impairment by man-made influence (such as drainage or forestry)
M23 GWDTE (highly groundwater dependent)	Pollution as a result of track use, uncontained spills from vehicles, chemical handling / storage. Drying out or changes to groundwater interflow patterns as a result of construction.	High	GWDTEs which are classified by SEPA as "highly groundwater dependent" have minor (1 -25 %) functional impairment by man-made influence (such as drainage or forestry).
Designated Hydrological Receptors (River Tweed SAC)	Increased run-off, erosion and sedimentation, stream flow impediments and pollution as a result of construction groundworks.	Very High	The hydrological receptor is of high environmental importance or is designated as European or international importance (Special Area of Conservation (SAC)) with an assessed condition of 'Favourable'.
Designated Hydrological Receptors (River Tweed SSSI)	Increased run-off, erosion and sedimentation, stream flow impediments and pollution as a result of construction groundworks.	High	A Site of Special Scientific Interest or hydrological receptor is of high environmental importance, with an Assessed condition of 'Favourable Maintained'.
PWS	Pollution as a result of track upgrades and uncontained	High[48]	The hydrological receptors support abstractions for

[48] Due to the number of receptors with different characteristics, High sensitivity has been used as a worst case scenario.

Receptor	Potential Effects	Sensitivity	Sensitivity Description
	spills from vehicles, and chemical handing/ storage. Drying out or changes to quantity as a result of upgrades to access track.		private water supply for up to 25 people and / or 100 livestock (at any given point in the year).

10.6 ASSESSMENT OF POTENTIAL EFFECTS

110. The potential effects of the Development on hydrological receptors have been considered for the construction, operation, and decommissioning phases. Effects occurring during construction and decommissioning are considered to be short-term effects, with those occurring as a result of the operational phase of the Development being considered to be long-term effects.

10.6.1 Potential Construction Effects

111. The nature and magnitude of effects that could result from construction activities, as described in **Chapter 3: Project Description**, are assessed in the following paragraphs, which includes:

- The upgrade of both existing access tracks from the operational forestry and the upgrade of existing public road for the construction of the Development; and
- Construction of new access tracks, turbines and associated infrastructure, watercourse crossings (including bailey bridge) hardstandings, borrow pits, substation, and temporary construction compounds for the Development.

10.6.1.1 Chemical Pollution

112. Potential effects involved with the management of construction are more a risk management issue, with the effects being assessed should the risk be realised. Should the Development proceed as described in **Chapter 3: Project Description** *i.e*. with no spills, there would be no effects.

113. Potential risks include the spillage or leakage of chemicals, fresh concrete, foul water, fuel or oil, during use or storage onsite. These pollutants have the potential to adversely affect soils, subsurface water quality, peat, surface water quality, and groundwater; and hence effects on the biodiversity of receiving watercourses.

114. The transportation, storage and use of potentially polluting chemicals at a windfarm is limited. The greatest use of such chemicals is of fresh concrete, used in foundations and hardstandings, which may be created on-site or transported onto site.

Surface Hydrology and Designated Hydrological Receptors

115. Watercourses could be at risk from a pollution incident during construction. Surface watercourses and surface water bodies are considered to be of high sensitivity.

116. Buffer distances between proposed construction works and watercourses have been implemented to reduce the potential for chemical pollutants to be transferred to the water environment. A 50 m buffer for natural watercourses from infrastructure (excluding watercourse crossings and access tracks) has been adopted. Micro siting of infrastructure should not encroach within the 50 m buffer except for access tracks and crossings.

117. Construction good practice methods, as outlined in Section 3 of Appendix A10.1: WCEMP, include the use of impermeable membranes and bunding of the construction compound which will safeguard water quality.

118. Measures such as absorbent spill pads / kits and other measures highlighted within the WCEMP, found in Section 3.3 of Technical Appendix A10.1, will effectively limit the uncontained release of chemicals to minor fugitive releases. These would be minimised through best practice construction methods such as vehicle speed limits and regular vehicle and machine maintenance. Routine training practices such as staff inductions and toolbox talks will be conducted throughout the construction phase of the Development. Information regarding staff training is detailed in the WCEMP.

119. Therefore, given the embedded measures detailed above, the magnitude of change on both watercourses and Designated Hydrological Receptors (High and Very High sensitivity) is considered to be Negligible. As the magnitude of change is negligible, and receptors range from High to Very High sensitivity, the effect of the Development on surface hydrology (in accordance with Table 10.4) is of Minor significance. This is **not significant** in terms of the EIA Regulations.

Groundwater and Near Surface Water

120. Pollutants coming into contact with bedrock also have the potential to indirectly alter the quality of the groundwater resource. pH and chemical alterations to groundwater are difficult to rectify due to the fractured nature of the rock and the lengthy attenuation and dispersal of chemicals.

121. As noted previously, due to the underlying hydrogeology consisting of a low productivity aquifer with small amounts of groundwater in the near surface weathered zone and secondary fractures, groundwater is unlikely to be present near the surface, meaning there is limited potential for pollutants to come into contact with groundwater.

122. Measures such as spill pads, impermeable geotextile membranes and measures described within the WCEMP (Appendix A10.1, Section 3.3) will effectively limit the uncontained release of chemicals to minor fugitive releases. Therefore, the magnitude of change on both groundwater, near surface water (High sensitivity) is considered to be Negligible. As the magnitude of change is Negligible, and receptors are of High sensitivity, the effects of the Development on groundwater and near surface water (in accordance with Table 10.4) is of Minor significance. This is **not significant** in terms of the EIA Regulations.

Private Water Supplies

123. The quality of some PWS within 100 m of excavations of less than 1 m depth (*e.g.* the Observatory) could be affected by chemical pollution during laying of load bearing surfaces on the existing public road.

124. Other PWS at greater distances are less likely to influenced by chemical pollution due to dilution and attenuation over distance.

125. Measures detailed in Section 3.6 of the WCEMP as detailed in the PWSRA will reduce the potential for the mobilisation of sediment. Given the proximity to Development infrastructure and the potential for High magnitude change a PWSRA is included as Technical Appendix A10.2 which details specific mitigation measures to be taken when working within the catchment of this PWS.

126. In the absence of specific mitigation the magnitude of change is considered to be High (i.e. a major permanent or long-term negative change to groundwater quality or available yield) on PWS of High sensitivity. This is of Major significance. This is **significant** in terms of the EIA Regulations.

127. Taking into account the mitigation proposed within the PWSRA, such as monitoring and the provision of an emergency standby alternative supply, effects on PWS, of High sensitivity, have the potential to be of Negligible magnitude and therefore (in accordance with Table 10.4) of Minor residual significance. This is **not significant** in terms of the EIA Regulations.

10.6.1.2 Erosion and Sedimentation

128. Erosion and sedimentation can occur from excavations, stone winning, ground disturbance and overburden stockpiling. Sediment entering watercourses has the potential to affect water quality, ecology and flood storage capacity.

Surface Hydrology and Designated Hydrological Receptors

129. Given the overland distance between construction areas and watercourses, as a result of the embedded buffers, any silt or other materials carried by overland flow as a result of construction are likely to be entrained in vegetation and existing drainage ditches before reaching watercourses.

130. Where the buffers are encroached by upgraded tracks, improvements to the public road, new access tracks, hardstanding, and load bearing surfaces, good practice construction measures will effectively prevent sediment entering watercourses e.g. adjacent to the proposed construction compound and the load bearing surface east of Early Burn (public road). Measures such as check dams, silt traps, settlement lagoons and buffer strips will minimise sedimentation and erosion; further details of these measures are detailed in the WCEMP (Section 3.2 of Technical Appendix A10.1).

131. Other SuDS measures, such as the use of settlement lagoons, swales and interception bunds, will effectively prevent sediment entering watercourses via drainage ditches adjacent to access tracks. As such, there will be limited potential for sediment or erosion effects on watercourses in the Core Study Area, including the hydrology and water quality of onsite watercourses. In addition, ditch blocking will be employed along heavily modified watercourses or ditches where the buffers are encroached to enhance the habitat and limit the potential of pollutants to be transferred to the wider hydrological network. Further details of these measures are found in section 3.1.5 of the WCEMP.

132. For these reasons, and the embedded mitigation detailed above, the magnitude of change on surface hydrology, including: watercourses (High sensitivity), and Designated Hydrological Receptors (Very High sensitivity), will be Negligible. As the magnitude of change is Negligible, and receptors range between High and Very High sensitivity, the erosion and sedimentation effects of the Development on surface hydrology (in accordance with Table 10.4) is of Minor significance. This is **not significant** in terms of the EIA Regulations.

Groundwater and Near Surface Water

133. Sediment also has the potential to change near surface water flow in superficial geology deposits and peaty soil characteristics by creating a physical barrier within naturally occurring drainage micropores. Sediment entering near-surface water in superficial deposits also has the potential to impact on groundwater quality within bedrock deposits /fissures.

134. Measures described in Section 3.3 of Technical Appendix A10.1: WCEMP, such as impermeable ground membrane layers and bunded areas, will effectively prevent sediment entering sub-surface water in superficial deposits (and groundwater) and peat. For these reasons, the magnitude of change on groundwater and near surface water will be Negligible. As the magnitude of change is Negligible, and receptors are of High sensitivity, the erosion and sedimentation effect of the Development on groundwater and near surface water (in accordance with Table 10.4) is of Minor significance. This is **not significant** in terms of the EIA Regulations.

Private Water Supplies

135. The quality of some PWS within 100 m of excavations of less than 1 m depth (*e.g.* the Observatory) could be affected by sediment mobilisation.

136. Measures detailed in Section 3.6 of the WCEMP, will reduce the potential for the mobilisation of sediment. Given the proximity to Development infrastructure and the potential for High magnitude change a PWSRA is included as Technical Appendix A10.2 which details specific mitigation measures to be taken when working within the catchment of this PWS.

137. In the absence of specific mitigation the magnitude of change is considered to be High (i.e. a major permanent or long-term negative change to groundwater quality or available yield) on PWS of High sensitivity. This is of Major significance. This is **significant** in terms of the EIA Regulations.

138. Following mitigation proposed within the PWSRA, such as monitoring and the provision of an emergency standby alternative supply, effects on PWS, of High sensitivity, have the potential to be of Negligible magnitude and therefore (in accordance with Table 10.4) of Minor residual significance. This is **not significant** in terms of the EIA Regulations.

10.6.1.3 Impediments to Surface Water Flow

139. Access tracks will only require the installation of two new watercourse crossings across all sections of the Development, as shown in Figure 10.5. Additionally, the use of the existing access track which serves the forestry operations has eliminated the requirement to upgrade existing watercourse crossings, therefore minimising the potential for impediment to flow.

140. The minimisation of the number of proposed watercourse crossings and the re-use of the existing watercourse crossings reduces one of the main activities that could give rise to impediment of flows. Additionally, measures described in Section 3 of Technical Appendix A10.1, such as the use of wide bottomless-arched culverts, where appropriate, are likely to prevent impediments to flow being created.

141. The use of a bailey bridge to cross Courhope Burn also reduces the potential for impediments to flow compared to the use of a culvert, as the structure provides less confinement to flow.

142. Felling of trees can increase surface water run-off and cause impediments to river flow through accumulation and transfer of brash. Brash build up within watercourses has the potential to impede the passage of waterborne ecology and divert / concentrate flow to river banks. In the long-term, however, it is generally accepted that, the removal of plantation forestry in proximity to watercourses can improve surface water conditions due to increased growth of bankside vegetation, improved ground level lighting and reduced potential for the introduction of impediments to flow.

143. Measures described in Section 3.7 of the WCEMP, such as brash matting, not stockpiling brash and not allowing brash to block drainage ditches or enter watercourses, verified by visual inspections, further reduce the potential for this effect to occur.

144. Therefore, given the embedded mitigation detailed previously, the magnitude of change on watercourses (High sensitivity) and Designated Hydrological Receptors (Very High sensitivity) is considered to be Negligible. As the magnitude of change is negligible, and receptors range from High to Very High sensitivity, the effect of the Development on watercourses and Designated Hydrological Receptors (in accordance with Table 10.4) is of Minor significance. This is **not significant** in terms of the EIA Regulations.

10.6.1.4 Changes in Groundwater Interflow Patterns

Groundwater and near Surface Water

145. Some wind turbine base excavations such as those in closer proximity to GWDTEs (T3, T4 and T5) may need temporary sub-surface water controls, such as physical cut-offs or de-watering. This could temporarily divert flows away from the excavation and lower the local water table and sub-surface water levels. Localised temporary changes to groundwater and near surface water interflow patterns may therefore arise. Turbine foundations and crane hardstandings also have the potential to change sub-surface water flow by creating physical barriers within naturally occurring drainage macropores in superficial deposits, however it is it is anticipated that that near-surface water will migrate around the turbine foundation, directly downslope of the turbine location under gravity, as new pathways within the peat are created (through macropores etc). Subsurface water controls are outlined in Section 3.5 of Technical Appendix A10.1: WCEMP.

146. The drying out of peaty soil can result from alterations to the natural drainage regime. Measures set out in Section 3.4 of the Technical Appendix A10.1: WCEMP, such as the rewetting of peat through controlled irrigation techniques, are considered sufficient, and sufficiently reliable, to avoid substantial alterations to the natural drainage regime, particularly given the shallow peat levels within the Core Study Area. As a result, peat is not expected to dry out, beyond what would be the case in the baseline scenario.

147. No substantial impediments to near-surface water flow will be created as the detailed site drainage design will take into account any severance of saturated areas to ensure hydrological connectivity is maintained, in accordance with SEPA / NatureScot 'Good practice during wind farm construction'.

148. Therefore, given the embedded measures detailed above, the magnitude of change on Groundwater and Near Surface Water (High sensitivity receptors) are considered to be of Negligible magnitude. As the magnitude of change is Negligible, and receptors are of High sensitivity, the effect of the Development on Groundwater and Near Surface Water (in accordance with Table 10.4) is of Minor significance. This is **not significant** in terms of the EIA Regulations.

Private Water Supplies

149. Through the PWRSA (Technical Appendix A10.2) it was identified that only one supply (Stewarton) draws groundwater from areas where excavations for the Development infrastructure exceed 1 m depth.

150. In order to determine the potential impact on supply yield, the contribution of groundwater and surface water to the supply requires further consideration. A conceptual site model has been developed for the site shown on Plate 8b of Technical Appendix A10.2. There is limited information about groundwater flow at the ridge, whilst there is the assumption that groundwater flow is generally bound by the watershed, the presence of fracturing including the Leadhills fault implies groundwater flow via fractures, which may connect to the supply further downslope to the east. The foundations for Turbine 3, which reach a depth of 3 m, are likely to be within the bedrock, and are likely to locally prevent or obstruct groundwater flow. With this infrastructure located close to the top of the watershed on the north-western slopes (at a topographical high point) it is only likely to divert or alter a relatively small proportion of flow at this height. The majority of the surface water catchment (estimated to be over two thirds) is on the south-eastern slope and ultimately fed by rainfall from this eastern side. This portion of surface water input and groundwater flow is unlikely to be influenced by the proposed infrastructure (foundations or access tracks) on the north-western slope.

151. The contribution source is likely to change in proportion during periods of high rainfall / wet weather, and periods of drought. During periods of lower rainfall and drought, as

there is little or no rainfall contribution, the supply is likely to be sustained primarily by groundwater flow.

152. Considering the potential changes to groundwater flow and yield of supply, whilst there is potential for groundwater connectivity between the supply in the east and the area of works in the west, based on the distance and topography, a large proportion of the hydrological catchment is likely to be driven by rainfall input on the eastern slope with a smaller contribution of groundwater influence from the west. This may lead to a noticeable but not significant change in yield particularly in times of drought as a worst-case scenario *i.e.* in a worst case scenario (drought) whilst the supply may not have run dry, a noticeable change may be noticed for example, a lower volume of water present within a header tank or lower flow of water from the spring intake.

153. This would represent changes to groundwater quality, levels or yields that do not represent a risk to existing baseline conditions, in accordance with Table 10.3.

154. As the magnitude of change is Low, and receptors are of High sensitivity, the effect of the Development on PWS is of Moderate significance. This is **significant** in terms of the EIA Regulations.

155. Taking into account the mitigation proposed within the PWSRA such as monitoring and site investigations, effects on PWS, of High sensitivity, have the potential to be of Negligible magnitude and therefore (in accordance with Table 10.4) of Minor significance. This is **not significant** in terms of the EIA Regulations.

10.6.1.5 Effects on the hydrological Function of Wetland Habitats

156. Several wetland habitats supporting NVC communities are present within the Core Study Area within 250 m of proposed infrastructure. The majority of these were determined in **Chapter 7: Ecology** not to be truly groundwater dependent.

157. However, as shown in Figure 10.6, and in Section 10.4.5, some isolated areas of M23 and M25 are present in the north, north-east, and centre of the Core Study Area, with the potential for indirect hydrological effects as a result of the Development. No direct loss of GWDTEs is anticipated.

158. The main access track within the Core Study Area divides a small area comprising M23 communities. Similarly, isolated patches of M23 were found central to the Core Study Area and M23:M25 were present in the south east, adjacent to Stewarton House, east of the Core Study Area. An existing access track serving T2 to T5 runs upgradient within 100 m of the GWDTE.

159. As discussed in **Chapter 7: Ecology**, M23:M25 communities have few floristic elements that suggested base-enrichment derived from groundwater and most of these communities were concluded to be fed by surface water.

160. Temporary sub-surface water controls and physical sub-surface barriers resulting from turbine foundations, hardstanding and access track construction have the potential to change the quality and quantity of water supplying GWDTEs.

161. The embedded design measures outlined in Section 3.5 of Appendix A10.1: WCEMP will also minimise the indirect effects on wetland habitats. As such, indirect hydrological effects will equate to a slight or negligible magnitude of change from baseline condition of geological resources.

162. Good practice design and construction measures outlined in Section 3 of Technical Appendix A10.1: WCEMP will minimise potential indirect effects of the Development on wetland habitats, including those not determined to be groundwater dependent.

163. Prior to access track construction, site operatives will identify flush areas, depressions or zones which may concentrate water flow. These sections will be spanned with plastic

pipes or drainage matting to ensure hydraulic conductivity under the road, and reduce water flow over the road surface during heavy precipitation.

164. Specifically, the following design measures will ensure that effects on wetland habitats are minimised:

- A PPP is implemented to ensure good practice working methods are followed throughout construction works;
- Silt traps will be deployed to trap and filter sediment-laden run-off throughout the construction phase of the Development;
- Settlement lagoons will be constructed and actively managed to control water levels and ensure that any run-off is contained, especially during times of rainfall;
- Turbine foundations are constructed in holes in the ground that will be de-watered, and hence water flow is typically into the foundation area. This will prevent concrete leaching into groundwater or surface water in the event of shutter collapse;
- All excavations will be sufficiently dewatered before concrete pours begin and that dewatering continues while the concrete cures. However, construction good practice will be followed to ensure that fresh concrete is isolated from the dewatering system; and
- If required, turbine foundations may be dewatered, temporarily lowering water levels in the superficial deposits and near-surface groundwater. The dewatering process would involve the treatment of any extracted water to remove any sediment and redistribute the water onto a vegetated surface in proximity to the excavation. This process would not involve any net loss of water from the hydrological system and would ensure that the water being treated is of the same (or similar) quality to what was extracted. Hence, there would not be an unacceptable effect on groundwater or near-surface water supplying GWDTEs.

165. In accordance with Table 10.12, M23 and M25 habitats are defined as High and Low sensitivity. The magnitude of indirect change is Negligible *i.e.* a minimal detectable effect on a GWDTE (between to 0.1 % - 5 % of study area) or no discernible effect on its integrity as a feature or its functionality, as outlined in Table 10.4. As such, there will be Minor (M23) and Negligible (M25) predicted effects on the hydrological function of GWDTEs. This is **not significant** in terms of the EIA Regulations.

10.6.1.6 Migration of Pollutants from Contaminated Land

166. Desk studies have not identified any areas of contaminated land within the Development and no effects are anticipated.

167. Should potentially contaminated land be encountered during excavations, however, this would be tested and appropriate action taken in accordance with The Environmental Protection Act 1990. Effects associated with contaminated land are therefore considered to be of Negligible magnitude for receptors of High and Very High sensitivity, which results in a residual significance of Minor and not significant in terms of the EIA Regulations. Should an area of contaminated land be encountered during excavations, measures outlined in Section 3 of Appendix A10.1: WCEMP will be implemented.

10.6.1.7 Acidification of Watercourses

168. Large scale felling of forestry and the storage of brash could potentially result in a short-term increase in the acidity of watercourses within the immediate catchment and have an effect on water quality and ecology. The acidification risk posed by felling is principally related to the disruption to the nitrogen cycling and resulting increased rates of mineralisation, nitrification, nitrate leaching and potential decline in acid neutralising capacity. Nitrate leaching from brash is a lesser issue, as is the impact of soil disturbance on surface water acidification. However, disturbance of the ground due to felling activities very close to watercourses could lead to flushing of acid from groundwater, if measures

to prevent run-off from entering the watercourses directly are not achieved. Felling will also involve the movement of heavy machinery across a soft ground surface, and hence will lead to soil disturbance which could have the potential to lead to acidification and sedimentation.

169. Forestry good practice measures are set out in Section 3.7 of Appendix A10.1: WCEMP, including specific measures for felling and for forestry activities within 100 m of natural watercourses. These measures will be implemented and maintained, and this will be carried out during the construction phase under supervision of an ECoW, whose role is described in Section 2.4 of Appendix A10.1: WCEMP.

170. Considering the small area requirement in each catchment for felling, and the adoption of these measures, the magnitude and significance of resulting effects would be Negligible. Given the High sensitivity of watercourses the residual significance is Minor. This is **not significant** in terms of the EIA Regulations.

10.6.1.8 Increase in Runoff and Flood Risk

Increase in run-off

171. The increase in hardstanding area associated with construction and operation of the Development could increase the volume and rate of localised surface run-off, although a large proportion of the proposed infrastructure hardstanding, including access tracks and crane hardstanding, would be permeable to some extent. The impermeable nature of the till and peat soils onsite means that, in the baseline scenario, there will be relatively low infiltration and relatively high run-off rates, and hence the addition of the Development would have minimal effect on the existing run-off scenario.

172. Measures, including SuDS measures, to attenuate run-off and intercept sediment prior to run-off entering watercourses are described in the WCEMP Appendix A10.1 and form a part of the Development good construction practice.

173. The Forests and Water Guidelines document reports that, due to rainfall interception losses:

"*Research suggests there may be a 1.5-2.0% reduction of potential water yield [watercourse flow] for every 10% of a catchment under mature conifer forest*".

174. It is assumed, therefore, that felling of mature forest may result in an average increase in water yield of up to 1.5 to 2 % for every 10 % of the catchment area that is subject to felling. It should be noted that, as interception loss has limited effect during the latter stages of periods of heavy rain, when the trees surfaces are saturated, this is likely to have a potential effect on average run-off, but not flood risk.

175. Table 10.13 demonstrates the required area to be felled to account for access tracks and turbine hardstanding in Cowieslinn Burn, Middle Burn, Shiplaw Burn, Courhope Burn and Flemington Burn catchments.

Table 10.13 Felled Area Required for Cowieslinn Burn, Middle Burn, Shiplaw Burn, Courhope Burn and Flemington Burn Catchments.

Catchment	Catchment Size (km^2)	Felled Area for track and turbines (km^2)	% of catchment	% surface water increase (as per Forests and Water Guidelines)
Cowieslinn Burn	7.44	0.17	2.28	0.50
Middle Burn	2.90	0.10	3.45	0.70
Shiplaw Burn	4.11	0.08	1.95	0.40

Catchment	Catchment Size (km^2)	Felled Area for track and turbines (km^2)	% of catchment	% surface water increase (as per Forests and Water Guidelines)
Courhope Burn	2.33	1.19	51.07	10.20
Flemington Burn	8.53	0.59	6.92	1.40

176. Given the incised nature of Courhope Burn and dentritic nature of the downstream catchment, including Flemington Burn, it is anticipated that the immediate increases in run-off and flows would be contained within the channel of the watercourses, before being transferred into the wider hydrological catchment of Lyne Water.

177. Furthermore, there are no receptors such as dwellings within the Core Study Area which could be influenced by increased flows within Courhope Burn.

178. In accordance with the Forestry Commission (2019) *Managing forest operations to protect the water environment* measures outlined within Section 3.7 of the WCEMP, such as cut-off ditches, check dams and forestry drainage, will control surface water flows to ensure surface water is not rapidly transferred to natural watercourses.

179. As such, the magnitude of change as a result of increased run-off as a result of felling is considered to be Negligible. Given the High sensitivity of watercourses the residual effect is of Minor significance. This is **not significant** in terms of the EIA Regulations

Flooding

180. No construction compounds, substations or meteorological masts are located within areas described as having a 0.5 % or greater annual risk of flooding.

181. The design of the Development layout has incorporated a buffer zone between watercourses and turbine bases of 50 m to watercourses, where possible, meaning any overtopping of minor watercourses is unlikely to reach infrastructure. As previously mentioned, flooding is restricted to minor isolated areas within the North of the Site where there is limited impact from construction and the Core Study Area.

182. The crossing of Courhope Burn will involve the installation of a bailey bridge rather than the use of a culvert. As such, this reduces the potential for flows to be throttled and back up behind the structure, following periods of heavy of prolonged precipitation.

183. For these reasons, the magnitude of change on watercourses of High sensitivity is considered to be Negligible, and therefore effects are assessed to be of Minor significance. This is **not significant** in terms of the EIA Regulations.

10.6.2 Potential Operational Effects

184. Potential effects associated with the operation of the Development are:

- Increased run-off rates and volume;
- Continued erosion and sedimentation from runoff from areas of hardstanding;
- Alterations to natural flow pathways from runoff from areas of hardstanding; and
- Risk of a pollution event from minor spills from maintenance vehicles.

185. The nature of these effects has been discussed in relation to the construction phase. As there would be substantially less activity during operation, and as there is unlikely to be any significant ground disturbance during operation, the magnitude of these effects is similarly reduced.

186. There will be a minor reduction in the potential for increased surface water run-off during the operational phase due to the reduction in hardstanding areas used during the construction phase, such as the restoration of the construction compound.

187. Whilst alterations to natural flow pathways will not be introduced during the operational phase, any changes during construction will continue through operation, as the majority of infrastructure will remain in place. Alterations to natural flow pathways will be reduced through adopting good practice design and construction, as set out in the outline WCEMP, such as cross drainage, use of shallow drainage ditches and prevention of blockages.

188. As a result, the magnitude and significance of all effects associated with operation of the Development are assessed as being Minor to Negligible, and **not significant** in terms of the EIA Regulations.

10.6.3 Potential Decommissioning Effects

189. Potential effects of decommissioning the Development are similar in nature to those during construction, as some ground-work would be required to remove turbine foundations and hardstandings to 1 m below ground level. These effects would be substantially lesser in magnitude than during construction, and would be controlled by a Pollution Prevention Plan (PPP) which would be incorporated into a full CEMP. Where infrastructure would be left in place, drainage features would also be left in place, where this is compatible with the PPP.

190. As a result, the magnitude and significance of all effects associated with decommissioning are assessed as being negligible, and **not significant** in terms of the EIA Regulations.

10.7 MITIGATION AND RESIDUAL EFFECTS

191. Embedded design measures and construction good practice measures are included in Appendix A10.1: WCEMP. The embedded mitigation and construction good practice measures are based on experience of providing detailed site design for several wind farm developments across Scotland, in consultation with SEPA.

192. With regards to private Water Supplies, mitigation measures are outlined in Technical Appendix A10.2: Private Water Supply Risk Assessment.

193. A programme of private water supply monitoring will be undertaken at selected properties, to ensure that in the event that unexpected impacts arise PWS is reinstated to baseline water quality and quantity conditions following the construction phase. Section 7.1.1 of Technical Appendix A10.2 outlines properties in question, as well as water supply monitoring parameters, frequency and justification.

194. Given the levels of certainty in the success of application of the mitigation measures and their effectiveness it is appropriate that the mitigation measures are taken into account and assumed to be fully effective in the determination of this application.

195. Specific mitigation for PWS combined with the embedded design measures described in Appendix A10.1 and Appendix A10.2, all identified potential effects have been assessed as being of negligible significance. The embedded measures proposed are established measures that are widely used in construction projects and which the Developer and its contractors are well used to undertaking.

196. No residual effects above Minor significance are predicted for all phases of Development, and are therefore **not significant** in terms of the EIA Regulations.

10.8 CUMULATIVE EFFECT ASSESSMENT

197. A cumulative effect is considered to be an additional effect on hydrological resources (within the same hydrological catchment) arising from the Development in addition to the combination of other developments likely to affect the hydrological environment.

198. At distances greater than 10 km, it is considered that schemes are unlikely to contribute to a cumulative hydrological effect due to attenuation and dilution over distance of potentially polluting chemicals. Therefore, for the purposes of the assessment of potential cumulative effects on the immediate catchment and hydrological regime, only proposed developments, which require large scale construction / excavation e.g. onshore wind farm developments, within approximately 10 km of the Development have been considered.

199. Data searches have not identified large scale developments (*i.e.* not single turbines) within 10 km of the Development which are consented developments and within the same catchments *i.e.* are hydrologically connected to the Development[49].

200. Operational wind farms are considered part of the baseline.

201. As such, there is no potential for cumulative effects with other sites.

[49] Highland Council, Interactive Wind Farm Map. [Online] Accessed here: https://highland.maps.arcgis.com/apps/webappviewer/index.html?id=5ec04b13a9b049f798cadbd5055f1787 [Accessed 24/02/2021].

10.9 SUMMARY OF EFFECTS

202. Table 10.15 provides a summary of the effects detailed within this chapter.

Table 10.15 Summary of Effects

Receptor	**Potential Effect**	**Significance of Effect**	**Mitigation Proposed**	**Residual Effect**
Construction Phase				
Surface hydrology (watercourses) and Designated Hydrological Receptors	Chemical Pollution	Minor	None beyond measures embedded in the WCEMP, including: impermeable membranes, bunding of the construction compound and absorbent spill pads / kits.	Minor
	Erosion and Sedimentation	Minor	None beyond measures embedded in the WCEMP, including: settlement bunding implemented in areas near watercourse buffers	Minor
	Pollution from contaminated land	Minor	None	Minor
	Impediments to flow	Minor	None beyond measures embedded in the WCEMP, including: arched culverts, brash matting, limited brash stockpiling to reduce the accumulation of brash in watercourses	Minor
	Acidification as a result of felling	Minor	None beyond measures embedded in the WCEMP, including: brash matting, limited brash stockpiling to reduce the accumulation of brash in watercourses	Minor
	Increase in Run-off and Flood Risk	Minor	None	Minor

Receptor	**Potential Effect**	**Significance of Effect**	**Mitigation Proposed**	**Residual Effect**
Groundwater and Near-Surface water	Changes in Groundwater Interflow Patterns	Minor	None beyond measures embedded in the WCEMP, including: controlled irrigation techniques and detailed site drainage design	Minor
	Chemical Pollution	Minor	None beyond measures embedded in the WCEMP, including: spill-kits and Geotextile impermeable membranes.	Minor
GWDTE's	Effects on the Hydrological Function of GWDTEs	Minor and Negligible	None beyond measures embedded in the WCEMP.	Negligible
PWS	Chemical Pollution	Major	Monitoring and the provision of emergency potable supply.	Minor
	Erosion and Sedimentation	Major	Monitoring and the provision of emergency potable supply.	Minor
	Changes in Groundwater Interflow Patterns	Moderate	Monitoring and site investigation.	Minor
Operational Phase				
Watercourses	Increase in Run-off and Flood Risk	Minor	None	Minor
Surface hydrology (watercourses) and Designated Hydrological Receptors, Groundwater, PWS and Near-surface water	Erosion and Sedimentation	Minor	None	Minor
Groundwater, Near-surface water and PWS	Changes in Groundwater Interflow Patterns	Minor	None	Minor

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Surface hydrology (watercourses) and Designated Hydrological Receptors, Groundwater, PWS and Near-surface water	Risk of a Pollution Event from Minor Spills from Maintenance Vehicles	Minor	None	Minor
Decommissioning				
Surface hydrology (watercourses) and Designated Hydrological Receptors, Groundwater, Near-surface water and PWS	Chemical Pollution	Minor	None beyond measures embedded in the WCEMP.	Minor
Surface hydrology (watercourses) and Designated Hydrological Receptors, Groundwater, Near-surface water and PWS	Erosion and Sedimentation	Minor	None beyond measures embedded in the WCEMP.	Minor

10.10 STATEMENT OF SIGNIFICANCE

203. This Chapter has assessed the likely significance of effects of the Development on hydrology and hydrogeology. The Development has been assessed as having the potential to result in effects of Minor significance or lower.

204. Given that only effects of moderate significance or greater are considered significant in terms of the EIA Regulations, the potential effects on hydrology and hydrogeology are considered to be **not significant**.

CLOICH FOREST WIND FARM

EIA Report – Volume 1 – EIA Report Text

Chapter 11

Noise

ARCUS

11 NOISE

11.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the effects of noise from the Cloich Forest Wind Farm ('the Development') upon nearby noise-sensitive receptors.

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

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

- Figure 11.1: Noise Contour Plot.

4. This chapter includes the following elements:

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

11.2 LEGISLATION, POLICY AND GUIDANCE

11.2.1 Legislation

5. The following legislation documents are of particular relevance to the assessment:

- The Control of Pollution Act 1974 (CoPA 1974)[1]; and
- The Environmental Protection Act 1990 (EPA 1990)[2].

11.2.1.1 The Control of Pollution Act 1974

6. CoPA 1974 provides Local Authorities with powers to control noise and vibration from construction sites.

7. Section 60 of the CoPA 1974 enables a Local Authority to serve a notice to persons carrying out construction work of its requirements for the control of site noise. This may specify plant or machinery that is or is not to be used, the hours during which construction work may be carried out, the level of noise or vibration that may be emitted, and provide for changes in circumstances. Appeal procedures are available.

8. Section 61 of the CoPA 1974 allows for those carrying out construction work to apply to the Local Authority in advance for consent to carry out the works; this is not mandatory. It does not, however, prevent nuisance action under Section 82 of the EPA 1990. The Application is expected to give as much detail as possible about the works to be carried out, the methods to be used, and the measures that will be taken to minimise noise and vibration.

[1] UK Government (1974). The Control of Pollution Act 1974. [Online] Available at: http://www.legislation.gov.uk/ukpga/1974/40 (Accessed 15/06/2021)
[2] UK Government (1990). The Environmental Protection Act 1990. [Online] Available at: http://www.legislation.gov.uk/ukpga/1990/43/contents (Accessed 15/06/2021)

11.2.1.2 The Environmental Protection Act 1990

9. The EPA 1990 specifies mandatory powers available to Local Authorities in respect of any noise that either constitutes or is likely to cause a statutory nuisance, which is also defined in CoPA 1974. A duty is imposed on Local Authorities to carry out inspections to identify statutory nuisances, and to serve abatement notices against these. Procedures are also specified with regards to complaints from persons affected by a statutory nuisance.

11.2.2 Policy and Guidance

10. The following key policy and guidance has been considered in carrying out this assessment.

11.2.2.1 Construction Noise

11. Guidance relevant to the effects of noise and vibration during construction and decommissioning is provided by BS 5228[3]. This standard:

- Is published in two parts: Part 1 - Noise and Part 2 - Vibration. The discussion below relates mainly to Part 1, however, the recommendations of Part 2 in terms of vibration are broadly very similar;
- Refers to the need for the protection against noise and vibration of persons living and working in the vicinity of, and those working on construction and open sites;
- Recommends procedures for noise and vibration control in respect of construction operations;
- Stresses the importance of community relations, and states that early establishment and maintenance of these relations throughout site operations will go some way towards allaying people's concerns;
- Provides recommendations regarding the supervision, planning, preparation, and execution of works – emphasising the need to consider noise at every stage of the operation;
- Describes methods of controlling noise at source and its spread; and
- Includes a discussion of noise control targets, and example criteria for the assessment of the significance of noise effects.

11.2.2.2 Operational Noise

12. Guidance relevant to the effects of noise during operation is provided in the following guidance and information sources:

- The Scottish Government's web-based planning information on onshore wind turbines[4];
- Planning Advice Note 1/2011 (PAN 1/2011): Planning and Noise[5];
- ETSU-R-97: The Assessment and Rating of Noise from Wind Farms[6]; and
- A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise[7].

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[3] BS 5228:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites – Part 1: Noise and Part 2: Vibration.
[4] Scottish Government (2014) Onshore Wind Turbines Planning Advice [Online] Available at: https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/ (Accessed 15/06/2021)
[5] The Scottish Government (2011) Planning Advice Note PAN 1/2011 Planning and Noise and accompanying Technical Advice Note, 2011.
[6] ETSU 1996 ETSU-R-97 The Assessment and Rating of Noise from Wind Turbines, ETSU for the DTI, 1996.
[7] A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind turbine Noise, IOA, 2013.

The Scottish Government's web-based Planning Information on Onshore Wind Turbines

13. The Scottish Government's web-based information provides advice to local authorities on the planning issues associated with wind farm development. With respect to noise from wind farms, it recommends the use of ETSU-R-97: *The Assessment and Rating of Noise from Wind Farms* and the Institute of Acoustics' *Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise*.

14. It goes on to refer to PAN 1/2011 as providing advice on the role of the planning system in helping to prevent and limit the adverse effects of noise, and states that the associated Technical Advice Note provides guidance which may assist in the technical evaluation of noise assessment.

PAN 1/2011

15. PAN 1/2011 promotes the principles of good acoustic design and the appropriate location of new potentially noisy development. The associated Technical Advice Note offers advice on the assessment of noise impact and includes details of the legislation, technical standards, and codes of practice appropriate to specific noise issues. Appendix 1 of the Technical Advice Note: Assessment of Noise describes the use of ETSU-R-97 in the assessment of wind turbine noise.

ETSU-R-97

16. ETSU-R-97 provides a framework for the assessment and rating of noise from wind turbine installations. It is the industry standard for the assessment of noise from wind farm developments in the UK, and the methodology has therefore been adopted for the present assessment.

17. Both background noise and noise from wind turbines typically vary with wind speed. According to ETSU-R-97, wind farm noise assessments should therefore consider the site-specific relationship between wind speed and background noise, along with the particular noise emission characteristics of the proposed wind turbines.

18. ETSU-R-97 specifies the use of the $L_{A90,10min}$ descriptor for both background and wind turbine noise. Therefore, unless otherwise specified, all references to noise levels within this Chapter relate to this descriptor. Similarly, all wind speeds referred to relate to a height of 10 metres (m) Above Ground Level (AGL) at the location of the Development, standardised in accordance with current good practice guidance.

19. The document recommends the application of external noise limits at the nearest noise sensitive properties, to protect outside amenity and prevent sleep disturbance inside dwellings. These limits take the form of a 5 decibel (dB) margin above the prevailing background noise level, except where background noise levels are lower than certain thresholds, where fixed lower limits apply. Separate limits apply for quiet daytime and night-time periods, as outlined below. The limits apply to the cumulative effects of all wind turbines that affect a particular location.

20. During daytime, the guidance specifies limits designed to protect the amenity of residents whilst within the external amenity areas of their properties. The limits are based on the prevailing background noise level for 'quiet daytime' periods, defined in ESTU-R-97 as:

- 18:00 – 23:00 every day;
- 13:00 – 18:00 on Saturday; and
- 07:00 – 18:00 on Sundays.

21. ETSU-R-97 recommends that the fixed lower noise limit for daytime should be set within the range 35 to 40 dB, $L_{A90,10min}$, with choice of value dependent on the following factors:

i) The number of dwellings in the neighbourhood of the Development;
ii) The effect of the noise limits on the number of kilo Watt hours (kWh) generated; and
iii) The duration and level of exposure.

22. Different standards apply at night, where potential sleep disturbance is the primary concern rather than the requirement to protect outdoor amenity. Night-time is considered to be all periods between 23:00 and 07:00. A limit of 43 dB(A) is recommended at night at wind speeds or locations where the prevailing wind speed related night-time background noise level is lower than 38 dB(A). At other times, the limit of 5 dB above the prevailing wind speed-related background noise level applies. The value of night-time fixed lower limit was selected in order to ensure that internal noise levels remained below those considered to have the potential to cause sleep disturbance, taking account of the attenuation of noise when passing from outdoors to indoors, and making allowance for the presence of open windows.

23. Where the occupier of the property has a financial interest in the Development, ETSU-R-97 states that the fixed lower noise limit for both daytime and night-time can be increased to 45 dB(A) and that *"…consideration should be given to increasing the permissible margin above background".*

24. A 'simplified criterion' is also described which is applicable where there are large separation distances between the proposed turbines and nearest noise-sensitive receptors. In such cases, a fixed limit of 35 dB, $L_{A90,10min}$ applies, without reference to background noise levels.

The IOA Good Practice Guide

25. The Good Practice Guide (GPG) was published by IOA in May 2013 and has been endorsed by the Scottish Government as current industry good practice. The GPG is supported by a suite of six Supplementary Guidance Notes (SGNs)[8]. The guide presents current good practice in the application of ETSU-R-97 assessment methodology for wind turbine developments at the various stages of the assessment process. The recommendations provided in the GPG been followed throughout this assessment.

26. The GPG provides advice on the assessment of cumulative noise impact, detailing a number of possible cumulative scenarios and recommended approaches. Advice is also provided with regard to the geographical scope of a cumulative noise assessment, to determine the area within which a cumulative noise assessment is necessary.

27. As noted in ETSU-R-97, noise from existing wind turbines should not form part of the background noise level from which noise limits for new wind energy developments are derived.

[8] Institute of Acoustics, Good Practice Guide Supplementary Guidance Notes 1 – 6, 2014.

11.2.2.3 Low-Frequency Noise and Infrasound Studies

28. A study[9], published in 2006 by acoustic consultants Hayes McKenzie on the behalf of the Department of Trade and Industry (DTI), investigated low frequency noise from wind farms. This study concluded that there is no evidence of health effects arising from infrasound or low frequency noise generated by wind turbines, but that complaints attributed to low frequency noise were in fact, possibly due to a phenomenon known as Amplitude Modulation (AM).

29. Further, in February 2013, the Environmental Protection Authority of South Australia published the results of a study into infrasound levels near wind farms[10]. This study measured infrasound levels at urban locations, rural locations with wind turbines close by, and rural locations with no wind turbines in the vicinity. It found that infrasound levels near wind farms are comparable to levels away from wind farms in both urban and rural locations. Infrasound levels were also measured during organised shut downs of the wind farms; the results showed that there was no noticeable difference in infrasound levels whether the turbines were active or inactive.

30. Bowdler et al. (2009)[11] concludes that:

> *"...there is no robust evidence that low frequency noise (including 'infrasound') or ground-borne vibration from wind farms generally has adverse effects on wind farm neighbours".*

11.2.2.4 Research into Amplitude Modulation

31. A study[12] was carried out on behalf of the Department for Business, Enterprise and Regulatory Reform (BERR) by the University of Salford, which investigated the incidence of noise complaints associated with wind farms and whether these were associated with AM. This report defined AM as aerodynamic noise from wind turbines with a greater degree of fluctuation than normal at blade passing frequency (occasionally referred to elsewhere as 'other AM' (OAM)). Its aims were to ascertain the prevalence of AM on UK wind farm sites, to try to gain a better understanding of the likely causes, and to establish whether further research into AM is required.

32. The study concluded that AM has occurred at only a small number of wind farms in the UK (4 of 133), and only for between 7% and 15% of the time. It also states that, at the time of writing, the causes of AM were not well understood and that prediction of the effect was not currently possible.

33. This research was updated in 2013 by an in-depth study undertaken by Renewable UK[13], which identified that many of the previously suggested causes of AM have little or no association to the occurrence of AM in practice. The generation of AM is based upon the interaction of a number of factors, the combination and contributions of which are unique to each site. With the current knowledge, it is not possible to predict whether any particular site is more or less likely to give rise to AM, and the incidence of AM occurring at any particular site remains low, as identified in the University of Salford study.

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[9] The measurement of low frequency noise at three UK wind farms, Hayes Mckenzie, The Department for Trade and Industry, URN 06/1412, 2006.

[10] Environment Protection authority (2013) Infrasound levels near wind farms and in other environments [Online] Available at: http://www.epa.sa.gov.au/xstd_files/Noise/Report/infrasound.pdf (Accessed 15/06/2021)

[11] Bowdler et al. (2009). Prediction and Assessment of Wind Turbine Noise: Agreement about relevant factors for noise assessment from wind energy projects. Acoustic Bulletin, Vol 34 No2 March/April 2009, Institute of Acoustics.

[12] Research into aerodynamic modulation of wind turbine noise'. Report by University of Salford, The Department for Business, Enterprise and Regulatory Reform, URN 07/1235, July 2007.

[13] Renewable UK, 2013: Wind Turbine Amplitude Modulation: Research to Improve Understanding as to its Cause and Effects.

34. In 2016, the IOA proposed a measurement technique[14] to quantify the level of AM present in any particular sample of wind farm noise. This technique is supported by the Department of Business, Energy & Industrial Strategy (BEIS, formerly the Department of Energy & Climate Change) who have published guidance[15], which follows on from the conclusions of the IOA study in order to define an appropriate assessment method for AM, including a penalty scheme and an outline planning condition. Notwithstanding this, the suggested outline planning condition is as yet unvalidated, remains in a draft form and would require site-specific legal advice on its appropriateness to a specific development.

35. Section 7.2.1 of the GPG therefore remains current, stating:

> *"The evidence in relation to 'Excess' or 'Other' Amplitude Modulation (AM) is still developing. At the time of writing, current practice is not to assign a planning condition to deal with AM".*

36. In summary the incidence of AM occurring at any particular site is low; it is not possible to predict whether any particular site is more or less likely to give rise to AM, and no appropriate planning condition has yet been established. As such, it is not considered necessary to carry out a specific assessment of AM.

11.2.2.5 Vibration

37. Research undertaken by Snow[16] found that levels of ground-borne vibration 100 m from the nearest wind turbine were significantly below criteria for 'critical working areas' given by British Standard BS 6472:1992[17], and were lower than limits specified for residential premises by an even greater margin.

38. Ground-borne vibration from wind turbines can be detected using sophisticated instruments several kilometres (km) from the wind farm site as reported by Keele University[18]. This report clearly shows that, although detectable using highly sensitive instruments, the magnitude of the vibration is orders of magnitude below the human level of perception and does not pose any risk to human health.

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[14] Institute of Acoustics, (2016) A Method for Rating Amplitude Modulation in Wind Turbine Noise
[15] BEIS, (2016), Review of the evidence on the response to amplitude modulation from wind turbines.
[16] ETSU (1997), Low Frequency Noise and Vibrations Measurement at a Modern Wind Farm, prepared by D J Snow.
[17] BS 6472:1992 Evaluation of human exposure to vibration in buildings (1 Hz to 80 Hz)
[18] Microseismic and infrasound monitoring of low frequency noise and vibrations from wind farms: recommendations on the siting of wind farms in the vicinity of Eskdalemuir, Scotland". Keele University, 2005

11.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

11.3.1 Scoping Responses and Consultations

39. Consultation for this EIA Report topic was undertaken with the organisations shown in Table 11.1.

Table 11.1 Consultation Responses

Consultee	**Scottish Borders Council (Environmental Health)**	
Type and Date	**Scoping Response 15 November 2019**	
Topic	**Comment**	**Response**
Operational Noise	A noise impact assessment should be undertaken in accordance with ETSU-R-97 and having regard to the methods described in the Institute of Acoustics Good Practice Guide to the Application of ETSU-R-97.	The stated guidance has been followed throughout this Chapter.
Operational Noise	The assessment should detail the following: (a) Accurate twelve-digit grid references for the turbines; (b) Accurate twelve digit-grid references for the noise sensitive receptors; (c) Elevations of turbines and receptors; (d) Details of any financial involvement at noise sensitive receptors; (e) Sound power level details for the turbine, in its intended mode of operation. Broadband and A-weighted octave band data required, together with uncertainty figures and any tonal penalty; (f) Ground factor used; (g) Atmospheric conditions for A_{atm}; (h) Propagation height; (i) Unless it can be shown that it would be possible to meet the simplified noise condition of 35 dB LA90 (10 min) at wind speeds up to 10m/s measured at 10m height, then a background noise survey will require to be carried out. (j) The cumulative noise effect from existing, consented or approved wind turbines. When considering the cumulative effect of other turbines, regard should be had to the consented noise levels detailed in the approval. (k) Information regarding any valley effect. It will be necessary to demonstrate whether or not, a 3 dB correction is required in respect of the valley significantly sloping ground effect.	(a) See Table 11.2 (b) See Table 11.5 (c) See Tables 11.2 and 11.5 (d) See Section 11.4.2 (e) See Tables 11.3 and 11.4 (f) – (h) See Section 11.3.6.1 (i) The noise limits applicable to the Development in isolation have been set in the planning conditions associated with existing Section 36 consent and deemed planning permission for the Cloich Forest Wind Farm (Planning and Environmental Appeals Division Reference: WIN-140-1) (the Consented Scheme). The Development has been assessed against these limits and as such, no further baseline noise surveys are required. (j) See Section 11.3.2.1 (k) Section 11.3.6.1
Background Noise	If background surveys are carried out then the following details are required: • Wind shear methodology • Best fit curve polynomials for daytime and night time (there must be sufficient data collected across the range of wind speeds from 4 m/s to 12 m/s	The noise limits applicable to the Development in isolation have been set in the planning conditions of the Consented Scheme. The Development has been assessed against these limits and as such, no

Consultee	Scottish Borders Council (Environmental Health)	
Type and Date	**Scoping Response 15 November 2019**	
Topic	**Comment**	**Response**
	• Location of monitoring positions • Method to record rainfall (noise data affected by rainfall or extraneous noise sources e.g. dawn chorus, agricultural activities, aircraft etc. should be excluded). • Equipment used including the type of wind shield fitted to the microphone (the preferred wind shield is a large diameter double layer item). A standard wind shield may not be suitable and it is recommended that the sound level meter manufacturer be consulted to confirm the suitability of any wind shield used.	further baseline noise surveys are required.
Cumulative Noise	When considering the cumulative impact of large and small wind turbines the preferred option is to use the ETSU-R-97 guidance for large wind and the BWEA guidance for small wind and add the two together. As mentioned in (j) above, when considering the cumulative effect of other turbines regard should be had the consented noise levels detailed in the approval.	See Section 11.3.2.1
Construction Noise	The applicant should provide information on construction noise and how this will be mitigated.	See Sections 11.3.3.1 and 11.6.1

11.3.2 Scope of Assessment

11.3.2.1 Operational Noise

40. The key issue for the assessment of potential noise effects relating to the Development is operational noise.

41. Typically, the operational noise assessment process comprises of:

i) Identification of potential receptors, i.e. residential properties and other potentially noise-sensitive locations;
ii) Measurement of prevailing, wind speed dependant background noise levels at nearby properties (if required);
iii) Establishment of limits for acceptable levels of wind turbine noise;
iv) Prediction of the likely levels of wind turbine noise received at each receptor; and
v) Comparison of the predicted levels with the noise limits.

42. Where the distance between the Development wind turbines and nearest noise-sensitive receptors is such that predicted noise levels are no greater than the simplified criterion of 35 dB, $L_{A90,10min}$ defined in ETSU-R-97 in wind speeds measured on site of up to 10 m/s, the measurement of background noise is unnecessary, as the assessment is based on the simplified criterion.

43. With specific regard to the Development, noise limits were established as part of the EIA process for the application for a wind farm, which obtained Section 36 consent and deemed planning permission in July 2016 (Planning and Environmental Appeals Division

Reference: WIN-140-1) ('the Consented Scheme'). These were derived in full accordance with current best practice, considered in detail during the Public Local Inquiry (PLI) for the Consented Scheme and are detailed in the respective planning conditions. As such, the aim of this Chapter is to assess noise due to the Development against the extant noise limits, which remain appropriate.

11.3.2.2 Cumulative Noise Assessment

44. ETSU-R-97 states that the assessment should take account of the effect of noise from all wind turbines that may affect a particular receptor. In order to facilitate this, a cumulative search was conducted to identify any wind turbines either operational, consented, or proposed (subject of a current planning application).

45. A list of cumulative sites is provided in Table 5.7 of **Chapter 5: Landscape and Visual Impact Assessment**. The closest cumulative development either in planning, consented, or operational has been identified as Bowbeat Wind Farm, located approximately 6 km east of the Development at the closest point on the respective development boundaries (8.6 km between the respective development centres).

46. No developments have been identified within 5 km of the Development (the distance at which other developments considered to have the potential to result in cumulative noise impacts). It is also of note that the cumulative scenario in the local area (i.e., within 5 km) remains the same as that considered in the noise assessment for the Consented Scheme[19] (i.e., the scenario upon which the noise limits for the Consented Scheme were determined remains the same).

47. Given the substantial distance from the Development to cumulative developments, and in line with the noise assessment for the Consented Scheme, there is no reasonable prospect of a significant cumulative effect. It should be noted that the Development, if consented, will replace the Consented Scheme in its entirety, so there can be no cumulative effects in this regard.

48. Cumulative effects therefore do not require further consideration in this assessment.

11.3.3 Elements Scoped Out of Assessment

11.3.3.1 Construction and Decommissioning Noise / Vibration

49. Construction noise effects resulting from the Consented Scheme were found to be not significant, and are controlled through planning conditions requiring the application of best practice noise management measures. Construction noise effects due to the Development are likely to be less than those of the Consented Scheme, given the reduced number of turbines.

50. Substantial sections of infrastructure remain the same as those assessed as part of the Consented Scheme, and any new infrastructure proposed as part of the Development will be located further from residential dwellings than that already consented.

51. Given the above, there is no reasonable prospect of a significant impact arising from construction noise effects. Notwithstanding this, and as requested in Scottish Borders Council's ('the Council') Scoping Response, best practice mitigation measures are outlined in Section 11.6.1 and are to be adopted as advocated in BS 5228.

52. Construction noise will be limited in duration and confined to working hours as specified by the Council which can be adequately controlled through planning condition. On this basis, no further assessment of construction noise is considered necessary.

[19] Hoare Lea Acoustics (2012) Cloich Forest Wind Farm Environmental Assessment - Noise & Vibration. Document Reference REP-1004308-MMC-280812-Appendix 12.1-2.

53. Noise produced during decommissioning of the Development is likely to be of a similar nature to that during construction, although the duration of decommissioning will be shorter than that of construction. Any legislation, guidance or best practice relevant at the time of decommissioning would be complied with. On this basis, no further assessment of decommissioning noise is considered necessary.

54. Given the large separation distances to the closest receptors, no significant vibration effects are anticipated and this has not been considered further in this Chapter.

11.3.3.2 Battery Energy Storage System

55. As described in **Chapter 3: Project Description**, the Development includes a battery energy storage system (BESS). Based upon Arcus' substantial experience of such facilities, they emit relatively low levels of noise; the BESS is likely to comprise of eight battery containerised modules, forming four units in total. The primary noise source of the BESS is considered to be the air conditioning units used to regulate the temperature of the BESS. Given this, coupled with the substantial (approximately 1.7 km) separation distance between the BESS facility and the closest noise-sensitive receptor, there is no reasonable prospect of a significant effect. This element has therefore not been considered further.

11.3.4 Study Area / Survey Area

56. The Study Area comprises the area where worst-case noise levels from the Development are greater than 35 dB, $L_{A90,10min}$, being the most stringent ETSU-R-97 noise limit (i.e., the simplified assessment criterion). The study area is illustrated on Figure 11.1 by the purple 35 dB, $L_{A90,10min}$ contour line.

11.3.5 Design Parameters

11.3.5.1 Development Layout

57. The Development turbine layout is presented in Figure 11.1, with grid references and elevations of each turbine detailed in Table 11.2.

Table 11.2 Development Layout

Turbine Number	Easting	Northing	Elevation Above Ordnance Datum (AOD), metres (m)
1	319967	646980	489
2	320015	645991	484
3	320558	646130	485
4	320947	646570	473
5	321167	647062	465
6	320149	647527	525
7	320425	646942	466
8	320616	647950	532
9	320830	647414	477
10	320594	648446	531
11	320190	648389	501
12	320212	648875	521

11.3.5.2 Micrositing

58. As set out in **Chapter 3: Project Description**, a 50 m micro-siting allowance has been included to avoid any further as yet unknown environmental or technical constraints. In the event that a turbine is required to be micro-sited closer to any noise-sensitive receptor identified in Table 11.5 of this Chapter than is currently proposed, predicted noise levels will be updated, and assessed against the noise limits specified in the Development's planning conditions. In the unlikely event that an exceedance of noise limits is identified as a result of micrositing, a noise mitigation scheme will be developed, operating one or more turbines in a reduced-noise mode under the required wind speeds and / or wind directions in order to ensure compliance with noise limits is maintained.

11.3.5.3 Candidate Turbine Emission Data

59. The GPG notes that most developments at planning stage will not have selected a preferred turbine, therefore a candidate turbine representative of a range of turbines should be selected to provide appropriate noise levels. Once noise levels have been predicted at the potentially affected properties, compliance with noise limits can be assessed and design advice provided if compliance with the limits is considered unlikely.

60. The Nordex N133 4.8 Megawatt (MW) wind turbine, with a hub height of 83 m, has been selected as the candidate turbine for this assessment. This assessment assumes the turbines are fitted with the serrated trailing edge (STE) blades, and operates at full power (Mode 0) at all times. The manufacturer's noise emission documentation excludes any margin for uncertainty; therefore, in accordance with the GPG, an additional 2 dB has been included in the sound power levels in this assessment, as detailed in Table 11.3.

Table 11.3: Manufacturer's Noise Emission Data – Nordex N133 4.8 MW, 83m hub height

	Standardised 10 m Wind Speed, ms^{-1}								
	4	5	6	7	8	9	10	11	12
	Sound Power Level, dB(A)								
Sound Power Level, dB LWA	94.2	99.7	103.9	104.5	104.5	104.5	104.5	104.5	104.5
Sound Power Level, dB, LWA, inc. 2 dB allowance for uncertainty	96.2	101.7	105.9	106.5	106.5	106.5	106.5	106.5	106.5

61. The octave-band frequency spectrum at the wind speed for which the maximum sound power level (including uncertainty) is achieved (7 ms^{-1}), is detailed in Table 11.4.

Table 11.4: Octave-band Spectra

	Octave-band Centre Frequency, f, Hz							
	63	125	250	500	1000	2000	4000	8000
	Octave-band Sound Power Level, dB, $L_{WA,f}$							
Sound Power Level, dB, LWA, Scaled to 106.5 dB(A)	89.4	95.1	97.4	98.2	100.0	100.6	98.2	87.6

62. As with the vast majority of modern wind turbines, the candidate turbine type is considered to be non-tonal in terms of ETSU-R-97. Therefore, no additions for such effects are required. Warranted noise emission data will be sought from the manufacturer of the turbine ultimately selected for construction.

11.3.6 Methodology for the Assessment of Effects

11.3.6.1 Noise Predictions

63. Noise predictions have been made using SoundPLAN software (v8.1), which implements the ISO 9613-2[20] methodology and takes account of the specific data and parameters recommended in the GPG, as summarised below.

- The turbine emission data includes a 2 dB addition for measurement uncertainty;
- Atmospheric absorption has been calculated based on conditions of 10°C and 70% relative humidity;
- The ground factor assumed is G=0.5 (mixed ground);
- A receiver height of 4.0 m has been applied;
- Barrier attenuation is limited to 2 dB where there is no line of sight from the receptor to a given turbine;
- An additional 3 dB has been added to noise immission levels at properties located across a valley or with heavily concave ground between the receptor location and the wind turbine(s)[21]; and
- The predicted noise levels ($L_{Aeq,t}$) have been converted to the required $L_{A90,10min}$ by subtracting 2 dB.

64. Corrections for valley and barrier effects in accordance with the GPG are incorporated within the modelling software using site-specific Digital Terrain Model (DTM) data, and are therefore included in the predicted noise levels presented in this Chapter.

65. ISO 9613-2 provides a prediction of noise levels likely to occur under worst-case conditions; those favourable to the propagation of sound, i.e., down-wind or under a moderate, ground-based temperature inversion as often occurs at night (often referred to as stable atmospheric conditions). The specific measures recommended in the GPG have been shown to provide good correlation with levels of wind turbine noise measured at operational wind farms[22,23].

11.3.6.2 Significance of Effect

66. The acceptable limits for wind turbine operational noise are clearly defined in ETSU-R-97 and the GPG, the methodology for assessment of wind turbine noise recommended by Government guidance. Therefore, this assessment determines whether the calculated immission levels at nearby noise-sensitive receptors are acceptable in terms of ETSU-R-97 and the GPG. Where the noise immission levels at noise-sensitive receptors are shown to be compliant with ETSU-R-97 and the GPG, the effect is considered to be not significant in terms of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[24] ('the EIA Regulations').

67. As such, the approach to assessment followed in other technical chapters within this EIA Report is not applicable to the effects of noise, and effects are not considered in terms

[20] ISO 9613-2:1996 Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation.
[21] Equation to determine concave ground as presented in Section 4.3.9 of the GPG.
[22] Bullmore et al. (2009). Wind Farm Noise Predictions and Comparison with Measurements, Third International Meeting on Wind Turbine Noise, Aalborg, Denmark 17 – 19 June 2009.
[23] Cooper & Evans (2013). Effects of different meteorological conditions on wind turbine noise.
[24] The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 [Online] Available at: https://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 15/06/2021)

of their magnitude and the sensitivity of receptors as these factors are implicit in the ETSU-R-97 and GPG methodology.

11.3.7 Assessment Limitations

68. No significant assessment limitations have been identified.

11.3.8 Embedded Mitigation

69. Noise effects were taken into consideration in the design of the Development, with the distance of the proposed turbines from residential properties being maximised as far as practicable. Further detail in the design process in provided in **Chapter 2: Site Selection and Design**.

11.4 BASELINE CONDITIONS

11.4.1 Identification of Receptors

70. Potential noise-sensitive receptors have been identified using Ordnance Survey MasterMap AddressBase, a database which combines the locations of buildings and other features from large-scale digital mapping with the Royal Mail's address database, along with aerial photography. The most noise-sensitive receptors remain the same as those detailed in Condition 19 (noise limits) for the Consented Scheme; the same receptors have therefore been assessed in this chapter. No other habitable properties were identified.

71. Names, grid references and elevations of each assessed receptor are presented in Table 11.5. Where the noise limits for the Consented Scheme refer to a group of dwellings, the grid reference in Table 11.5 relates to the dwelling in that group which is closest to the Development, as a worst-case.

Table 11.5 Assessed Receptors

Receptor	Easting	Northing	Elevation AOD (m)
Cloich Farm	321649	649079	336
Harehope Farm	320071	644357	319
Nether Stewarton	321893	645638	291
Ruddenleys	320456	651000	339
Upper Stewarton	321692	646054	311

72. Providing noise limits are met at the most noise-sensitive receptors, limits will therefore also be achieved at all other receptors.

11.4.2 Noise Limits

73. Background noise monitoring was undertaken as part of the EIA for the Consented Scheme, and was in accordance with what is now current best practice guidance (i.e., the GPG). In the interest of completeness, these background noise levels are presented in Table 11.6, overleaf.

Table 11.6: Background Noise Levels

Receptor	**Standardised Wind Speed at 10 m AGL, ms^{-1}**								
	4	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
	Prevailing Background Noise Level, dB, $L_{A90,10min}$								
Quiet Daytime									
Cloich Farm	24.7	25.7	27.1	28.9	31.0	33.5	36.3	39.5	43.0
Harehope Farm	22.4	24.2	27.1	30.4	33.8	36.9	39.7	42.0	43.9
Nether Stewarton	24.5	25.1	26.6	28.4	30.6	32.8	34.8	36.3	37.2
Ruddenleys	22.9	24.2	26.2	28.6	31.2	33.7	36.0	37.8	39.0
Night-time									
Cloich Farm	20.3	22.5	25.1	27.8	30.3	32.6	34.4	35.7	36.7
Harehope Farm	17.6	20.0	23.2	26.8	30.6	34.4	37.9	41.3	44.4
Nether Stewarton	19.2	20.3	21.9	23.9	26.3	29.1	32.3	35.8	39.6
Ruddenleys	19.1	21.1	23.8	26.8	29.8	32.5	34.7	36.2	36.6

74. As part of the EIA for the Consented Scheme, noise limits for day time and night-time periods were derived from the results of the background noise monitoring above, for each assessed receptor. These limits were discussed and agreed during the PLI for the Consented Scheme, including the ETSU-R-97 fixed lower limits applicable to each receptor (rounded to the nearest 1 dB), and the use of proxy locations where appropriate (i.e. confirming that background noise levels measured at Nether Stewarton were representative of those at Upper Stewarton).

75. As discussed in Section 11.2.2.2, ETSU-R-97 allows for an increase in the daytime fixed lower limit to 45 dB, $L_{A90,10min}$ for properties where the occupant has a direct financial interest in the Development. The occupant of Cloich Farm has such an interest in the Development; however, as the Development is able to comply with the requirements of ETSU-R-97 without requiring such an increase, this increase is not being sought in this assessment in order to maintain consistency with the extant noise limits for the Consented Scheme.

76. The noise limits as detailed in Condition 19 of the Consented Scheme therefore remain suitable for the assessment of the Development, and are presented in Table 11.7, overleaf.

Table 11.7: Noise Limits

Receptor	Standardised Wind Speed at 10 m AGL, ms^{-1}								
	4	5	6	7	8	9	10	11	12
	Noise Limit, dB, $L_{A90,10min}$								
Daytime (0700 – 2300)									
Cloich Farm	35.0	35.0	35.0	35.0	36.0	38.0	41.0	44.0	48.0
Harehope Farm	35.0	35.0	35.0	35.0	39.0	42.0	45.0	47.0	49.0
Nether Stewarton	37.0	37.0	37.0	37.0	37.0	38.0	40.0	41.0	42.0
Ruddenleys	35.0	35.0	35.0	35.0	36.0	39.0	41.0	43.0	44.0
Upper Stewarton	39.0	39.0	39.0	39.0	39.0	39.0	40.0	41.0	42.0
Night-time (2300 – 0700)									
Cloich Farm	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Harehope Farm	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.0	49.0
Nether Stewarton	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.0
Ruddenleys	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Upper Stewarton	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.0

11.5 ASSESSMENT OF POTENTIAL EFFECTS

77. Table 11.8 details the predicted noise immission levels due to the operation of the Development, following the methodology described in Section 11.3.6.1, and using the noise emission data presented in Section 11.3.5.2. Worst-case predicted noise levels are also presented graphically as a series of noise contours in Figure 11.1.

78. As shown in Figure 11.1, only one receptor (Upper Stewarton) is predicted to experience worst-case noise levels in excess of the ETSU-R-97 simplified assessment criterion of 35 dB, $L_{A90,10min}$, and is therefore the only receptor requiring assessment. However, in the interest of completeness, all receptors specified in the noise limits for the Consented Scheme have been assessed, to facilitate an effective comparison.

Table 11.8: Predicted Operational Noise Levels due to the Development

Receptor	Standardised Wind Speed at 10 m AGL, ms^{-1}								
	4	5	6	7	8	9	10	11	12
	Predicted Noise Level, dB, $L_{A90,10min}$								
Cloich Farm	23.9	29.4	33.6	34.2	34.2	34.2	34.2	34.2	34.2
Harehope Farm	20.0	25.5	29.7	30.3	30.3	30.3	30.3	30.3	30.3
Nether Stewarton	23.2	28.7	32.9	33.5	33.5	33.5	33.5	33.5	33.5
Ruddenleys	18.8	24.3	28.5	29.1	29.1	29.1	29.1	29.1	29.1
Upper Stewarton	26.0	31.5	35.7	36.3	36.3	36.3	36.3	36.3	36.3

79. Table 11.9, overleaf, details the difference (margin) between predicted noise immission levels (Table 11.8) and the noise limits (Table 11.7) for the assessed receptors. A negative margin indicates that the predicted noise level is below the derived noise limit.

Table 11.9: Margin between Predicted Turbine Noise and Noise Limits

Receptor	Standardised Wind Speed at 10 m AGL, ms^{-1}								
	4	5	6	7	8	9	10	11	12
	Margin, dB								
Daytime									
Cloich Farm	-11.1	-5.6	-1.4	-0.8	-1.8	-3.8	-6.8	-9.8	-13.8
Harehope Farm	-15.0	-9.5	-5.3	-4.7	-8.7	-11.7	-14.7	-16.7	-18.7
Nether Stewarton	-13.8	-8.3	-4.1	-3.5	-3.5	-4.5	-6.5	-7.5	-8.5
Ruddenleys	-16.1	-10.6	-6.4	-5.8	-6.8	-9.8	-11.8	-13.8	-14.8
Upper Stewarton	-16.2	-10.7	-6.5	-5.9	-6.9	-9.9	-11.9	-13.9	-14.9
Night-time									
Cloich Farm	-19.1	-13.6	-9.4	-8.8	-8.8	-8.8	-8.8	-8.8	-8.8
Harehope Farm	-23.0	-17.5	-13.3	-12.7	-12.7	-12.7	-12.7	-15.7	-18.7
Nether Stewarton	-19.8	-14.3	-10.1	-9.5	-9.5	-9.5	-9.5	-9.5	-11.5
Ruddenleys	-24.1	-18.6	-14.4	-13.8	-13.8	-13.8	-13.8	-13.8	-13.8
Upper Stewarton	-24.2	-18.7	-14.5	-13.9	-13.9	-13.9	-13.9	-13.9	-13.9

80. As Table 11.9 shows, worst-case noise levels due to the Development are below the respective limits at all assessed receptors and wind speeds. Therefore, noise due to the operation of Development has been shown to be compliant with the requirements of ETSU-R-97.

81. Furthermore, it has been found that the predicted noise levels due to the operation of the Development are lower than those presented in the 2012 Environmental Statement at all assessed receptors and wind speeds, and lower than those of the 2014 Supplementary Environmental Information (i.e. the layout which was ultimately consented) at the large majority of receptors and wind speeds. Further information on a comparison between the Development and the Consented Scheme is provided in the Project Comparison Report, which accompanies this EIA Report.

11.6 MITIGATION AND RESIDUAL EFFECTS

11.6.1 Construction and Decommissioning Phases

82. The Development infrastructure has been located as far as practicable from residential dwellings in order to minimise the effect of noise during construction. The good practice measures detailed below will be implemented to manage the effects of noise during construction operations, and will be required of all contractors:

- Operations shall be limited to times agreed with the Council;
- Deliveries of turbine components, plant and materials by HGV to site shall only take place by designated routes and within times agreed with the Council;
- The site contractors shall be required to employ the best practicable means of reducing noise emissions from plant, machinery and construction activities, as advocated in BS 5228;
- Where practicable, the work programme will be phased, which would help to reduce the combined effects arising from several noisy operations;
- Where necessary and practicable, noise from fixed plant and equipment will be contained within suitable acoustic enclosures or behind acoustic screens;

- All sub-contractors appointed by the main contractor will be formally and legally obliged, and required through contract, to comply with all environmental noise conditions and / or Construction Environmental Management Plans;
- Where practicable, night-time working will not be carried out. Local residents shall be notified in advance of any night-time construction activities likely to generate significant noise levels, e.g., turbine erection; and
- Any plant and equipment normally required for operation at night (23:00 - 07:00), e.g., generators or dewatering pumps, shall be silenced or suitably shielded to ensure that the night-time lower threshold of 45 dB, $L_{Aeq,night}$ shall not be exceeded at the nearest noise-sensitive receptors.

83. In the event that stone is required to be extracted from borrow pits by blasting, the following process would be employed to ensure that the effects of blasting noise and vibration on nearby properties are adequately controlled:

- Compliance with planning conditions specifying limits to vibration resulting from blasting, restrictions on times of blasting, and a requirement for vibration monitoring;
- Trial blasting, using progressively larger charge loads, to establish suitable acceptable charge; and
- Provision of information on blasting to neighbouring residents.

84. Application of the above measures to manage construction noise will ensure that effects are minimised as far as is reasonably practicable and that the construction process is operated in compliance with the relevant legislation.

85. Noise produced during decommissioning of the Development is likely to be of a similar nature to that during construction, although the duration of decommissioning will be shorter than that of construction. Any legislation, guidance or best practice relevant at the time of decommissioning would be complied with.

11.6.2 Operational Phase

86. No mitigation beyond the embedded mitigation set out in Section 11.3.8 is necessary to meet the requirements of guidance and avoid significant effects, and none is proposed.

11.7 CUMULATIVE EFFECT ASSESSMENT

Cumulative effects have been considered, as described in Section 11.3.2.2. Given the substantial distance from the Development to cumulative wind farm developments, and in line with the noise assessment for the Consented Scheme, there is no reasonable prospect of a significant cumulative effect. It should be noted that the Development, if consented, will replace the Consented Scheme in its entirety, so there can be no cumulative effect in this regard.

11.8 SUMMARY OF EFFECTS

87. An assessment of potential noise effects associated with the Development has been carried out.

88. Construction noise will be limited in duration and confined to working hours as specified by the Council and therefore can be adequately controlled through the application of good practice measures and secured by planning conditions, in line with the Decision Notice for the Consented Scheme. This will ensure that any noise from the Development Site during construction will be adequately controlled.

89. Operational noise has been assessed in accordance with ETSU-R-97 and in line with current best practice. It has been shown that the Development would comply with the requirements of ETSU-R-97 at all receptor locations. It is anticipated that the planning

conditions related to operational noise for the Consented Scheme will be retained, and applied to any consent for the Development.

90. Noise during decommissioning will be of a similar nature to that of construction and will be managed through best practice or other guidance or legislation relevant at the time.

11.9 STATEMENT OF SIGNIFICANCE

91. Construction noise will be limited in duration and confined to working hours as agreed with the Council and can therefore be adequately controlled through planning condition. The application of mitigation measures where applicable will also ensure that any noise from site will be adequately controlled such that construction noise effects are **not significant** in terms of the EIA Regulations.

92. The effect of operational noise has been assessed using the methodology described in ETSU-R-97. Predictions made based on the candidate turbine type, and assessed against the appropriate noise limits. The predicted noise levels are calculated to be below the respective limits and therefore the effect of operational noise is **not significant** in terms of the EIA Regulations.

93. Noise during decommissioning will be managed to ensure compliance with best practice, legislation and guidelines current at the time in order to ensure that effects are **not significant** in terms of the EIA Regulations.

11.10 GLOSSARY

AGL: Above Ground Level

Background Noise: The background noise level is the underlying level of noise present at a particular location for the majority (usually 90%) of a period of time. As such it excludes any short-duration noises, such as individual passing cars (but not continuous traffic), dogs barking or passers-by. Sources of background noise typically include such things as wind noise, traffic and continuously operating machinery (e.g. air conditioning or generators).

Decibel (dB): The decibel is the basic unit of noise measurement. It relates to the cyclical changes in air pressure created by the sound (Sound Pressure Level) and operates on a logarithmic scale, ranging upwards from 0 dB. 0 dB is equivalent to the normal threshold of human hearing at a frequency of 1000 Hz. Each increase of 3 dB on the scale represents a doubling in the Sound Pressure Level, and is typically the minimum noticeable change in sound level under normal listening conditions. For example, while an increase in noise level from 32 dB to 35 dB represents a doubling in sound pressure level, this change would only just be noticeable to the majority of listeners.

dB(A): Environmental noise levels are usually discussed in terms of dB(A). This is known as the A-weighted sound pressure level, and indicates that a correction factor has been applied, which corresponds to the human ear's response to sound across the range of audible frequencies. The ear is most sensitive in the middle range of frequencies (around 1000-3000 Hertz (Hz)), and less sensitive at lower and higher frequencies. The A-weighted noise level is derived by analysing the level of a sound at a range of frequencies and applying a specific correction factor for each frequency before calculating the overall level. In practice this is carried out automatically within noise measuring equipment by the use of electronic filters, which adjust the frequency response of the instrument to mimic that of the ear.

Frequency: The frequency of a sound is equivalent to its pitch in musical terms. The units of frequency are Hertz (Hz), which represents the number of cycles (vibrations) per second.

Noise Emission: The sound power level emitted from a given source.

Noise Immission: The sound pressure level detected at a given location (e.g. nearest dwelling).

$L_{A90,t}$: This term is used to represent the A-weighted sound pressure level that is exceeded for 90% of a period of time, t. This is used as a measure of the background noise level.

$L_{Aeq,t}$: This term is known as the A-weighted equivalent continuous sound pressure level for a period of time, t. It is similar to an average, and represents the sound pressure level of a steady, continuous noise which has the same energy as the actual measured noise.

Low-frequency noise: Noise at the lower end of the range of audible frequencies (20 Hz – 20 kHz). Usually refers to noise below 250 Hz. Should not be confused with infrasound, which is sound below the lowest normally audible frequency, 20 Hz.

Noise: Unwanted sound. May refer to both natural (e.g. wind, birdsong etc.) and artificial sounds (e.g. traffic, noise from wind turbines, etc.).

Noise-sensitive receptors: Locations that may potentially be adversely affected by the addition of a new source of noise (typically residential dwellings).

Sound power (W): The sound energy radiated per unit time by a sound source, measured in watts (W).

Sound power level (Lw): Sound power measured on the decibel scale, relative to a reference value (W_o) of 10^{-12} W.

Sound pressure (P): The fluctuations in atmospheric pressure relative to atmospheric pressure, measured in Pascals (Pa).

Sound pressure level (L_p): Sound pressure measured on the decibel scale, relative to a sound pressure of 2×10^{-5} Pa.

Tonal element: A characteristic of a sound where the sound pressure level in a particular frequency range is greater than in those frequency ranges immediately above higher or lower. This would be perceived as a humming or whining sound.

Vibration: In this context, refers to vibration carried in structures such as the ground or buildings, rather than airborne noise.

CLOICH FOREST WIND FARM

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Chapter 12

Access, Traffic and Transportation

ARCUS

12 ACCESS, TRAFFIC AND TRANSPORTATION

12.1 INTRODUCTION

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

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

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

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

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

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

5. This Chapter includes the following elements:

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

12.2 LEGISLATION, POLICY AND GUIDANCE

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

Table 12.1: Legislation, Policy and Guidance

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

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

12.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

12.3.1 Scoping Responses and Consultations

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

Table 12.2: Consultation Responses

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

12.3.2 Scope of Assessment

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

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

12.3.3 Elements Scoped Out of Assessment

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

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

12.3.4 Study Area

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

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

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

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

15. Two approach corridors are considered in this assessment:

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

16. The routes are outlined in the following sections.

12.3.4.1 Abnormal Load Route

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

17. This route is illustrated on Figure 12.1.

12.3.4.2 General Approach for Construction Vehicles

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

18. This route is illustrated on Figure 12.2.

12.3.5 Baseline Survey Methodology

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

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

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

12.3.6 Methodology for the Assessment of Effects

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

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

- Rule 1 – include road links where traffic flows are predicted to increase by more than 30% (or where the number of heavy goods vehicles is predicted to increase by more than 30%); and
- Rule 2 – include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

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

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

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

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

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

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

12.3.6.1 Sensitivity of Receptors

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

Table 12.3: Framework for Determining Sensitivity of Receptors

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

12.3.6.2 Magnitude of Effect

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

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

Table 12.4: Framework for Determining Magnitude of Effects

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

12.3.6.3 Significance of Effect

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

Table 12.5: Framework for Assessment of the Significance of Effects

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

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

12.3.7 Assumptions

12.3.7.1 Baseline Traffic

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

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

Table 12.6: Traffic Count Data

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

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

12.3.7.2 Material Import Requirements

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

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

12.3.7.3 Construction Vehicle Routes

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

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

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

12.4 BASELINE CONDITIONS

12.4.1 Baseline Traffic Flow

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

Table 12.7: Existing Average Daily Traffic (ADT) 2019

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

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

12.4.2 Road Capacity

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

Table 12.8: Theoretical Road Capacities

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

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

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

12.4.3 Road Traffic Collision Assessment

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

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

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

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

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

12.4.4 Sensitive Receptors

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

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

Table 12.9: Sensitive Receptors

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

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

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

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

12.5 FUTURE BASELINE SCENARIOS

12.5.1 Traffic Flow

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

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

Table 12.10: Projected Baseline Traffic Flow

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

12.6 ANTICIPATED CONSTRUCTION DEVELOPMENT TRAFFIC

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

12.6.1 Forestry

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

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

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

Table 12.11: Forestry Extraction

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

12.6.2 Site Mobilisation and Demobilisation

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

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

Table 12.12: Anticipated Vehicle Movements - Site Mobilisation / Demobilisation

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

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

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

12.6.3 Access Track and Hardstanding Construction

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

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

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

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

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

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

12.6.4 Turbine Foundation Construction

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

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

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

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

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

Table 12.14: Anticipated Vehicle Movements - Turbine Foundation Construction

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

12.6.5 Control Building and Substation Construction

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

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

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

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

Table 12.15: Anticipated Vehicle Movements - Substation Construction

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

12.6.6 Electrical Cabling Delivery

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

Table 12.16 – Anticipated Vehicle Movements - Electrical Cabling Delivery

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

12.6.7 Crane Delivery

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

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

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

Table 12.17: Anticipated Vehicle Movements - Crane Delivery

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

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

12.6.8 Turbine Delivery

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

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

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

Table 12.18: Anticipated Vehicle Movements - Turbine Delivery

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

12.6.9 Fuel Delivery

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

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

Table 12.19: Anticipated Vehicle Movements – Fuel Delivery

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

12.6.10 Construction Personnel and Staff

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

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

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

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

Table 12.20: Anticipated Vehicle Movements – Staff

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

12.6.11 Summary

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

Table 12.21: Anticipated Vehicle Movements – Summary

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

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

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

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

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

***Total flow in peak month

12.7 ASSESSMENT OF POTENTIAL EFFECTS

12.7.1 Traffic Generation

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

12.7.1.3 D17 Whim – Shiplaw Road and D18 Cloich Road

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

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

12.7.2 Accidents and Safety

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

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

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

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

12.7.3 Pedestrian Amenity

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

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

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

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

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

12.7.4 Driver Delay

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

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

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

12.7.5 Severance

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

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

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

12.7.6 Noise and Vibration

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

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

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

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

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

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

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

12.7.7 Hazardous Loads

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

12.7.8 Visual Effects

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

12.7.9 Air Quality

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

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

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

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

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

12.8 CUMULATIVE EFFECT ASSESSMENT

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

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

12.9 MITIGATION AND RESIDUAL EFFECTS

12.9.1 Mitigation Measures

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

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

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

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

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

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

12.9.2 Residual Effects

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

12.10 SUMMARY OF EFFECTS

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

Table 12.24: Summary of Effects

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

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

12.11 STATEMENT OF SIGNIFICANCE

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

CLOICH FOREST WIND FARM

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Chapter 13

Forestry

13 FORESTRY

13.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the effects of the Cloich Forest Wind Farm ('the Development') on the forestry resource. The Development is located within the Cloich Forest estate approximately 5.5 kilometres (km) north-west of Peebles ('the Site').

2. This assessment was undertaken by Scottish Woodlands Ltd.

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

- Figure 13.1: Site Location
- Figure 13.2: Current Species;
- Figure 13.3a-b: Infrastructure Felling;
- Figure 13.4: Management Felling; and
- Figure 13.5: Restocking of Management Felling Areas.

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

- Technical Appendix A13.1: Current Tree Species Stocking within the Site.

5. This Chapter includes the following elements:

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

13.2 LEGISLATION, POLICY AND GUIDANCE

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

- The Forestry and Land Management (Scotland) Act 2018[1];
- The Scottish Government's Policy on the Control of Woodland Removal[2];
- The UK Forestry Standard[3];
- Scotland's Forestry Strategy[4]; and
- The Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017[5].

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[1] UK Legislation (2018). Forestry and Land Management (Scotland) Act 2018. Available at: https://www.legislation.gov.uk/asp/2018/8/contents/enacted (Accessed 24/05/2021)

[2] Forestry Commission Scotland (2009). The Scottish Government's Policy on the Control of Woodland Removal. Edinburgh. Available at: https://forestry.gov.scot/publications/349-scottish-government-s-policy-on-control-of-woodland-removal-implementation-guidance (Accessed 24/05/2021) *Note that in April 2019 Forestry Commission Scotland became "Scottish Forestry".*

[3] Forestry Commission (2017). The UK Forestry Standard. Edinburgh. Available at: https://www.gov.uk/government/publications/the-uk-forestry-standard (Accessed 24/05/2021)

[4] The Scottish Government (2019). Scotland's Forestry Strategy. Edinburgh. Available at: https://www.gov.scot/publications/scotlands-forestry-strategy-20192029/ (Accessed 24/05/2021)

[5] The Scottish Government (2017). The Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at https://www.legislation.gov.uk/ssi/2017/113/contents/made (Accessed 24/05/2021)

13.3 ASSESSMENT METHODOLOGY

13.3.1 Scoping Responses and Consultations

7. Consultation for this Development was undertaken with the organisations shown in Table 13.1.

Table 13.1 Consultation Responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
Scottish Environmental Protection Agency (SEPA)	Scoping Response 30/10/19	"Key holing" rather than large scale felling must be used where possible to avoid large amounts of waste and a peak in the release of nutrients. A map and table detailing forestry removal must be provided as part of the application.	Permanent tree clearance around turbine locations will be limited to a 110m radius to minimise loss of forestry crops. Figures 13.3a-b & 13.4 and Tables 13.3 & 13.4 illustrate the extent of forestry removal over the Site.
Historic Environment Scotland (HES)	Scoping Response 01/11/19	For some scheduled monuments within the site boundary there may be the potential to clear forestry which currently obstructs views which may contribute to setting. We recommend that these options are explored.	Two Scheduled Monuments (SM2755 and SM2756) fall within areas designated for management felling as a result of the construction of the Development. Consequently, these two Scheduled Monuments will be clear-felled, as part of the management felling; however, felling is proposed to be permanent to the extent of their designation boundary, plus 25 m protective buffer. For SM2755, there will be an additional small area of permanent felling to the west of the Scheduled Monument which will provide line of sight to another scheduled monument located outwith the Site Boundary on neighbouring land.
Scottish Borders Council	Scoping Response 18/12/19	Regarding compensatory woodland replanting, this will be required to be consistent with the Scottish Borders Woodland Strategy. The earlier consent had a commitment to offsite tree planting in the Eddleston Water to provide additional enhancement linked to the Eddleston Water project. Details of a compensatory re-planting scheme should be provided in the EIA.	Land for the necessary compensatory planting site to fulfil the obligations of the control of woodland removal policy has yet to be identified; the location and design of this area will be agreed and approved by Scottish Forestry prior to the construction of the Development. Cloich Windfarm Partnership LLP ('the Applicant') cannot directly carry out offsite tree planting on land under the control of the Eddleston Water Project; however, the Applicant will, if appropriate, explore the possibility of contributing to the Eddleston Water Project as a compensatory planting measure should the opportunity arise.

13.3.2 Scope of Assessment

8. The key issues for the assessment of potential effects on existing forestry crops relating to the Development are as follows:

- Permanent effects which predominantly relate to the permanent removal of trees from the Site to facilitate the Development; and
- Indirect effects, including the potential impact on crops adjoining areas removed for infrastructure construction which may subsequently become unstable and susceptible to windblow damage.

13.3.3 Study Area

9. The Study Area relates to the existing forestry crops within the Site Boundary (illustrated on Figure 13.1) as any impact on the forestry crops as a result of the Development will be limited to this geographic area.

13.3.4 Baseline Survey

10. Data covering the forestry crops within the Site was provided by Forestry and Land Scotland (FLS) on a compartment and sub-compartment level in June 2020 which provided baseline information to assist in assessing any impact arising as a result of the Development. This data was updated after a subsequent Site inspection in March 2021.

13.3.5 Methodology for the Assessment of Effects

11. Impacts relating to effects on forestry cover are largely assessed using simple area analysis to gauge the magnitude of any crop removal as a consequence of the Development.

13.4 BASELINE CONDITIONS

12. The Site lies predominantly on moderate to steeply sloping ground and extends from approximately 280 m Above Ordnance Datum (AOD) up to approximately 476 m AOD at the peak of Crailzie Hill in the south.

13. On the James Hutton Institute's Land Capability for Forestry Series[4] the land is classed as F5 and F6. The land capability series is a map based classification of Scotland with the land area broadly split into seven zones of suitability based on an assessment of the degree of limitation imposed by the physical factors of soil, topography and climate on the growth of trees and on silvicultural practices. F5 is described as *"Land with limited flexibility for the growth and management of tree crops"* and F6 is described as *"Land with very limited flexibility for the growth and management of tree crops"*.

14. Soils within the Site are as described in **Chapter 9: Geology, Ground Conditions and Peat**.

15. Generally, the physical characteristics of the Site are conducive to commercial forestry production with relatively few limitations on the growth of the main productive conifer species.

13.4.1 Forest Crops

16. The Site is located within a commercial forestry plantation held by the Government Agency, FLS. The Site falls wholly within Cloich Forest which is an extensive commercial conifer forest which extends to 1080.60 hectares (ha) as illustrated by Figure 13.1 and encompasses crops planted over the last 60 years. The compartment record for these

[4] The James Hutton Institute (2017). Available at: http://map.environment.gov.scot/Soil_maps/?layer=4 . (Accessed on 25th May 2021.)

crops is presented within Technical Appendix A13.1 and illustrated by the species map, Figure 13.2. The forestry area details are also summarised in Table 13.2.

Table 13.2 Summary of the current woodland crops within the Site

Planting	Species									
Year	DF	LAR	MB	MC	NS	OG	UP	SP	SS	TOTAL
0						153.41	119.41			272.82
1890			0.49							0.49
1900			0.44							0.44
1960								0.87	9.69	10.56
1961									26.66	26.66
1962		0.52							23.64	24.16
1970									58.62	58.62
1971		4.22							14.69	18.91
1972	3.9				7.12				77.87	88.88
1973		2.59							0.4	2.99
1974		1.38		10.71				0.7	132.4	145.22
1975		0.4			4.51				62.38	67.29
1976		4.1							9.3	13.4
1982					11.33				31.23	42.56
1983									11.97	11.97
1989									5.94	5.94
1992									1.81	1.81
2002			8.24						34.88	43.12
2005			3.88		11.63				10.53	26.04
2006			12.45						37.92	50.37
2010		0.52	4.43	0.18	2.25			3.17	56.39	66.94
2012		0.71	3.96		4.35				33.91	42.93
2015			8.50					3.02	23.36	34.88
2016					4.32				19.22	23.54
2018									0.06	0.06
TOTAL	3.9	14.4	42.39	10.89	45.51	153.41	119.41	7.76	682.90	1,080.60

(DF= Douglas Fir, LAR = Larch species, MB = Mixed broadleaves, MC = Mixed conifers, NS = Norway spruce, OG= Open ground, SP = Scots pine, SS = Sitka spruce, UP = Unplanted.)

17. Sitka spruce is the principal crop present comprising 682.90 ha and representing 61% of the crops within the Site. There are elements of slower growth in some compartments but overall the conifer crops across the Site exhibit good growth rates recorded in the range of Yield Class 6-20 in the compartment record presented in Technical Appendix A13.1.

18. The crops within the Site include 42.39 ha of broadleaf crops in mixed species plantings largely comprising of stands that were established over recent years (since 2002). None of the areas of broadleaves within the Site are designated as native woodland under the Forestry Commission Scotland's Native Woodland Survey of Scotland 2014[5], therefore no native woodland would be lost as a consequence of the Development.

19. The forest within the Site is covered by an approved Land Management Plan (LMP) dating from 30th October 2017. This plan documents the proposed felling and restocking to be

[5] Literature
Forestry Commission Scotland (2014). Scotland's Native Woods. Forestry Commission Scotland, Edinburgh.

implemented within the forest over the 10 year period to 30th October 2027. Under the plan crops over an area of 233.48 ha are scheduled for felling between 2021 until the end of 2026.

20. The current plan was designed to accommodate the layout of the Consented Scheme within the Site in 2016. The LMP for the forest was structured to dovetail with the clearance required for the Consented Scheme and will require further revision to accommodate the Development due to the changes in the design and reduced number of turbines. The area of tree clearance required to accommodate the Development is less than the area of ground outlined for felling during the current term of the LMP and both relate to similar timeframes.

21. Sporadic windblow damage is occurring within several of the compartments containing maturing timber and the degree of damage arising may force a review of the current felling phases as presented in the LMP leading to a more truncated felling schedule being adopted.

13.5 ASSESSMENT OF POTENTIAL EFFECTS

13.5.1 Forestry Removal for the Construction and Operation of the Wind Farm.

22. Construction of the permanent infrastructure required for the Development (including the construction compound, access tracks, borrow pits, turbine foundations and crane pads) would require the removal of trees from the Site and for these areas to be subsequently maintained free of trees to accommodate equipment and ensure access for maintenance during the lifetime of the Development.

23. The grid connection cabling to be installed for the Development within the Site would be buried underground adjacent to the access tracks serving the turbines. Consequently the installation of grid connection cabling within the access track corridors will not require the removal of any further areas of tree crops within the Site.

24. Figure 13.4 illustrates the effects of infrastructure construction on the forestry compartments outlining the areas of crops that will require to be removed. The main areas of tree removal are associated with the 110 m clearance radius required around each turbine and clearance along road access corridors which are generally 25 m wide with associated wider excavations required for necessary earthworks in various locations.

Table 13.3 Summary of the stocking within the land required for infrastructure construction

Planting Year	Species								
	DF	LAR	MB	MC	NS	OG	SP	SS	TOTAL
0						16.73			16.73
1962		0.06						9.72	9.78
1970								0.42	0.42
1972	0.35				0.78			15.36	16.49
1973		0.07						0.19	0.26
1974		0.08		3.68			0.08	19.28	23.12
1975								4.28	4.28
1982					0.22			1.32	1.54
1989								0.10	0.10
1992								0.26	0.26
2005			0.42		0.42			0.46	1.30
2006			0.37					0.17	0.54
2010			0.08	0.18	0.28		2.06	3.94	6.54

Planting Year	Species								
	DF	LAR	MB	MC	NS	OG	SP	SS	TOTAL
2012			0.10		0.17			3.83	4.10
2015								1.83	1.83
2018								0.06	0.06
TOTAL	0.35	0.21	0.97	3.86	1.87	16.73	2.14	61.22	87.35

(DF= Douglas fir, Lar = Larch species, MB = Mixed broadleaves, MC = Mixed conifers, NS = Norway spruce, OG= Open ground, SP = Scots pine, SS = Sitka spruce.)

25. As set out in Table 13.3, 87.35 ha of land would be used for infrastructure construction within which 70.62 ha currently comprises of established tree crops and 16.73 ha would relate to existing open ground within the forest.

26. The 70.62 ha of crops removed represents 8.74% of the current stocked forest area within the Site. This will be compensated for by an appropriately designed new compensatory forestry planting scheme on a substitute site in order to satisfy the requirements of the Control of Woodland Removal Policy.

27. Some crops adjoining the areas to be felled to construct the roads, turbines and sub-station etc. may require further tree clearance due to the predicted instability of these adjoining stands of trees. Crops which are projected to be of a sufficient height by the anticipated construction date in 2027, such that any exposed cut faces would be at high risk of subsequent windblow damage, would be cleared as management felling.

28. At present FLS are unsure how the existing LMP will be implemented as the design was tailored to the Consented Scheme, this makes it difficult to assess how intervening restructuring within the crops will be implemented between the application date and the proposed commencement of construction in late 2026 or early 2027. In light of this, calculations have been based on the current stocking within the forest. Ultimately the area of crops cleared for infrastructure is unlikely to alter significantly although the age structure of the crops may change slightly. It is likely that the area of crops required to be cleared for management felling will have reduced by the projected construction date due to intervening harvesting work having been implemented. Consequently the figures presented below present a worst-case scenario illustration.

29. Based on the current crops on site the area of proposed management felling for windblow mitigation would be 129.63 ha representing 16.05% of the stocked forest area within the Site. These areas of crops are illustrated in Figure 13.4 and the species breakdown summarised in Table 13.4.

Table 13.4 Summary of the additional crops proposed for management felling

Planting Year	Species				
	LAR	MC	NS	SS	TOTAL
0					0.00
1962	0.46			13.91	14.37
1972			3.68	47.12	50.80
1974		2.82		38.12	40.94
1975				16.32	16.32
1982				7.20	7.20
TOTAL	0.46	2.82	3.68	122.67	129.63

(LAR = Larch species, MC = Mixed conifers, NS = Norway spruce, SP = Scots pine, SS = Sitka spruce).

30. The existing FLS management data for Cloich Forest documents a felling programme extending over 5 decades as summarised in Table 13.5. Over the remainder of the approved LMP period to 2027 a total area of 233.48 ha can be felled and replanted with

a further 127.34 ha scheduled to be cleared and restocked over the following 5 year period subject to a plan review and the approval of the second 10 year phase of the plan in 2027. It is apparent from the magnitude of the areas to be felled that there is adequate scope to adjust the LMP felling programme so as to accommodate the crop clearance required for infrastructure construction and associated management felling which would extend in total to an area of 200.25 ha of crops. Appropriate adjustments could be made to accommodate the felling necessary for the Development by substituting these areas with areas currently approved for felling and restocking under the LMP and thereby maintaining a similar felling profile to that which has already been proposed for the forest. There is already a significant overlap between felling consented under the existing LMP and the felling necessary for the Development (in excess of 85 ha) though, as noted previously, FLS are uncertain as to how much of the permitted harvesting will be progressed under the current plan.

Table 13.5 Summary of annual felling coupes proposed for Cloich Forest.

Felling year	Area (Ha)
2023	138.60
2024	49.96
2026	44.92
2028	60.46
2030	12.96
2031	12.83
2032	41.09
2033	52.79
2034	48.73
2036	13.77
2040	6.71
2042	21.08
2043	15.71
2045	21.93
2055	7.77
2056	33.57
2062	64.92
2065	149.98
2066	2.68
2067	63.83
Outwith Plan	216.30
TOTAL	1080.60

31. Any formal variations required to the current LMP which might be necessary to accommodate the infrastructure construction and management felling for the Development will be discussed and agreed with Scottish Forestry once consent for the Development has been secured.

32. Areas felled for windblow mitigation within the forests would be replanted with a replacement crop in the same location with species determined by the approved restocking plan within the existing LMP as illustrated in Figure 13.5.

33. The visual effect of the loss of trees is assessed in **Chapter 5: Landscape and Visual Impact Assessment**.

13.5.2 Forestry Removal for the Decommissioning of the Development

34. There would be no additional impact on the woodland areas during the decommissioning of the Development as it is envisaged that the proposed infrastructure could be removed and the ground re-instated without removing further trees from the Site.

13.6 CUMULATIVE EFFECT ASSESSMENT

35. There are no particular cumulative effects of tree removal linked to other wind farm projects in the area due to the restocking/replanting mitigation which has to be implemented for all such projects.

13.7 MITIGATION AND RESIDUAL EFFECTS

13.7.1 Tree Replanting

36. Under the Scottish Government's Control of Woodland Removal policy any tree crops permanently removed to accommodate the Development would require to be replanted on a like-for-like area basis either within the Site or at a suitable substitute location.

37. It is proposed that the management felling areas cleared to create wind-firm boundaries in crops adjoining the turbine construction areas and sections of new access tracks would be restocked after felling in the same location in line with the existing restock design within the approved LMP (with possible minor adjustments to improve landscape design if requested by Scottish Forestry during the LMP revision process).

38. The current LMP restock design includes increased areas of broadleaf crops and additional areas of open ground to improve landscape design and species diversity within the next rotation of crops in compliance with the UK Forestry Standard. Two Scheduled Monument sites (SM's) recorded as SM2755 and SM2756 lie within areas designated for management felling as a result of the construction of the Development. Consequently, these two SMs will be clear-felled to the extent of their designation boundary, plus a 25m protective buffer. In addition, the site at SM2755 will have a small additional area to the west left unplanted so as to secure a line of sight to a further scheduled site lying outwith the Site on neighbouring land. A third SM (reference SM3998) lies within the Site Boundary but outwith the development area and therefore it is not subject to felling as a result of the Development. In time trees covering this SM will also be cleared as part of FLS' future felling operations. As a consequence 129.63 ha of crops will be harvested as management felling and 121.42 ha of crops will be replanted with an additional area of 8.21 ha of integrated open ground within these crops. This mirrors the management prescription that would be adopted within the Site in the absence of the Development so does not result in any net tree loss as a consequence. The breakdown of the restocking within these areas is presented in Table 13.6.

Table 13.6 Species breakdown of proposed restocking within areas cleared for management felling.

Species	Area (ha)
MB	24.97
NS	14.79
OG	8.21
SP	0.67
SS	80.99
Total:	129.63

(MB = Mixed broadleaves, NS = Norway spruce, OG = Open ground, SP = Scots pine, SS = Sitka spruce).

39. 70.62 ha of productive ground would be removed from forestry for the duration of the operation of the Development and would be replaced by an appropriately designed new compensatory planting scheme on a substitute site. The location of that substitute site has yet to be identified. In compliance with the terms of the Control of Woodland Removal Policy details including the location, design, planting timescale and appropriate post-planting maintenance schedule would be agreed with Scottish Forestry in advance of construction commencing on the Development.

40. The substitute site would replicate the net crop area felled for infrastructure construction and would also include additional land to accommodate a 10% designed open ground component in addition to the planted crops in order to comply with the UK Forestry Standard. The substitute site area would therefore extend to a total area of 78.47 ha.

13.7.2 Residual Effects

41. The proposed on-site restocking of the management felling zones and the intended substitute new planting would ensure the necessary compliance with the Control of Woodland Removal Policy.

42. The proposed work would ensure that the required areas of forest crops present within the Site would be maintained once the proposed off-site substitute planting and on-site replanting work has been completed.

13.8 SUMMARY OF EFFECTS

43. Table 13.7 provides a summary of the effects detailed within this Chapter.

Table 13.7 Summary of Effects

Receptor	Potential Effect	Mitigation Proposed	Residual Effect
Construction Phase			
Existing forestry crops	Removal of 70.62 ha of forest crops for infrastructure construction.	70.62 ha of tree planting will be undertaken within a new compensatory planting site.	Negligible
Existing forestry crops	Risk of windblow in crops adjoining construction areas prompting management felling over 129.63 ha.	Restocking within the Site to comprise 121.42 ha of tree crops and 8.21 ha of integrated open ground (in line with the current LMP) will be carried out.	Negligible

13.9 STATEMENT OF SIGNIFICANCE

44. The significance of the temporary loss of forestry crops from within the Site is viewed as low given the scale of the woodland resource within the Site and the nature of the forestry asset which is commercial plantation forestry rather than natural or semi-natural woodland. The mitigation work to re-establish the areas of crops removed by both restocking within the Site and supplemental compensatory planting outwith the Site as summarised in Table 13.7 will ensure the necessary areas of forestry crops are maintained.

45. As the area is to be replicated and the timescale between crop removal and any restocking and new compensatory planting being implemented will be short-term the overall significance of the Development on the existing forestry crops is considered to be negligible.

CLOICH FOREST WIND FARM

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Chapter 14

Aviation and Radar

ARCUS

14 AVIATION AND RADAR

14.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment (EIA Report) identifies and assesses the potential effects that the proposed Cloich Forest Wind Farm ('the Development') may have on the aviation and radar stakeholders in the area.

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

- Technical Appendix A14.1: Cloich Wind Farm, Eskdalemuir, Desktop Budget Calculations.

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

- Figure 14.1: VFR 250k Chart Extract; and
- Figure 14.2: VFR 500k Chart Extract.

4. This Chapter aligns closely to the following elements as far as possible:

- Overview;
- Legislation, Policy and Guidance;
- Scoping Responses and Consultation
- Baseline Conditions;
- Assessment of Potential Effects;
- Mitigation;
- Residual Effects;
- Statement of Significance; and
- Summary.

5. The Aviation & Radar assessment within this Chapter was undertaken by Cdr John Taylor RN (Ret) of Wind Power Aviation Consultants Ltd (WPAC). John Taylor has over 35 years' experience as an Air Traffic Controller, Fighter Controller and Aviation Regulator and was head of Air Traffic Control for the Royal Navy. His responsibilities included responding to wind farm consultations onshore and offshore. Since 2008 his company has provided expert advice on the interaction between wind turbines and aviation including assessing over 3,000 wind turbine proposals and giving evidence at over 20 Public Inquiries and Appeals in England and Scotland. He has also advised a number of Local Authorities on this issue. His team includes experts on radar propagation and modelling and low flying operations.

6. This Chapter also includes input from specialists from Xi Engineering Consultants Ltd in relation to Eskdalemuir Seismic Array.

14.2 LEGISLATION, POLICY AND GUIDANCE

7. There are a number of aviation publications relevant to the interaction of wind turbines and aviation containing guidance and legislation, which cover the complete spectrum of aviation activity in the UK as shown below:

- Civil Aviation Publication (CAP) 764 Civil Aviation Authority (CAA) Policy and Guidance on Wind Turbines Version 6, Feb 2016 (CAA, 2016);
- CAP 168 Licensing of Aerodromes, Version 11 March 2019 (CAA 2019);
- CAP 670 ATS Safety Requirements Version 3 June 2019 (CAA 2019);
- CAP 774 UK Flight Information Services, Ed 3 May 2017 (CAA 2017);
- CAP 738 Safeguarding of Aerodromes Version 2 Dec 2006 (CAA 2006);
- CAP 793 Safe Operating Practices at Unlicensed Aerodromes Ed 1 July 2010 (CAA 2010);
- CAP 493 Manual of Air Traffic Services Part 1 Ed 7.0 2017 (CAA 2017);
- CAP393 The Air Navigation Order 2016 and Regulations (CAA 2016);
- CAP 660 Parachuting Ed 5 March 2020 (CAA 2020);
- Military Aviation Authority Regulatory Article 2330 (Low Flying) (MOD MAA 2019);
- UK Aeronautical Information Publications (AIP) (NATS 2020);
- CAA 1:250,000 and 1:500,000 VFR Charts (NATS 2019,2020); and
- CAA Policy Statement: Lighting of En-Route Obstacles and Onshore Wind Turbines 01 April 2010 (CAA 2010).

14.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

14.3.1 Overview and Study Area

8. The assessment of effects of the Development is based upon the guidance laid down in CAA Publication CAP 764 Policy and Guidelines on Wind Turbines Version 6 (Dated February 2016) with the consultation criteria for aviation stakeholders defined in Chapter 4 of CAP 764.

9. CAP 764 states the distances from various types of airfields where consultation should take place. These distances include:

- Airfield with a surveillance radar – 30 kilometres (km);
- Non-radar licensed aerodrome with a runway of more than 1,100 metres (m) – 17 km;
- Non-radar licensed aerodrome with a runway of less than 1,100 metres – 5 km;
- Licensed aerodromes where the turbines would lie within airspace coincidental with any published Instrument Flight Procedure (IFP);
- Unlicensed aerodromes with runways of more than 800 metres – 4 km;
- Unlicensed aerodromes with runways of less than 800 metres – 3 km;
- Gliding sites – 10 km; and
- Other aviation activity such as parachute sites and microlight sites within 3 km – in such instances developers are referred to appropriate organisations.

10. CAP 764 goes on to state that these distances are for guidance purposes only and do not represent ranges beyond which all wind turbine developments will be approved or within which they will always be objected to. These ranges are intended as a prompt for further discussion between developers and aviation stakeholders which may result in the study area being modified as required based on specific airspace and operational considerations.

14.3.2 Ministry of Defence (MoD)

11. It is also necessary to take into account the aviation and air defence activities of the Ministry of Defence (MOD) as safeguarded by the Defence Infrastructure Organisation (DIO). The types of issues that are addressed in this Chapter include:

- Ministry of Defence Airfields, both radar and non-radar equipped;
- Ministry of Defence Air Defence Radars;
- Ministry of Defence (now UK Met Office) Meteorological Radars; and
- Military Low Flying.

14.3.3 National Air Traffic Services Ltd (NERL) Facilities

12. It is necessary to take into account the possible effects of wind turbines upon the National Air Traffic Services En Route Ltd (NERL) communications, navigation and surveillance systems – a network of primary and secondary radars and navigation facilities around the United Kingdom.

13. As well as examining the technical impact of wind turbines on Air Traffic Control (ATC) facilities, it is also necessary to consider the physical safeguarding of ATC operations using the criteria laid down in CAP 168 Licensing of Aerodromes to determine whether a proposed development will breach obstacle clearance criteria.

14.3.4 Desk Study

14. The radar calculation results shown in this Chapter have been produced using specialist propagation prediction software (RView Version 5). Developed over a number of years, it has been designed and refined specifically for the task. RView uses a comprehensive systems database which incorporates the safeguarding criteria for a wide range of radar and radio navigation systems. RView models terrain using the Ordnance Survey (OS) Terrain 50 digital terrain model, which has a post spacing of 50 m and has a root mean square (RMS) error of 4 m. The results are verified using the Shuttle Radar Topography Mission (SRTM) dataset, a separate smoothed digital terrain model with data spacing of 3 arc seconds. By using two separate and independently generated digital terrain models, anomalies are identified and consistent results assured. RView models the refractive effects of the atmosphere on radio waves and the First Fresnel Zone. A feature of RView is that as well as performing calculations in the manner believed to be most appropriate it also allows comparison with results from simpler models. For example, RView can perform calculations using the true Earth Radius at the midpoint between the radar and the wind turbine or the simplified 4/3 Earth Radius model. If needed, RView is also capable of modelling a range of atmospheric refractive conditions. RView models the trajectory of radar signals at different elevations, enabling modelling of both volume surveillance and pencil beam radars as well as the effects of angular sterilisation as applied, for example, in Met Office radars.

14.3.5 Site Visit

15. Site surveys were not required for the evaluation of aviation impacts at Cloich Forest and have not been undertaken for this assessment.

14.3.6 Methodology for the Assessment of Potential Effects

16. Assessment of potential effects has been undertaken by identifying whether impacts are anticipated upon aviation and radar infrastructure, and therefore whether aviation stakeholders are anticipated to object to the Development.

17. The assessment does not determine significant or non-significant effects, but whether there is an effect or no effect.

14.3.7 Scoping Responses and Consultations

18. Consultation for this EIA Report topic was undertaken with the organisations shown in Table 14.1.

Table 14.1 Consultation Responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
MOD DIO	Scoping Response (DIO13930) 31/10/2019	The MOD expressed concerns regarding two issues: firstly, the effect on the RAF Spadeadam ATC Radar and secondly the Eskdalemuir Seismic Array. They also requested infra-red OR 25cd red lights.	Noted further consultation required.
	Tip Height Increase Consultation (DIO13930) 06/02/2020	The MOD expressed concerns regarding two issues: firstly, the effect on the RAF Spadeadam ATC Radar and secondly the Eskdalemuir Seismic Array. They also requested infra-red OR 25cd red lights.	WPAC wrote to DIO to challenge the ATC radar objection based on the location. This resulted in the additional response below which removes the Spadeadam ATC concern.
MOD DIO	Further Consultation (DIO13930) 20/10/2020	The MOD has concerns in relation to the Eskdalemuir Seismological Recording Station. Military Low Flying Training – "*The development site occupies Tactical Training Area 20T (TTA 20T) therefore in the interests of air safety, the MOD would request that the development be fitted with MOD accredited aviation safety lighting. The perimeter turbines and any additional masts are to be fitted with MOD accredited 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.*"	Xi Engineering has undertaken an assessment (Appendix A14.1) in relation to the Eskdalemuir Seismological Recording Station.

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
Edinburgh Airport	Scoping Response 04/11/2019	No Objection to the Development.	Noted.
	Tip Height Increase Consultation 29/01/20	Increase in tip height does not change previous response. No Objection to the Development.	Noted.
Highlands and Islands Airport Limited	Scoping Response 24/10/2019	No Objection to the Development.	Noted.
	Tip Height Increase Consultation 30/01/20	Increase in tip height does not change previous response. No Objection to the Development.	Noted.
Glasgow Prestwick Airport	Scoping Response 01/11/2019	No Objection to the Development.	Noted.
	Tip Height Increase Consultation 07/02/20	Increase in tip height does not change previous response. No Objection to the Development.	Noted.
NATS Safeguarding	Scoping Response	No Objection to the Development.	Noted.
	Email response dated 21/01/20 (Ref SG10504)	Increase in tip height does not change previous response. No Objection to the Development.	Noted.

14.4 BASELINE CONDITIONS

14.4.1 Aviation & Radar

19. The location of the Development in an aviation context is shown in Figures 14.1 and 14.2.

20. The Development is located 25 km to the south-east of Edinburgh Airport and under the Edinburgh Control Area (CTA), Class D regulated airspace which in this area has a base level of 3,500 feet (ft) above mean sea level (amsl) and extends upwards to 6,000 ft.

21. Above and beyond this area is the Scottish Terminal Area (TMA) which is controlled by NATS En Route Ltd (NERL) from the Scottish ATC Centre at Prestwick. In military terms, the Development is remote from any military airfields, the closest being the ex-RAF Leuchars, now an army base over 75 km to the north-east of the Development. The closest military ATC facility is the RAF Spadeadam Electronic Warfare Training Facility; the control centre is located over 63 km to the south-east of the Development. The danger areas associated with the Spadeadam facility are shown in Figure 14.2 delineated by a purple hashed boundary line and designated D510 and D510A. The northernmost point of the danger areas is 55 km to the south of the Development.

14.4.2 Eskdalemuir Seismic Array

22. The Eskdalemuir Seismic Array is located approximately 42 km south of the Development; therefore, the Development falls within the 50 km consultation zone.

23. The Development represents a re-design of the consented Cloich Forest Wind Farm ('the Consented Scheme'), which was granted S36 consent and deemed planning permission following a Public Local Inquiry (PLI), on 8 July 2016 (Planning and Environmental Appeals Division (DPEA) Reference: WIN-140-1).

24. The Consented Scheme, consisting of 18 turbines, is allocated a seismic budget of 0.0064902 nm by the Ministry of Defence – this budget remains valid at the time of writing this Chapter of the EIA Report.

14.5 ASSESSMENT OF POTENTIAL EFFECTS

14.5.1 Licensed Aerodromes

25. The only licensed aerodrome within standard consultation distance is Edinburgh Airport at 25 km. The Development is beyond the distance where physical safeguarding needs to be considered. Radar modelling has been undertaken to determine if any of the turbines will be in view of the main primary surveillance radar (PSR) at the Edinburgh Airport with the results shown in Table 14.2 below.

Table 14.2 Radar Line of Sight (RLOS) Results Edinburgh Airport PSR

Turbine	RLOS (metres AGL)
1	517.3
2	554.8
3	566.9
4	583.1
5	576.5
6	464.9
7	555
8	471.2
9	560.4
10	460.9
11	466
12	432.4

26. These results confirm that every turbine is very well screened by terrain, confirming the Edinburgh Airport assessment that there will be no effect on facilities or operations at the airport.

27. It is noted that both Glasgow Prestwick Airport (GPA) and Highlands and Islands Airports Ltd (HIAL) were consulted and responded with no objection therefore no assessment is required in this Chapter. In relation to HIAL their closest radar equipped airport is at Inverness and their closest non-radar equipped licensed aerodrome is at Dundee, located over 80 km to the north, both airports are clearly well beyond any possible requirement for consultation or assessment, and are therefore not assessed in this Chapter. The lack of any effect on any of these facilities is confirmed in the consultation responses listed in Table 14.1.

14.5.2 Unlicensed Aerodromes

28. There are no unlicensed aerodromes within or close to consultation distance. The closest shown on aviation charts is Kirknewton, over 18 km to the north of the Development, therefore, consultation is not required.

29. An online search for private airfields has also been conducted and none identified within consultation distance. Not all private strips are listed in publications or marked on charts.

14.5.3 Ministry of Defence

30. As reported previously, there are no MOD airfields in the region, however, there is an ATC facility at RAF Spadeadam. Radar modelling has been undertaken against the two main radars located at Deadwater Fell and Berryhill. In the case of Berryhill, there is no radar line of sight below 500 m across the Development. The results for the Deadwater Fell radar are shown in Table 14.3.

Table 14.3 RAF Spadeadam Deadwater Fell radar

Turbine	RLOS (metres AGL)
1	124.6
2	54.5
3	115.1
4	112
5	89.1
6	63.4
7	126.3
8	36.1
9	85.5
10	39.8
11	72.1
12	47.3

31. The results show that all of the turbines are in radar line of sight of the Spadeadam Deadwater Fell radar and will create an area of clutter on the radar displays at the unit; however, discussions with the MOD have enabled them to conclude that they have no objection due to the fact that the turbines are in airspace sufficiently separated from the Spadeadam Area of Interest.

14.5.4 Air Defence Radar

32. The closest air defence radar is located at Brizlee Wood, near Alnwick, Northumberland. Radar modelling shows that radar line of sight is in excess of 500 m AGL and the proposed development will therefore have no effect on air defence radar systems. This is confirmed by the MOD response listed previously.

14.5.5 Military Low Flying

33. The MOD response in Table 14.1 is factually incorrect. The Development is not within Tactical Training Area 20 where aircraft can be authorised to fly as low as 100 ft, but within LFA16, where aircraft are generally limited to 250 ft. However, the lighting requirement as laid out in the MOD response is still a sensible and proportionate flight safety measure and applies irrespective of the type and designation of the specific low

flying area. As stated in Table 14.1 the MOD are not objecting to the Development on aviation grounds.

14.5.6 Met Office Radars

34. The Met Office safeguards its network of radars using a European methodology known as OPERA (Operational Programme on the Exchange of Radar data). In general, they will object to any turbine within 5 km in line of sight and will examine the impact of any turbines within 20 km. Where a site is within 20 km, the Met Office will undertake an operational assessment based on three main criteria, having determined if there is a technical effect on the radar. The factors they will consider include the following:

- Proximity to airports;
- River catchment response times; and
- Population density.

35. In this case the closest Met Office radar is at Holehead over 70 km to the north-west of the Development and therefore well beyond 20 km. There is no requirement for consultation to be undertaken with the Met Office.

14.5.7 NATS En Route Ltd (NERL)

36. The two NERL long range radars with the lowest coverage in this area are at Great Dun Fell and Lowther Hill. Radar modelling has been undertaken against both radars with the results shown in Tables 14.4 and 14.5 respectively below.

Table 14.4 Great Dun Fell Radar

Turbine	RLOS (metres AGL)
1	546.9
2	566.3
3	531.3
4	485.8
5	434.5
6	479.4
7	540.2
8	402.1
9	457.8
10	369.8
11	461.8
12	425.2

37. The results in Table 14.4 show that the turbines will all be well screened by terrain from the Great Dun Fell radar.

Table 14.5 Lowther Hill Radar

Turbine	RLOS (metres AGL)
1	335.8
2	405.8
3	398
4	426.5

Turbine	RLOS (metres AGL)
5	442.5
6	270.5
7	391.4
8	278.8
9	388.6
10	249.5
11	261
12	171.5

38. The results in Table 14.5 show that all the turbines will be screened by terrain from the Lowther Hill radar. Both sets of results show that there will be no effect on the NERL surveillance systems and this is confirmed by the NATS consultation response stating that "*NATS (En Route) Public Limited Company ("NERL") has no safeguarding objection to the proposal*."

14.5.8 Eskdalemuir Seismic Array

39. The Development Site lies within the Eskdalemuir Consultation Zone and is subject to MoD approval for seismic budget. The MoD has allocated the Consented Scheme, and therefore the Development, a seismic budget of 0.0064902nm. Whilst the size of the candidate turbine has increased since the allocation of this budget, Technical Appendix 14.1 shows that by either using a turbine with very low seismic vibration levels or by adopting a before and after measurement process, it is possible to build out the Development within the current seismic budget allocated by the MoD. The Development is situated approximately 42 km from the Array, and as such has a minimal seismic signature. Ongoing work being performed by Xi Engineering Consultants on behalf of the wind industry and the Scottish Government also has the capability to increase the available budget for the entire Eskdalemuir consultation Zone and potentially assist the Development.

14.6 MITIGATION AND RESIDUAL EFFECTS

40. There are no radars or other ATC systems that will require any mitigation in relation to the Development. The only mitigation required is to satisfy the MOD requirement to ensure the wind farm is visible to pilots of low flying aircraft.

41. The MOD response states that either *"MOD accredited 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."*

42. Cloich Windfarm Partnership LLP ('the Applicant') will elect to install infra-red lighting as it is invisible to the naked eye and will therefore, have no landscape or visual effects.

43. There is no requirement for CAA standard visible aviation obstruction lighting as the turbine tip height will be less than 150 metres above ground level.

14.7 CUMULATIVE EFFECT ASSESSMENT

44. Given no effects are identified, there are no cumulative effects to take into account.

14.8 SUMMARY

45. An assessment has been made of the potential for significant effects of the Development on the aviation resource. This assessment did not identify potential significant effects on any receptors during the construction, operation and decommissioning of the Development.

46. The Development has been shown to not exceed allocated budget with regard to Eskdalemuir Seismic Array.

14.9 GLOSSARY

AGL	Above Ground Level
ATC	Air Traffic Control
AMSL	Above Mean Sea Level
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CTA	Control Area
DIO	Defence Infrastructure Organisation
HIAL	Highlands and Islands Airports Ltd
LFA	Low Flying Area
MOD	Ministry of Defence
NATS	National Air Traffic Service
NERL	NATS En Route Ltd
OPERA	Operational Programme on the Exchange of Radar data
RAF	Royal Air Force
RLOS	Radar Line of Sight
TMA	Terminal Area
TTA	Tactical Training Area (for low flying)
VFR	Visual Flight Rules
WPAC	Wind Power Aviation Consultants

CLOICH FOREST WIND FARM

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Chapter 15

Socio-Economics, Land-Use, Recreation and Tourism

15 SOCIO-ECONOMICS, LAND USE, RECREATION AND TOURISM

15.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the effects of Cloich Forest Wind Farm ('the Development') on the Socio-Economic, Land Use, Tourism and Recreation resources and receptors.

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

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

- Figure 15.1: Assessed Tourism and Recreational Receptors; and
- Figure 15.2: Core Paths and Recreational Routes.

4. This Chapter includes the following elements:

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

5. The following terms are used within this Chapter to describe the Development:

- The Development: the whole physical process involved in the development of Cloich Forest Wind Farm, including wind farm construction, operation, and decommissioning (*i.e.* not a piece of land or an area);
- The Site Boundary: the red line boundary as shown in Figures 1.1 and 1.2; and
- The Site: the land within the Site Boundary available for turbine development and associated wind farm infrastructure.

15.2 LEGISLATION, POLICY AND GUIDANCE

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

- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[1];
- Economic Action Plan 2019 – 2020[2];
- Scotland's Economic Strategy[3];
- Protecting Scotland, Renewing Scotland: Scotland's Programme for Government 2020 – 2021[4];
- National Performance Framework[5];

[1] The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 [Online] Available at: https://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 11/02/2021)
[2] Scottish Government (2018) Economic Action Plan 2019 – 2020 [Online] Available at: https://economicactionplan.mygov.scot/ (Accessed 11/02/2021)
[3] Scottish Government (2015) Scotland's Economic Strategy [Online] Available at: https://www.gov.scot/publications/scotlands-economic-strategy/pages/0/ (Accessed 11/02/2021)
[4] Scottish Government (2020) Protecting Scotland, Renewing Scotland: Scotland's Programme for Government 2020 – 2021 [Online] Available at: https://www.gov.scot/programme-for-government/ (Accessed 11/02/2021)
[5] Scottish Government (2019) National Performance Framework [Online] Available at: https://nationalperformance.gov.scot/national-outcomes (Accessed 11/02/2021)

- Scottish Planning Policy[6];
- National Planning Framework 3[7];
- Scottish Borders Council (2016) Local Development Plan, Volume 1, Policies[8];
- Scottish Borders (2013) Economic Strategy 2023[9];
- Building a resilient recovery from the COVID-19 crisis[10];
- Towards a Robust, Resilient Wellbeing Economy for Scotland: Report of the Advisory Group on Economic Recovery[11];
- Eight policy packages for Scotland's Green Recovery[12];
- Institute of Environmental Management and Assessment (IEMA) (2011) The State of Environmental Impact Assessment in the UK[13];
- NatureScot (2018) Environmental Impact Assessment Handbook[14]; and
- Wind Farms and Tourism Trends in Scotland: BiGGAR Economics (2017)[15].

15.2.1 Legislation

7. The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the EIA Regulations') establish in broad terms what is to be considered when determining the effects of development proposals on socio-economics, land-use, recreation and tourism.

15.2.2 National Policy

15.2.2.1 Socio-Economics

8. Scotland's Economic Strategy sets out how the Scottish Government will provide support for businesses and individuals to grow in an economically sustainable way with the dual objectives of boosting competitiveness and tackling inequality. As part of these objectives, the document aims to direct investment in order to maximise opportunities for employment, business, leisure and tourism and also to join up planning policy to facilitate this.

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[6] Scottish Government (2014) Scottish Planning Policy [Online] Available at: https://www.gov.scot/publications/scottish-planning-policy/pages/2/ (Accessed 11/02/2021)
[7] Scottish Government (2014) National Planning Framework 3 [Online] Available at: https://www.gov.scot/publications/national-planning-framework-3/ (Accessed 11/02/2021)
[8] Scottish Borders Council (2016) Local Development Plan, Volume 1, Policies [Online] Available at: https://www.scotborders.gov.uk/downloads/file/2017/ldp_-_volume_1_policies (Accessed 11/02/21)
[9] Scottish Borders (2013) Economic Strategy 2023 [Online] Available at: https://www.scotborders.gov.uk/downloads/file/456/economic_strategy (Accessed 11/02/21)
[10] Committee on Climate Change (2020) Building a Resilient recovery from the COVID-19 crisis [Online] Available at: https://www.theccc.org.uk/publication/letter-building-a-resilient-recovery-from-the-covid-19-crisis-to-roseanna-cunningham-msp/ (Accessed 11/02/2021)
[11] Scottish Government (2020) Towards a Robust, Resilient Wellbeing Economy for Scotland: Report of the Advisory Group on Economic Recovery [Online] Available at: https://www.gov.scot/publications/towards-robust-resilient-wellbeing-economy-scotland-report-advisory-group-economic-recovery/ (Accessed 11/02/2021)
[12] Climate Emergency Response Group (2020) Eight policy packages for Scotland's Green Recovery (2020) Available at: https://www.changeworks.org.uk/sites/default/files/CERG_Green%20Recovery_Final%20report_July2020_0.pdf (Accessed 11/02/2021)
[13] IEMA (2011) The State of Environmental Impact Assessment Practice in the UK [Online] Available at: https://transform.iema.net/article/state-eia-practice-uk (Accessed 11/02/2021)
[14] SNH (2018) Environmental Impact Assessment Handbook [Online] Available at: https://www.nature.scot/handbook-environmental-impact-assessment-guidance-competent-authorities-consultees-and-others (Accessed 11/02/2021)
[15] BiGGAR Economics (2017) Wind Farm and Tourism Trends in Scotland [Online] Available at: https://biggareconomics.co.uk/wp-content/uploads/2020/01/Wind-farms-and-tourism-trends-in-Scotland.pdf (Accessed 11/02/2021)

9. The document identifies four strategic priorities which are critical to economic growth:

- Investing in our people, infrastructure and assets in a sustainable way;
- Fostering a culture of innovation;
- Promoting inclusive growth; and
- Internationalisation.

10. The National Performance Framework tracks progress towards national outcomes. It shows how well Scotland is performing overall on the 81 national indicators including topics such as economy and the environment. In terms of economy, the Scottish Government recognises that a strong, competitive economy is essential to supporting jobs, incomes and our quality of life. The Scottish economy must be environmentally sustainable, inclusive and benefit all Scotland's people and communities.

11. On the 23rd June 2014 the Scottish Government published the Scottish Planning Policy (SPP), which was updated on 18 December 2020. It is clear from SPP that the Scottish Government is committed to developing further renewable energy projects and paragraph 153 of SPP advises that:

"*Efficient supply of low carbon and low cost heat and generation of heat and electricity from renewable energy sources are vital to reducing greenhouse gas emissions and can create significant opportunities for communities. Renewable energy also presents a significant opportunity for associated development, investment and growth of the supply chain*" (page 36).

12. Paragraphs 29 and 169 discuss that decisions for proposals for energy infrastructure should be guided by giving due weight to net economic benefit (paragraph 29) and that key considerations are likely to include:

"net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities (paragraph 169)".

13. The National Planning Framework (NPF3) sets out a long-term strategy for Scotland's important development and investment opportunities in infrastructure. Combined with the SPP, NPF3 aims to help deliver a sustainable, economic future for Scotland's communities. NFP3 states that in order to help make Scotland a low carbon place, the spatial strategy suggests:

"…to retain the benefits of renewable energy development in Scotland by supporting investment at key sites across the country."

14. NPF3 also indicates that the future of the renewables sector in Scotland will be key to bringing new employment to Scotland's remote areas and that rural communities will benefit from well-planned renewable energy development.

15. In November 2020 the Scottish Government issued the Fourth National Planning Framework Position Statement[16]. Within the introduction – Our Future Places – it is recognised that the planning system will have to be rebalanced so that climate change is a guiding principle in all plans and decisions, focussing efforts on encouraging developments that help to reduce emissions. The aim should not be to restrict development, but rather to stimulate that green economy. The Position Statement goes on to identify supporting renewable energy developments as one of the key opportunities to both achieve climate change targets and stimulate the green economy.

16. In September 2020, the Scottish Government published its Government's Programme for Scotland 2020-2021 which details the Scottish Government's plans for Scotland's economic, health and educational development. With regards to Scotland's economic

[16] Scottish Government – Scotland's Fourth National Planning Framework Position Statement [Online] Available at: https://www.gov.scot/publications/scotlands-fourth-national-planning-framework-position-statement/ (Accessed 11/02/2021)

programme, the Scottish Government announced its Green Recovery Plan which detailed its funding for a transition to net-zero; this was a part of the Programme for Government 2020/21. The plan states that nearly £1.6 billion will support up to 5,000 jobs and tackle fuel poverty. An additional £500 million will be invested into Scotland's natural economy, £100 million into the Green Job Fund and £60 million to help industrial and manufacturing sectors decarbonise, grow and diversify[17].

15.2.2.2 Land Use

17. In relation to land use, paragraph 80 of Scottish Planning Policy (SPP)[18] states that:

> *"Where it is necessary to use good quality land for development, the layout and design should minimise the amount of such land that is required. Development on prime agricultural land, or land of lesser quality that is locally important should not be permitted except where it is essential:*
>
> *…..to meet an established need, for example for essential infrastructure, where no other suitable site is available; or……*
>
> *for the generation for energy from a renewable source or the extraction of minerals where this accords with other policy objectives and there is secure provision for restoration to return the land to its former status."*

15.2.3 Local Planning Policy

18. The Scottish Borders Local Development Plan (LDP) was adopted by Scottish Borders Council ('the Council') in 2016. The Scottish Borders LDP provides a planning framework for the future use and development of land within Scottish Borders, creating a context to guide the location of development over the next five years, from the adopted date, along with setting out development opportunities and ways to enhance the rural and urban environment.

19. Planning policy is addressed in full in the Planning Statement which accompanies this EIA Report. Relevant Socio-economic, land use, tourism and recreation policies contained within the Council's LDP are summarised in the following sections:

15.2.3.1 ED7 Business, Tourism and Leisure Development in the Countryside

20. The aim of this policy is to ensure that there is appropriate employment generating development in the countryside as well as protecting the environment and to ensure that business, tourism and leisure related developments are appropriate for their location.

15.2.3.2 ED9 Renewable Energy Development

21. This policy aims to support renewable energy, to ensure developments are being constructed in appropriate locations and to advise on the factors that are to be taken into consideration when looking at proposals. The policy takes into account government policy which emphasises the role of local authorities and the planning system in meeting the national renewable targets. The policy supports a wide range of renewable energy sources, including onshore wind farms and takes into account the economic benefits of wind energy, as well as the factors relating to local tourism and business.

15.2.3.3 ED10 Protection of Prime Quality Agricultural Land and Carbon Rich Soils

22. This policy focuses on the protection of the quality of agricultural land and carbon rich soils. Prime quality agricultural land is a valuable resource which needs to be retained for farming and food production. When allocating sites for development, the Council aims to

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[17] The Scottish Government (2020) Scotland's Green Recovery [Online] Available at: https://www.gov.scot/news/scotlands-green-recovery/ (Accessed 11/02/2021)
[18] Scottish Government (2014) Scottish Planning Policy [Online] Available at: https://www.gov.scot/publications/scottish-planning-policy/pages/2/ (Accessed 11/02/2021)

avoid such land; carbon rich soils are an important carbon store and can contribute to climate change when extracted. This policy aims to prevent the permanent loss of prime agricultural land and carbon rich soils; proposals for renewable energy developments will be required to accord with the objectives and requirements of policy ED9 rather than meet the requirements of this policy.

15.2.3.4 EP13 Trees, Woodlands and Hedgerows

23. This policy aims to protect the woodland resource and in turn, the character and amenity of settlements and the countryside, maintain habitats and provide an important recreational asset. The policy encourages developers to take into consideration the existing woodland resources within and out with their development schemes to ensure the protection of the resource during construction.

15.2.3.5 EP15 Development Affecting the Water Environment

24. This policy aims to ensure that development does not adversely affect any of the components that comprise the water environment (e.g. rivers, lochs, groundwater etc.). The Council aims to protect and improve the quality of the water environment and requires developers to consider how their proposals might generate potential adverse impacts and to implement measures that will aim to minimise any such impacts and enhance and restore the water environment.

15.2.3.6 IS5 Protection of Access Routes

25. The aim of this policy is to protect all existing access routes in accordance with the Land Reform (Scotland) Act 2003 and the Countryside (Scotland) Act 1967 to maintain, protect and keep access open and free from obstruction. The Council's Core Plan identifies routes which are of significant value to Tourism and to local residents; developers should ensure these routes remain as attractive and convenient as it was prior to development.

15.2.4 Guidance

26. The following documents have been considered for the assessment of potential effects of the Development on, socio-economics, land use, recreation and tourism:

- Institute of Environmental Management and Assessment (IEMA) (2011) The State of Environmental Impact Assessment in the UK;
- Scottish Natural Heritage (2018) Environmental Impact Assessment Handbook; and
- Wind Farms and Tourism Trends in Scotland: BiGGAR Economics (2017).

15.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

15.3.1 Scoping Responses and Consultations

27. Consultation for this EIA Report topic was undertaken with the organisations shown in Table 15.1.

Table 15.1 Summary of Consultation Responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
British Horse Society	N/A	No response to Scoping Request with regard to socio-economics, land use or recreation and tourism.	N/A
Scottish Borders Council	Scoping Response (15/11/2019)	Information on the positive and negative economic effects of the Development (in addition to environmental/carbon offset benefits and impacts) would be welcome in order to achieve a rounded understanding of the positive and negative aspects of the Development. Assurances that the specific impacts of this Development would not have unacceptable effects on established local rural (particularly tourist) businesses. Provide some comparison in impacts between the Consented Scheme and the Development would be helpful in focussing on the likely differences, positive or negative. According to the records held by the Council, there are several trails and public rights of way through the Site and in the vicinity. The Council notes the following: • Cross Borders Drove Road; • Public Right of Way Noblehouse to Shiplaw; and • Promoted Path Courhope to Shiplaw. Wind turbines should be set back at a reasonable distance from rights of way and other potential recreational routes.	The potential for economic effects is addressed in Sections 15.4.1 & 15.5.1 of this Chapter. Information on carbon balance is included within Chapter 16 of this EIA Report. The potential for effects on tourism related receptors is addressed in Sections 15.4.3 & 15.5.4 of this Chapter. The potential for effects on public rights of way is addressed in Sections 15.4.3 and 15.5.4 of this Chapter. Turbines are all appropriately set back from public rights of way and other recreational routes by a minimum of 150 m. Comparison of effects provided in separate Project Comparison Document which accompanies the Application.
Scottish Borders Council	Increase in tip height consultation (17/02/2020)	No additional comments relevant to socio-economics, land use or recreation and tourism.	N/A
Eddleston & District Community	Scoping Response 15/11/2019	EDCC raise concerns regarding recreation and tourism receptors such as walkers, riders and cyclists who use trails and routes within	Concerns noted. The potential for effects on these

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
Council (EDCC)		the vicinity of the Development, specifically the Cross Borders Drove Road.	receptors is addressed in Sections 15.4.3 & 15.5.4 of this Chapter. In addition, **Chapter 5: Landscape and Visual Impact Assessment** provides an assessment of visual amenity impacts on tourism and recreation receptors.
John Muir Trust	Scoping Response 15/10/2019	No comment at the Scoping stage but will assess if and when application is lodged and make comment as necessary.	N/A
Lamancha, Newlands and Kirkurd Community Council	Scoping Response 18/11/2019	The Community Council consider that more should be done to reflect the impact on users of the Cross Borders Drove Road. This core path is being used increasingly by both local walkers, cyclists and horse riders as well as visitors from elsewhere in the Lothian/Borders region and long-distance walkers (it forms part of Scotland's National Trail, between Cape Wrath and Kirk Yetholm).	Noted. The Cross Borders Drove Road has been fully considered during the Development's design and has been assessed in full within this Chapter. In addition, **Chapter 5: Landscape and Visual Impact Assessment** provides an assessment of visual amenity impacts on tourism and recreation receptors.
The Royal Burgh of Peebles & District	Scoping Response 27/10/2019	Concern is noted that the visitor "gateway" impression will be severely impacted as the development will dominate the horizon for those travelling down from Edinburgh and will be visible from just south of Leadburn. The proposed reduction in the number of masts is welcomed, however there is still concern relating to the increase in unit size and the potential for a greater impact.	Concerns noted. **Chapter 5: Landscape and Visual Impact Assessment** will assess visual amenity and landscape impacts.
ScotWays	29/11/2019	The National Catalogue of Rights of Way shows rights of way BT6, BT10, BT40 and BT41 appear to be affected. The Heritage Paths project promotes two routes affected by the proposed application: the Cross Borders Drove Road and the Post Road through the Meldons.	All points raised are noted. The potential for effects on these receptors is addressed in Sections 15.4.3 & 15.5.4 of this Chapter and

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		The Development Site and surrounding areas have a high volume of recreational activity, including walkers and mountain bikers. Scotways note advice that wind turbines are set back a minimum distance equivalent to the height of the blade tip.	**Chapter 5: Landscape and Visual Impact Assessment** within this EIA Report.

15.3.2 Scope of the Assessment

28. This Chapter considers:

- The effect of the Development on the socio-economic resource, including employment, within the local, regional and national context;
- The effects on land-use in the immediate vicinity of the Development; and
- The effects on tourist attractions and recreation facilities within and near to the Development.

29. The key issues for the assessment of potential effects relating to the Development are:

- Short-term direct and indirect effects arising from the construction phase;
- Long-term direct and indirect effects that occur during the Operational phase, but are mitigated at decommissioning; and
- Permanent direct and indirect effects that continue after decommissioning.

30. Where appropriate conclusions from **Chapter 5: Landscape and Visual Impact Assessment** have been utilised to inform the assessments within this chapter. In those instances, cross references have been provided.

15.3.2.1 Socio-Economics

The principal socio-economic assessment criteria relate to the employment effects within the Study Area, as defined in Section 15.3.4. These effects are defined in terms of job years and the Gross Value Added (GVA) generated by any jobs created by the Development.

15.3.2.2 Land-Use

Land-use is the anthropogenic management and occupation of the environment, and what the land is used for. Developments can affect the ability of the land to be effectively used for its current purpose and also affect the potential use in the future. This can result from direct loss of land to new infrastructure, which is therefore no longer available for the current land-use; disruption to existing land-use operations can occur as a result of construction and operational activities of a new development (e.g. access restrictions). In this case, the land in which the Development is proposed ('the Site') consists predominantly of commercial forestry plantation and associated access track.

15.3.2.3 Recreation and Tourism

Recreational behaviour will be affected where a development potentially leads to a change in recreational habits or activities. Factors which might lead to change in recreational behaviour include loss, closure, or diversion of routes; obstructing access routes; enhancing access; reduction in amenity or intrusion; enhancement in amenity; and changes in setting and context of the recreational resource.

Where other technical assessments presented within this EIA Report, have considered the effects on recreational resources, *e.g.* **Chapter 5: Landscape and Visual Impact Assessment**, these findings will be drawn upon to inform the assessment of the wider recreational effects.

When assessing tourism, this Chapter deals primarily with amenity, which is defined as the pleasantness of the asset that contributes to its character (*i.e.* the essence of why the asset is visited). Amenity is inextricably linked with both recreational behaviour and tourism.

15.3.3 Elements Scoped Out of Assessment

There are 66 Listed Buildings within 5 kilometres (km) of the Site Boundary. The 66 Listed Buildings include: four Category A, 42 Category B and 20 Category C Listed Buildings.

The four Category A listed buildings are:

- Spitalhaugh House including Stable and Bridge;
- Portmore House;
- Court of Offices, Whim House; and
- Sundial, Lamancha.

Subdial, Lamancha falls outwith the ZTV and is therefore scoped out of further assessment.

31. Spitalhaugh House including Stable and Bridge, Portmore House, and the Court of Offices, Whim House all fall within the zone of theoretical visibility shown on Figure 5.2.1a of **Chapter 5: Landscape and Visual Impact Assessment**; however, both Spitalhaugh House including Stable and Bridge, and the Court of Offices, Whim House do not constitute as tourism and recreational receptors and are therefore scoped out of further assessment. Portmore House falls within the ZTV and its gardens are open to the public – outwith the Covid-19 pandemic – and is therefore scoped in for further assessment.

32. With the exception of the Great Polish Map of Scotland (Category B), Barony Castle Hotel (Category B), and Cringletie House Hotel (Category B), other Category B and C listed buildings within the local area, do not constitute tourist attractions, and are therefore scoped out of further assessment. The Great Polish Map of Scotland, as a tourism and recreation receptor is scoped in for further assessment; and both the Barony Castle Hotel & Cringletie House Hotel are scoped in for assessment as accommodation providers.

33. Listed buildings within 5 km of the Site Boundary are considered fully within **Chapter 6: Archaeology and Cultural Heritage**.

34. There are 3 Scheduled Monuments within the Site and a further 52 within 5 km of the Site Boundary. None are 'properties in care' heritage receptors, although some scheduled monuments within 5 km fall nearby locally promoted paths. However, the appreciation and experience of these scheduled monuments relates to setting which is considered fully within **Chapter 6: Archaeology and Cultural Heritage** therefore are scoped out of further assessment in this Chapter.

35. With regard to the cumulative effects assessment, there are no single turbines within 5 km, and relatively few single turbines beyond 5 km from the outermost wind turbines of the Development; therefore single turbines are scoped out and not considered within the assessment of cumulative effects. Similarly, there are relatively few turbines below 50 m tip height surrounding the Development, and none within 5 km; therefore turbines below 50 m in tip height are scoped out and not considered within the assessment of cumulative effects. Additionally, schemes at Scoping stage are scoped out of cumulative assessment.

15.3.4 Study Area

36. The study areas in this assessment are receptor specific and are detailed in the following sections.

15.3.4.1 Socio-Economics

37. The 'Study Areas' are defined as at local and national scale as follows:

- 'Local' is defined as comprising the electoral wards of both Penicuik and Tweeddale West;
- 'Regional' is defined as the Scottish Borders; the geographical size of the Scottish Borders area means that the Development will not affect the entire area. As national statistics apply to Scottish Borders as a single area, it will be referred to as a whole for a number of assessments; and
- 'National' is defined as Scotland.

15.3.4.2 Land Use

38. The 'Study Area' comprises the land within the Site Boundary and that taken by the Development, either temporarily during construction and decommissioning or permanently after operation and decommissioning.

15.3.4.3 Tourism and Recreation

39. The Primary Study Area for tourism and recreation comprises land within the Site Boundary when considering direct effects and within 10 km of the Site Boundary when considering indirect effects.

40. A Secondary Study Area, comprising land within the Site and within 5 km of the Site Boundary, is used for assessing direct and indirect effects on Recreational Routes, Core Paths and Rights of Way.

15.3.4.4 Cumulative Effects

41. Cumulative effects related to socio-economics, land-use and tourism are assessed in the context of other developments within 10 km of the Site. Cumulative effects in this context are generally related to visibility of multiple schemes, or effects such as multiple developments being constructed within proximity to one another. 10 km is therefore considered to be the conceivable maximum distance that these effects may occur.

15.3.5 Baseline Survey Data Sources

42. The following sources of information have been used to inform the baseline description set out in this Chapter:

- The Scottish Borders Council (www.scotborders.gov.uk);
- Visit Scotland (https://www.visitscotland.com/);
- Heritage Paths (www.heritagepaths.co.uk);
- National Statistics Online (www.statistics.gov.uk);
- National Records of Scotland (www.nrscotland.gov.uk/statistics-and-data);
- NOMIS Official Labour Market Statistics (www.nomisweb.co.uk);
- Scottish Tourist Board (www.visitscotland.com);
- ScotWays (www.scotways.com);and
- Sustrans (www.sustrans.co.uk)

43. Baseline conditions have been established through desktop studies and consultation, including responses to the Scoping Report. However, information gathered, and conclusions arrived at, through Site visits undertaken for other environmental topics, namely Landscape & Visual Impact Assessment and Cultural Heritage & Archaeology, have also been used to inform aspects of the baseline for this Chapter.

15.3.6 Methodology for the Assessment of Effects

44. Effects on the socio-economics, land use, and tourism and recreation resources can be described as direct, indirect or cumulative. The methodology for assessment of effects takes account of the NatureScot (2018) Environmental Impact Assessment Handbook.

45. The assessment aims to predict the likely effects (positive, negative or neutral) arising from the Development; these effects are divided into:

- Direct effects: those arising from an immediate effect of the Development such as physical disturbance to land-use resource and therefore the tourism and recreation resource, such as the footprint of the Development and/or construction/decommissioning activities restricting/blocking access to tourism receptors;
- Indirect effects: for example, opportunities that will be created by the Development further down the supply chain, (e.g. companies providing services to the Development), or visual effects from the Development on the amenity of nearby recreational assets;
- Induced effects: for example, employment opportunities created by the additional spend of wages within the local economy and the purchasing of basic materials, equipment and office space for staff, or a loss of business to an economic receptor from reduced attraction for visitors; and
- Cumulative Effects: where the combined effect of two or more developments are of greater significance than those of the Development itself.

46. The significance of the potential effects of the Development has been classified by professional consideration of the sensitivity of the receptor and the magnitude of change.

15.3.6.1 Sensitivity of Receptors

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

48. Table 15.2 details the framework for determining the sensitivity of receptors.

Table 15.2 Framework for Determining Sensitivity of Receptors

Sensitivity of Receptor	Definition
Very High	The asset is of very high socio-economic, land use, recreational or tourism value, or of importance at UK or International level, and has little or no capacity to absorb change without fundamentally altering its present character. For example, it is a destination in its own right (for attractions), with a substantial proportion of visitors on a national (UK) level and/or possesses priority in national policy.
High	The asset is of high socio-economic, land use, recreational or tourism value, or of importance to Scotland, and has low capacity to absorb change without fundamentally altering its present character. For example, it is a destination in its own right (for attractions), with a significant contribution to the national (Scotland) economy and/or possesses priority/weight in regional and/or local policy.

Sensitivity of Receptor	Definition
Medium	The asset is of some socio-economic, land use, recreational or tourism value, or is of regional importance (e.g. Scottish Borders), and has moderate capacity to absorb change without substantially altering its present character. For example, it is a popular destination among current visitors (for attractions), with a significant contribution to the regional economy and/or possesses priority/weight in regional and/or local policy.
Low	The asset has low socio-economic, land use, recreational or tourism value, or is of local importance (e.g. Penicuik and Tweeddale West), and is tolerant to change without detriment to its character. For example, it is an incidental destination for current visitors (for attractions).
Negligible	The asset is of little socio-economic, land use, recreational or tourism value, and is resistant to change. For example, an incidental destination for low numbers of current visitors (for attractions) and/or possesses no weight in authority policy.

49. Sensitivity of the receptor, in terms of landscape and visual impact, is assessed within **Chapter 5: Landscape and Visual Impact Assessment**; operational assessment conclusions are drawn into this assessment where appropriate, and interpreted in the context of tourism and recreation. Chapter 5 notes that the visibility of construction effects, beyond those experienced at the Site level where low-level construction activity will be apparent in certain views, will largely relate to views of tall cranes and turbine construction. These construction effects will be transient and change throughout the construction period as wind turbines are gradually constructed in sections. As such, visual effects during the construction phase are unlikely to exceed the level of effect associated with operational visual effects and are not assessed separately.

50. Professional judgement is applied when arriving at the sensitivity of receptors, based on both the table above and the findings from Chapter 5 (in the context of tourism and recreation).

15.3.6.2 Magnitude of Change

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

52. The criteria for assessing the magnitude of change are presented in Table 15.3.

Table 15.3 Framework for Determining Magnitude of Change

Magnitude of Change	Definition
High	Total loss or major alteration (positive or negative) of the socio-economic, land use, tourism or recreational assets/receptors.
Medium	Loss of, or alteration to (positive or negative), one or more key elements of the socio-economic, land use, tourism or recreational asset’s baseline value.
Low	Slight alteration (positive or negative) of the socio-economic, land use, tourism or recreational asset/receptors.
Negligible	Barely perceptible alteration (positive or negative) of the socio-economic, land use, tourism or recreational asset/receptors.

15.3.6.3 Significance of Effect

53. The sensitivity of the asset and the magnitude of the predicted change will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects. Table 15.4 summarises guideline criteria for assessing the significance of effects.

Table 15.4 Framework for Assessment of the Significance of Effects

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

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

55. Effects can be positive, negative or neutral and these are specified where applicable in the assessment within this Chapter.

56. Consideration is given to the national, regional and local baseline situation when assessing sensitivity, with the magnitude of change determined in proportion to the geographic scale relevant to each receptor.

57. In terms of socio-economic factors, potential effects would be significant if the Development resulted in any fundamental or material changes in population, structure of community, and economic activity during the operational phase of the Development.

58. For tourism and recreation factors, potential effects would be significant if the Development resulted in any fundamental or material changes in key elements/features of the receptor and/or if effects resulted in major, long-term alterations of the baseline conditions of the attraction, accommodation, recreation route etc.

59. In terms of land-use factors, potential effects would be considered significant if the Development resulted in long-term modification or net loss of an important land-use receptor.

15.3.7 Assessment Limitations

60. Data has been collated from published sources and no surveys specific to the Development and in support of this assessment have been carried out; however, as noted earlier, Site visits related to other environmental topics have, where appropriate, informed the baseline information.

61. Baseline figures have been taken from the latest available information prior to the current COVID-19 situation / economic crisis. As such, assessments are based on the economic climate prior to COVID-19. It is widely recognised that future impacts as a result of the pandemic are not yet fully understood, with the Scottish economy currently in a fragile state. In the medium term, the Scottish Government predict that GDP output is projected to recover gradually back to its pre-COVID level in 2023-24[19]. Given this projection and the anticipated construction date of 2027, pre-COVID data is considered to more be representative than that dating from 2020.

[19] Scottish Government, State of the Economy September 2020, [Online], available at https://www.gov.scot/publications/state-economy/ (Accessed 29/04/2021)

62. Whilst efforts have been made to ensure that the key tourism and recreation facilities in the area have been identified, it is possible that there are a number of small attractions that will not have been identified through the data collection process.

15.4 BASELINE CONDITIONS

63. The land within the Site which contains the proposed turbines and associated infrastructure covers an area of approximately 1,080 hectares (ha), centred on National Grid Reference (NGR) 320648, 647881. The Site lies wholly within the administrative boundary of the Council, and within both Penicuik and Tweeddale West electoral wards. It is noted that the Site is approximately 3.2 km south of Midlothian Council, and approximately 6.6 km east of South Lanarkshire Council.

15.4.1 Socio-economics

15.4.1.1 Population

Local Study Area

64. According to the last Census (2019 Estimate), the Local Study Area (LSA) had a total population of 24,207, of which 52% were female and 48% were male. This is divided as 13,812 within Penicuik[20] and 10,043 within Tweeddale West[21].

65. Of the LSA population (according to the latest available breakdown), 16.7% were aged under 16 (4,045 residents), 62% were aged 16-64 (15,040 residents), and lastly, 19.3% were aged 65 and over (4,670 residents)[22, 23].

Regional Study Area

66. The Scottish Borders Council area, in the south east of Scotland, is largely rural and includes numerous small towns and villages. It covers an area of around 4,732 km^2 with an estimated population of 115,510[24] (2019). The largest settlements are Hawick (approximately 14,003 residents), Galashiels (approximately 12,670 residents), and Peebles (approximately 8,538 residents)[25].

67. In 2019, the female population of the Scottish Borders was higher than men with 51.4% being female and 48.6% being male. The largest age group within the population is between the ages of 45 and 64; the average life expectancy was higher for females at 82.1, with males being 78.8, both of which are above the Scottish average[26].

[20] Scottish Government Statistics (2017) Electoral Ward Penicuik [Online] Available at: https://statistics.gov.scot/atlas/resource?uri=http%3A%2F%2Fstatistics.gov.scot%2Fid%2Fstatistical-geography%2FS13003018 (Accessed 12/04/2021)
[21] Scottish Government Statistics (2017) Electoral Ward Tweeddale West[Online] Available at: https://statistics.gov.scot/atlas/resource?uri=http%3A%2F%2Fstatistics.gov.scot%2Fid%2Fstatistical-geography%2FS13002761 (Accessed 12/04/2021)
[22] Scottish Borders (2015) Tweeddale West: Overview of Population, Deprivation, Employment and Schools (Accessed 26/02/21)
[23] Midlothian (2015) Penicuik Neighbourhood Profile (Accessed 26/02/21)
[24] National Records of Scotland (2020) Scottish Borders Council Area Profile [Online] Accessed here: https://statistics.gov.scot/atlas/resource?uri=http%3A%2F%2Fstatistics.gov.scot%2Fid%2Fstatistical-geography%2FS12000026 (Accessed 11/02/21)
[25] Scottish Borders (2014) Scottish borders Town Matrix and Town Centre Index [Online] Available at: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjS6pDD39XvAhWQX8AKHbruDu0QFjAAegQIBBAD&url=https%3A%2F%2Fwww.scotborders.gov.uk%2Fdownload%2Fdownloads%2Fid%2F3428%2Fscottish_borders_town_matrix_2016.pdf&usg=AOvVaw1-Z6XZY52dVU7KtgSjent5 (Accessed 01/04/2021)
[26] National Records of Scotland (2020) Scottish Borders Council Area Profile [Online] Accessed here: https://scottishborders.moderngov.co.uk/Data/Scottish%20Borders%20Council/201008191000/Agenda/Item%20No.%208%20-%20sbfigures10.pdf (Accessed 11/02/21)

68. By mid-2019, 25% of the Scottish Borders population was over 65 years, which is higher than the Scottish average of 19%[27]. National Records of Scotland projections signal that in Scotland the gap between older and younger populations is expected to expand further over time. The pensionable age (over 65) population is set to continue to increase over the next 30 years, however with the pensionable age set to rise to 67 in 2028, the number of people over the pensionable age may decrease; the change in pensionable age is not accounted for within this assessment.

69. The employment rate for the working age population aged 16-24 in the Scottish Borders was 75.7% which was above the rate for Scotland as a whole (74.5%). In the Scottish Borders, 80.3% of males were in employment compared to the 78.1% Scottish average; 71.4% of women were in employment compared to the 71.1% Scottish average[28].

70. There are five local based area partnerships within the Borders and these are:

- Berwickshire;
- Cheviot;
- Eildon;
- Teviot and Liddesdale; and
- Tweeddale.

71. The aforementioned local area partnerships provide locals with an opportunity to take part in informal discussion and debate about the challenges facing their local communities. The local area partnerships seek to bring together a range of different people from different organisations, groups and businesses.

National Study Area

72. According to the last Census (2019 estimation), Scotland's population is approximately 5,463,300[29]. This is its highest ever population, and an increase of 25,200 people (0.46%) since 2018. Since 1959, Scotland's population has increased by 300,700 and has been growing each year since 2000, though the rate of growth over this period has varied.

15.4.1.2 Employment

Local Study Area

73. Within the electoral ward of Penicuik, in 2015, 42.4% of the population were in full-time employment; 15.9% were in part-time employment; 6.6% were self-employed and only 4% were unemployed[30].

74. Tweeddale West has shown a consistently lower rate of unemployment compared to the Scottish Borders as a whole, and Scotland. The unemployment claimant rate in February 2017 in Tweeddale West was shown to be approximately just over 1%, whereas for the Scottish Borders and Scotland, it was approximately 1.7% and approximately 2.4%, respectively[31].

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[27] National Records for Scotland (2019) Mid-Year Population Estimates Scotland, Mid-2019 [Online] Available at: https://www.nrscotland.gov.uk/files//statistics/population-estimates/mid-19/mid-year-pop-est-19-report.pdf (Accessed 22/02/2021)
[28] Skills Development Scotland (2019) Regional Skills Assessment, Scottish Borders [Online] Available at: https://www.skillsdevelopmentscotland.co.uk/media/46136/scottish-borders-rsa-summary-report.pdf (Accessed 26/02/2021)
[29] National Records of Scotland (2019) Mid-Year Population Estimates Scotland, Mid-2019 [Online] Available at: https://www.nrscotland.gov.uk/files//statistics/population-estimates/mid-19/mid-year-pop-est-19-report.pdf (Accessed 11/02/2021).
[30] Midlothian (2015) Penicuik Neighbourhood Profile (Accessed 26/02/21)
[31] Scottish Borders Council (2017) Tweeddale West – Overview of Population, Deprivation, Unemployment and School [Online] Available at: https://www.scotborders.gov.uk/download/downloads/id/2982/ward_1_-_tweeddale_westpdf.pdf (Accessed 03/03/2021)

Regional Study Area

75. According to the last Census (2011), 53,600 of Scottish Borders population were in employment with 69.7% being in full-time employment; 18.4% of those full-time employees are earning less than minimum wage.

76. In 2017, there were 5,705 business sites within the Scottish Borders, with 4,516 of those being business units[32]. In 2017 the male employment rate was at 79.9% whereas the female employment rate was significantly lower at 69.5%[33].

77. In 2019[34], the employment rate for the working age population (aged 16-64) in the Scottish Borders was 75.7%, which was above the rate for Scotland (74.5%). Compared to Scotland, the region had above average employment rates for:

- Young people (aged 16-24) at 61.9%, compared to 58.3%;
- Males at 80.3%, compared to 78.1%;
- Females at 71.4%, compared to 71.1%;
- Disabled people at 49.0%, compared to 45.9%; and
- Ethnic minorities at 76.2%, compared to 57.4%.

78. The industries and their employment rates within the Scottish Borders[35] include:

- Wholesale and retail trade (16%);
- Human health and social work (16%);
- Manufacturing (10%);
- Construction (8%);
- Agriculture, forestry and fishing (8%);
- Education (7%);
- Accommodation and food service activities (6%);
- Professional, scientific and technical activities (6%);
- Arts, entertainment and recreation (4%);
- Administrative and support service activities (4%);
- Public administration and defence (4%);
- Transportation and storage (3%)
- Other service activities (2%);
- Real Estate activities (2%);
- Information and communication (1%);
- Electricity, gas and Steam (1%);
- Financial and insurance activities (1%);
- Water supply, sewerage and waste management (<1%); and
- Mining and quarrying (<1%).

[32] Scottish Government Statistics (2017) Scottish Borders [Online] Available at: https://statistics.gov.scot/atlas/resource?uri=http%3A%2F%2Fstatistics.gov.scot%2Fid%2Fstatistical-geography%2FS12000026 (Accessed 11/02/21)
[33] Scottish Government Statistics (2017) Scottish Borders [Online] Available at: https://statistics.gov.scot/atlas/resource?uri=http%3A%2F%2Fstatistics.gov.scot%2Fid%2Fstatistical-geography%2FS12000026 (Accessed 11/02/21)
[34] Skills Development Scotland (2019) Regional Skills Assessment, Scottish Borders [Online] Available at: https://www.skillsdevelopmentscotland.co.uk/media/46136/scottish-borders-rsa-summary-report.pdf (Accessed 04/03/2021)
[35] Skills Development Scotland (2019) Regional Skills Assessment, Scottish Borders [Online] Available at: https://www.skillsdevelopmentscotland.co.uk/media/46136/scottish-borders-rsa-summary-report.pdf (Accessed 26/02/2021)

79. Employment in the Scottish Borders has decreased by 1.0% from 2009 to 2019[36]. This was largely caused by job losses in the larger, more prominent sectors such as:

- Human Health and Social Work Activities (-1500 jobs);
- Manufacturing (-700 jobs); and
- Accommodation and Food Service Activities (-400 jobs)

80. While these sectors experienced job losses, other sectors grew. This employment decline is not predicted to continue. From 2019 to 2029[36], employment is expected to grow by 1.9% which equates to 1000 jobs over the growth period. In comparison to Scotland as a whole, this is a slower rate of growth; a 3% increase in employment is expected to occur across Scotland.

81. The greatest increase in employment in the Scottish Borders is expected to occur from 2019 to 2029 in the following sectors:

- Construction and Professional (400 jobs);
- Scientific and Technical (400 jobs);
- Arts, Entertainment and Recreation (300 jobs);
- Administration and Support Services (300 jobs); and
- Wholesale and Retail (200 jobs).

82. Over the period to 2029, full-time employment is expected to increase in the Scottish Borders with 700 more full-time jobs in 2029 compared to 2019. Both male and female full-time employment will increase, by 500 and 200 jobs respectively. Part-time employment is also expected to increase by 300 jobs. Female part-time employment is forecast to decline by 100 jobs, but some of this decline is expected to be offset by growth of 400 jobs in male part-time employment[37].

15.4.1.3 Renewables and Economic Development

83. The UK renewables industry plays a central role in the economy by producing, transforming and supplying energy in its various forms to all sectors. UK Government statistics released on the 31st January 2019 show turnover from renewable energy activity in Scotland was £5.5 million in 2017[38], with individual sectors showing employment increases of up to 300% between 2015 and 2016[39]. The same study found that Scottish renewable developments in support a total of 17,700 jobs, with 33% of those resulting from onshore wind projects (5,800 jobs). In June 2021 the University of Strathclyde's Fraser of Allander Institute released statistics which shows that 22,660 jobs are supported by green energy in Scotland[40]. Additionally, Scottish Government statistics show that in 2017 the Scottish low carbon and renewable energy sector generated over £11 billion in

[36] Skills Development Scotland (2019) Regional Skills Assessment, Scottish Borders [Online] Available at: https://www.skillsdevelopmentscotland.co.uk/media/46136/scottish-borders-rsa-summary-report.pdf (Accessed 04/03/2021)
[37] Skills Development Scotland (2019) Regional Skills Assessment, Scottish Borders [Online] Available at: https://www.skillsdevelopmentscotland.co.uk/media/46136/scottish-borders-rsa-summary-report.pdf (Accessed 04/03/2021)
[38] Office for National Statistics – Low carbon and renewable energy economy indirect estimates (2019) [Online] Available at: https://www.ons.gov.uk/economy/environmentalaccounts/datasets/lowcarbonandrenewableenergyeconomyindirectestimatesdataset (Accessed 11/02/2021).
[39] Scottish Renewables (2018) Scots renewable energy industry turnover £5.5 billion, new UK Government stats show [Online] Available at: http://www.scottishrenewables.com/news/scots-renewable-energy-industry-turnover/ (Accessed 11/02/2021)
[40] University of Strathclyde / Fraser of Allander Institute (2021) The Economic Impact of Scotland's Renewable Energy Sector [Online] Available at: https://www.scottishrenewables.com/assets/000/001/718/2021_FAI_Economic_Impact_of_Scotland_s_Renewable_Energy_Sector_original.pdf?1622564058 (Accessed 04/06/2021)

turnover, whilst supporting over 46,000 jobs[41]. Scottish onshore wind projects, which support 8,000 jobs, delivered almost half (45.8%) of the UK's turnover from onshore wind in 2016, the latest year for which figures are available. Scotland's turnover from onshore wind activities totalled £1.5 billion in 2016 and achieving 'world leader' status for renewables in 2017[42].

84. The International Energy Agency (IEA) released statistics following analysis of daily data through mid-April 2020 during the COVID-19 pandemic (published in their Global Energy Review 2020) showing that countries in full lockdown, including the UK, experienced an average 25% decline in energy demand per week[43]. Due to COVID-19, the requirements for electricity security and resilient energy systems are heightened, with the need for clean energy transitions to be at the centre of development for economic recovery. The IEA also comment that with the outbreak of COVID-19, the economy would see a collapse in demand for fossil fuels, meaning electricity will play the biggest role in the global energy system in 2020[44].

85. Investment in renewable energy generation in the Scottish Borders is not only helping to meet Council and national climate change targets but it has also delivered economic benefits for the area.

86. As a result of the COVID-19 global pandemic, a global recession is expected to happen as the ongoing lockdowns across the globe have resulted in a reduction in employment and economic investment. In relation to energy, the demand for electricity and transportation fell and by mid-April the energy demand in countries under full lockdown fell by 25%[45] which led to a decline in oil prices and as a result, saw a decline in the fossil fuel industries. Since the beginning of the pandemic, electricity generation from renewables has been ongoing with a 1.5% increase in the global use of renewable energy[46]; renewable electricity generation increased by almost 3% in the first quarter of 2020. However, new renewable energy projects have slowed down as a result of a decline in construction due to supply chain disruptions, lockdown measures and social distancing guidelines[47] which has had an impact on existing and planned projects, investment, employment, and supply chains[48].

87. Furthermore, figures from Scottish Renewables[49] show opportunities for an economic boost from renewable energy projects and a sustained green recovery from the COVID-19 pandemic, signifying that renewable development could play a key role in the country's

[41] Scottish Government (2019) Annual Energy Statement 2019 [Online] Available at: https://www.gov.scot/publications/annual-energy-statement-2019/pages/3/ (Accessed 11/02/2021)
[42] WWF (2017) Scotland a 'World Leader' for renewables in 2017 [Online] https://www.wwf.org.uk/updates/scotland-world-leader-renewables-2017 (Accessed 11/02/2021)
[43] The International Energy Agency (2019) COVID-19 [Online] Available at: https://www.iea.org/topics/covid-19 (Accessed 11/02/2021)
[44] The Guardian (2020) Covid-19 crisis will wipe out demand for fossil fuels, says IEA [Online] Available at: https://www.theguardian.com/business/2020/apr/30/covid-19-crisis-demand-fossil-fuels-iea-renewable-electricity (Accessed 11/02/2021)
[45] Khanna, M. (2020), COVID-19: A Cloud with a Silver Lining for Renewable Energy?. Applied Economic Perspectives and Policy. doi:10.1002/aepp.13102 [Online] Available at: https://onlinelibrary.wiley.com/action/showCitFormats?doi=10.1002%2Faepp.13102 (Accessed 11/02/2021)
[46] Khanna, M. (2020), COVID-19: A Cloud with a Silver Lining for Renewable Energy?. Applied Economic Perspectives and Policy. doi:10.1002/aepp.13102 [Online] Available at: https://onlinelibrary.wiley.com/action/showCitFormats?doi=10.1002%2Faepp.13102 (Accessed 11/02/2021)
[47] Khanna, M. (2020), COVID-19: A Cloud with a Silver Lining for Renewable Energy?. Applied Economic Perspectives and Policy. doi:10.1002/aepp.13102 [Online] Available at: https://onlinelibrary.wiley.com/action/showCitFormats?doi=10.1002%2Faepp.13102 (Accessed 11/02/2021)
[48] IRENA (2020) The Post-Covid Recovery: an agenda for resilience, development and equality. [Online] Available here: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jun/IRENA_Post-COVID_Recovery_2020.pdf (Accessed 11/02/21)

economic recovery, including both direct employment and large-scale financial investment.[49]

88. The Scottish Renewables research indicates that investment in renewable energy could speed up the recovery from the economic impacts of COVID-19 at a faster rate. There are opportunities for renewable energy production to grow five times faster than current trends. International Renewable Energy Agency (IRENA) has promoted increased investment in renewables as an economic driver for the Covid-19 recovery which could see the creation of 5.5 million additional jobs, globally, by 2023[50] in the industry if governments follow IRENA's 'Transforming Energy Scenario'. A worldwide second outbreak of COVID-19 is estimated to cause a 7.6% decline in global GDP, with worst affected economies declining as much as 11-12%[51]; therefore, investment in renewable energy projects can make the energy economy more robust to the challenges of COVID-19 and economic uncertainty.

15.4.2 Land Use

89. The Site is currently managed for commercial forestry operations by Forestry and Land Scotland (FLS); however, the area around Courhope in the south of the Site consists of improved upland pasture, utilised for sheep grazing, and improved grassland which remains clear of forestry. The forestry on Site is coniferous woodland at varying stages of maturity, including substantial areas of clear felling awaiting re-planting.

90. The topography of the Site and the immediate vicinity is generally complex with exposed hill tops. The Site encompasses the rolling Cloich Hills, including Peat Hill (466m Above Ordnance Datum (AOD)), Ewe Hill (462m AOD), White Rig (325m AOD), and Crailzie Hill (476m AOD). The hills are dissected by a number of watercourses, including Middle Burn, Flemington Burn, Martyr's Dean, Courhope Burn and Harehope Burn.

91. There are a number of existing forestry tracks used for the commercial forestry harvesting. The Site is currently accessible for informal non-vehicular recreation such as walking, cycling and horse riding, though there are health and safety restrictions in place during periods of harvesting and other forestry operations which means the network of paths and tracks is not always fully accessible to the public.

92. There is currently one active quarry on Site, located at approximate NGR 320456, 649061 which is utilised periodically by FLS to obtain rock, and is otherwise not in use. Public access is not permitted within the quarry.

93. In addition to the operational commercial forest of Cloich Forest, the Site and immediate vicinity consists of further areas of forestry and rural farmland, primarily used for grazing and other agricultural activities.

[49] Scottish Renewables (2020) Renewable energy research shows green covid-19 recovery jobs and investment boost [Online] Available at: https://www.scottishrenewables.com/news/648-renewable-energy-research-shows-green-covid-19-recovery-jobs-and-investment-boost (Accessed 11/02/2021)
[50] IRENA (2020) The Post-Covid Recovery: an agenda for resilience, development and equality. [Online] Available here: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jun/IRENA_Post-COVID_Recovery_2020.pdf (Accessed 11/02/21)
[51] IRENA (2020) The Post-Covid Recovery: an agenda for resilience, development and equality. [Online] Available here: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jun/IRENA_Post-COVID_Recovery_2020.pdf (Accessed 11/02/21)

15.4.3 Tourism and Recreation

15.4.3.1 Tourism and Recreation Receptors

94. Tourism is a key element in the socio-economic, environmental, and cultural welfare of Scotland. In 2019, around 17.5 million overnight trips were taken in Scotland (UK and international visitors) for which visitor expenditure totalled around £5.9 billion[52]. These figures represent substantial increases on 2018 figures; in 2018, around 15.5 million overnight trips were taken in Scotland, for which visitor expenditure totalled around £5.1 billion[53].

95. In 2017-2019 there were 3,074,000 visits to the Scottish Borders; 1,264,000 of which were overnight visits[54]. A total net tourism spend of £144 million was spent in the Scottish borders during this time. The Scottish Borders experienced an increase in overnight tourism during this period with a 9% increase compared to 2016-2018; bednights increased by 25% and tourism expenditure increase by 13% over the same period.

96. The growth in visitors to the Scottish Borders was largely driven by domestic visitors. Residents of Scotland made 13% more overnight trips during 2017-2019 when compared to 2016-2018; and additionally spent 14% more money compared to 2016-2018. Increasing numbers of English and Welsh visitors also travel to the Scottish Borders and generated more than half of the total trips, bednights and overnight expenditure in the region. International visitors to the borders also rose in the period 2017-2019 and increased their average length of stay[55].

97. Domestic day trips to the Borders fell by 10% to 2.7 million per year 2017-2019, although the annual day trip expenditure increased.

98. In 2019, 57% of visitors went to Hotels for accommodation, with 52% visiting self-catering services and 39% visiting Guest Houses/B&Bs. Free tourist attractions were the most popular in the Scottish Borders region; the most visited is the Tweed Valley Forest Park (347,763 visitors). The most visited paid tourist attraction was Melrose Abbey (61,325 visitors)[56].

99. The Scottish Borders tourism industry is primarily made up of built heritage facilities, a wide range of outdoor spaces and activities, a wide range of speciality shopping and artist studios/galleries, as well as high quality accommodation[57].

100. The table below indicates a number of tourist attractions within the Primary Study Area of 10 km of the Site Boundary.

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[52] VisitScotland (2020) Key Facts on Tourism in Scotland 2019 [Online] Available at: https://www.visitscotland.org/binaries/content/assets/dot-org/pdf/research-papers-2/key-facts-on-tourism-in-scotland-2019.pdf (Accessed 11/02/2021)
[53] VisitScotland (2019) Key Facts on Tourism in Scotland 2018 [Online] Available at: https://www.visitscotland.org/binaries/content/assets/dot-org/pdf/research-papers-2/key-facts-on-tourism-in-scotland-2018-v2.pdf (Accessed 22/02/2021)
[54] Visit Scotland (2019) Insight Department: Scottish Borders Factsheet. [Online] Available at: https://www.visitscotland.org/binaries/content/assets/dot-org/pdf/research-papers-2/regional-factsheets/scottish-borders-factsheet-2019.pdf (Accessed 04/03/2021)
[55] Visit Scotland (2019) Insight Department: Scottish Borders Factsheet. [Online] Available at: https://www.visitscotland.org/binaries/content/assets/dot-org/pdf/research-papers-2/regional-factsheets/scottish-borders-factsheet-2019.pdf (Accessed 04/03/2021)
[56] Visit Scotland (2019) Insight Department: Scottish Borders Factsheet. [Online] Available at: https://www.visitscotland.org/binaries/content/assets/dot-org/pdf/research-papers-2/regional-factsheets/scottish-borders-factsheet-2019.pdf (Accessed 04/03/2021)
[57] Tourism and Leisure Solutions (2015) Midlothian and Scottish Borders Tourism Destination Audit 2015 [Online] Available at: https://www.scotborders.gov.uk/downloads/file/2186/tourism_destination_audit_2015 (Accessed 11/02/2021)

Table 15.5: Tourist Activities and Attractions within the Primary Study Area (within 10 km of the Site Boundary)

Tourist Activity / Attraction	Sensitivity of Receptor[58]	Approximate Distance from Site Boundary	Contextual Location	Theoretical Visibility from Receptor (Y/N)
White Meldon	Medium	2 km (SE)	Peebles	Y
Black Meldon	Medium	2 km (SE)	Peebles	Y
The Great Polish Map of Scotland	Low	2.5 km (E)	Peebles	Y
Portmore House & Gardens	Low	3.5 km (NE)	Peebles	Y
Peebles Golf Club	Low	5 km (S)	Peebles	N
Borderloop – cycling track	Low	5.5 km (SE)	Peebles	Y
Neidpath Castle	Low	5.6 km (SE)	Peebles	N
Haylodge Park	Low	6.5 km (SE)	Peebles	N
John Buchan Story	Medium	7 km (SE)	Peebles	Y
Peebles Hydro and Spa	Medium	7.5 km (SE)	Peebles	N
Glentress Forest – 7 Stanes Mountain Biking	Low	8.71 km (SE)	Peebles	Y
Go Ape	Medium	9.8 km (SE)	Peebles	Y
Glentress Forest	Low	9.8 km (SE)	Peebles	Y
Kailzie Gardens	Low	9.8 km (SE)	Peebles	N
Pentlands Hills Regional Park	Medium	9.5 km (NW)	Edinburgh	Y
Tweed Valley Park	Low	10 km (SE)	Peebles	Y
National Cycling Route 196	Medium	10 km (NW)	Penicuik	Y

101. Those attractions scoped out of further assessment are highlighted in orange; those highlighted in blue are scoped in for further assessment.

102. The following tourism activities and attractions do not have theoretical visibility based on Figure 5.1.2a (**Chapter 5: Landscape and Visual Impact Assessment**), and are scoped-out and not assessed further within this assessment:

- Peebles Golf Club;
- Neidpath Castle;
- Haylodge Park;
- Peebles Hydro and Spa; and
- Kailzie Gardens.

103. The Tweed Valley Park, National Cycling Route 196, Go Ape, and Glentress Forest are at distances of approximately 10 km from the Site; as a result of this intervening distance,

[58] The rationale for determining the sensitivity of each receptor, in line with the outlined methodology, is explained below.

they are very unlikely to experience indirect significant effects and are therefore scoped out of further assessment.

104. Both the Borderloop – Cycling Track and John Buchan Story are tourism activities and attractions which fall within the ZTV of the Development; however, significant effects are unlikely to occur due to the intervening distance and nature of these receptors, therefore are scoped out of further assessment.

105. Those highlighted in blue within Table 15.5, and shown on Figure 15.1, are popular and well-established tourist attractions and have the potential to experience effects as a result of the Development. They experience high visitor numbers and are important to local, regional, and national economies. The following sections provide baseline information for each attraction in-turn, including visitor numbers etc. where possible together with a judgement regarding their sensitivity based on the criteria presented in Table 15.2.

White Meldon & Black Meldon

106. White Meldon and Black Meldon are prehistoric hillforts which are open to visitors, largely recreational hillwalkers. White Meldon rises to approximately 427 m AOD and overlooks the west of the valley of Meldon Burn; Black Meldon rises to approximately 407 m AOD, and is located approximately 1.6 km west of White Meldon. Both are popular with recreational hillwalkers, and other recreational users of the natural environment. White Meldon is within Tweed Valley Special landscape Area (SLA) and Black Meldon is within the Upper Tweeddale National Scenic Area, both designations are largely located to the west, south, and east of the receptors.

107. **Chapter 5: Landscape and Visual Impact Assessment** assessed views of the Development from Black Meldon as Major and Significant; Chapter 5 did not specifically assess views of the Development from White Meldon, however as the ZTV shows similar visibility as the neighbouring Black Meldon due to comparable location and scale, White Meldon will likely have the same operational visual effects as Black Meldon.

108. White Meldon and Black Meldon generally attract local visitors; however, some visitors from outwith the local area may make recreational use of the hill tops. Users of the receptors, largely recreational hillwalkers, will make use of the whole walking routes around the receptors, rather than just the summit alone. Additionally, when at the summit, users will enjoy 360° panoramic views, rather than a singular field of view.

109. Therefore, given the receptors are considered to be of some recreational and tourism value which have a moderate capacity to absorb change, they are judged to be of medium sensitivity.

The Great Polish Map of Scotland

110. The Great Polish Map of Scotland is a unique feature within the Scottish Landscape, it is a physical map of Scotland, sculpted in concrete and measures 40 m by 50 m[59]. The map lies in the grounds of Barony Castle (now Barony Castle Hotel) and was built between 1974 and 1979 by a small group of Poles from the Jagiellonian University of Krakow, Poland. It was abandoned but then restored between 2010 and 2017.

111. The Great Polish Map of Scotland is designated as a listed building (LB51967) and attracts more than just local visitors. However, the receptor is within the grounds of Barony Castle Hotel, and is surrounded by mature mixed woodland, forming a substantial barrier to outward-looking views, and therefore is considered to be tolerant to change and therefore of low sensitivity.

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[59] Barony Castle (2021) The Great Polish Map of Scotland [Online] Available at: https://www.baronycastle.com/about-barony-castle/the-great-polish-map-at-barony-castle/ (Accessed 20/04/2021)

Portmore House & Gardens

112. Portmore House and its gardens were built in the 19th century; they were neglected but were restored in 1987. The gardens cultivate a wide range of plants, with large Victorian glasshouses which contain exotic plants. Outside of the walled garden is the water garden which leads to a woodland walk. The house and gardens are approximately 3.5 km east from the Site, along the A703. Only the gardens and grounds are open to the public, and therefore constitute as a tourist attraction.

113. Portmore House is designated as a Category A listed building; while the Entrance Gateway and Lodge is designated as a Category C listed building, and the grounds are designated as a Garden and Designed Landscape (GDL). An assessment of the potential cultural heritage effects is undertaken within **Chapter 6: Archaeology and Cultural Heritage**, which finds that as a whole the Development's impact on the setting of the GDL is not significant.

114. **Chapter 5: Landscape and Visual Impact Assessment** adjudged that there will be a Moderate and significant visual effect as a result of the Development from its grounds.

115. The Gardens are situated within an area with mature forestry on all sides of the receptor, this forestry forms a barrier to outward looking views at many locations within the grounds of Portmore House and Gardens. Some views over existing forestry do exist within the grounds of the receptor, and when looking towards the Development, as described above and in **Chapter 5: Landscape and Visual Impact Assessment**. However, the receptors' attraction, from a tourism and recreation point of view, is largely enjoyed at ground level within the gardens to the north of Portmore House, where views outward are screened by woodland. Subsequently, the receptor is adjudged to be tolerant to change and is classed as a local receptor, therefore considered to be of low sensitivity.

John Buchan Way

116. John Buchan Way is a 22 km way marked trail from Peebles to Broughton which utilises minor roads, tracks and good paths on open moorland and farmland, traversing various hills and valleys of Tweeddale; key hills to see along the way include Stobo Hope Head and Penvalla and Hammer Head. The route is named after Tweeddale's John Buchan, who has a museum dedicated to him in Peebles town centre.

117. It should be noted that the John Buchan Way is a recreational path; however, falls outwith the Secondary Study Area for recreational paths, therefore, as a path which forms as a tourist attraction, the John Buchan Way is included within tourism and recreation receptors for assessment.

118. **Chapter 5: Landscape and Visual Impact Assessment** adjudged Moderate and Significant visual effect for a section of the route between the B712 / Stobo Road and Morning Hill (approx. 11 km of 22 km route). Beyond this section of the route, there will be visual no effect. Therefore, the receptor has a moderate capacity to absorb change; and as the receptor extends outwith the local context, across 22 km of the Scottish Borders, the receptor is considered to be of medium sensitivity.

Glentress Forest –7 Stanes Mountain Biking

119. The 7 Stanes are mountain biking centres which span across the south of Scotland and offer some of the best mountain biking in the country; they attract visitors from a national and worldwide level. The Glentress 7 Stanes Mountain Biking has routes that provide views of the Tweed Valley; they also have a Wildlife Room where visitors can learn more about the wildlife found in Glentress Forest.

120. The receptor is located within Glentress Forest, and therefore largely within areas of dense forestry that restricts and blocks wider views of the surrounding landscape. As a

result, the receptor is considered to be tolerant to change and therefore, of low sensitivity.

Pentlands Hills Regional Park

121. The Pentland Hills are a range of medium sized hills (the largest, Scald Law, is 1900 feet) that extend for around 25km from Edinburgh to near Dolphinton. The Pentlands Hills Regional Park encompasses the northern hills between the City of Edinburgh and Carlops. The Pentland Hills provide hillside grazing for sheep farms and sport shooting is also a seasonal activity in some locations. The park has a good network of footpaths for public access and is a popular destination for visitors from Edinburgh and the Lothians.

122. As a regionally important area of upland land formations and recreational routes, with often expansive wider views of the surrounding landscape, the Pentlands Hills Regional Park is considered of medium sensitivity.

15.4.3.2 Local Accommodation

123. There are a number of settlements near to the Site which offer a range of accommodation; the nearest settlement offering accommodation is Eddleston approximately 3 km east of the nearest indicative turbine (T5).

124. Table 15.6 presents local accommodation options within the primary study area of 10 km; this information has been gathered through a search of available online information. It is acknowledged that there may be some additional accommodation available which is not detailed within online sources which have been used to complete the baseline.

Table 15.6: Local Accommodation within the Study Area (within 10 km of the Site Boundary)

Accommodation Name	Address	Approximate Distance from Site boundary
Barony Castle Hotel	Old Manse Road, Eddleston, Peebles, EH45 8QW	2.5 km (E)
The Horseshoe Inn	Eddleston, Peebles, EH45 8QP	3 km (E)
Cringletie House Hotel	Edinburgh Road, Peebles, EH45 8PL	4 km (E)
Drochil Castle	Ann Black, Drochil Castle Farm, West Linton EH46 7DD	4.6 km (SW)
Winkston Farmhouse	Edinburgh Rd, Peebles EH45 8PH	5 km (SE)
Gartmore Holiday Cottage	Blyth Square, West Linton EH46 7EG	5 km (NW)
The Gordon Arms Hotel	Dolphinton Rd, West Linton EH46 7DR	5.3 km (NW)
Torview Bed and Breakfast	Torview House, Peebles EH45 8NP	5.5 km (S)
Slipperfield Cottages	Slipperfield House, West Linton EH46 7AA	5.6 km (W)
Tonetine Hotel	High St, Peebles EH45 8AJ	6 km (SE)
Green Tree Hotel	41 Eastgate, Peebles EH45 8AD	6.8 km (S)
Rutherfors house Bed & Breakfast	Rutherford House, West Linton EH46 7AS	6.9 km (NW)
Cross Keys Hotel	24 Northgate, Peebles EH45 8RS	6.98 km (SE)
The Park Hotel	2 Innerleithen Rd, Peebles EH45 8BA	7 km (SE)
The Neidpath Inn	27-29 Old Town, Peebles EH45 8JF	7 km (SE)
Peebles Hydro & Spa	Innerleithen Rd, Peebles EH45 8LX	7.5 km (SE)
Whitestone House	Innerleithen Rd, Peebles EH45 8BD	7.7 km (SE)

Accommodation Name	Address	Approximate Distance from Site boundary
Kingsmuir Guest House	Springhill Rd, Peebles EH45 9EP	7.8 km (SE)
Craiguart Hotel	Eshiels, Innerleithen Rd, Peebles EH45 8LZ	8 km (SE)
Roberton Mains Farm Cottage	Roberton Mains Farm, Dolphinton, West Linton EH46 7AB	8 km (E)
Ferniehaugh Cottage	West Linton EH46 7HJ	8 km (W)
The Leadburn	Leadburn, West Linton EH46 7BE	8 km (N)
The Allan Ramsay House	Carlops, Penicuik EH26 9NF	8.4 km (NW)
Patieshill Farmhouse B & B	Patieshill Farm, Penicuik EH26 9NB	8.5 km (NW)
Stobo Castle Health Spa	Stobo, Peebles EH45 8NY	9.5 km (S)
Peggyslea Farm Visit Bed & Breakfast	Peggyslea Farm, Nine Mile Burn, Penicuik EH26 9LX	9.5 km (NW)
Glentress Forest Lodges	Eshiels, Peebles EH45 8NA	10 km (SE)
Glentress Hotel	Glentress, Peebles EH45 8NB	10 km (SE)

125. As noted above, it is acknowledged that there may be other accommodation and hospitality providers which exist within the Primary Study Area that have not been noted in Table 15.6 as a result of some providers of accommodation not being listed on available online sources. The visual effects upon nearby settlements are assessed within **Chapter 5**: **Landscape and Visual Amenity.**

15.4.3.3 Public Rights of Way and Core Paths

126. There are many recreational routes, paths, and trails in proximity to the Development and within the Secondary Study Area (5 km of the Development), including:

- Cross Borders Drove Road;
- Post Road through the Meldons;
- Core Paths;
- Promoted Paths; and
- Public Rights of Way.

127. These recreational routes, paths, and trails are detailed in full within Table 15.7 below. The Site is accessible via the Land Reform Act (Scotland) 2003[60].

Cross Borders Drove Road

128. The Cross Borders Drove Road is a part of Scotland's Great Trails[61] and encompasses valleys, rolling countryside, hills and historic settlements/villages; it is one of the most utilised walking tracks in Scotland. It is also listed as a Heritage Path[62]. The official Drove Road runs along an approx. 84 km stretch from Hawick to Karperrig; however, it is often extended to between approx. 97 km and 113 km should users seek to continue on to West Lothian or Edinburgh.

129. The route passes through Hawick; Selkirk; Innerleithen; Peebles; West Linton; East Calder; Livingston; and Edinburgh. The Drove Road passes through the southern section of the Site Boundary. The route is also part of a Scottish Hill Track.

[60] Office of Public Sector Information (OPSI) (2016). [Online] 'Land Reform Act Scotland 2003. [Online] Available at: https://www.legislation.gov.uk/asp/2003/2/pdfs/asp_20030002_en.pdf (Accessed 11/02/2021)
[61] Scotland's Great Trails (2021) Scotlands Great Trails [Online] Available at: https://www.scotlandsgreattrails.com/ (Accessed 06/04/2021)
[62] Heritage Paths (2021) Heritage paths [Online] Available at: www.heritagepaths.co.uk (Accessed 06/04/2021)

130. As one of Scotland's Great Trails, the route is of national importance; however, due to the route's length there are extensive sections of the route which are not within close proximity to the Development. **Chapter 5: Landscape and Visual Impact Assessment** adjudged Major and significant visual effect for the receptor along the stretches of the route on the approach to the Site from the west (LVIA VP 1), within the Site and to the south-east of the Site (LVIA VP 2) as far as Hamilton Hill. However, Chapter 5 states that beyond these sections of the route, the magnitude of change reduces, resulting in either a minor and not significant visual effect, or no effect. Therefore, as a route which extends well beyond the Site, the receptor as a whole is adjudged to be tolerant to change. However, due to its national importance the sensitivity of the receptor is concluded as medium as a result of professional judgement taking into account the above rationale.

Post Road through the Meldons

131. The Post Road through the Meldons is a Heritage Path and encompasses a Scottish Hill Track. The path is approximately 11.5 km in length, starting at Lyne and ending north-west of White Rig. It is generally suitable for pedestrians, bikes and horses; and is thought to have been historically used as a drove road.

132. The Post Road through the Meldons is considered to be of local importance, and therefore low sensitivity.

Core Paths

133. There are 11 core paths within the Secondary Study Area. These paths are designated by the Council and afforded protection to ensure the public can exercise access rights established under the Land Reform Act (Scotland) 2003.

134. The core paths within the Secondary Study Area are detailed within Table 15.7 below. As locally designated paths, and paths of low recreation and tourism value, they are of low sensitivity.

Promoted Paths

135. There are two promoted paths (Promoted Path 63 & 64) within the Secondary Study Area, both of which enter the Site. They are promoted by the Council, of local importance, and paths of low recreation and tourism value, therefore of low sensitivity.

136. The promoted paths within the Secondary Study Area which the Council identified in its Scoping Response are detailed within Table 15.7 below.

Public Rights of Way

137. There are many public rights of way within the Secondary Study Area, some of which enter the Site. They are promoted by the Council, and paths of low recreation and tourism value, therefore of low sensitivity.

138. The public rights of way within the Secondary Study Area which ScotWays and the Council identified in their Scoping Responses are detailed within Table 15.7 below.

Table 15.7: Identified Recreational Routes, Core Paths and Rights of Way within the Secondary Study Area (5 km from the Site Boundary)

Type of Route	Status of Route	Assigned Collective Route Name	Sensitivity of Route	Individual References	Approximate Distance from Site Boundary	Assessment Location
Heritage Route / Scottish Great Trail / Hill Track	National	Cross Borders Drove Road	Medium	N/A	Within the Site Boundary.	Refer to 'Cross Borders Drove Road' assessment. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
Heritage Route / Hill Track	Local	Post Road through the Meldons	Low	N/A	Within the Site Boundary.	Refer to 'Post Road through the Meldons' assessment. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
Core Path	Local	Core Path 174	Low	LANK/174/1	200 m (SW)	Refer to 'Other Core Paths & Public Rights of Way' Assessment. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
				LANK/174/2	200 m (SW)	
				LANK/174/3	2. 7 km (W)	
				LANK/174/4	3 km (W)	
		Core Path 168	Low	LANK/168/1	2. 8 km (W)	Follows Cross Borders Drove Road – refer to assessment of 'Cross Borders Drove Road'. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
				LANK/168/2	2.8 km (W)	
				LANK/168/3	3 km (W)	
			Low	LANK/168/4	3.2 km (W)	
		Core Path 167	Low	LANK/167/1	5 km (W)	Refer to 'Other Core Paths & Public Rights of Way' Assessment. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
				LANK/167/2	5.1 km (W)	
				LANK/167/3	4.8 km (SW)	

Type of Route	Status of Route	Assigned Collective Route Name	Sensitivity of Route	Individual References	Approximate Distance from Site Boundary	Assessment Location
		Core Path 147	Low	RBUP/147/6	3.8 km (SE)	Refer to 'Other Core Paths & Public Rights of Way' Assessment. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
				RBUP/147/5	4.4 km (SE)	
				RBUP/147/4	5 km (SE)	
		Core Path 162	Low	RBUP/162/2	4 km (SE)	Refer to 'Other Core Paths & Public Rights of Way' Assessment. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
		Core Path 143	Low	RBUP/143/3	5 km (SE)	Refer to 'Other Core Paths & Public Rights of Way' Assessment. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
			Low	RBUP/143/6	5 km (S)	
		Core Path 146	Low	EDDL/146/1	2.7 km (E)	Refer to 'Other Core Paths & Public Rights of Way' Assessment. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
		Core Path 150	Low	EDDL/150/5	1.3 km (E)	Follows Post Road through the Meldons – refer to assessment of 'Post Road through the Meldons'. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
				EDDL/150/4	1.4 km (E)	
				EDDL/150/3	1.5 km (E)	
				EDDL/150/2	1.6 km (E)	
				EDDL/150/1	1.7 km (E)	
		Core Path 151	Low	EDDL/151/1	1.4 km (E)	Refer to 'Other Core Paths & Public Rights of Way' Assessment.

Type of Route	Status of Route	Assigned Collective Route Name	Sensitivity of Route	Individual References	Approximate Distance from Site Boundary	Assessment Location
						Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
		Core Path 154	Low	EDDL/154/1	2.8 km (E)	Refer to 'Other Core Paths & Public Rights of Way' Assessment. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
		Core Path 152	Low	EDDL/152/1	2.7 km (E)	Refer to 'Other Core Paths & Public Rights of Way' Assessment. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
Promoted Path	Local	Promoted Path 63	Low	EDDL/63P/3	Within the Site Boundary.	Refer to 'Promoted Path 63' Assessment. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
				EDDL/63P/4	Within the Site Boundary.	
				EDDL/63P/5	1.4 km (E)	
				EDDL/63P/6	1.5 km (E)	
		Promoted Path 64	Low	EDDL/64P/3	Within the Site Boundary.	Follows Cross Borders Drove Road – refer to assessment of 'Cross Borders Drove Road'. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
				EDDL/64P/2	600 m (E)	
				EDDL/64P/1	620 m (E)	Follows Post Road through the Meldons – refer to assessment of 'Post Road through the Meldons'. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.

Type of Route	Status of Route	Assigned Collective Route Name	Sensitivity of Route	Individual References	Approximate Distance from Site Boundary	Assessment Location
Public Right of Way	Local	BT6	Low	BT6	0 m from the Site Boundary.	Refer to 'Other Core Paths & Public Rights of Way' Assessment. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
		BT10	Low	BT10	Within the Site Boundary.	Refer to 'BT10' assessment. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
		BT40	Low	BT40	Within the Site Boundary.	Follows Cross Borders Drove Road – refer to assessment of 'Cross Borders Drove Road'. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.
		BT41	Low	BT41	0 m from the Site Boundary.	Refer to 'Other Core Paths & Public Rights of Way' Assessment. Construction Effects: Section 15.5.4.3. Operational Effects: Section 15.5.4.6.

139. In addition to the routes summarised in this section, it is acknowledged that public access may not be limited to such formally recognised routes, particularly in consideration of the general right to access most land that was formalised in the Land Reform Act (Scotland) 2003[63]. Other public rights of way exist within the surrounding area, as seen on Figure 15.1; however, those listed within Table 15.7 were identified by the Council and ScotWays in their scoping responses. All other rights of way are outwith the Site Boundary and therefore assessed as a whole.

140. The Site also encompasses Scottish Hill Tracks, as shown in Figure 15.7; however, these tracks share their alignment with routes within Table 15.7 and are therefore covered within assessments referred to in Table 15.7.

141. Recreational use may include members of the public making use of the wider access tracks associated with the Cloich Forest. However, as the Site is used as an active commercial forest there are provisions in place to control public access within the Site during times when felling etc. is taking place; these provisions are in the interests of public health and safety and will remain applicable during all phases of the Development.

15.4.3.4 Public Attitudes towards Wind Farm Development

142. The potential for impact on tourism is closely linked to public perception of those visiting the area. This section provides an overview of studies undertaken to assess public perception of wind farm development across the UK.

143. In 2011, as part of their policy update, VisitScotland commissioned research to learn more about UK consumer attitudes to wind farms. The survey was largely attitudinal based and according to the results, wind farms are not expected to have significant impacts on the levels of tourism. In some cases, they have become attractions themselves; Whitelee Wind Farm Visitor Centre attracted over 120,000 visitors in the first 12 months of opening in 2009 and was awarded a Gold Award for Green Tourism in 2015[64].

144. Based on this research, VisitScotland published a Position Statement[65] in 2014 which stated:

> *"VisitScotland understands and supports the drive for renewable energy and recognises the economic potential of Scotland's vast resource, including the opportunities for wind farm development… There is a mutually supportive relationship between renewable energy developments and sustainable tourism."*

145. A Department of Energy and Climate Change (DECC)[66] survey on public attitudes showed that in March 2014, 80% of the British public said they supported using renewable energy for electricity, heat and fuel in the UK.

146. More recently, the Public Attitudes Tracker, published by the Department for Business Energy and Industrial Strategy (BEIS) in 2020[67], showed 73% of people support the

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[63] Scottish Government (2003) Land Reform (Scotland) Act 2003 [Online] Available at: https://www.legislation.gov.uk/asp/2003/2/contents (Accessed on 22/02/2021)
[64] ScottishPower Renewables (2020) About Whitelee [Online]. Available at: https://www.whiteleewindfarm.co.uk/whitelee-windfarm-about-us (Accessed 22/02/2021)
[65] VisitScotland (2014) VisitScotland Position Statement – Wind Farm [Online] Available at: https://www.visitscotland.org/binaries/content/assets/dot-org/pdf/policies/visitscotland-position-statement---wind-farms---oct-2014.pdf (Accessed on 11/02/2021)
[66] Department of Energy and Climate Change (DECC) (2014) Public Attitudes Tracker Survey - Wave 9, 29th April 2014 [Online] Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/306898/summary_of_key_findings_wave_9.pdf (Accessed on 11/02/2021
[67] Department for Business, Energy and Industrial Strategy (2020) BEIS Public Attitudes Survey – Wave 35 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/934647/BEIS_PAT_W35_-_Key_findings.pdf (Accessed on 11/02/2021)

development of onshore wind, which remained stable when compared to 77% recorded in 2019; long-term support for onshore wind has increased from 65% in March 2015. The advance in onshore wind development in Scotland has also been accompanied by an interest in understanding how the impacts of wind farm developments affect local house prices. In recent years, there has been considerable research looking at measurable effects on whether or not properties near, or in sight of, new wind farm developments see price changes that differ from other houses. A topical study conducted by RenewableUK and the Centre for Economics and Business Research concluded that no adverse impacts were found on house prices from a range of wind farm cases across England and Wales and that there was, in fact, a slight beneficial influence on house prices from the cases analysed[68].

147. Shortly after that study was published, an analysis conducted by Gibbons identified that larger wind farms may reduce the values of properties by up to 12% within a 2 km radius and reduce property prices as far as 14 km away[69], as a result of wind farm visibility, but the price effect could also be attributed to noise and shadow flicker effects. Subsequently, ClimateXChange did a parallel study based on Scottish property and following Gibbons' approach, but with an increased resolution and precision of the data[70]. This study, undertaken in 2016, concludes that there is no consistent evidence of adverse impacts of wind developments on house price growth and that research sample sizes tend to be too low to be statistically viable and conclude robust results.

148. In addition to the above, the impact of onshore wind developments has also been discussed in the Republic of Ireland. In 2012, Fáilte Ireland, Ireland's National Tourism Development Authority, commissioned an updated survey on the effect that onshore wind turbines have on visitors to Ireland[71]. The study found that 71% of visitors claimed that a greater number of wind farms in Ireland would either have no impact or a positive impact on their likelihood to visit Ireland; the study found that this opinion was based on the principal that visitors largely supported the generation of renewable energy and subsequent carbon emission reductions.

149. Most recently, a poll recently undertaken by IWEA, of 1,015 members of public of the Irish public surveyed, 83% support wind power in the Republic of Ireland. Another study undertaken by Fáilte Ireland *'Protecting the Irish Environment and Landscape: A Critical Issue for Irish Tourism'* Report[72] 'points to '*beautiful and unspoilt scenery'* as being the top priority reason for tourists visiting Ireland. However, the Fáilte Ireland Report notes that *"that a majority of tourists did not find that either their experience of Ireland or their sightseeing was negatively affected by the presence of wind farm".*

150. Whilst these studies were conducted in Ireland, it is further evidence that there is no proven link that onshore wind has a detrimental impact on tourism and recreation.

151. In addition and supportive of the above, total installed capacity of renewable electricity in Scotland, of which onshore wind will play a significant role, has increased from 4,369

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[68] RenewableUK (2014) The Effect of Wind Farms on House Prices [Online] Available at: https://www.renewableuk.com/news/304411/RenewableUK--Cebr-Study---The-effect-of-wind-farms-on-house-prices.htm (Accessed on 11/02/2021)

[69] Stephen Gibbons (2015) Gone with the Wind: Valuing the Visual Impacts of Wind Turbines through House Prices. *Journal of Environmental Economics and Management* 72, doi: 10.1016/j.jeem.2015.04.006.

[70] Heblich *et al.,* (2016) Impact of wind turbines on house prices in Scotland [Online] Available at: https://www.climatexchange.org.uk/media/1359/cxc_wind_farms_impact_on_house_prices_final_17_oct_2016.pdf (Accessed on 11/02/2021)

[71] Fáilte Ireland (2012) Visitor Attitudes on the Environment [Online] Available at: https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/4_Visitor_Insights/WindFarm-VAS-(FINAL)-(2).pdf?ext=.pdf (Accessed: 11/02/2021)

[72] Fáilte Ireland (2011) Guidelines on the treatment of tourism in an Environmental Impact Statement.

MW in 2010 to 11,933 MW in 2020[73]; this represents a 173% increase between 2010 and 2020. And during this time, tourism within Scotland, as discussed in Section 15.4.3 has continued to see increases in visitor numbers and overnight stays etc.; therefore, suggestive and supportive of the principal that increased renewable energy deployment does not negatively impact upon tourism.

15.5 ASSESSMENT OF POTENTIAL EFFECTS

15.5.1 Effects on Socio-Economics

152. The investment in the Development has potential to generate a range of economic and social effects and opportunities for local businesses; most notably employment opportunities and local spending. Potential social and economic effects can be divided into:

- Wider effects, which are largely unquantifiable: including effects in the wider economy from renewable energy development, such as research and development, skills development and worker retention.
- Direct effects: for example, employment opportunities in the construction, operation and maintenance and decommissioning of the Development. The nature and scale of the economic effects would depend on the total cost and the sources of the materials and labour. Other direct effects include a community benefit fund; the payment of non-domestic rates; and rental income received by the landowner.
- Indirect effects: such as employment opportunities created down the supply chain by those companies providing services to the Development during construction, operation and decommissioning; and
- Induced effects: for instance, employment created by the additional spend of wages into the local economy and the purchasing of basic materials, equipment and office space for staff.

153. The direct, indirect and induced effects are assessed below for each phase of the Development. This follows a more general assessment of wider benefits.

15.5.1.1 Wider Economic Benefits

154. In terms of potential supply chain benefits, the Development provides opportunities for the involvement of local, regional and Scottish suppliers in a range of activities, including research and development, design, project management, civil engineering, component fabrication / manufacture, installation and maintenance. There is expertise in all of these areas in the wider region, although a full wind energy supply chain covering all aspects of wind turbine component manufacture has not yet been developed within the region or indeed within Scotland as a whole. Scotland currently houses wind turbine manufacturing plants in Argyll and Bute, Fife, and in the Highlands respectively. Proposals are also emerging for the location and development of wind turbine manufacturing facilities, including those in and around the east coast, although these are currently primarily for offshore technologies.

155. The key consideration in this context is that with an increasing number of wind farm schemes either operational, under development or having gained consent in Scotland, the commercial viability, and with it, job prospects amongst Scottish firms, has improved. Cluster benefits in the industry increase where firms are supported by the spending of other firms within the renewables sector. The net effect is to increase business and employment opportunities within Scotland's renewable energy sector, boosting the performance of local and national economies.

[73] Scottish Renewables (2021) Statistics: Energy Consumption by Sector [Online] Available at: https://www.scottishrenewables.com/our-industry/statistics#:~:text=Capacity,only%2047MW%20up%20from%202019. (Accessed 06/04/2021)

156. In addition, during the construction process there will be opportunities where those employed will develop skills that will be of benefit to the local economy and to local businesses in the longer term. Further, employment generated through the Development will contribute to diversifying the local economy and help support the local retention of the working age population.

15.5.1.2 Construction Effects

Employment

157. To construct the Development, the Applicant will place significant contracts for services and materials and the infrastructure contractor would be required by the Applicant to give local companies due consideration for the provision of goods and services. A series of 'Meet the Developer Days' will be held to brief local businesses on the types of contracts being let during the construction period, to assist local businesses to take advantage of the opportunities arising and bid for appropriate contracts.

158. Local sourcing of equipment is preferred whenever possible, but this procurement is subject to tendering and may be constrained by the specialist nature of some of the equipment. Qualified local contractors will be encouraged to tender for construction, operation and maintenance work, to ensure maximum benefit to local communities.

159. Among the services that local contractors may be able to provide during the construction phase:

- Haulage and transport services;
- Site clearance;
- Access road, turbine platform construction and other civil engineering services;
- Site and ground investigation services;
- Building construction, electrical, plumbing, roofing, flooring, plastering, decorating and joinery services;
- Crane companies to provide lifting services;
- Plant and equipment hire;
- Fencing, road furniture and signage installation;
- Supply of building and electrical materials (e.g. aggregates, concrete, cabling, equipment, culvert tubes etc.);
- Mechanical, electrical, project management and supervisory services;
- Provision and servicing of temporary welfare facilities; and
- Supply of fuel and other consumables.

160. It is anticipated that a temporary workforce averaging at 75 people will be employed during the 18-month construction period. Calculated by 'job years', one individual working for 18 months would result in 1.5 job years; therefore, 75 individuals working during the 18-month construction period represents 112.5 job years.

161. There would also be knock on effects from the direct employment during the construction and development of the Development as employees spend a proportion of their salaries in the wider economy, creating indirect benefits. The research undertaken by RenewableUK in 2012[74] found that the average salary for employees in the onshore wind sector is £34,613.

162. Overall, the construction of the Development will have positive, short-term, direct and indirect effects on the area, through the increase in employment. This will not result in any fundamental or long-term change to population, local services, employment or overall structure of the community, but will represent a minor positive effect at a local level. This is considered **not significant** in terms of the EIA regulations.

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[74] DECC, RenewableUK (2012) Onshore wind: Direct and Wider Economic Impacts [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48359/5229-onshore-wind-direct--wider-economic-impacts.pdf (Accessed 22/02/2021)

Induced Effects

163. It is likely that there will be some local employment generated as an indirect result of the construction of the Development. This could include supply chain spin-offs for local businesses and sub-contracted work relating to the transportation of labour and materials. Local shops, cafes, accommodation providers and hotels often experience an increase in turnover during the construction phase as they have opportunities to provide additional services to the developer and their contractors. There are several accommodation options in the local and wider area, and it is expected that local services will be used by temporary construction contractors.

164. There may also be the opportunity for local people, who are employed by the appointed contractors, to work on the Development. They would be developing skills gained during construction which will be of benefit both to individuals and the local economy in the longer term. Skills gained or improved may include, for example, project management and construction skills which would be transferrable to other construction roles, including other wind farm projects.

165. Following the COVID-19 outbreak, experts have said that the construction sector may act as a catalyst for economic recovery. The *Build Back Better: COVID-19 Economic Recovery Plan*[75] features a blueprint for a safe return to construction, and sets out recommendations to help stimulate demand for new housing and essential infrastructure emerging from government investment while delivering income to HMRC through training of a new generation of skilled workers post COVID-19. Additionally as referenced in Section 15.4.1.3, Scottish Renewables have emphasized the key role that renewable development could play in the post COVID-19 economic recovery, including both employment and large-scale financial investment[76].

166. Overall, the construction of the Development will have positive, short-term, induced effects on the area, through the increase in employment. This will not result in any fundamental or long-term change to population, local services, employment or overall structure of the community, but will represent a minor positive effect on the economy at a local level. This is considered **not significant** in terms of the EIA Regulations.

Capital Expenditure

167. Based on the BiGGAR Economics report commissioned by RenewableUK[77], onshore wind Capital Expenditure (CAPEX) is £1.32 m per MW on average. This includes the following elements:

- Turbine: Tower; Blades; and Nacelle;
- Balance of Plant: Civil and Project Management; Roads; Substation; Buildings; Turbine foundation and hardstanding; Landscaping/forestry/fencing; Mechanical and electrical installation; and
- Grid Connection: Engineering services; Construction; Electrical Components; and industrial equipment and machinery.

168. The final MW of the project will not be determined until the final turbine model has been selected; however, this assessment assumes that the Development has a capacity of 57

[75] Birmingham City University (2020) Build Back Better: Covid-19 Economic Recovery Plan [Online] Available at: https://scottishconstructionnow.com/uploads/documents/Build%20Back%20Better%20-%20a%20Covid-19%20economic%20recovery%20plan%20FINAL.docx.pdf (Accessed 22/02/2021)
[76] Scottish Construction Now (June 2020) Scottish Renewables energy research shows green COVID-19 research shows green COVID-19 recovery jobs and investment boost [online] Available at: https://www.scottishconstructionnow.com/article/scottish-renewables-energy-research-shows-green-covid-19-recovery-jobs-and-investment-boost (Accessed 22/02/2021)
[77] RenewableUK (2015) Onshore Wind: Economic Impacts in 2014 [Online] Available at: https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/publications/reports/onshore_economic_benefits_re.pdf (Accessed 22/02/2021)

MW based on a candidate turbine of the Nordex N133 (4.8 MW per machine). Assuming a conservative installed capacity of 57 MW, the total CAPEX of the Development would be expected to be approximately £75.2 m.

169. The BiGGAR Report estimates that, of these construction costs, regional expenditure would be 12%; national expenditure would be 36% (Scotland); and UK expenditure would be 47%. The remaining 53% of construction costs will be spent outwith the UK.

170. On this basis, it is estimated that, during the construction phase, the Development will be worth approximately £35.3 million to the UK economy. Of that approximately £27 million is expected to be spent within Scotland (national) and £9 million is expected to be spent within the local region.

171. The Development will bring positive, short-term, direct, indirect and induced effects to the national and regional area, through the expenditure on capital costs.

172. The change will be of low magnitude at the regional level (medium sensitivity) and negligible at a national level (high sensitivity). Therefore, minor, positive effects are anticipated at a regional and national level, which is considered **not significant** in terms of the EIA Regulations.

15.5.1.3 Operational Effects

Employment

173. The Development will have both direct and indirect effects on employment during operation. The Development will be regularly maintained by a specialist maintenance team. Employees are likely to include a part-time maintenance engineer (local site operator) and a small number of staff to periodically service the turbines. Induced effects will include local spending by the Applicant and maintenance contractors.

174. Overall, the operation of the Development will bring long-term, beneficial, direct, indirect and induced effects to the area, through the increase in employment and business opportunities. This will not result in any fundamental or long term change to population, local services, employment or overall structure of the community, but effects will be of low magnitude at the local level (of low sensitivity). Employment effects arising from the operational phase are of negligible, positive significance, but this is considered to be **not significant** in terms of the EIA Regulations. However, the Development will contribute to employment in Scotland.

Operational Expenditure

175. In the 2015 BiGGAR Report[78] on the economic benefits of the UK onshore wind industry, the average cost of an onshore wind farm was £59,867 per MW installed per annum. This includes:

- Turbine Maintenance;
- Site Maintenance;
- Operational Management;
- Land Agreements;
- Habitat Management costs;
- Non-domestic rates (business rates);
- Community Benefit; and
- Other.

176. For the Development, annual Operational Expenditure (OPEX) is expected to be in the region of £3.4 million per annum. Of this total spend, the BiGGAR report estimates 42%

[78] RenewableUK (2015) Onshore Wind: Economic Impacts in 2014 [Online] Available at: https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/publications/reports/onshore_economic_benefits_re.pdf (Accessed 22/02/2021)

will be spent in the local area, which would include business rates and land agreements with the local landowner, as well as a proportion of the maintenance costs. 87% of the total operation and maintenance expenditure will likely be within the UK. It has been assumed that the BiGGAR Report is based upon 2-2.5 MW machines; with fewer machines with a greater generating capacity it can be expected that some of these costs may decrease.

177. The OPEX for the Development is not substantial in magnitude in comparison to the annual GDP of Scottish Borders or the value of the renewable industry in Scotland, with the majority of the expenditure taking place at the local, regional or national level. This is considered to be a positive negligible effect, and **not significant** in terms of the EIA Regulations.

Community Benefit

178. The Scottish Government has emphasised the importance of communities benefitting from renewable energy generation, including through community benefit funds and shared ownership as outlined the Scottish Energy Strategy[79].

179. The Development will establish a community fund in line with Scottish Government guidance which currently promotes paying £5,000 per MW installed capacity per annum to a Community Benefit Fund. This will result in an annual value of up to approximately £285,000 per year (based on a conservative estimate of 57 MW). With a 30 year operational consent, this will provide up to approximately £8.5 million in community benefit, dependent on the final installed capacity.

180. Although not a material consideration for the planning process, and has not been factored into this assessment, the Community Fund represents a positive economic effect for the local community.

Community Ownership

181. The Scottish Government has set targets for community investment in onshore wind and the project landowner, FLS, is an Agency of the Scottish Government. The Applicant supports the principles of shared ownership in wind farms and on completion of the Development's construction, there will be an opportunity for the local community and FLS (combined) to purchase up to 25% ownership of the wind Farm and share any profit generated.

182. Investment in the wind farm would be offered after it has been built; at which time final costs will be clear.

15.5.2 Decommissioning Effects

183. Socio-economic effects during the decommissioning phase are anticipated to be of a similar nature and scale as construction effects for a shorter period of time, thereby representing a minor short-term, positive effect at local level, which is considered **not significant** in terms of the EIA Regulations.

15.5.3 Effects on Land-Use

184. The Site covers an area of approximately 1,080 hectares (ha), centred on National Grid Reference (NGR) 320648, 647881. However, the total infrastructure footprint is substantially less. The total new land take of the Development, consisting of the turbine infrastructure (wind turbine foundations, crane hardstandings, new and upgraded access tracks, substation and control building) equates to approximately 33 ha; following

[79] Scottish Government (2017) The Future of Energy in Scotland: Scottish Energy Strategy [Online] Available at: https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/ (Accessed 22/02/2021)

construction and restoration, the footprint of the Development infrastructure on the surface of the ground will be 17 ha. This equates to approximately 1.6% of the total land in the Site.

185. Forestry felling is described in **Chapter 13: Forestry**. Permanent felling associated with the Development equates approximately 71 ha; in addition prior to construction, approximately 129 ha of forestry will be felled. Where trees are removed from sections of mature coupes, it is often necessary to harvest the entire coupe to mitigate the effects of windblow. Of this 129 ha, 121 ha will be replanted following construction of the Development; with approximately 8 ha remaining as integrated open ground within the forest in line with UK Forestry Standard, as detailed in **Chapter 13: Forestry**.

186. The total change to land use, including both the infrastructure footprint and required felling buffers (not including that which will be restored following construction), is approximately 71 ha, which equates to approximately 6.5% of the total land in the Site.

15.5.3.1 Construction Effects

187. The Development is located within an area of commercial forestry operations and will involve felling within the Site, as described above and in **Chapter 13: Forestry**. The forestry removal required for the Development will be the first construction activity to occur in the construction programme.

188. The Forestry Design Plan will be updated to account for the construction and operation of the Development and communication protocols between FLS and the Development Contractor will be established to ensure commercial forestry operations are maintained as agreed.

189. Following the introduction of the Development, the land use of the Site will remain as a commercial forestry site, undergoing active land management; therefore, as the site is tolerant to change, the sensitivity of the land use is considered to be low. The magnitude of change is considered to be negligible as felling forms an inherent part of the current land use of the Site.

190. Effects on land use arising from the construction phase is therefore considered to be negligible, which is **not significant** in terms of the EIA Regulations. As stated throughout this Section, the effects of the construction phase of the Development will not have a significant effect on land-use receptors in accordance with the EIA Regulations.

15.5.3.2 Operational Effects

191. During operation of the Development, all areas of commercial forestry will continue to be managed by FLS. The operational phase of the Development will result in a loss of land which would otherwise continue to be used as forestry plantation for the duration of the windfarm operation. Of the approximately 200 ha of forestry removed as part of the construction, approximately 121 ha will be restocked on Site, with 8 ha of integrated open ground, as part of the forest design plan, resulting in a net loss of approximately 6.5%.

192. The change to land use is therefore considered to be of low magnitude. The land-take on a low sensitivity receptor is a long-term, negligible effect on land-use, which is considered to be **not significant** in terms of the EIA Regulations.

193. As stated throughout this Section, the effects of the operational phase of the Development will not have a significant effect on land-use receptors in terms of the EIA Regulations.

15.5.3.3 Decommissioning Effects

194. The operational lifespan of the Development is expected to be 30 years. Following this, an application may be submitted to retain or replace the turbines, or they could be decommissioned.

195. Disruption to land-use during decommissioning will be similar to that during construction, with a temporary cessation of forestry within the Site while activities to remove the turbines are undertaken. It is expected that decommissioning would take up to 12 months to complete. The magnitude of effect would therefore be negligible. Decommissioning will have an effect of short-term, negligible significance on land-use, which is a low sensitivity receptor, which is considered negligible and **not significant** in terms of the EIA Regulations.

196. It is expected that decommissioning will involve the reinstatement of the turbine foundations and associated hardstanding and demolition and removal of control building and compound. The land will be restored with topsoil. This will reduce the permanent land-take for the Development. Prior to decommissioning works, a comprehensive restoration plan setting out the specific methods of re- instatement will be agreed with the Council. There will be negligible permanent land take following decommissioning, largely consisting of the access tracks for use by FLS, and presents a negligible effect on land-use, which is considered to be **not significant** in terms of the EIA Regulations.

15.5.4 Effects on Tourism and Recreation

197. Potential effects on the tourism and recreational resource are categorised as:

- Direct physical effects: for example, temporary diversion of public rights of way during the construction period; and
- Indirect effects: such as the changes in amenity at tourism and recreational receptors.

15.5.4.1 Construction Effects – Tourism and Recreation Receptors

198. The following sections outline the assessment of construction effects associated with the Development on identified tourism and recreational receptors – as outlined in Table 15.5.

Onsite Informal Recreation

199. The Land Reform Act (Scotland) 2003[80] establishes a statutory right to access most land and inland water for recreational use. However, access to areas where construction is taking place or where there is construction related activities will be temporarily restricted under the Construction (Design and Management) Regulations 2015[81] for health and safety purposes.

200. Informal routes, utilising the network of forest tracks would be temporarily diverted where construction activities or felling is taking place. Waymarked trails such as the Cross Border Drove Road, and Promoted Paths 63 & 64, which runs through the southern and eastern parts of the Site (respectively) would be either actively managed or temporarily diverted to ensure continuity of the route. Notices will be placed in prominent locations around the Site with details of any areas with restricted access. Such measures would be agreed in advance with the Council in the form of an Access Management Plan.

[80] Scottish Government (2003) Land Reform (Scotland) Act 2003 [Online] Available at: https://www.legislation.gov.uk/asp/2003/2/contents (Accessed 15/03/2021)
[81] Health and Safety Executive (2015) The Construction (Design and Management) Regulations 2015 [Online] Available at: http://www.hse.gov.uk/construction/cdm/2015/index.htm (Accessed 15/03/2021)

White Meldon & Black Meldon

201. Both White Meldon & Black Meldon are located outwith the Site, located at approximately NGR 3211934 642833 and NGR 320663 642505 (respectively) south of the Site; therefore, any construction effects would be limited to visual construction effects largely relating to views of tall cranes and turbine construction (in line with Section 5.9.1.3 of **Chapter 5: Landscape and Visual Impact Assessment**).

202. As elevated landforms with extensive views of the Development, it is likely that construction effects will be within view; however, due to the intervening distance between the receptors and the nearest turbines (T3 – 3.6 km & T2 – 3.5 km, respectively), the transient nature of construction, and construction effects being short-term in nature, it is concluded the magnitude of change would be low.

203. As White Meldon & Black Meldon are considered to be of medium sensitivity and the magnitude of change is predicted to be low, any construction effects are assessed minor, short-term and therefore **not significant** in terms of the EIA Regulations.

The Great Polish Map of Scotland

204. The Great Polish map of Scotland is located outwith the Site, located at approximately NGR 323702 647179 east of the Site, and the Great Polish map of Scotland is not located along the turbine delivery route; therefore, any construction effects would be limited to visual construction effects largely relating to views of tall cranes and turbine construction (in line with Section 5.9.1.3 of **Chapter 5: Landscape and Visual Impact Assessment**).

205. However, it is unlikely that users at the receptor will experience views of construction activities due to the intervening distance between the receptor and the nearest turbine (T5 – 2.5 km), as well as natural screening of construction visibility due to mature woodland which surrounds the receptor. Therefore, whilst taking into account the aforementioned rationale, and the fact that construction effects will be short-term in nature, it is concluded the magnitude of change would be low.

As the Great Polish Map of Scotland is considered to be of low sensitivity and the magnitude of change is predicted to be low, any construction effects are assessed as negligible, short-term and therefore **not significant** in terms of the EIA Regulations.

Portmore House & Gardens

206. The Portmore House & Gardens access is located south of the turbine delivery route; therefore, any construction effects would be limited to visual construction effects largely relating to views of tall cranes and turbine construction (in line with Section 5.9.1.3 of **Chapter 5: Landscape and Visual Impact Assessment**).

207. However, it is unlikely that users at the receptor will experience views of construction activities due to the nature of the receptor and the intervening distance between the receptor and the nearest turbine (T5 – 4.3 km), the natural screening of construction visibility due to mature woodland which surrounds the receptor, and the receptors' entrance/access position south of the turbine delivery route. Therefore, whilst taking into account the aforementioned rationale, and the fact that construction effects will be short-term in nature, it is concluded the magnitude of change would be low.

208. As Portmore House is considered to be of low sensitivity and the magnitude of change is predicted to be low, any construction effects are assessed negligible, short-term and therefore **not significant** in terms of the EIA Regulations.

John Buchan Way

209. As explained in Section 15.4.3.1, the John Buchan Way is of medium sensitivity. The John Buchan Way is located outwith the Site, located approximately 8.3 km south of the nearest turbine (T2), and the John Buchan Way is located a considerable distance south of the turbine delivery route, thus any construction effects would be limited to visual construction effects largely relating to views of tall cranes and turbine construction (in line with Section 5.9.1.3 of **Chapter 5: Landscape and Visual Impact Assessment**).

210. When travelling towards the Site, users at the receptor will likely experience views of construction activities (limited to tall cranes etc.) during approximately half of the route between Stobo Road / B712 and Morning Hill; however, will not experience views for the remaining half of the route. However, due to the intervening distance between the receptor and the nearest turbine, the natural screening of construction visibility which will exist along a large section of the route, and the fact that construction effects will be short-term in nature, it is concluded the magnitude of change would be low.

211. As the John Buchan Way is considered to be of medium sensitivity and the magnitude of change is predicted to be low, any construction effects are assessed minor, short-term and therefore **not significant** in terms of the EIA Regulations.

Glentress Forest - 7 Stanes Mountain Biking

212. Glentress Forest is located outwith the Site, approximately 8.7 km south-east of the Site. The Mountain Biking facility, and its access, are not located on the turbine delivery route to the Site, thus any construction effects would be limited to visual construction effects largely relating to views of tall cranes and turbine construction (in line with Section 5.9.1.3 of **Chapter 5: Landscape and Visual Impact Assessment**).

213. However, it is unlikely that users of the mountain bike trails will experience views of construction activities due to the activity (mountain biking – often fast-paced and within dense forestry) that the receptor offers users, the intervening distance between Glentress Forest and the Site, and natural forestry screening of views. Therefore, whilst taking into account the aforementioned rationale, and the fact that construction effects will be short-term in nature, it is concluded the magnitude of change would be negligible.

As the Glentress Forest Mountain Biking facility is considered to be of low sensitivity and the magnitude of change is predicted to be negligible, any construction effects are assessed negligible, short-term and therefore **not significant** in terms of the EIA Regulations.

Pentlands Hills Regional Park

214. Pentlands Hills Regional Park is located outwith the Site, approximately 9.5 km north-west of the Site. The Pentlands Hills Regional Park is not located on the turbine delivery route to the Site,, any construction effects would be limited to visual construction effects largely relating to views of tall cranes and turbine construction (in line with Section 5.9.1.3 of **Chapter 5: Landscape and Visual Impact Assessment**).

215. However, it is unlikely that users at the receptor will experience views of construction activities due to the intervening distance between the receptor and the Site, and natural screening of views; in addition, theoretical visibility of the Development does not span across the whole receptor. Therefore, whilst taking into account the aforementioned rationale, and the fact that construction effects will be short-term in nature, it is concluded the magnitude of change would be negligible.

216. As the Pentlands Hills Regional Park is considered to be of medium sensitivity and the magnitude of change is predicted to be negligible, any construction effects are assessed as negligible, short-term and therefore **not significant** in terms of the EIA Regulations.

15.5.4.2 Construction Effects – Other Receptors (Accommodation Etc.)

217. Indirect effects on offsite resources such as local accommodation providers, mentioned in Section 15.4.3.2, and local socio-economics, mentioned in Section 15.4.1, are unlikely to be negatively affected by the construction of the Development. As per **Chapter 12: Access, Traffic, and Transportation**, the turbine delivery route to Site comes south from Grangemouth; there are no identified tourism accommodation receptors located directly on the route to Site, therefore in-combination with the intervening distance between accommodation providers etc. and the Development, it is considered that the magnitude of change would be negligible and that these receptors are of low sensitivity to the Development. Therefore, this represents a negligible, short-term, negative effect which is considered **not significant** in terms of the EIA Regulations.

218. Local shops, cafes, accommodation providers and hotels often experience an increase in turnover during the construction phase as they have opportunities to provide additional services to the wind farm development. The Development will result in a minor, short-term, positive effect at local level, which is **not significant** in terms of the EIA Regulations.

15.5.4.3 Construction Effects – Recreational Routes, Core Paths, and Rights of Way

219. The following sections outline the assessment of construction effects associated with the Development on identified recreational routes, core path and public rights of way – as outlined in Table 15.7. Identified recreational routes, core path and public rights of way are also shown on Figure 15.2.

Cross Border Drove Road

220. The Cross Borders Drove Road, as shown on Figure 15.2, enters the Site at approximate NGR 318895 646080 in the west, and exits the Site at approximate 321609 646104 in the east. The Cross Borders Drove Road is crossed by the Development's access tracks (both existing and new), as per the detailed development site layout shown in Figure 3.1. The nearest turbine location is T3, located approximately 175 m south of the route.

221. The turbine delivery route to the Site, as detailed within **Chapter 12: Access, Traffic, and Transportation**, commences near Grangemouth and travels east towards the Edinburgh City Bypass, then south towards Site. All traffic would enter the Site having travelled from the north. The Cross Borders Drove Road does not cross the turbine delivery route and is located, at its nearest point, 3.9 km from the site entrance (as described in **Chapter 3: Project Description**). However, as the Cross Borders Drove Road runs through the Site, it will be crossed by construction traffic associated with the Development.

222. As explained in Section 15.4.3.3, the Cross Borders Drove Road is of medium sensitivity. The section of the Cross Borders Drove Road within, and nearby, the Site will experience views of the construction of the Development due to the route passing directly through, and nearby, areas of high construction activity; however, this construction activity will be short-term.

223. As a result of the Cross Borders Drove Road being within the Site, and due to construction traffic crossing the Cross Borders Drove Road, short-term management measures (detailed in Section 15.7) are likely to be required. This disruption would be experienced over an approximate 500 m stretch, encompassing both points where the Development's access tracks cross the route. The disruption over the approximate 500 m stretch is in the context of the wider ~113 km route; disruption would take place over 0.4% of the total route, and would be temporary in nature. Given the temporary short-term nature of the change, and the small section of the route that is affected, magnitude of change is predicted to be medium.

224. As the Cross Borders Drove Road is considered to be of medium sensitivity and the magnitude of change is predicted to be medium, construction effects are assessed as moderate and short-term, and therefore **significant** in terms of the EIA Regulations.

Post Road through the Meldons

225. The Post Road through the Meldons, as shown on Figure 15.2, crosses the public road which forms part of the Development's access at approximate NGR 323233 649473 . The nearest turbine location is T4, located approximately 1.3 km west of the route.

226. As explained in Section 15.4.3.3, the Post Road through the Meldons is of low sensitivity. The section of the Post Road through the Meldons within (where it crosses the access route), and nearby, the Site will experience views of the construction of the Development due to the route passing directly across the public road which will be subject to upgrade works; however, the construction activity at this crossing will be minimal; relating to road widening works and short-term in nature and will not give rise to any closure of the route.

227. The turbine delivery route to the Site, as detailed within **Chapter 12: Access, Traffic, and Transportation**, commences near Grangemouth and travels south towards the Site. All traffic would enter the Site having travelled from the north, crossing The Post Road through the Meldons. The route may be subject to delays as construction vehicles pass by; however, this is not anticipated to result in route closure for the Post Road through the Meldons.

228. As the Post Road through the Meldons enters the Site on the access route, and construction traffic will cross the Post Road through the Meldons, short-term disruption, health and safety signage, and temporary traffic management will be required; however, closure is not anticipated. Any disruption would be experienced over a very short part of the route as it junctions with the main access road. Given the temporary short-term nature of the change, and that only a small section of the route is affected, magnitude of change is predicted to be low.

229. As the Post Road through the Meldons is considered to be of low sensitivity and the magnitude of change is predicted to be low, construction effects are assessed as negligible and short-term, and therefore **not significant** in terms of the EIA Regulations.

Promoted Path 63

230. Promoted Path 63, as defined by the Council and shown on Figure 15.2, originates at approximate NGR 324392 648204 at the A703; the route then heads west and north along public rights of way, entering the Site as it joins the main access to the Development. Promoted Path 63 then runs along the 'D17 Cloich', past Cloich Farm and into the main body of the Site, following existing forestry tracks and forming part of the Development's access tracks. The Path ends at approximate NGR 320531 646357, as it joins the Cross Borders Drove Road and Promoted Path 64. The nearest turbine location is T5, located approximately 155 m east of the route.

231. As explained in Section 15.4.3.3, the Promoted Path 63 is of low sensitivity. The A703, 'D17 Whim – Shiplaw', and 'D18 Cloich' forms part of the turbine delivery route to Site as detailed within **Chapter 12: Access, Traffic, and Transportation**. Therefore, the construction traffic route follows and encompasses part of the Promoted Path 63.

232. Part of the Promoted Path 63 forms the turbine delivery route and internal wind farm tracks, and construction traffic will use these sections. The road and forestry tracks will be subject to widening works along the sections of the Promoted Path 63 which fall within the Site. For the sections of the promoted path 63 that are within the Site, short-term diversions and management measures (detailed in Section 15.7) may be required. Local access to properties will be maintained throughout the construction period.

233. Outwith periods of temporary closure, there will be temporary disturbance from increased construction traffic along the route. This would be experienced over 5.5 km of the ~8 km route (69%) and would be temporary in nature. Given the temporary nature of the change, and that the whole route is not affected, magnitude of change is predicted to be medium.

234. As the Promoted Path 63 is considered to be of low sensitivity and the magnitude of change is predicted to be medium, any effects are minor and short-term, and therefore **not significant** in terms of the EIA Regulations.

Public Right of Way BT10

235. BT10, as defined by ScotWays and shown on Figure 15.1, passes through the Site, entering at approximate NGR 321298 650282 in the west; the route then heads east along the 'D17 Cloich' which forms part of the main access road to the Development. The nearest turbine location is T12, located approximately 1.8 km south of the route.

236. As explained in Section 15.4.3.3, public rights of way, including the BT10, is of low sensitivity. The A703, 'D17 Whim – Shiplaw', and 'D18 Cloich' is the turbine delivery route to Site as detailed within **Chapter 12: Access, Traffic, and Transportation**. Therefore, the construction traffic route follows and encompasses the BT10.

237. As the BT10 forms the turbine delivery route and construction traffic will utilise the route, there will be road widening works along the sections of the BT10 which fall within the Site. For the sections of the BT10 that fall within the Site, short-term diversion and management measures (detailed in Section 15.7) may be required. However, local access will be maintained for residents who need to access property. Outwith periods of temporary closure, temporary disturbance from increased construction traffic is the only other construction effect which the route may be subject to. This would be experienced over the section of the route within the Site Boundary and would be temporary in nature. Given the temporary nature of the change, and that the whole route is not affected, magnitude of change is predicted to be medium.

238. As the BT10 is considered to be of low sensitivity and the magnitude of change is predicted to be medium, any effects are minor and short-term, and therefore **not significant** in terms of the EIA Regulations.

Other Core Paths and Public Rights of Way

239. As detailed within Table 15.7, and shown on Figure 15.1, there are several other core paths, recreational routes, and public rights of way within the Secondary Study Area; however, these routes do not enter the Site and do not cross the turbine delivery route to Site and therefore are only subject to indirect construction effects.

240. Construction effects on these remaining routes are limited to short-term disruption due to increased traffic, as a result of construction in the locality, and construction visual effects. Construction visual effects will not be significant due to intervening distance, and natural screening, between the Site and the routes. As explained in Section 15.4.3.3, all remaining routes are of low sensitivity, and subject to a magnitude of change assessed as low.

241. Therefore, other routes are predicted to experience construction effects, in the form of disruption, which is short-term, temporary, minor and **not significant** in terms of the EIA Regulations.

15.5.4.4 Operational Effects – Tourism and Recreation Receptors

Onsite Informal Recreation

242. The Site will be accessible to the public at all times of the year as per Section 1 and 2 of Land Reform Act (Scotland) 2003. However, temporary exclusions may be required close

to turbines and grid infrastructure for health and safety reasons during times where essential maintenance is required. This is not envisaged to affect the use of established footpaths within the site. This would represent a low magnitude of change on a low sensitivity receptor, representing a negative, long-term, negligible effect which is **not significant** in terms of the EIA Regulations.

243. Visual effects associated with the Development may occur at receptor locations, when people are looking towards the Development and from locations where clear views of the turbines are accessible. The visual effects of the Development from several tourism and recreational assets are assessed in **Chapter 5**: **Landscape and Visual Impact Assessment** of the EIA Report. It should be noted that there is a distinction between a visual effect and effects on recreational amenity. Effects on recreational amenity are described as effects that would influence the recreational value *e.g.* use or enjoyment of an asset such as a walking route.

Identified Tourism and Recreation Receptors

244. The identified tourism and recreation receptors for assessment of operational effects are:

- White Meldon;
- Black Meldon;
- The Great Polish Map of Scotland;
- Portmore House;
- John Buchan Way;
- Glentress 7 Stanes Mountain Biking; and
- Pentlands Hills Regional Park.

245. There will be no direct effects on any of the aforementioned receptors during the operation of the Development.

246. There is the potential for indirect effects to occur on receptors, where tourism numbers change as a result of the Development. As detailed in Section 15.4.3.4, surveys of the public's attitudes to wind farms provide no clear evidence that the presence of wind farms in an area has a negative effect on local tourism. Tourists using local public rights of way and local tourist attractions may have a particular sensitivity to visual effects; however, access to tourist facilities will be unaffected.

247. Table 15.8, overleaf, summarises the visual effects on the aforementioned tourism and recreation receptors. Where possible, these visual effects are based on findings identified in **Chapter 5: Landscape and Visual Impact Assessment**; where there are no relevant **Chapter 5: Landscape and Visual Impact Assessment** findings, visual effects are based on professional judgement using predicted theoretical visibility, as shown in Figure 5.1.2a. Consequently, Table 15.8 provides assessment of the operational effects in the context of tourism and recreation.

Table 15.8: Summary of Operational Visual Effects and Operational Tourism and Recreation Effects on Identified Tourism and Recreation Receptors

Receptor	Visibility based on Development ZTV[82] (Yes or No)	Assessment of Tourism and Recreation Operational Effects		
		Sensitivity of Receptor	**Magnitude of Change**	**Significance of Effect & Rationale**
White Meldon & Black Meldon	Yes	Medium	Low	Generally, White Meldon & Black Meldon will experience views of the Development; and tourism and recreation users will generally make use of the main viewpoint, where visual effects are greatest. However, there will be intervening distance between the receptor and the Development. The long distance views from both White Meldon and Black Meldon are largely to the west, south, and east from the hilltops towards the Upper Tweeddale NSA and the Tweed Valley SLA. Immediate views north, where the Development is located, does not have any immediate local or nationally designated landscapes. Additionally, evidence cited in Section 15.4.3.4 indicates that onshore wind developments do not have significant effects on tourism in terms of tourist attractions' appeal to visitors. Therefore, for recreation and tourism the magnitude of change as a result of the operational phase of the Development is low. Given the medium sensitivity of the receptors and the low magnitude of change, the resultant significance of effect for tourism and recreation is minor and **not significant**.
The Great Polish Map of Scotland	Yes	Low	Negligible	The Great Polish Map of Scotland is located within the grounds of Barony Castle, and encircled by well-established woodland. This woodland, and neighbouring buildings is very likely to screen views to the Development. Visitors to the map will be focussed on the ground level attraction below and visibility to the Development will be minimal. Additionally, evidence cited in Section 15.4.3.4 indicates that onshore wind developments do not have significant effects on tourism in terms of tourism attractions' appeal to visitors. Therefore, for recreation and tourism the magnitude of change as a result of the operational phase of the Development is negligible. Given the low sensitivity of the receptor and the negligible magnitude of change, the resultant significance of effect for tourism and recreation is negligible and **not significant**.

[82] Full visual impact assessment is included within Chapter 5: Landscape and Visual Impact Assessment.

Receptor	**Visibility based on Development ZTV[82] (Yes or No)**	**Assessment of Tourism and Recreation Operational Effects**		
		Sensitivity of Receptor	**Magnitude of Change**	**Significance of Effect & Rationale**
Portmore House & Gardens	Yes	Low	Medium	Portmore House & Gardens will experience visual effects from its grounds on higher elevations and without natural screening. However, visitors will be focussed on the gardens. Visitors will not always be looking towards the Development, and views are likely to be screened by mature woodland which surrounds large sections of the gardens. Additionally, evidence cited in Section 15.4.3.4 indicates that onshore wind developments do not have significant effects on tourism in terms of tourism attractions' appeal to visitors. Therefore, for recreation and tourism the magnitude of change as a result of the operational phase of the Development is low. Given the low sensitivity of the receptor and the low magnitude of change, the resultant significance of effect for tourism and recreation is negligible and **not significant**.
John Buchan Way	Yes	Medium	Low	Approximately half of the John Buchan Way will not experience views of the Development; however, west of the B712 visual effects will occur. As a long-distanced tourism and recreation receptor, and as shown in evidence cited in Section 15.4.3.4 which indicates that onshore wind developments do not have significant effects on tourism in terms of tourism attractions' appeal to visitors, it is not likely there will be any significant reduction in user numbers of the John Buchan Way as a result of the Development. The magnitude of change as a result of the operational phase of the Development is low. Given the medium sensitivity of the receptor and the low magnitude of change, the resultant significance of effect for tourism and recreation is minor and **not significant**.

Receptor	Visibility based on Development ZTV[82] (Yes or No)	Assessment of Tourism and Recreation Operational Effects		
		Sensitivity of Receptor	**Magnitude of Change**	**Significance of Effect & Rationale**
Glentress Forest mountain biking centre	Yes	Low	Negligible	The Glentress Forest mountain biking trails are located within well-established, mature forestry. The ZTV shows that the vast majority of the Glentress 7 Stanes Mountain Biking facility does not have theoretical visibility, and therefore not subject to views of the Development. Visibility, where it exists on the ZTV would be further curtailed by existing forestry screening. Users of the trails will be focussed on the ground level as they mountain bike through the forest. Additionally, evidence cited in Section 15.4.3.4 indicates that onshore wind developments do not have significant effects on tourism in terms of tourism attractions' appeal to visitors. Therefore, for recreation and tourism the magnitude of change as a result of the operational phase of the Development is negligible. Given the low sensitivity of the receptor and the negligible magnitude of change, the resultant significance of effect for tourism and recreation is negligible and **not significant**.
Pentlands Hills Regional Park	Yes	Medium	Low	Much of the Pentlands Hills Regional Park will not experience views of the Development. There are areas of the Pentlands Hills Regional Park which will be subject to visual effects; however, these are not significant due to the distance between the receptor and the Development, as detailed within Chapter 5: Landscape and Visual Impact Assessment tables 5.53 & 5.55. Recreational users of the Pentland Hills are likely to make use of large parts of the park; not only areas with visibility. Additionally, evidence cited in Section 15.4.3.4 indicates that onshore wind developments do not have significant effects on tourism in terms of tourism attractions' appeal to visitors. Therefore, in conjunction with the intervening distance and screening of Development views, for recreation and tourism the magnitude of change as a result of the operational phase of the Development is low. Given the medium sensitivity of the receptor and the low magnitude of change, the resultant significance of effect for tourism and recreation is minor and **not significant**.

15.5.4.5 Operational Effects – Other Receptors (Accommodation Etc.)

248. Other recreational receptors, including local shops, cafes, accommodation providers and hotels, as mentioned in Section 15.4.3, are not expected to be affected by the Development during the operational phase due to the intervening distance of these receptors from the Development. Where there is theoretical visibility in views from an accommodation provider, for example, it is likely to be screened to varying extents by natural and man-made features, such as trees, elevated landform, and/or buildings; or further, views will be reduced in impact by distance. Further, as detailed within Section 15.4.3.4, tourists are not deterred by presence of onshore wind developments. It is therefore considered that the magnitude of change would be negligible, representing a negligible effect which is **not significant** in terms of the EIA Regulations.

249. The Development will be regularly maintained by a specialist maintenance team likely to include maintenance engineers and a small number of staff to occasionally service the turbines; in addition, workers will be employed to undertake ongoing habitat management work. Local shops, cafes, accommodation providers and hotels could experience an increase in turnover during the operational phase as they have opportunities to provide additional services to the Development's staff. The Development will result in a minor, positive effect at local level, which is **not significant** in terms of the EIA Regulations.

15.5.4.6 Operational Effects – Recreational Routes, Core Paths and Public Rights of Way

250. The identified recreational routes, core paths, and public rights of way receptors for assessment of operational effects are:

- Cross Borders Drove Road;
- Promoted Path 63;
- Post Road through the Meldons;
- Public Right of Way BT10; and
- Other Core Paths and Public Rights of Way.

251. There will be no direct effects on any of the aforementioned receptors during the operation of the Development.

252. Surveys of the public's attitudes to wind farms provide no clear evidence that the presence of wind farms in an area has a negative effect on local tourism (see Section 15.4.3.4). Access to routes and paths will be unaffected.

253. Table 15.9, overleaf, summarises the visual effects on the aforementioned receptors. These visual effects are based on findings identified in **Chapter 5: Landscape and Visual Impact Assessment** where possible, and based on professional judgement and the theoretical visibility each receptor will be subject to. Consequently, Table 15.9 provides assessment of the operational effects in the context of tourism and recreation.

Table 15.9: Summary of Operational Visual Effects and Operational Tourism and Recreation Effects on Identified Recreational Routes, Core Paths and Public Rights of Ways Receptors

Receptor	**Visibility based on Development ZTV[83] (Yes or No)**	**Assessment of Tourism and Recreation Operational Effects**		
		Sensitivity of Receptor	**Magnitude of Change**	**Significance of Effect & Rationale**
Cross Border Drove Road	Yes	Medium	Low	Sections of the Cross Border Drove Road will experience views of the Development, visual effects will be greatest on the Cross Borders Drove Road where it nears/enters the Site, where proposed wind turbines are located. However, the majority of the route will not experience significant visual effects. Therefore, as the visual effects are limited to a short section of the receptor given its total length, it is not likely there will be any notable change to the use of the receptor for recreation. When considering the whole route as one receptor, and the evidence cited in Section 15.4.3.4 that onshore wind development do not have negative implications for tourism, the magnitude of change as a result of the operational phase of the Development is negligible. Given the medium sensitivity of the receptor and the low magnitude of change, the resultant significance of effect for tourism and recreation is minor and **not significant**.
Post Road through the Meldons	Yes	Low	Low	The Post Road through the Meldons will experience extensive views of the Development according to the ZTV. No direct effects are predicted as a result of operation of the Development, thus operational effects are limited to visual effects. Users of the receptor will be travelling along the route, therefore, on approach, views of the Development will be of a transitory nature. As there will be no operational disruption to the route, the intervening distance between the Development and the receptor, and that users move along the route, it is judged that there will only be a slight alteration to the recreational value of the receptor, therefore, the magnitude of change will be low. Given the low sensitivity of the receptor and the low magnitude of change, the resultant significance of effect for tourism and recreation is negligible and **not significant**.

[83] Full visual impact assessment is included within Chapter 5: Landscape and Visual Impact Assessment.

Receptor	Visibility based on Development ZTV[83] (Yes or No)	Assessment of Tourism and Recreation Operational Effects		
		Sensitivity of Receptor	**Magnitude of Change**	**Significance of Effect & Rationale**
Promoted Path 63	Yes	Low	Medium	Promoted Path 63 will experience extensive views of the Development according to the ZTV, as the receptor passes through the Development and forms part of the onsite access tracks. No direct effects are predicted as a result of operation of the Development, thus operational effects are limited to visual effects. And, as the Site, in which the path runs through, is forested; and receptors will likely have views of the Development, at eye/ground-level, screened by areas of forestry, the magnitude of change is likely to be medium. Given the low sensitivity of the receptor and the medium magnitude of change, the resultant significance of effect for tourism and recreation is minor and **not significant**.
Public Right of Way BT10	Yes	Low	Low	The BT10 will experience views of the Development. No direct effects are predicted as a result of operation of the Development, thus operational effects are limited to visual effects. Users will likely experience views of the Development of a transitory nature when approaching the Development, it is judged that there will only be a slight alteration to the recreational value of the receptor, therefore, the magnitude of change will be low. Given the low sensitivity of the receptor and the low magnitude of change, the resultant significance of effect for tourism and recreation is negligible and **not significant**.
Other Core Paths and Public Rights of Way	Yes	Low	Low	Other Core Paths and Public Rights of Way will experience views of the Development according to the ZTV. However, the paths/routes will not be closed or disrupted as a result of operation of the Development, thus operational effects are limited to visual effects. Users of these routes will experience views of the Development of a transitory nature when approaching the Development although screening by buildings and natural features, such as foliage will also reduce visibility. As there will be no operational disruption to the route, the intervening distance between the Development and the receptors reduces visual effects, and users moving along the route, sometimes at speed, it is judged that there will be a barely perceptible alteration to the recreational value of the receptors and therefore, magnitude of change will be negligible. Given the low sensitivity of the receptor and the negligible magnitude of change, the resultant significance of effect for tourism and recreation is negligible and **not significant**.

15.5.4.7 Decommissioning Effects

254. Effects during the decommissioning phase are anticipated to be of a similar nature and scale as construction effects, albeit for a shorter period when compared to construction, and are therefore **significant** in terms of the EIA Regulations for the Cross Borders Drove Road.

255. All other receptors will experience decommissioning effects that are **not significant** in terms of the EIA Regulations, as per construction effects assessment.

15.6 CUMULATIVE EFFECT ASSESSMENT

The appropriate scale for considering cumulative development depends on the nature of the potential effect. These are considered in turn, for each category of potential effect. Bowbeat Wind Farm (Operational) consists of 24 turbines and is located 6.9 km[84] away from the Development. Within 10 km cumulative effects study area, there are no other operational/consented/under construction/proposed (including at appeal/public inquiry) wind farm developments to consider.

15.6.1 Socio-Economics

256. Regional socio-economic effects have been defined as at the scale of the Scottish Borders. As there are no other nearby wind farm developments under construction, which could increase the beneficial socio-economic effects associated with the Development there is no cumulative effect on socio-economics.

257. Potential exists in the future, other wind farms be proposed and consented in the area, for job creation to occur to support the industry. However, at a regional level, the sustaining of jobs, in construction in particular, is considered **not significant**.

258. The greater the capacity of consented and constructed developments in the area, the more likely it is that the local area can benefit from supply chain opportunities. Additionally, it is likely that maintenance operations of the Development and other nearby wind farm development will be sourced locally as there would be enough opportunity locally to employ full time employees and provide work to local companies however, these effects are **not significant** in terms of the EIA Regulations.

15.6.2 Land Use

259. There are no other within wind farm developments within the study area for land use, therefore no cumulative effects are predicted on land use.

15.6.3 Tourism and Recreation

260. Cumulative visual effects on outdoor recreational and tourism facilities resulting from the Development in conjunction with other wind farms in the Study Areas are assessed in **Chapter 5: Landscape and Visual Impact Assessment**.

261. Cumulative effects on the amenity of tourism and recreation receptors during operation are strongly linked to visual effect. As set out in Section 15.4.3.4, there is no evidence that tourism is adversely impacted by wind farms in Scotland. There are no known impacts recorded as a result of the operational Bowbeat Wind Farm, which is the only cumulative development considered; therefore, no cumulative impacts are predicted in combination with the Development.

[84] Approximate distance between the outermost turbines of the Development and other wind farms.

15.7 MITIGATION AND RESIDUAL EFFECTS

262. Socio-economic and land use effects were assessed as **not significant**, therefore mitigation is not required as a result of the Development.

263. With regard to tourism and recreation, **significant** effects were identified during construction and operation of the Development on the Cross Borders Drove Road; all other receptors are judged to be in receipt of effects deemed **not significant**.

264. During the construction of the Development a significant effect has been identified in relation to the Cross Borders Drove Road. This effect will be mitigated through the application of an Access Management Plan, to be drafted and agreed with the Council prior to construction. Following appropriate mitigation within the Access Management Plan, including a gating system operated by a banksman as well as appropriate health and safety signage local route diversions (if required), and traffic management measures, the residual effect during the construction of the Cross Borders Drove Road will be **not significant**. Whilst no other significant effects were identified during construction, it is anticipated that the Access Management Plan will cover all identified routes by construction and further reduce effects.

15.8 SUMMARY OF EFFECTS

265. Table 15.10 provides a summary of the effects detailed within this chapter; where no effects were identified these are not summarised but detailed in the assessments.

Table 15.10: Summary of Effects

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Socio-Economics	Construction & Decommissioning: • Positive, minor increase in employment; and • Positive, minor increase in capital expenditure.	Not Significant	None	Not Significant
	Operation: • Positive, negligible increase in employment and local business; • Positive, negligible increase in operational expenditure; and • Minor, positive, long-term, investment through community benefit fund. (Not accounted for in the assessment of significance.)	Not Significant	None	Not Significant
Land Use	Construction & Decommissioning: • Negligible effect on land use during construction; and • Short-term, negligible effect on land use during decommissioning.	Not Significant	None	Not Significant
	Operation: • Long-term, negligible effect on land use as a result of the operation of the Development.	Not Significant	None	Not Significant

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Tourism and Recreation	Construction & Decommissioning: • Moderate, short-term effects relating to construction activities for the Cross Borders Drove Road; • Negligible/minor, short-term effects relating to construction activities for all other identified tourism and recreation receptors, and identified recreational routes, core paths and public rights of way; and • Minor, short-term, positive increase in accommodation use.	Significant Not Significant	Access Management Plan None	Not Significant Not Significant
	Operation: • Minor effect relating to operation of the Development for the Cross Borders Drove Road; • Negligible/minor effects relating to operation of the Development for all other identified tourism and recreation receptors, and identified recreational routes, core paths and public rights of way; and • Minor, positive increase in accommodation/business use.	Not Significant Not Significant Not Significant	None None None	Not Significant Not Significant Not Significant

15.9 STATEMENT OF SIGNIFICANCE

266. The renewables industry is an important economic asset to the UK and Scotland, and supports a substantial and growing number of employment opportunities. Although not significant in terms of the EIA Regulations, the Development will further contribute to the beneficial economic effect of renewable energy, and associated skills base within Scotland.

267. The establishment of a local community fund will make a valuable contribution to community initiatives surrounding the Site however, this is not significant in terms of the EIA Regulations. There is further potential for enhancements from participation in shared ownership etc.

268. A short-term **significant** construction/decommissioning effect in terms of the EIA Regulations was identified for the Cross Borders Drove Road; mitigation via an Access Management Plan reduces the construction effect to **not significant**.

269. No other significant effects in terms of the EIA Regulations are predicted on socio-economics, all other tourism and recreation and land-use receptors during the construction, operation or decommissioning phases of the Development.

CLOICH FOREST WIND FARM

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Chapter 16

Climate Change and Carbon Balance

16 CLIMATE CHANGE AND CARBON BALANCE

16.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the effects of the Cloich Wind Farm ('the Development') on climate change and carbon balance resource, and presents a Climate Change Impact Assessment (CCIA).

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

3. This Chapter of the EIA Report is supported by Technical Appendix A16.1: Carbon Balance Calculations provided in Volume 3.

4. This Chapter includes the following elements:

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

16.2 LEGISLATION, POLICY AND GUIDANCE

5. The following legislation, policy and guidance have been considered in carrying out this assessment:

- Institute of Environmental Management and Assessment (IEMA) Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation 2020[1];
- Electricity Act 1989[2];
- Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, as amended[3] (the EIA Regulations);
- The 2020 Routemap for Renewable Energy in Scotland (2011)[4] and as updated in 2013[5] and 2015[6];
- The Electricity Generation Policy Statement (2013)[7];
- Letter from Chief Planner to all Heads of Planning in relation to energy targets and SPP (November 2015)[8];

[1] IEMA (2020) Environmental Impact Assessment Guide to Climate Change Resilience and Adaption 2020 [Online]. Available at: https://www.iema.net/resources/reading-room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020 (Accessed 12/02/21)
[2] UK Government (1989) Electricity Act 1989 [Online] Available at: https://www.legislation.gov.uk/ukpga/1989/29/contents (Accessed 12/02/2021)
[3] UK Government (2017) Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 [Online] Available at: https://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 12/02/2021)
[4] Scottish Government (2011). 2020 Routemap for Renewable Energy in Scotland [Online]. Available at: https://www2.gov.scot/Publications/2011/08/04110353/0 (Accessed 12/02/2021)
[5] Scottish Government (2013). 2020 Routemap for Renewable Energy in Scotland – Update 2013 [Online]. Available at: https://www2.gov.scot/Resource/0044/00441628.pdf (Accessed 12/02/2021)
[6] Scottish Government (2015). 2020 Routemap for Renewable Energy in Scotland – Update 2015 [Online]. Available at https://www2.gov.scot/Resource/0048/00485407.pdf (Accessed 12/02/2021)
[7] Scottish Government (2013) Electricity Generation Policy Statement 2013 [Online] Available at: https://www.gov.scot/publications/electricity-generation-policy-statement-2013/ (Accessed 12/02/2021)
[8] Scottish Government (2015) Letter from Chief Planner to all Heads of Planning in relation to energy targets and SPP [Online] Available at: https://www.gov.scot/publications/energy-targets-and-scottish-planning-policy-chief-planner-letter/ (Accessed 12/02/2021)

- Scottish Energy Strategy (December 2017)[9];
- Onshore Wind Policy Statement (December 2017)[10];
- European Commission Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (2013)[11];
- HM Government UK Climate Change Risk Assessment Government Report (2012);[12]
- Scottish Government's Scottish Climate Change Adaption Programme[13]
- The Scottish Climate Change Plan (2018)[14];
- The Scottish Government's declaration of a Climate Emergency (April 2019)[15];
- The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019[16] and the legally binding net zero target for 2045 and interim targets for 2020, 2030 and 2040;
- Achieving Net Zero (2020)[17];
- Energy White Paper: Powering our net zero future (2020)[18];
- Securing a green recovery on a path to net zero: climate change plan 2018–2032 – update (2020)[19]; and
- The Committee on Climate Change (CCC) Reducing UK emissions: 2020 Progress Report (2020)[20].

6. Notable information sources containing baseline and projected climate data include:

- Digest of United Kingdom Energy Statistics (DUKES) 2020[21];
- State of the UK Climate 2018[22];
- Met Office UK Climate Projections 2018 (UKCP18) (updated September 2019)[23]; and

[9] Scottish Government (2017) The Future of Energy in Scotland: Scottish Energy Strategy [Online] Available at: https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/ (Accessed 12/02/2021)
[10] Scottish Government (2017) Onshore Wind: Policy Statement [Online] Available at: https://www.gov.scot/publications/onshore-wind-policy-statement-9781788515283/ (Accessed 12/02/2021)
[11] European Commission (2013). Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (2013) [Online]. Available at: https://ec.europa.eu/environment/eia/pdf/EIA%20Guidance.pdf (Accessed 12/02/2021)
[12] HM Government (2012). UK Climate Change Risk Assessment: Government Report [online]. Available at: https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-government-report (Accessed 12/02/2021)
[13] Scottish Government (2014). Scottish Climate Change Adaption Programme (SCCAP) [online]. Available at: https://www.gov.scot/publications/climate-ready-scotland-scottish-climate-change-adaptation-programme/ (Accessed 12/02/2021)
[14] Scottish Government (2018) Climate Change Plan: Third Report on Proposals and Policies 2018 – 2031 (RPP3) [Online[Available at: https://www.gov.scot/publications/scottish-governments-climate-change-plan-third-report-proposals-policies-2018-9781788516488/ (Accessed 12/02/2021)
[15] Scottish Government (2019) Action to Address Climate Emergency [Online] Available at: https://www.gov.scot/news/action-to-address-climate-emergency/ (Accessed 12/02/2021)
[16] Scottish Government (2019) Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 [Online] Available at: http://www.legislation.gov.uk/asp/2019/15/enacted (Accessed 12/02/2021)
[17] National Audit Office (2020) Achieving Net Zero [Online] Available at: https://www.nao.org.uk/report/achieving-net-zero/ (Accessed 30/03/2021)
[18] UK Government (2020) Energy White paper: powering our net zero future [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf (Accessed 30/30/2021)
[19] Scottish Government (2020) Securing a green recovery on a path to net zero: climate change plan 2018–2032 – update [Online] Available at: https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/ (Accessed 30/03/2021)
[20] The CCC (2020) Reducing UK emissions: 2020 Progress Report to Parliament [Online] Available at: https://www.theccc.org.uk/publication/reducing-uk-emissions-2020-progress-report-to-parliament/#key-findings (Accessed 12/02/2021)
[21] UK Government (2020) Digest of United Kingdom Energy Statistics 2020 [Online] Available at: https://www.gov.uk/government/statistics/digest-of-uk-energy-statistics-dukes-2020 (Accessed 12/02/2021)
[22] International Journal of Climatology, volume 39, Issue S1 (July 2019) ed. Radan Huth. Wiley
[23] Met Office (2018). UK Climate Projections [Online]. Available at: https://www.metoffice.gov.uk/research/collaboration/ukcp (Accessed 12/02/2021)

- The Met Office UKCP18 Science Overview Report[24].

7. Other information sources are referenced throughout the Chapter.

16.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

16.3.1 Scoping Responses and Consultation

8. Consultation for this EIA Report topic was undertaken with various consultees however, not all responded. Responses relevant to climate change are detailed in Table 16.1.

Table 16.1: Consultation Responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
Scottish Environment Protection Agency (SEPA)	Scoping Response 30/10/2019	Scottish Planning Policy states (Paragraph 205) that "Where peat and other carbon rich soils are present, applicants must assess the likely effects of development on carbon dioxide (CO_2) emissions. Where peatland is drained or otherwise disturbed, there is liable to be a release of CO_2 to the atmosphere. Developments must aim to minimise this release".	Noted. This Chapter provides a CCIA which includes a Carbon Balance Assessment.
		The planning submission must a) demonstrate how the layout has been designed to minimise disturbance of peat and consequential release of CO2 and b) outline the preventative/mitigation measures to avoid significant drying or oxidation of peat through, for example, the construction of access tracks, drainage channels, cable trenches, or the storage and re-use of excavated peat.	Whilst the Site is largely not underlain with peat; the Carbon Balance Assessment takes into account any peat disturbance and consequential release of CO_2.

[24] Lowe, J.A. *et al.* (2018). UKCP18 Science Overview Report. The Met Office. Available at: https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Overview-report.pdf (Accessed 12/02/2021)

16.3.2 Scope of Assessment

9. The following assessments are considered in terms of the Development:

- The influence of the Development on climate change; and
- A summary of effects on environmental receptors sensitive to climate change.

10. These assessments consider effects on environmental receptors as a result of the Development.

16.3.3 Elements Scoped Out of Assessment

11. The assessment of the influence of the Development on climate change focusses on the overall balance of greenhouse gas (GHG) emissions as climate change is directly linked to these emissions. No further analysis is undertaken of how climate parameters change in direct response to the emissions balance of the Development.

12. An assessment of the vulnerability of the Development to climate change has been scoped out of assessment, on the basis that none of the identified climate change trends could affect the Development, with the exception of increased windstorms. Any risk to the turbines from windstorms can be mitigated by installing braking mechanisms on the turbines, which would allow them to be operated only under specific wind speeds. Should severe windstorms be experienced, the turbines would be shut down. Additionally, flooding is not expected to pose a significant risk to the operation of the wind farm.

13. In relation to the effects on other environmental receptors, a qualitative review is undertaken in this Chapter of whether projected climate change will modify the future baseline without the Development sufficiently to change the results of the assessments undertaken in other chapters. The assessments are not repeated in this Chapter, which should be read in conjunction with the other technical chapters.

14. Of the technical assessments included within this EIA Report, receptors within ecology, ornithology and hydrology have been identified as having a potential for the baseline to be modified as a result of climate change. Effects of climate change on ecology, ornithology and hydrology are included in this chapter, with all other technical areas scoped out of further consideration as baseline receptors are unlikely to be affected by the climate changes forecast during the operational phase of the Development.

16.3.4 Study Area / Survey Area

15. The Study Area considered for the assessment of vulnerability of the Development to climate change consists of all infrastructure proposed within the site boundary ('the Site'). The assessment will consider the forecast climate changes over the planned operational phase of the Development i.e. until approximately 2055. Information on climate trends and projections at the Scottish and local scale (where available) are utilised.

16. The Study Area for the assessment of the influence of the Development on climate change considers GHG emissions (current levels and targets) within the Scottish and UK spatial scale. Reference is made to the global context as appropriate.

17. For the environmental receptors sensitive to the Development, the study area for the assessment on future baseline for these receptors is outlined in individual technical chapters, specifically:

- Ecology;
- Ornithology; and
- Hydrology.

16.3.5 Design Parameters

18. The design of the Development is a balance of technical, resource, and environmental considerations. Those of relevance for the assessments in this Chapter include:

- Installed capacity and capacity factor - for calculation of carbon balance;
- Turbine spacing in relation to prevailing wind direction - for effects on generation, turbulence and vulnerability to damage with potential changes to wind speed direction and storminess;
- Amount and layout of new track and infrastructure in relation to peat – for calculation of carbon balance;
- Permanent Felling associated with the Development – for calculation of carbon balance;
- Buffers to watercourses – for assessing vulnerability to flooding due to changes in precipitation events; and
- Construction Management commitments particularly in relation to minimisation of disturbance and re-use of peat, and potential for flooding (as embedded in a Construction Environmental Management Plan (CEMP), and the submitted Peat Management Plan (PMP), etc.) – for assessing potential emissions and vulnerability to flooding.

16.3.6 Baseline Survey Methodology

19. Climate trends and projections are published by the Met Office through the UK Climate Projections website. The UKCP18 became available in November 2018, and was most recently updated in September 2019[25]. The UKCP18 provide the most up to date assessment of how the climate of the UK may change over this century.

20. UKCP18 uses scenarios for future greenhouse gas emissions called Representative Concentration Pathways (RCPs). The four RCPs attempt to capture a range of potential alternative futures and outcomes linked to global temperature increases and include a wide variety of assumptions on socioeconomic development and commitment to emissions reductions. The sensitivity of the scenario responses is much more pronounced in the second half of the 21st Century, where the responses diverge more rapidly than in the first half of the century. The four RCPs are as follows:

- RCP2.6: assumes an increase in global mean surface temperature of 1.6°C (-0.9-2.3) by 2081-2100 (no change scenario)[26];
- RCP4.5: assumes an increase in global mean surface temperature of 2.4°C (1.7-3.2) by 2081-2100 (low emissions scenario)[26];
- RCP6.0: assumes an increase in global mean surface temperature of 2.8°C (2.0-3.7) by 2081-2100 (medium emissions scenario)[26]; and
- RCP8.5: assumes an increase in global mean surface temperature of 4.3°C (3.2-5.4) by 2081-2100 (high emissions scenario)[26].

21. Over the 30-year anticipated lifetime of the Development, the choice of scenario is therefore not fundamental to the assessment but, where appropriate, the medium emissions scenario RCP6.0 is utilised as the future baseline. Reflecting the Paris Climate Agreement[27], in which most countries including the UK pledged to reduce emissions by

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[25] Met Office (2020) UK Climate projections (UKCP) [Online] Available at: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/index (Accessed 25/02/2021)
[26] Met Office (2018) UCKP18 Guidance: Representative Concentration Pathways [Online] Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-guidance---representative-concentration-pathways.pdf (Accessed 25/02/2021)
[27] United Nations (2016) Framework Convention on Climate Change. Adoption of the Paris Agreement, 21st Conference of the Parties, Paris [Online] Available at: https://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf (Accessed 12/02/2021)

2030, this scenario assumes no further emissions reductions after 2030 and allows for some increase in emissions.

22. Projections are reported for 20-year time periods through to 2100. The 2021 – 2040 and 2041 - 2060 periods provide the closest projections to the operational phase of the Development. For the purpose of this CCIA, where appropriate the 2040 - 2059 time period is used as the impacts of climate change are anticipated to be more evident with time.

23. Projected climatic changes at the 50% probability level (central estimate) are utilised, unless otherwise indicated. This is the level where there is as much evidence pointing to a lower outcome as a higher one. There is substantial evidence that the actual climatic change outcome will be in the 10th to 90th percentile range and this is also utilised for limited assessment parameters[28].

16.3.6.1 Influence of the Development of Climate Change

24. This section of the CCIA seeks to quantify the effect of the Development on climate change.

25. In Scotland, applications submitted under Section 36 of the Electricity Act 1989 are required to undertake the carbon balance assessment using the Scottish Government's carbon calculator tool. This has been completed for the Development using the latest version of the calculator (C-CalcWebV1.6.1)[29]. The Development's carbon calculator reference number is 3MBU-ZUMC-V243, as detailed within Appendix A16.1. The carbon assessment methodology used is consistent with that published by the Rural and Environment Research and Analysis Directorate of the Scottish Government entitled 'Calculating carbon savings from wind farms on Scottish peat lands – a new approach'[30]. This publication sets out the approach and assumptions that should be used to estimate potential carbon losses[31] and savings from wind farms on Scottish peatlands. The carbon balance assessment is included as Appendix A16.1.

26. The calculation evaluates the balance of total carbon savings and carbon losses over the life of the Development. The potential carbon savings and carbon costs associated with wind farms are as follows:

- Carbon emission savings due to generation (based on displacing emissions from different power sources);
- Lifetime costs associated with manufacture of turbines and construction;
- Loss of carbon from backup power generation;
- Loss of carbon-fixing potential of peatland;
- Loss and/or saving of carbon stored in peatland (by peat removal or changes in drainage);
- Loss and/or saving of carbon-fixing potential as a result of forestry clearance; and
- Carbon gains due to proposed habitat improvements such as bog restoration.

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[28] Lowe et al (2018) UKCP18 Science Overview Report (Page 13)
[29] Scottish Government & SEPA. Carbon Calculator Tool v1.6.1 [Online]. Available at: https://informatics.sepa.org.uk/CarbonCalculator/index.jsp (Accessed 12/02/2021)
[30] Nayak et al (2008) Calculating carbon savings from wind farms on Scottish peat lands: a new approach (Scottish Government) [Online] Available at: https://www.gov.scot/publications/calculating-carbon-savings-wind-farms-scottish-peat-lands-new-approach/pages/13/ (Accessed 12/02/2021)
[31] Carbon losses are defined within the Scottish Governments Technical Note Version 2.10.0 on Calculating potential carbon losses and savings from wind farms on Scottish peatlands. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/12/carbon-calculator-technical-guidance/documents/calculating-potential-carbon-losses-and-savings-from-wind-farms-on-scottish-peatlands-technical-guidance/calculating-potential-carbon-losses-and-savings-from-wind-farms-on-scottish-peatlands-technical-guidance/govscot%3Adocument/Calculating%2Bpotential%2Bcarbon%2Blosses%2Band%2Bsavings%2Bfrom%2Bwind%2Bfarms%2Bon%2BScottish%2Bpeatlands%2B-%2Btechnical%2Bguidance.pdf (Accessed 16/04/2021)

27. The calculation of the carbon balance of a proposed wind farm provides a mechanism by which the carbon costs of a wind farm development can be weighed against the carbon savings attributable to the wind farm during its lifetime. This calculation is summarised as the length of time (in years) it will take the carbon savings to amount to the carbon costs and is referred to as the 'payback period'. This information can then inform decision makers of the viability of a wind farm development in terms of overall carbon savings.

28. Calculations are provided for expected, best case and worst-case scenarios of Development. The expected scenario is based on the layout of 12 turbines and candidate turbine (Nordex N133, 4.8 MW) described in **Chapter 3: Project Description**, and has an estimated installed capacity of approximately 57 MW. The other scenarios are based on varying assumptions regarding wind energy capacity factor, characteristics of peatland and Development land-take.

29. The data sources and assumptions used in the carbon balance assessment are detailed in Appendix A16.1. The assessment was informed by an iterative peat probing process, as described in **Chapter 9: Geology, Ground Conditions and Peat**.

16.3.6.2 Effects on Environmental Receptors Sensitive to Climate Change

30. This section of the CCIA identifies where climate change has the potential to significantly impact the findings of assessments undertaken and reported elsewhere in this EIA Report. Reference is made to the specific assessment chapters, where the baseline conditions and sensitivity of receptors are discussed, assessments are not repeated.

16.3.7 Methodology of Assessment Effects

31. To determine whether effects are significant under the EIA Regulations, it is appropriate to consider the sensitivity (vulnerability and susceptibility) of the receptor and the magnitude of the impact, taking into account uncertainty. This is based on the professional judgement of the assessor.

16.3.7.1 Sensitivity of Receptors

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

33. Table 16.2 details the criteria for determining the sensitivity of receptors.

Table 16.2: Criteria for Determining Sensitivity of Receptors

Sensitivity of Receptor	Definition
Very High	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.
Low	The receptor is tolerant of change without detriment or benefit to its character, is low environmental value, or is of local importance.
Very Low	The receptor is resistant to change and is of little environmental value.

16.3.7.2 Magnitude of Change

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

35. The criteria for assessing the magnitude of an effect are presented in Table 16.3.

Table 16.3: Criteria for Determining Magnitude of Change

Magnitude of Change	Definition
Very High	A national-level change to the baseline condition of a receptor.
High	A fundamental change (positive or negative) to the baseline condition of the receptor, leading to total loss or major alteration of character.
Medium	A material change (positive or negative) leading to partial loss or alteration of character.
Low	A slight, detectable, alteration of the baseline condition which may be positive or negative.
Negligible	A barely distinguishable change from baseline conditions.

16.3.7.3 Significance of Effect

36. The sensitivity of the asset and the magnitude of the predicted change will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects.

37. The IEMA guidelines for CCIA state the following with regards to the assessment of significance:

> *"This guidance is not proposing changes to the significance criteria used in the EIA process. However, the susceptibility or resilience of the receptor to climate change must be considered as well as the value of the receptor.*
>
> *Therefore, a high-value receptor that has very little resilience to changes in climatic conditions should be considered more likely to be significantly affected than a high-value receptor that is very resilient to changes in climatic conditions.*
>
> *The uncertainty of the combined effect needs to be taken into account. If uncertainty about how a receptor will adapt to a changing climate is high, then it is recommended that a conservative threshold of significance is adopted within the evaluation".*

38. Table 16.4 outlines the framework for the assessment of significance of effects, which is supported heavily by professional judgement.

Table 16.4: Framework for Assessment of the Significance of Effects

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

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

40. The categories of significance are described in Table 16.5:

Table 16.5: Categories of Significance of Effect

Significance	Definition
Major	A fundamental change to location, environment, species or sensitive receptor.
Moderate	A material, but non-fundamental change to a location, environmental, species or sensitive receptor.
Minor	A detectable but non-material change to a location, environment, species or sensitive receptor
Negligible	No detectable or material change to a location, environment, species or sensitive receptor.

41. Effects assessed can be either positive, negative or neutral. Whilst receptors may be considered "high-value", a non-material magnitude of the impact would result in any effect being considered not significant.

16.3.8 Assessment Limitations

42. The climate change projections are based on global models for a range of GHG emissions scenarios and generally consider regional responses to climate change rather than local responses. This is based on best scientific knowledge at this time and judgements on datasets and future socioeconomic drivers.

43. Downscaling adds another level of uncertainty. There may be more detail, but the uncertainty of the science may be higher. As understanding of the climate system and the ability to model it improves, it is likely that future projections will be refined.

44. The probabilities presented and the estimated ranges are based on a set of modelling, statistical and dataset choices with expert judgement playing an important role. However, as some potential influences on future climate are not yet known some choices may change as the science develops[32].

45. Specifically, in relation to wind, the UKCP18 Wind Fact sheet[33] states that local variations due to the land surface are hard to model, particularly in very exposed or sheltered locations. This can be particularly relevant in high wind speed situations where local gusts can result from small scale weather events such as thunderstorms.

16.3.9 Embedded Mitigation

46. As detailed in **Chapter 2: Site Selection & Design**, the Development has been driven by the key objective of capturing the maximum energy possible, while balancing environmental and technical constraints. The design choices made as a consequence of the key constraints are considered to be mitigation which is 'embedded' in the design; the following are most relevant for the CCIA:

- Development infrastructure is built to withstand strong windspeeds and to harness energy;
- Turbine spacing is sufficient to reduce turbulence effects on turbines downwind;

[32] Lowe *et al* (2018) UKCP18 Science Overview Report
[33] UKCP18 (2019) Factsheet: Wind [Online]. Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-wind_march21.pdf (Accessed 12/02/2021)

- The turbines are located to maximise energy generation while minimising environmental impacts;
- The Development design aims to minimise environmental impacts e.g., through use of existing track layout;
- Turbines, and associated infrastructure, have not been sited in areas of peat with depths greater than 0.5 m to minimise peat disturbance;
- 50 m buffers from watercourses incorporated in layout design, protecting water quality and also protecting Development infrastructure from flooding; and
- Implementation of a Construction Environmental Management Plan (CEMP) (to be agreed with authorities prior to construction), Peat Management Plan (PMP) etc. during construction to minimise environmental impacts.

16.4 BASELINE CONDITIONS

47. The State of the UK Climate 2019[34] provides the latest report on observed climate data for UK. Key findings are as follows:

- The decade 2010-2019 was on average 0.3^{o}C warmer than the 1981-2010 average and 0.9^{o}C warmer than 1961-1990. The ten warmest years on record have occurred since 2002;
- The decade 2010–2019 has been on average 1% wetter than 1981–2010 and 5% wetter than 1961–1990 for the UK overall. Six of the ten wettest years for the UK in a series from 1862 have occurred since 1998;
- In the context of seasonal changes, for the most recent decade (2010-2019):
    - UK summers have been on average 11% wetter than 1981–2010 and 13% wetter than 1961–1990;
    - UK winters have been on average 4% wetter than 1981–2010 and 12% wetter than 1961–1990; and
- In the UK, there is no strong evidence for trends in storminess as determined by maximum gust speeds over the last five decades.

48. Climate Projections show that the trends over the 21st Century in the UK are towards warmer and wetter winters and hotter, drier summers, with an increase in frequency and intensity of extremes.

49. The climate parameters considered most relevant to the assessments referenced within this Chapter are wind speed, temperature and precipitation.

16.4.1 Wind Speed

50. The global projections over the UK show an increase in near surface (10 metre [m] height) wind speeds over the UK in the second half of the 21st Century, in the winter season when higher wind speeds are generally experienced. The increase is modest when compared to inter-annual variability. This would be accompanied by an increase in frequency of winter storms over the UK[35]. There are no significant changes forecast in the wind speeds over the first part of the century.

51. These projections are in line with earlier findings by Pryor and Barthelmie (2010)[36] who concluded that in the near-term (i.e., until the 2050s) there will be no detectable significant change in the wind resource of northern Europe.

[34] International Journal of Climatology, volume 39, Issue S1 (July 2020) ed. Radan Huth. Wiley
[35] UKCP18 (2018) Factsheet: Wind.
[36] Pryor, S.C. and Barthelmie, R. J. (2010) Climate Change Impact on Wind Energy: A Review. Renewable and Sustainable Energy Review, 14(1): 430-437

16.4.2 Temperature

52. At a UK level, for period 2041-2060 projected changes to annual mean temperature (compared to 1981-2000) is projected at +1.8^{o}C (50% probability) for RCP8.5 (unmitigated scenario). Results for the 10th to 90th percentile range are between +0.9^{o}C to +2.7^{o}C[37]. Key observations are that:

- Both winters and summers will be warmer, with more warming in the summer; and
- In summer there is a pronounced north/south divide with greater increases in maximum summer temperatures over the southern UK compared to Scotland.

16.4.3 Precipitation

53. Rainfall patterns over the UK are not uniform and vary on regional and seasonal scales, which will continue in the future. Future changes are uncertain but point to wetter winters and drier summers in general. Drying in summer will be strongest in the South of England, whilst Scotland is generally associated with increased precipitation in winter[38].

54. Over the UK, the changes to precipitation projected for 2041-2060 (compared to 1981-2000) for RCP8.5 (unmitigated scenario) are:

- Winter precipitation – increase of 7%. Results for the 10th to 90th percentile range are between -5% and +21%.
- Summer precipitation – decrease of 15%. Results for the 10th to 90th percentile range are between -31% and +0%.

16.4.4 Greenhouse Gas Emissions and Renewable Energy

55. The central aim of the Paris Agreement is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2^{o}C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5^{o}C[39].

56. A substantial reduction in greenhouse gas emissions is imperative to avoid irreversible damage caused by the impacts of climate change. *"When it comes to rises in global average temperature, every fraction of a degree matters"* was stated in a recent publication providing analysis for the Global Carbon Budget 2018[40].

57. The 2018 IPCC Special Report[41] highlighted that to limit global warming to below 1.5^{o}C by the end of the century, emissions would need to decline by approximately 45% by 2030 and reach net zero around 2050. This is the temperature rise when a variety of increasingly severe effects are considered to occur and the IPCC identifies that rapid and far-reaching transitions are required in all sectors including energy. Action is required immediately to reduce emissions by 50% by 2030. Figures from the Global Carbon Project however report that global CO_2 emissions from fossil fuels and industry have increased every decade from an average of 11.4 gigatonnes of equivalent carbon dioxide ($GtCO_2$) in the 1960s to an average of 34.7$GtCO_2$ during 2009-2018. Emissions in 2018 reached a new record high of 36.6$GtCO_2$. Though global emissions in 2019 have been

[37] Lowe *et al* (2018) UKCP18 Science Overview Report November 2018 (Updated March 2019) (Table 2.2, Page 16)
[38] Lowe *et al* (2018) UKCP18 Science Overview Report
[39] UN Climate Change (2015) the Paris Agreement [Online] Available at: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement (Accessed 12/02/2021)
[40] Figueres, C., C. Le Quéré, G. P. Peters, G. Whiteman, A. Mahindra, D. Guan, et al. (2018) Carbon Budget 2018**:** Emissions are still rising: ramp up the cuts, Nature, vol 564, 27-30.
[41] Intergovernmental Panel on Climate Change (IPCC) (2018) Global Warming of 1.5^{o}C: Summary for Policymakers [Online] Available at: https://www.ipcc.ch/sr15/ (Accessed 12/02/2021)

projected to increase by an additional 6%, which is a slower growth than in the past two years[42].

58. The Scottish Government has introduced a number of policies aimed at reducing GHG emissions and meeting renewable energy targets set at Scotland, UK, European and International levels with ambitious targets for reductions in greenhouse gas emissions. The Climate Change Act (Emissions Reduction Targets) (Scotland) Act 2019 amends the Climate Change (Scotland) Act 2009 and was introduced to Parliament in May 2018. The Bill was passed in September 2019 and received Royal Assent in October 2019. Following the Committee on Climate Change (CCC) recommendation, the Act was amended to set a new target to cut Scottish greenhouse gas emissions to net zero by 2045, five years ahead of the target date set for the whole of the UK, with interim targets now set to cut emissions by 75% and 90% by 2030 and 2040 respectively (in relation to 1990 levels).

59. The 2nd Scottish Climate Change Adaptation Programme 2019 - 2024 was published in September 2019. This document sets out the Scottish Government's policies and proposals for climate change adaptation, building on the 1st five-year programme.

60. In October 2020 the CCC published its latest report to the Scottish Parliament on progress in reducing carbon emissions[43]. The report notes the significant progress which the power sector has made towards reducing carbon emissions in Scotland and the UK as a whole. The switch to low carbon generation has contributed two thirds of the total fall in emissions in Scotland, driven by the increase in renewable generation from wind power, and the reduction in fossil fuel capacity – including the closure of all of Scotland's remaining coal fired plants.

61. Renewable generation capacity in Scotland has more than trebled in the last 10 years with 11.9 GW of installed generation capacity across the country as of June 2020[44]. It is estimated that renewables generated the equivalent of 90.1% of Scotland's gross electricity demand in 2019.

62. However, Scotland has a target to reduce GHG emissions to net-zero by 2045, which includes electricity generation. As stated in the 2020Progress Report to Parliament by the CCC, Scotland must reduce its emissions by an average of 1.9 million metric tonnes ($MtCO_2e$). In 2017, emissions fell by 1.5 $MtCO_2e$ in Scotland, less than the Scottish Government's annual reduction targets. To be able to meet its 2045 target, Scotland must further reduce its GHG emissions.

63. The CCC published the 2020 report to Parliament[45], assessing progress in reducing UK emissions over the past year. The report highlights that although a limited number of steps have been taken over the past year to support the transition to a net-zero economy and improve the UK's resilience to the impacts of climate change, much remains to be done. The report indicates that reaching net zero emissions in the UK will require all energy to be delivered to consumers in zero-carbon form, i.e., renewables and nuclear, bioenergy and fossil fuels combined with carbon capture and storage.

64. GHG emissions from the UK electricity sector have been decreasing over the last years, and this is primarily because of a reduction in GHG emissions from power stations.

[43] Climate Change Committee (October 2020) Reducing emissions in Scotland Progress Report to Parliament [Online] Available at: https://www.theccc.org.uk/publication/reducing-emissions-in-scotland-2020-progress-report-to-parliament/ (Accessed 23/11/2020)
[44] Scottish Government (2020) Annual Compendium of Scottish Energy Statistics 2020 [Online]. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/statistics/2019/05/annual-compendium-of-scottish-energy-statistics/documents/annual-compendium-december-2020/annual-compendium-december-2020/govscot%3Adocument/ACSES%2B2020%2B-%2BDecember.pdf (Accessed 12/02/2021)
[45] The CCC (2020) Reducing UK emissions: 2020 Progress Report to Parliament [Online] Available at: https://www.theccc.org.uk/publication/reducing-uk-emissions-2020-progress-report-to-parliament/#key-findings (Accessed 12/02/2021)

Between 2018 and 2019 there was a 13.2% decrease in emissions from power stations – this is mainly attributed to a change from fossil fuel generation to renewables.[46] Cities for Climate Protection (CCP) set out policies and proposals to reduce emissions from this sector by a further 28% between 2018 and 2032, taking the overall reduction within the sector to 87% compared to 1990.

65. With the continued development of onshore wind farms, in the planning and pre-construction phases, it is anticipated that onshore wind farms will continue to make a sizeable contribution to the energy generated from renewable energy technologies within Scotland. The CCP sets out as one of the policy outcomes for this sector that from 2020 onwards, Scotland's electricity generation intensity will be less than 50 grams of carbon dioxide equivalent per kilowatt hour (CO_2eq/kWh), powered by a high penetration of renewables. The CCP latest figures for 2018 show intensity has seen a slight increase to 44.6CO_2e/kWh[47] compared to 2017 which was 24gCO_2e/kWh[48]; however, it still remains below 50 grams of CO_2eq/kWh.

16.5 ASSESSMENT OF POTENTIAL EFFECTS

66. As a large energy asset of generation in excess of 50 Megawatts (MW), the Development can be classed as an asset of regional importance and classed as Medium sensitivity for the following assessments.

16.5.1 Influences of the Development on Climate Change

16.5.1.1 Carbon Savings

67. Every unit of electricity produced by a wind farm development displaces a unit of electricity which would otherwise have been produced by a conventional (coal or gas) power station, and therefore presents carbon savings.

68. The electricity produced from the wind farm is assumed to substitute energy production by entirely coal-fired generation, or a mix of fossil fuels, or the national grid mix of energy generation. A renewable energy development would have a maximum potential to save carbon emissions when substituting coal fired generation, which is a possibility if coal is at the bottom of the cost merit order of generation.

69. However, it is not appropriate to define the electricity source for which this renewable electricity project would substitute, due to uncertainty in future grid mix. For this reason, carbon emission savings are calculated for each scenario in the carbon calculator.

70. The potential annual carbon emission savings for the Development are provided in Table 16.6, and within Appendix A16.1. Based on the latest DUKES Statistics[49] and an average capacity factor of 27% (based on DUKES Statistics[45]), it is expected the Development would result in the production of approximately 136,236 megawatt hour (MWh) annually, equating to approximately 4,087,066 MWh over the operational life of the Development (30 years). This equates to displacing approximately 1,839,180 tonnes of fossil fuel mix generation equivalent CO_2 emissions, over the operational life which is a positive

[46] UK Government (2020) 2019 UK greenhouse gas emissions, provisional figures [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/875485/2019_UK_greenhouse_gas_emissions_provisional_figures_statistical_release.pdf (Accessed 30/03/2021)
[47] Scottish Government (2020) Climate Change Plan 2018-2032 Update. [Online] Available at: https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/ (Accessed 12/02/2021)
[48] Scottish Government (2019) Climate Change Plan: monitoring report 2019 [online] Available at: https://www.gov.scot/publications/climate-change-plan-monitoring-report-2019/pages/3/#:~:text=Renewable%20electricity%20generation%20capacity%20in,2008%20to%2051.7%25%20in%202017 (Accessed 12/02/2021)
[49] UK Government (2019) Regional Statistics 2009-2019: Standard Load Factors [Online] Available at: https://www.gov.uk/government/statistics/regional-renewable-statistics (Accessed (05/03/2021)

environmental effect. The projected change in wind speeds as a result of climate change over the operational phase of the Development is considered to be non-material for the purposes of this assessment.

Table 16.6: Carbon Savings for the Development (Expected Scenario)

	Expected CO_2 Saving (t $C0_2yr^{-1}$)
Coal fired electricity generation	125,337
Grid mix electricity generation	34,547
Fossil fuel mix electricity generation	61,306

71. It should be noted that the average capacity factor of 27% is likely to represent a significant underestimation when compared to the actual capacity factor experienced at the Site. Consequently, carbon savings are also likely to be conservative.

16.5.1.2 Carbon Losses

72. As detailed within the Scottish Government's Technical Note Version 2.10.0 on Calculating potential carbon losses and savings from wind farms on Scottish peatlands[31], the manufacturing, construction and installation of the wind turbines on Site has an associated carbon cost, and carbon losses are also generated by the requirement for extra capacity to back up wind power generation. Carbon losses associated with reduced carbon fixing potential and loss of soil organic matter occurs through drainage effects and excavation of peat for construction. Carbon losses at this site may also be associated with felling of existing forestry.

73. Organic soils (peatlands) in Scotland act as carbon sinks, whereby they absorb carbon dioxide in their formation. They may also release carbon due to land use change, such as drainage for agriculture or the establishment of forestry. The Development is located within a Site where limited peat deposits are present, as per survey findings discussed in **Chapter 9: Geology, Ground Conditions and Peat** of this EIA Report.

74. Carbon losses for the expected scenario are summarised in Table 16.7.

Table 16.7: Carbon Losses for the Development (Expected Scenario)

Losses	**t $C0_2$ Equivalent (total for wind farm lifetime)**
Losses due to turbine life (e.g. manufacture, construction, decommissioning)	50,369
Losses due to back-up	19,618
Losses due to reduced carbon fixing potential	954
Losses from soil organic matter	5,673
Losses due to Dissolved Organic Carbon (DOC) and Particulate Organic Carbon (POC) leaching	363
Losses due to felling forestry	27,966
TOTAL LOSSES OF CARBON DIOXIDE	104,943

16.5.1.3 Payback Period

75. The carbon payback period is a measurement/indicator to help assess a proposal. The shorter the payback the greater benefit the Development will have in displacing emissions associated with electricity generated by burning fossil fuels.

76. The payback period is calculated taking the total carbon cost (carbon losses) associated with the Development and dividing by the annual carbon gains from displaced fossil fuel power generation and any site improvements.

77. The estimated payback period for the Development is 3.1 years compared to grid-mix electricity generation. In comparison to fossil fuel mix and coal-fired electricity generation the payback period of the Development reduces to 1.7 years and 0.8 years respectively. Table 16.8 below goes into further detail regarding the carbon payback period for the Development.

Table 16.8: Payback in Years for each Scenario used in the Carbon Calculator

Compared to…	Expected Scenario	Best Case Scenario	Worst Case Scenario
Coal fired electricity generation	0.8	0.7	1.1
Grid-mix electricity generation	3.1	2.4	3.9
Fossil fuel-mix of electricity generation	1.7	1.3	2.2

78. The CO_2 emission savings for the operational lifetime beyond that (currently predicted as 30 years) would a net benefit of the Development to reducing climate change. This is considered a Low magnitude of effect i.e. a slight, detectable, alteration of the baseline condition.

79. Given the challenge and international urgency of climate change, as identified in the recent IPCC special report, climate is considered to have Very High sensitivity to changes in GHG emissions. The Development is therefore assessed to have Moderate, positive environmental effects, that is **significant** under the EIA Regulations.

16.5.2 Effects of Future Climate Change Scenario on Environmental Receptors Sensitive to Climate Change

80. The potential for environmental receptors to be impacted by the Development are assessed in Chapters 6-17 of this EIA Report. Of these ecological, ornithological and hydrological receptors are the most sensitive to climate change and are discussed further in Table 16.9 below.

Table 16.9: Climate Change Effects on Environmental Receptors

EIA Report Chapter	Receptor	Climate Change Effect	Effect on Receptor
7	Ecology – Habitats, Protected Species	Temperature: up to + 2°C Shift to wetter winters and dryer summers Negligible change in wind speeds	While changes in temperature could affect the composition and growth rates of plant communities and invertebrates, and hence protected species and habitats, the uncertainties are high and it is not clear that the effect of the Development on those receptors would alter substantially as a result.
8	Ornithology	Temperature: up to + 2°C Shift to wetter winters and dryer summers	A rise in temperature has the potential to impact on habitats which in turn may affect the behaviour of bird interests. As noted above uncertainties are high and the type and significance of

EIA Report Chapter	Receptor	Climate Change Effect	Effect on Receptor
		Negligible change in wind speeds	effects identified from the Development are not anticipated to alter as a result.
9 & 10	Geology, Hydrology and Hydrogeology	Shift to wetter winters and dryer summers	Limited change to future baseline and to the identified effects of the Development.

81. Given the relatively limited magnitude of change in climate parameters predicted over the operation of the Development, negligible changes to the baseline for environmental receptors are anticipated during this period. This is incorporated into the assessments undertaken in other chapters of this EIA Report.

82. No additional significant effects will occur as a result of climate change during the operational phase of the Development.

16.6 MITIGATION AND RESIDUAL EFFECTS

83. As detailed in Section 16.5.1, the Development will have a positive effect due to the CO_2 emission savings for the operational lifetime and beyond resulting in a net benefit of the Development to reducing climate change. Any adverse, negative effects as a result of the Development are of such limited, and negligible nature, that they are not significant in terms of the EIA Regulations. As such, no mitigation is required under the EIA Regulations other than that already embedded into the Development and recommended as best practice.

84. An iterative design approach was taken for the layout of the Development to avoid siting turbines and hardstanding in proximity to watercourses as well as infrastructure in deep peat to minimise disturbance of peat soils and associated carbon losses. As illustrated on Figure 2.2 of **Chapter 2: Site Selection & Design**) the only section of track associated with the Development that is located in peat greater than 1 m is existing forestry track in the east of the Site; upgrades to this section of the track are considered unlikely. Further micro-siting will be informed by detailed pre-construction ground investigations.

85. An Outline PMP has been produced and is provided in **Chapter 9: Geology, Ground Conditions and Peat**. Proposed reuses of the excavated peat are in line with the Scottish Renewables and SEPA Guidance[50] and the outline PMP demonstrates that all excavated peat can be suitably re-used on Site. Methods for handling and storing excavated peat have been described in the Outline PMP to ensure its reuse potential is maximised and any carbon losses are minimised. Monitoring of the reinstated areas will be carried out to ensure that the environmental objectives are realised.

86. The Outline PMP will be updated prior to construction once further site investigation data and detailed engineering designs are available. Temporary peat storage locations will be identified in the updated PMP and will be guided by a geotechnical engineer. The updated PMP will also include detailed method statements and phasing of works, and will be agreed with SEPA and the planning authority prior to construction commencing.

87. Under the Scottish Government's Control of Woodland Removal policy any tree crops permanently removed for the Development would require to be replanted on a like-for-like area basis either within the Site or at a suitable substitute location. Approx. 71 hectares (ha) of productive forestry would be removed for the duration of the operation of the Development, and would be replaced by a compensatory planting scheme on a

[50] Scottish Renewables, SEPA (2012) Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and Minimisation of Waste [Online] Available at: https://www.gov.scot/Topics/Business-Industry/Energy/Energy-sources/19185/17852-1/CSavings/guidancepeatwaste (Accessed 12/02/2021)

substitute site. An additional 121 ha of forestry will be removed prior to the construction period and restocked on Site. The mitigation work to re-establish the areas of crops removed by both restocking within the Site and supplemental compensatory planting out with the Site will ensure the overall area of forestry crops is maintained.

88. Other mitigation measures will include the management of wind turbines to maintain operational efficiency during their lifetime. Maintenance plans for wind turbines would be developed to maximise turbine output and efficiency.

16.7 CUMULATIVE EFFECT ASSESSMENT

89. The Scottish and UK Governments have set ambitious targets for reducing GHG emissions by 2045 and 2050 respectively. The Development, in conjunction with other renewable energy developments, will contribute to Scotland and the UK's aims to reduce carbon emissions and achieve meet its ambitious greenhouse gas emissions targets.

90. DUKES 2020 details that renewable electricity represented 37.1% of total UK generation in 2019, with onshore wind's overall share of capacity increasing to 13.3% of all generators overall, up two percentage points on 2018.

91. The Development will contribute approximately 57 MW of installed capacity which will contribute to increasing renewable energy generation capacity within Scotland the UK.

92. The cumulative effect of the Development with other UK renewables generation is considered to be a fundamental change in the climate effects of UK energy supply and contribute to the UK's legally binding emission reduction targets. This represents a major, positive effect that is **significant** under the EIA Regulations

16.8 SUMMARY OF EFFECTS

93. Table 16.10 provides a summary of the effects detailed within this Chapter.

Table 16.10: Summary of Effects

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Influence of the Development on Climate Change				
Climate - average temperature predictions as linked to GHG emissions.	Reduction in GHG emissions through offsetting of existing conventional generation.	Moderate Major cumulatively	None Embedded mitigation has reduced payback period and maximise beneficial impact.	Significant contribution cumulatively to regional emissions and renewable energy generation targets.
Effects on Environmental Receptors				
Environmental Receptors assessed in individual chapters of EIA Report.	Change to future baseline of receptors and assessment results.	Negligible Little change over time period to baseline condition of receptors.	None Mitigation as identified in individual assessment chapters	None

16.9 STATEMENT OF SIGNIFICANCE

94. The Development will have positive effect on carbon savings and a significant positive effect when considered cumulatively with Scottish renewable energy deployment. This is significant in terms of the EIA Regulations.

No additional significant effects to those already identified within the EIA Report will occur as a result of climate change during the operational phase of the Development.

CLOICH FOREST WIND FARM

EIA Report – Volume 1 – EIA Report Text

Chapter 17

Other Issues

ARCUS

17 OTHER ISSUES

17.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the effects of Cloich Forest Wind Farm ('the Development') on any remaining topics that are within the scope of the Environmental Impact Assessment (EIA).

2. This assessments within this Chapter were undertaken by Arcus Consultancy Services Limited (Arcus).

3. The topics included within this Chapter include:

- Shadow Flicker;
- Telecommunications and Utilities;
- Human Health & Safety, including Major Accidents and Disasters; and
- Waste.

4. The assessments within this Chapter largely align with the following elements, as appropriate:

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

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

- Figure 17.1: Shadow Flicker Study Area and Casting Map; and
- Figure 17.2: Borders Online Telecommunication Links.

17.2 SHADOW FLICKER

17.2.1 Introduction

6. This Section evaluates the effects of shadow flicker from the Development on nearby receptors. Under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. Shadow flicker is an effect that can occur when the shadow of a blade passes over a small opening (such as a window), briefly reducing the intensity of light within the room, and causing a flickering to be perceived. Shadow flicker effects only occur inside buildings where the blade casts a shadow across an entire window opening. The likelihood and duration of the effects depends on a range of factors including the direction, distance and aspect of residential dwellings in relation to the turbines, turbine height and rotor diameter, the topography between residential dwellings and turbines, the time of year and day; and the local weather conditions.

7. If significant shadow flicker effects on residential dwellings are identified as part of this assessment, technical solutions to mitigate shadow flicker will be provided.

17.2.2 Legislation, Policy and Guidance

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

- Scottish Government Onshore Wind Turbines: Planning Advice[1];
- Review of Light and Shadow Effects from Wind Turbines in Scotland[2].
- Scottish Borders Council Supplementary Guidance: Renewable Energy[3]

17.2.2.1 Scottish Government Onshore Wind Turbines: Planning Advice

9. This document provides planning advice for onshore wind developments including consideration of shadow flicker effects. This is the most current Scottish planning advice for Shadow Flicker and has been used to inform the methodology for this assessment. It states:

> *"…where separation is provided between wind turbines and nearby dwellings (as a general rule 10 rotor diameters), "shadow flicker" should not be a problem".*

17.2.2.2 Review of Light and Shadow Flicker Effects from Wind Turbines in Scotland

10. A review of light and shadow effects from wind turbines was commissioned by ClimateXChange to review how light and shadow flicker effects are considered in the development planning process in Scotland.

11. This document includes a review of current UK guidance, along with a review of how the current guidance is applied through the selection and review of case studies.

12. The review provides a number of recommendations regarding the content of guidance on shadow flicker. These include:

- Guidance should not include reference to the occurrence of shadow flicker throw 'within 130 degrees of north';
- Guidance should exclude reference to the 10 rotor diameter distance; and
- There is a need for guidance on the thresholds of exposure to shadow flicker in Scotland.

13. It should be noted that since the publication of this review (2017), shadow flicker guidance in Scotland has not changed, and as such, the guidance in the Scottish Government Onshore Wind Turbines: Planning Advice remains extant.

17.2.2.3 Scottish Borders Council Supplementary Guidance: Renewable Energy

14. The Scottish Borders Council ('the Council') have produced Supplementary Guidance (SG) for renewable energy which supports Policy ED9 – Renewable Energy Development. The SG provides more detailed policy and guidance for developers on the requirements for wind energy and other renewable energy.

15. The SG acknowledges that shadow flicker can be disruptive and create annoyance. It states that recent evidence shows shadow flicker can be experienced at a greater distance than 10 rotor diameter distance.

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[1] Scottish Government (2014) Onshore Wind Turbines: Planning Advice [Online]. Available at: https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/ (Accessed on 12/02/21)
[2] LUC (2017) Review of Light and Shadow Effects from Wind Turbines in Scotland [Online] Available at: https://www.climatexchange.org.uk/research/projects/review-of-light-and-shadow-effects-from-wind-turbines-in-scotland/ (Accessed 12/02/21)
[3] Scottish Borders Council (2018) Supplementary Guidance, Renewable Energy [Online] Available at: https://www.scotborders.gov.uk/download/downloads/id/2757/renewable_energy_supplementary_guidance.pdf (Accessed 12/02/21)

16. In relation to assessing potential effects of shadow flicker at nearby properties, the SG states:

> *"Where requested by the Council, the developer will be required to produce shadow flicker assessments modelled to take into account all residential property within 2 km of a wind turbine."*

17.2.3 Assessment Methodology and Significance Criteria

17.2.3.1 Consultation

17. Table 17.1 illustrates the scoping responses from consultees relating to shadow flicker.

Table 17.1: Consultation Responses from Shadow Flicker Consultees

Consultee	Type and Date	Comment	Response
Scottish Borders Council	Scoping Response 15/11/2019	The development's compatibility with current guidance, which refers to a 10 x rotor diameter range within 130 degrees due north, should be considered. The Council's SG also requests assessment for residential properties within 2 km of each turbine.	A shadow flicker assessment has been included in the EIA Report and assesses residential properties within 2 km of each turbine.

17.2.3.2 Study Area/ Survey Area

18. In line with current guidance, a 10 x rotor diameter study area (1,360 m) would ensure that shadow flicker effects are identified at nearby dwellings. However, a distance of 2 km has been identified around each turbine location ('the Study Area') in line with the Council's Supplementary Guidance for Renewable Energy (Section 17.2.2.3.), as shown in Figure 17.1.

19. Potential sensitive receptors in the area around the Development were identified from Ordinance Survey (OS) 1:25,000 scale digital mapping and online aerial imagery. OS AddressBase data was used to confirm the locations and names of permanent dwellings in the Study Area.

20. As shown in Figure 17.1 twelve residential properties are located within the Study Area.

17.2.3.3 Baseline Survey Methodology

21. The assessment of shadow flicker is a desk-based assessment, and as such, no on-site survey specific to shadow flicker has been undertaken, with the exception of more general site visits conducted by the Applicant and other Arcus technical teams verifying the location and nature of surrounding properties.

17.2.3.4 Methodology for the Assessment of Effects

22. A recognised computer software package[4] was used to calculate theoretical specific times and durations of shadow flicker effects at each property located within the Study Area.

23. This software creates a mathematical model of the Development and its surroundings, based on:

- Turbine locations, hub height and rotor diameter (based on candidate turbine V136, 136 m rotor and 81.9 m hub);
- Topography (obtained from OS Land-Form Panorama elevation data on a 50 m horizontal grid);
- Latitude and longitude of the Site (used in calculating the position of the sun in relation to time of day and year); and
- Location of residential dwellings within 2 km of the turbines.

24. It is assumed that if shadow flicker effects experienced at properties within these search areas are not significant, then effects experienced by properties further afield will be reduced and therefore also not significant.

25. Certain worst-case assumptions are made in the calculation, including:

- Weather conditions are such that shadows are always cast during each day of the year, i.e. bright sunshine every day;
- The turbine rotor will always be facing directly towards the property and that the property has a window directly facing the turbines, maximising the size of the shadow and hence the frequency and duration of the effect;
- The turbines will always be rotating; and
- There will not be intervening structures or vegetation (other than topography) that may restrict the visibility of a turbine, preventing or reducing the effect.

26. The following assumptions have been made for all potential receptors in order to identify all potential effects as a worst case:

- All windows have been assumed to measure 1 m by 1 m (for larger windows the intensity of the effect would be reduced), to be situated at a height of 3 m above ground level, to the window's centre (representing an average of ground and first floor levels that may be typically 1.5 m and 4.5 m, respectively);
- Each property is located at the grid reference given in Table 17.2 (as per details from OS AddressBase data); and
- Windows facing towards each of the cardinal compass point directions (North, South, East and West) have been modelled in order to identify effects from all possible directions. In practice, not all of these directions face the Development, and the buildings may not have windows on each facade.

27. The above calculations are intended to investigate a worst-case scenario by indicating a theoretical maximum potential duration of effects and to provide an approximation of the times of day and year that these would occur rather than a precise prediction.

28. For much of a given year, weather conditions will be such that shadows would not be cast or would be weak and thus would not give rise to shadow flicker effects. In 2020, at Peebles, cloud cover typically occurred for 67% of the time, resulting in bright sunshine occurring for around 33% of daylight hours from January 2020 to January 2021[5]. This factor of 33% of daylight hours will be used to calculate the likely hours of shadow flicker occurrence which will then be used as the basis for the assessment of significance effects.

[4] Resoft WindFarm 4.2.1.7
[5] World Weather Online, Peebles [Online] Available at: https://www.worldweatheronline.com/peebles-weather/scottish-borders/gb.aspx (Accessed 18/02/2021)

29. In practice some of this time would be in non-windy conditions when the turbine blades would not be rotating. In windy conditions, the wind direction may not have been aligned with the direction of the sun, such that shadows were not being cast as widely as in the worst-case. In practice, other factors such as the potential for screening by vegetation or intervening structures will also reduce or prevent flicker incidence even further, as compared to the theoretical maximum period or the likely period of effect suggested by the calculations. The actual potential impact is therefore likely to be only a fraction of the theoretical maximum.

17.2.3.5 Significance Criteria

30. No formal guidance is available regarding what levels of shadow flicker may be considered acceptable in the UK. However, 'Wind Energy Development Guidelines' published by the Northern Ireland Department of the Environment, Heritage and Local Government (2009)[6] states that:

"*It is recommended that shadow flicker at neighbouring offices and dwellings within 500 m should not exceed 30 hours per year or 30 minutes per day.*"

31. This assessment predicts the potential maximum effects that occur, and a likely maximum duration for effects once prevailing weather conditions are taken into account. The Northern Irish guidance threshold has been adopted for all residential receptors as a measure of assessing the significant of predicted shadow flicker effects.

32. Mitigation is proposed to minimise or remove predicted effects, if levels of shadow flicker are deemed to be unacceptable in practice.

17.2.3.6 Assessment Limitations

33. The assumptions made in the assessment process, outlined in Section 17.2.3, are considered to be conservative where assessment results are likely to be worst case.

17.2.4 Baseline Conditions

34. Eleven properties (potential receptor, used as assessment locations) have been identified within the Study Area. Table 17.2 details the properties within the shadow flicker Study Area, as shown in Figure 17.1.

Table 17.2: Shadow Flicker Assessment Locations

Property Name	Easting	Northing	Nearest Turbine	Distance to Nearest Turbine (metres)
Cloich Farm Peebles	321652	649089	T10	1,200 m
Whitelaw Burn	322892	647898	T5	1,900 m
Upper Stewarton	321713	646050	T4	925 m
Nether Stewarton	321912	645628	T4	1,350 m
Stewarton House	321925	645537	T4	1,420 m
Stewarton Toll	322015	645532	T4	1,500 m

[6] Department of the Environment, Best Practice Guidance to Planning Policy Statement 18 'Renewable Energy', 2009

Property Name	Easting	Northing	Nearest Turbine	Distance to Nearest Turbine (metres)
Stewarton Lodge	322140	645514	T4	1,600 m
Harehope Farmhouse	320063	644354	T2	1,600 m
Old Harehope	320049	644248	T2	1,750 m
The Steading	320006	644169	T2	1,800 m
Harehope Cottage	320163	644044	T2	1,900 m

17.2.5 Assessment of Potential Effects

17.2.5.1 Construction Phase

35. Shadow flicker is a phenomenon that only occurs once the turbines are installed and operational and thus no shadow flicker effects are anticipated during the construction phase of the Development.

17.2.5.2 Operational Phase

36. Table 17.3 details the theoretical maximum hours of shadow flicker per annum, based on the worst-case assumptions discussed in Section 17.2.3. It also shows the calculation of the predicted likely number of hours of shadow flicker per annum, assuming 33% per annum bright sunshine.

37. A worst-case approach has been taken, initially, whereby the screening effects provided by trees or other buildings have not been taken into account, nor has any account been taken of which building facades have windows (it has been assumed that all facades have windows). The degree of effect will depend on the precise position of windows facing the proposed turbines, the location of screening, which itself may change over time as vegetation grows or is removed and wind direction / turbine orientation.

38. The theoretical maximum number of hours per annum, as shown in Table 17.3, is for all windows and accounts for any overlap where effects may be experienced at different windows or from different turbines simultaneously.

Table 17.3: Potential Shadow Flicker Effects at Assessed Locations

Name	Window Orientation	Days per year	Maximum minutes per Day	Theoretical Maximum Hours per Annum	Likely Hours per Annum[7]
Cloich Farm Peebles	North	0	0	0	0
	East	0	0	0	0
	South	102	39.6	34.6	11.4
	West	102	40.2	34.8	11.5
Whitelaw Burn	North	0	0	0	0
	East	0	0	0	0
	South	26	18.6	6.1	2

[7] Assumes 33% bright sunshine.

Name	Window Orientation	Days per year	Maximum minutes per Day	Theoretical Maximum Hours per Annum	Likely Hours per Annum[7]
	West	26	18.6	6.1	2
Upper Stewarton	North	55	29.4	13.9	4.6
	East	0	0	0	0
	South	13	19.8	3.1	1.1
	West	68	29.4	17.1	5.6
Nether Stewarton	North	66	24.6	19.3	6.4
	East	0	0	0	0
	South	0	0	0	0
	West	66	24.6	19.4	6.4
Stewarton House	North	75	24.6	21.6	7.1
	East	0	0	0	0
	South	0	0	0	0
	West	75	24.6	21.6	7.1
Stewarton Toll	North	45	22.8	13.5	4.5
	East	0	0	0	0
	South	0	0	0	0
	West	45	22.8	13.5	4.5
Stewarton Lodge	North	40	21.6	11	3.6
	East	0	0	0	0
	South	0	0	0	0
	West	40	21.6	11	3.6
Harehope Farmhouse	North	0	0	0	0
	East	0	0	0	0
	South	0	0	0	0
	West	0	0	0	0
Old Harehope	North	0	0	0	0
	East	0	0	0	0
	South	0	0	0	0
	West	0	0	0	0
The Steading	North	0	0	0	0
	East	0	0	0	0
	South	0	0	0	0
	West	0	0	0	0
Harehope Cottage	North	0	0	0	0
	East	0	0	0	0
	South	0	0	0	0

Name	Window Orientation	Days per year	Maximum minutes per Day	Theoretical Maximum Hours per Annum	Likely Hours per Annum[7]
	West	0	0	0	0

39. It has been calculated that theoretical shadow flicker is likely to occur at eight of the twelve assessed properties (as shown in Figure 17.1). Cloich Farm Peebles is expected to receive the highest levels of shadow flicker effects, calculated as being possible for up to a theoretical maximum of 34.8 hours per annum. No shadow flicker effects were found for Harehope Farmhouse, Old Harehope, The Steading, or Harehope Cottage.

40. Based upon weather conditions required to facilitate shadow flicker occurring for only 33% of the time (as outlined in Section 17.2.3), the likely number of hours per year where shadow flicker could potentially occur is reduced to 11.5 hours per annum at Cloich Farm Peebles. These figures are likely to comprise an over-estimate of actual effects, given the conservative aspects of this assessment as set out in the assessment methodology.

41. Similarly, as seen from Table 17.3, all other properties assessed are predicted to receive shadow flicker effects for durations below the guidance threshold of 30 minutes per day or 30 hours per year. As such, shadow flicker due to the Development is therefore considered **not significant** in terms of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[8] ('the EIA Regulations'). Shadow flicker effects upon settlements and isolated properties beyond the 2 km zone are likely to be negligible.

42. It is understood that a micro-siting allowance of 50 m is being applied for with this application. Should turbines be fully micro-sited, it is predicted that the likely shadow flicker duration at Cloich Farm Peebles will remain well below the shadow flicker threshold. Therefore, with the implementation of micro-siting, shadow flicker due to the Development is considered to remain not significant at the identified properties. Properties at a greater distance from the Development will therefore also comply with the threshold and will be **not significant** in terms of the EIA Regulations.

17.2.6 Cumulative Effect Assessment

43. The nearest wind farm is Bowbeat Wind Farm, a 24-turbine development located 8.6 km east of the Development. As this distance exceeds the Council's 2 km distance for likely shadow flicker effects, it is considered that shadow flicker impacts from Bowbeat Wind Farm are unlikely to occur in practice, at the assessed properties in Table 17.2. Cumulative shadow flicker effects from Bowbeat Wind Farm have therefore not been considered further.

17.2.7 Mitigation and Residual Effects

44. Shadow flicker effects have been assessed as not significant; therefore, no mitigation is required.

17.2.8 Summary of Effects

45. An assessment of potential shadow flicker effects associated with the Development has been carried out in line with Scottish Government guidance and local guidance from the Council. The theoretical maximum and likely hours of shadow flicker occurrence per year have been calculated for properties located within 2 km of the turbines.

[8] The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 [Online] Available at: https://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 11/02/2021)

46. During the operational phase, it has been found that eight properties are expected to experience shadow flicker however at no property shadow flicker effects are predicted to exceed the threshold of 30 hours per annum. Therefore, the effects are **not significant** in terms of the EIA Regulations. With the implementation of micro-siting, shadow flicker due to the Development is considered to remain not significant at the identified properties.

47. The flicker effects are expected to be further reduced in practice due to screening and wind direction impacting on varying orientations of turbines. The potential for shadow flicker effects at distances greater than 2 km from the turbines are not significant.

48. Whilst this assessment shows no significant effects, the Applicant is open to a planning condition requiring a shadow flicker mitigation strategy should it be found that unacceptable shadow flicker effects are experienced by nearby properties.

49. A planning condition would provide an appropriate form of assurance that any complaints would be investigated within a reasonable timescale and that the rectification of any substantiated shadow flicker issue would be implemented promptly and effectively. Statement of Significance

50. No shadow flicker effects will occur during construction or decommissioning.

51. The effect of shadow flicker during the operational period has been assessed using appropriate guidance and it is concluded that any shadow flicker effects caused by the Development are considered **not significant** in terms of the EIA Regulations.

17.3 TELECOMMUNICATION & UTILITIES

17.3.1 Introduction

52. Due to the size and nature of wind turbines, they have the potential to interfere with electromagnetic signals passing above ground during operation. Infrastructure affected can include telecommunication links, microwave links, and television reception.

53. In particular, the tower and rotating blades of wind turbines have the most potential for interference with electromagnetic signals. The degree and nature of the interference will depend on:

- The location of the wind turbines with respect to the receiver and the transmitter;
- Characteristics of the rotor blades;
- Signal frequency; and
- The radio wave propagation in the local atmosphere.

54. In addition, other infrastructure such as buried utilities may be affected by the construction of the Development.

55. This section of the EIA Report details the relevant guidance, consultation that has been undertaken with infrastructure operators, the existing baseline for these elements as relevant to the Development and an assessment of the likely effects as a result of the Development.

17.3.2 Legislation, Policy and Guidance

56. There are a number of documents which provide guidance on telecommunications considerations for wind energy developments. The guidance considered in this assessment are:

- British Wind Energy Association - Best Practice Guidelines of Wind Energy Developments[9];
- The Scottish Government - Onshore Wind Turbine: Planning Advice[10];
- Ofcom (2003) Guidelines for Improving Digital Television and Radio Reception; and
- Ofcom – Tall Structures and Their Impact on Broadcast and Other Wireless Service[11].

57. The potential effects as a result of the Development have been assessed with reference to the above documents.

17.3.3 Scoping Responses and Consultation

58. Telecommunication operators were consulted on an ongoing basis throughout the EIA, from Scoping to final assessment. As detailed within Table 17.4, all relevant consultees were contacted to provide information relating to utilities and telecommunication links which may be affected due to the Development. For those that responded, consultation was then repeated as part of further consultation as the Development's design progressed. On all occasions, turbine co-ordinates and dimensions of the then layouts were provided to consultees. Table 17.4 provides a summary of the consultation undertaken.

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[9] (BWEA), (1994) Best Practice Guidelines of Wind Energy Developments [Online] Available at: https://www.thenbs.com/PublicationIndex/documents/details?Pub=BWEA&DocID=258180 (Accessed 23/02/2021).
[10] Scottish Government (2014) Onshore wind turbines: planning advice [online] Available at: https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/ (Accessed 11/02/21)
[11] Ofcom (2009) Tall Structures and Their Impact on Broadcast and Other Wireless Service [online] Available at: https://www.ofcom.org.uk/__data/assets/pdf_file/0026/63494/tall_structures.pdf (Accessed 11/02/21)

Table 17.4: Telecommunication Consultation

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
Arqiva	N/A	No response	N/A
Atkins	Scoping Response 24/01/2020	No objection to the Development.	Noted.
	Tip Height Increase Consultation 24/01/2020	No objection to the Development.	Noted.
	Further Consultation on Application Layout 28/02/2021	No objection to the Development.	Noted.
British Telecommunications Plc (BT)	28/01/2020 Scoping Response	The Development should not cause interference to BT's current and presently planned radio network.	Noted.
	Tip Height Increase Consultation 28/01/2020	The Development should not cause interference to BT's current and presently planned radio network.	Noted.
	Further Consultation on Application Layout 09/03/2021	The Development should not cause interference to BT's current and presently planned radio network.	Noted.
Joint Radio Company Limited (JRC)	Scoping Response 21/01/2020	This proposal is cleared with respect to radio link infrastructure operated by Scottish Power and Scotia Gas Networks.	Noted.
	Tip Height Increase Consultation 21/01/2020	This proposal is cleared with respect to radio link infrastructure operated by Scottish Power and Scotia Gas Networks.	Noted.
	Further Consultation on Application Layout 25/02/2021	This proposal is cleared with respect to radio link infrastructure operated by Scottish Power and Scotia Gas Networks.	Noted.
Manor, Stobo and Lyne Community Council	21/11/2019 Scoping Response	Ensure consultation with Borders Online is undertaken before finalising the proposed siting for the turbines.	Noted. Further consultation with Borders Online has been undertaken (as below).
Ofcom	20/01/2020 Scoping Response	No Response.	N/A
Borders Online	16/03/2020 Further Consultation following public exhibition discussions.	Borders Online provided infrastructure coordinates.	Borders Online infrastructure was mapped and it was confirmed that the Development was not located within close proximity to any

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
			Borders Online telecommunication links. Infrastructure was mapped, considered and avoided throughout the iterative design process.
Scottish Water	15/10/2019 Scoping Response	According to Scottish Water records there is no public Scottish Water, Water or Waste Water infrastructure within the vicinity of the Development.	Noted.

17.3.4 Baseline and Assessment of Effects

17.3.4.1 Telecommunications

59. Should the construction and operation of the Development materially affect the operation of telecommunication links, such as through degradation of signal quality to the extent that it warrants an objection from the link operator, this would be considered a significant effect. Mitigation is generally available either through rerouting of any affected links or upgrades to the transmitting and / or receiving apparatus.

60. Consultation with the relevant organisations was initiated during the initial and advanced stages of the EIA to identify any potential microwave or telecommunication links that could be affected by the Development. Ofcom monitors the fixed microwave links throughout the UK, whereas JRC manages the radio spectrum used by the UK Fuel and Power Industry. Atkins undertakes a similar role for the water industry. Arqiva operates the Freeview terrestrial transmission network including BBC and ITV. Borders Online is a local provider of community broadband within the Scottish Borders, and within close proximity to the Development.

61. The search for existing telecommunication and microwave links was undertaken by providing consultees with turbine coordinates in order for the consultees to model the Development. This ensures all telecommunication and microwave links potentially affected are identified.

62. BT and JRC identified no links associated with the Development and have raised no objection to the Development. In addition, and as noted within Table 17.4, consultation was undertaken with Borders Online. Borders Online provided coordinates of their infrastructure which were subsequently mapped and taken into account during the iterative EIA design process. As shown on Figure 17.2, the proposed turbine locations are not near Borders Online telecommunication infrastructure, and are out with the applied 250 m telecommunication buffer.

63. Digital television signals are rarely affected by the operation of wind turbines; however, in some cases interference can be caused by blocking or reflections. A minimum signal strength is required for digital television to operate effectively, if a property already receiving a weak digital signal experiences additional blocking or reflections from wind turbines, the signal level may drop, causing the television to pixelate or cut out intermittently. Reflections and blocking from other objects (such as trees) close to a

receptor can cause similar effects. Simple measures to boost the signal through an improved receiver are usually sufficient to correct the issue.

64. The nearest property (Upper Stewarton) to the Development is located approximately 925 m from the nearest turbine (T4). The area surrounding the Site receives television signals that were made exclusively digital after the digital switchover was completed, and hence no analogue TV signals are broadcast in the area. As a result, and considering the intervening distance between the turbines and property, television reception received by the nearest properties to the Site will not be affected, and no effects are predicted to occur.

65. Notwithstanding this, in the event that interference which is directly attributable to the Development is experienced, the Applicant will endeavour to implement a suitable mitigation solution via an appropriately worded condition which outlines an investigative process of establishing whether or not the Development is responsible. Examples of technical solutions include: changing the receptor height, re-orientating the receptor to receive signals from an alternative transmitter, upgrading the receptor system or installation of satellite television. As consultation has indicated that TV interference is unlikely to arise from the Development, unforeseen specific issues would be investigated following a complaint to establish whether the wind farm gave rise to the interference and suitable corrective action would be implemented (depending on the nature of the issue) when the Development is operational. Any interference experienced before the wind farm is operational is unlikely to relate to the Development.

66. Broadcast radio (FM, AM and DAB digital radio) are transmitted on lower frequencies than those used by analogue TV signals. Lower frequency signals tend to pass through obstructions more easily than the higher frequency TV signals, and diffraction effects also become more pronounced at lower frequencies. Both of these factors will tend to lessen the impact of wind turbines on radio reception. Should interference to radio signals be experienced as a result of the Development, the technical solutions described in the above paragraph are also able to provide suitable mitigation.

17.3.4.2 Utilities

67. Other below ground infrastructure, such as utilities, could be affected during construction; however, implementation of best practice would ensure that these are not adversely affected during construction or operation. Scottish Water did not raise concerns to the Development via the Scoping Opinion.

68. **Chapter 10: Hydrology and Hydrogeology** provides a full assessment of potential impacts on public and private hydrology related utilities.

69. A linesearch[12] utility search was undertaken during the EIA process which found that no utility links are located within or around the Site, however, prior to construction, a more detailed linesearch for undergrounded utilities would be undertaken and any services located and any adverse effects would be avoided through the implementation of safe systems of work. During construction, there may be construction traffic passing beneath electricity lines along the transportation route, although, it is very unlikely that any damage to this infrastructure will occur; appropriate management measures will be put in place to ensure that electricity lines are not affected by the Development, and that the Development is constructed in accordance with relevant health and safety legislation as appropriate. Additionally, as a result of turbine delivery to the Site there will be telecommunication poles which will be required to be relocated in order to allow safe delivery of abnormal loads to the Site. The relocation of telecommunication infrastructure will be conducted safely, ahead of abnormal load delivery, and in consultation with key stakeholders. Following the implementation of such measures, if necessary, there will be

[12] Linesearch Online Tool [Online] Available at: http://www.linesearchbeforeudig.co.uk/# (Search undertaken 03/03/2020)

no effect on utility infrastructure as a result of the Development, and it is not considered further.

17.3.5 Statement of Significance

70. Consultation undertaken with the telecommunications consultees has confirmed that there are no fixed communication links operating across proposed turbine locations. Therefore, the Development will not interfere with telecommunications and electromagnetic signals. Effects on television reception are unlikely, and technical solutions are readily available as suitable mitigation measures should unexpected adverse effects arise. Adverse effects on infrastructure such as utilities would be avoided through safe systems of work. Therefore, there are **no significant** effects predicted upon telecommunications and utilities as a result of the Development.

17.4 HUMAN HEALTH & SAFETY, INCLUDING MAJOR ACCIDENTS & DISASTERS

17.4.1 Introduction

71. The EIA Regulations state than an EIA must identify, describe and assess in an appropriate manner, the expected effects deriving from the vulnerability of the Development to Major Accidents and Disasters (MADS) that are relevant to the Development, as well as upon human health and safety.

17.4.2 Assessment Methodology

72. In identifying relevant major accidents or disasters, the following definitions are used to guide this assessment which are informed by the Institute of Environmental Management and Assessment (IEMA) EIA Quality Mark Article:

- Major Accident – uncontrolled occurrence in the course of the construction or operation of the Development, leading to serious danger to the environment, which may be either immediate or delayed;
- Disaster - An event not directly caused by the Development, leading to serious danger to the environment, which may be either immediate or delayed. It may result from natural sources, such as flooding, adverse weather, ground movement, or from man-made sources (e.g., escalation of a fire from an adjacent facility); and
- Relevance – a relevant major accident or disaster is defined as follows:
    - Caused by the Development;
    - Having the potential to impact upon the Development; and
    - Would be exacerbated or mitigated by the Development.

17.4.3 Vulnerability of the Development to Disasters

73. The land upon which the Development is proposed within the application boundary (the Site) is not located within an area known for natural disasters such as floods, hurricanes, tornadoes, volcanic eruptions, earthquakes or tsunamis.

74. As stated in **Chapter 16: Climate Change and Carbon Balance** of this EIA Report, none of the identified climate change trends listed will affect the Development with the exception of the potential for increased high wind speed conditions. Due to the exposed nature of wind farm sites, wind turbines are designed to withstand extreme weather conditions. Brake mechanisms installed on turbines allow them to be operated only under specific wind speeds and, should severe wind speeds be experienced, the turbines automatically feather the blades and shut down. Although an unlikely event for Scotland, the brake mechanism could also apply to a hurricane scenario.

75. Other disasters (natural or manmade) that could affect the Development include forest fires and floods. Fires within woodland form a small proportion of "primary outdoor fires" in Scotland[13] and are uncommon[14], and the risk of a forest fire affecting the Development is therefore low. In the rare event that a forest fire does occur, standard operating procedures for emergency operations at wind turbine sites would be followed.

76. Flooding and ground saturation/landslips on slopes are the most probable natural disaster that could affect the Development. Flood risk is assessed within Section 10.6.1.8 of **Chapter 10: Hydrology and Hydrogeology**. The Development has been designed to minimise the impact of flooding by incorporating a 50 m buffer zone between watercourses and turbine bases and crane hardstandings. Measures, including SuDS, to

[13] Scottish Fire & Rescue Service (2020). Fire and Rescue Incident Statistics2019-20 [Online] Available at: https://www.firescotland.gov.uk/about-us/fire-and-rescue-statistics.aspx (Accessed 13/02/2021)
[14] Davies, G. and Legg, C. (2016). Regional Variation in Fire Weather Controls the Reported Occurrence of Scottish wildfires. PeerJ, 4, p.e2649.

attenuate run-off and intercept sediment prior to run-off entering watercourses are described in Appendix A10.1 and are embedded as part of the Development design. Additionally, on the watercourse crossing which occurs over Courhope Burn, a bridge is proposed rather than a standard culvert due to the larger nature of Courhope Burn. During high precipitation events, for example, the proposed bridge will help to reduce the probability of Courhope Burn flooding where the watercourse crossing is proposed, as a bridge will result in less constriction to flow compared to a standard culvert. Although no turbines, construction compounds, or substations are located within areas described as having a 0.5% (fluvial flooding) or greater annual risk of flooding, emergency response plans appropriate for the individual phases of the Development would be in place and implemented to deal with any occurrences. These would ensure the health and safety of employees and the protection of critical infrastructure.

77. No other natural or man-made disasters are considered to have the realistic potential to occur and therefore are not considered further within this Chapter.

78. Where the Development has the potential to exacerbate or mitigate effects of disasters this is assessed in other chapters within the EIA Report as relevant, particularly within the hydrological assessment in **Chapter 10: Hydrology and Hydrogeology** of this EIA Report (in relation to flooding), geological assessment within **Chapter 9: Geology, Ground Conditions, and Peat**, and in relation to offsetting of greenhouse gas emissions and related climate change impacts in **Chapter 16: Climate Change and Carbon Balance**.

17.4.4 Potential for the Development to Cause Major Accidents

79. The risk of environmental accidents is covered, where relevant, in individual technical chapters. For example, the potential for accidents, like spillages, are considered in **Chapter 10: Hydrology and Hydrogeology** of this EIA Report, whilst aviation safety issues are assessed within **Chapter 14: Aviation & Radar** of this EIA Report. Other general construction health and safety measures would be implemented by the development contractor in line with best practice prior to the commencement of construction, as discussed in Section 17.4.4.1.

80. The introduction of the Development, namely the turbines, associated electrical infrastructure, and the Battery Energy Storage System (BESS) facility, introduces the potential for forest fire events to occur as the Development is located within an area of commercial forestry. Additionally, borrow pit workings also have the potential to cause harm during construction. These considerations are dealt with in the below sections.

81. No other major accidents are considered likely to occur. On-site accidents during construction and operation are assessed in the following subsections of this Chapter.

17.4.4.1 Construction Phase

82. Effects upon health and safety are managed through risk assessments, pursuant to legislation of the United Kingdom such as the Control of Major Accident Hazards Regulations 201515 (as amended by the Health and Safety (Amendment) (EU Exit) Regulations 2018[16]) and the Planning (Hazardous Substances) Regulations 201517. The aforementioned legislation lays down rules for the prevention of major accidents which might result from certain industrial activities and the limitation of their consequences for human health and the environment. The aforementioned legislation requires the

[15] The Control of Major Accident Hazards Regulations 2015 [Online] Available at: https://www.legislation.gov.uk/uksi/2015/483/contents/made (Accessed 14/04/2021)
[16] The Health and Safety (Amendment) (EU Exit) Regulations 2018 [Online] Available at: https://www.legislation.gov.uk/uksi/2018/1370/contents/made (Accessed 14/04/2021)
[17] The Planning (Hazardous Substances) Regulations 2015 [Online] Available at: https://www.legislation.gov.uk/uksi/2015/627/contents/made (Accessed 14/04/2021)

preparation of emergency plans and response measures which will be covered under equivalent documents relevant to the nature of the Development.

83. The Construction (Design and Management) Regulations 2015[18] (CDM Regulations) are intended to ensure that health and safety issues are properly considered during development to reduce the risk of harm. In accordance with the CDM Regulations, a Principal Designer and Principal Contractor would be appointed.

84. The Principal Designer would have responsibility for coordination of health and safety during the pre-construction phase. Guidance published by the Health and Safety Executive in January 2015, defines principal designers as *"…designers appointed by the client in projects involving more than one contractor. They can be an organisation or an individual with sufficient knowledge, experience and ability to carry out the role."*

85. Principal contractors are defined in the 2015 CDM Regulations as *"contractors appointed by the client to coordinate the construction phase of a project where it involves more than one contractor …They … must possess the skills, knowledge, and experience, and (if an organisation) the organisational capability necessary to carry out their role effectively given the scale and complexity of the project and the nature of the health and safety risks involved."*

86. Throughout all phases of the Development, cognisance would be made of the following guidance documents produced by RenewableUK, and updated by SafetyOn:

- Wind Turbine Safety Rules Third Edition[19]; and
- Guidance & Supporting Procedures on the Application of Wind Turbine Safety Rules Third Edition[20].

87. The remoteness and the type of the Development will reduce the severity of accidents occurring and major accidents occurring as a result of construction are highly unlikely. In the event that such an event was to occur during construction, emergency response plans would be available and implemented to deal with any occurrences.

88. The risk of construction accidents as they relate to human health and safety would be covered in Construction Method Statements (CMS), a Construction Environmental Management Pan (CEMP), and specific risk assessment method statements, prepared in response to conditions attached to the deemed planning permission; such conditions would not be a requirement of the consent.. These would include identifying site-specific risks and preparing assessments to minimise and manage the risk such as equipment safe handling, personal protection equipment, amongst others.

89. The Development will require considerable areas of early felling, albeit within a managed forest which is periodically felled and replanted as part of its normal management. Felling makes use of high-powered machinery which carries a risk of accidents occurring. Additionally, the Development will require rock quarrying from one or two borrow pit locations; as an activity which makes use of high-powered machinery there is a risk of accidents. The risk of forestry fires, felling and rock quarrying accidents would be reduced through adhering to health and safety measures which would be implemented in line with best practice.

[18] The Construction (Design and Management) regulations 2015 (2015) [Online] Available at: https://www.legislation.gov.uk/uksi/2015/51/contents/made (Accessed 10/03/2021)
[19] SafetyOn (2019) Wind Turbine Safety Rules, Third Edition - Issue 2 [Online] Available at: https://safetyon.com/__data/assets/pdf_file/0005/662729/Wind-Turbine-Safety-Rules-Edition-3-2015-Issue-2-December-2019.pdf (Accessed on 10/03/2021)
[20] SafetyOn (2019) Guidance on the Application of Wind Turbine Safety Rules, Third Edition – Issue 3 [Online] Available at: https://safetyon.com/__data/assets/pdf_file/0006/662730/Wind-Turbine-Safety-Rules-Guidance-Edition-3-2015-Issue-3-Dec-2019.pdf (Accessed on 10/03/2021)

90. In addition to the above measures outlined on health and safety which will play a role in also reducing the likelihood and severity of both borrow pit accidents and forest fires, the risk of forest fires during the construction phase of the Development is further reduced through there being no brash and other flammable materials being left in an uncontrolled manner. Machinery used during the construction which may, during operation of such machinery, carry risk of fire would be operated in line with health and safety guidance and bets practice. Activities during construction relating to the felling of trees and borrowing of rock will also be conducted in line with standard operating procedures and in compliance with health and safety measures and regulations outlined above.

91. As a result of the above measures, which reduce the likelihood and severity of construction accidents, construction accidents are not considered further within this Chapter.

17.4.4.2 Operational Phase

92. Electrical infrastructure will be located across the Development in the form of an electrical substation and battery energy storage system (BESS) which will be subject to routine maintenance such that it is not considered to pose a significant risk of creating an accident, such as forest fires. Additionally, a felling buffer has been applied to all infrastructure, further reducing the risk of fire spreading into forestry during the operation of the Development. Elements of the Development which may pose a risk of catching fire will be regularly inspected by wind farm management and maintained by specialist teams, further reducing the risk of fire incidents. Additionally, effects upon population and human health are unlikely due to the remoteness of the Development, the low population density, and adherence to required safety clearances around turbines.

93. A possible but rare source of danger to human or animal life from a wind turbine would be the loss of a piece of the blade or, in the most exceptional circumstances, of the whole blade from an operational turbine. Many blades are composite structures with no bolts or other separate components. Even for blades with separate control surfaces on or comprising the tips of the blade, separation is highly unlikely. Wind turbines have an exemplary safety record with no recorded instances of fatalities to any member of the public anywhere in the world. The turbines are also designed to shut down automatically during high wind speed conditions, typically in excess of 60 miles per hour (mph).

94. There is a risk of ice accumulation on turbine blades, nacelles and towers under certain conditions such as periods of very cold weather with high humidity. In those instances where icing of blades occurs, fragments of ice might be released from blades, particularly when the machine is started. The wind turbines would be fitted with vibration sensors to detect any imbalance which might be caused by icing of the blades. This enables the operation of machines with iced blades to be inhibited to eliminate the risk of ice throw.

95. The possibility of attracting lightning strikes applies to all tall structures, and wind turbines are no different. Appropriate lightning protection measures are incorporated in wind turbines to ensure that lightning is conducted harmlessly past the sensitive parts of the nacelle and down into the ground.

96. The Scottish Government Online Advice (2014) states *"although wind turbines erected in accordance with best engineering practice should be stable structures, it may be advisable to achieve a set-back from roads and railways of at least the height of the turbine proposed, to assure safety"*.

97. The distance between the nearest proposed turbines and public roads/footpaths is in excess of tip height, with the nearest receptor, the Cross Borders Drove Road, over 160 m from the closest turbine.

17.4.5 Statement of Significance

98. Due to its location, the Site is not prone to natural disasters. Whilst adverse weather conditions, most notably high wind speed events, ice producing conditions and lightning strikes, do occur within Scotland, wind turbines are designed to withstand extreme weather conditions. Brake mechanisms, vibration sensors and lightning protection measures are installed on turbines allowing them to be operated under optimal conditions and inhibited during extreme weather events.

99. The risk of construction accidents as they relate to human health and safety are detailed and managed through the CDM Regulations and in a CEMP through specific construction risk assessment method statements, which will be prepared in accordance with conditions attached to any consent of the Development.

100. Therefore, the overall risk of health and safety including major accidents and disasters is considered negligible and **not significant** in terms of the EIA Regulations.

17.5 WASTE

101. Exact quantities and types of waste are unknown at this stage of the Development. It is expected that they could include:

- Excavated material;
- Forestry Residues;
- Welfare facility waste;
- Packaging;
- Waste chemicals, fuels and oils;
- Waste metals;
- Waste water from dewatering;
- Waste water from cleaning activities; and
- General construction waste (paper, wood, etc.).

102. A Site Waste Management Plan (SWMP) will detail how waste streams are to be managed, following the Waste Hierarchy of prevention, reuse, recycle, recover and as a last resort, disposal to landfill. The SWMP will be agreed and implemented prior to construction commencing on Site.

103. Therefore, it is not considered necessary for waste to be assessed further within this EIA Report and is scoped out for further assessment.

CLOICH FOREST WIND FARM

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Chapter 18

Summary of Mitigation

18 SUMMARY OF MITIGATION

This Chapter of the Environmental Impact Assessment Report (EIA Report) provides a summary of mitigation measures that have been proposed within the EIA Report to prevent, reduce or offset the effects associated with the Cloich Forest Wind Farm ('the Development').

Embedded mitigation measures have been integral to the design evolution of the Development as outlined in **Chapter 2: Site Selection and Design** and **Chapter 3: Project Description**. The overall aim of the design strategy was to create a wind farm with a cohesive design that relates to the surrounding landscape whilst taking account of the environmental characteristics of the area in which the Development is located ('the Site'), for example priority habitats and key ornithological species, peat and hydrological resources.

Table 18.1 presents a schedule of mitigation measures for the Development listed according to the relevant environmental topic, which would be applied during the construction and operation of the Development.

Table 18.1: Summary of Mitigation

Chapter	Proposed Mitigation	Timing
Chapter 3: Project Description	**Micro-siting** A micro-siting allowance of 50 metres (m) in all directions is proposed for turbines and associated infrastructure. This is to allow for a degree of flexibility should unsuitable ground conditions be encountered or in the event of environmental constraints being identified during pre-construction surveys. Any changes will be subject to approval of an Ecological Clerk of Works (ECoW) with other specialist environmental advice (e.g., hydrology, archaeology, etc.) as required.	Pre-Construction and Construction
	Construction Method Statements (CMSs) The construction phase will be controlled via a series of detailed CMSs which will be prepared by a civil engineering contractor appointed by the Applicant, who will have overall responsibility for environmental management on the construction site.	Pre-Construction and Construction
	Construction Environmental Management Plan (CEMP) The CEMP, produced prior to construction, will be the overarching live document which combines the principles of all other management plans and environmental plans outlined within this EIA Report and would support the CMSs. The CEMP will typically be supported by, but not limited to, the following documents which apply to the construction process: • Water Construction Environmental Management Plan (WCEMP); • Peat Management Plan; • Pollution Prevention Plan; • Traffic Management Plan; • Site Waste Management Plan (SWMP); and • Restoration Plan.	Pre-Construction and Construction
	Health and Safety Health and safety issues during construction and decommissioning fall under the Construction (Design and Management) (CDM) Regulations 2015[1]. A Construction Phase Plan (Health and Safety Plan) will be prepared by the Construction Project Manager with records provided to the Applicant during the works to enable the Health and Safety File to be completed**.**	Pre-Construction and Construction

[1] Health and Safety Executive (2015) Construction Design and Management Regulations 2015 [Online] Available at: http://www.hse.gov.uk/construction/cdm/2015/index.htm (Accessed 23/06/2021).

Chapter	Proposed Mitigation	Timing
Chapter 5: Landscape and Visual Impact Assessment (LVIA)	**Embedded Mitigation** Embedded Mitigation includes the design changes that been implemented during the development of the scheme, these are set out in detail in **Chapter 2: Site Selection & Design**. All mitigation for landscape and visual effects is embedded within the final design for the Development.	Pre-Submission
	Construction Environmental Management Plan (CEMP) Measures such as arrangements for vegetation and soil removal, storage and replacement and the restoration of disturbed areas after construction will be detailed in the CEMP produced following consent and prior to construction, which will also include reference to CMSs.	Pre-Construction and Construction
Chapter 6: Archaeology and Cultural Heritage	**Embedded Mitigation** Embedded Mitigation includes the design changes that been implemented during the development of the scheme, these are set out in detail in **Chapter 2: Site Selection & Design**. All mitigation for archaeological and cultural heritage effects is embedded within the final design for the Development.	Pre-Submission
	Pre-Construction Surveys & Tool Box Talks Archaeological features (SM2756 and HER51667) would be subject to a full survey of prior to construction; tool box talks highlighting the archaeology within the Development Site; fencing (if required); and a watching brief during construction in the vicinity of SM2756.	Pre-Construction & Construction
	Enhancement Mitigation SM2756 Kilrubie Hill Ring Enclosures and the top of Whaup Law (SM2755) would be felled and not replanted as part of the Development's forestry proposals in order to end the planting disturbance to SM2756 and to open up viewsheds from Whaup Law Cairn (SM2755) which currently do not exist due to surrounding forestry.	Pre-Construction, Construction, and Operation

Chapter	Proposed Mitigation	Timing
	Enhancement Mitigation – Light Detection and Ranging (LIDAR) LIDAR survey has been a successful tool for identifying archaeological features within forestry plantation and is recommended here. This LIDAR survey would be carried out over the most important and sensitive areas of historic landscape that would be affected by the Development, where appropriate permissions can be obtained. This would include the Meldon Valley, the valley of Flemington Burn and the Cademuir hillforts. In selected areas, the LIDAR would be collected at ultra-high resolution (to at least c. 0.25 m) alongside detailed vertical aerial photographs. These areas would include: • White Meldon and Black Meldon; • Upper and Lower Cademuir hillforts; and • Whiteside Hill hillfort. The full details of the specification for this survey would be resolved in discussions with Historic Scotland, the Council Archaeological Officer and Forestry Scotland senior archaeologist.	Pre-Construction & Construction
Chapter 7: Ecology	**Embedded Mitigation – Environmental Clerk of Works (ECoW)** A suitably qualified and experienced Environmental Clerk of Works (ECoW) will be appointed to provide appropriate ecological and environmental advice during construction, including the monitoring of compliance with conservation legislation, the recommendations of this EIA Report and any subsequent planning conditions.	Pre-Construction and Construction
	Embedded Mitigation – Pre-construction Survey for Protected Species Pre-construction Surveys for protected species, such as otter and badger, will be undertaken to provide up-to-date information about the distribution and abundance of the protected species identified in the baseline. The results of the surveys will inform the need for Species Protection Plans and associated mitigation and licencing requirements, all of which will be developed in line with NatureScot guidance.	Pre-Construction
	Embedded Mitigation – Bat Separation Distance To minimise the risk of bats colliding with operational turbines, the 50 m separation distance between blade tips and high-value bat habitats implemented during construction, will be maintained throughout the operational life of the Development by ensuring that tree regeneration does not encroach on the buffer.	Operation

Chapter	Proposed Mitigation	Timing
	Enhancement Mitigation - Outline Habitat Management Plan Habitat Management will be implemented in accordance with a Habitat Management Plan (HMP). A detailed HMP will be written and developed in full following consent, and in consultation with NatureScot, SBC, RSPB and the Tweed Forum, where relevant. Certain high-value areas (i.e., areas with broadleaved trees) will be enhanced with the provision of 15 bat boxes (i.e., three boxes on each of five trees). Exact specifications will be provided in the HMP.	Pre-Construction, Construction, and Operation
Chapter 8: Ornithology	**Embedded Mitigation – Breeding Bird Protection Plan (BBPP)** The key embedded mitigation with relevance to ornithological features is the implementation of a Breeding Bird Protection Plan (BBPP). This will be developed to detail good practice measures aimed at ensuring the safeguarding of breeding birds and legislative compliance during all phases of the Development. Proposed measures are outlined below.	Pre-Construction, Construction, and Operation
	Embedded Mitigation – Timing of Works Where possible, site clearance works will take place outside the main breeding bird season (March to August inclusive).	Construction
	Embedded Mitigation – Pre-Construction Surveys (Goshawk) Pre-construction surveys for goshawk is recommended. A pre-construction survey of areas of suitable habitat for nesting goshawk within 500 m of works will be completed ahead of any operations, by a suitably experienced and qualified Ecological Clerk of Works (ECoW), to check for active nests (or other evidence of breeding).	Pre-Construction
	Embedded Mitigation – Pre-Construction Surveys (Crossbill) Prior to any felling, precautions must be taken to avoid potential disturbance to nesting birds or destruction of active nests. A pre-construction survey of areas of suitable habitat for nesting crossbill within 150 m of works will be completed ahead of any operations, regardless of the time of year, by a suitably experienced and qualified ECoW, to check for evidence of breeding (such as active nests or territorial behaviour).	Pre-Construction

Chapter	Proposed Mitigation	Timing
	Embedded Mitigation – Pre-Construction Surveys (other breeding birds) Where construction works are required during the breeding bird season (March to August inclusive), the area within 500 m of works will be surveyed ahead of any operations, by a suitably experienced and qualified ECoW, to check for active nests of all bird species.	Pre-Construction
	Embedded Mitigation – Toolbox Talk A 'toolbox talk' will be delivered by a suitably experienced ECoW to ensure that all contractors working on the Development are aware of ornithological sensitivities and relevant legislation.	Pre-Construction & Construction
	Embedded Mitigation – Protection of Nesting birds If any nests (or breeding territories of Schedule 1 species) are identified during pre-construction surveys, an exclusion zone around the nest/breeding territory will be established (with the distance appropriate to the species and agreed through consultation with NatureScot). No works will be permitted within the exclusion zone and no personnel or vehicles will be allowed to enter or pass through until the ECoW has confirmed that the breeding attempt has reached a natural conclusion. Where this is not feasible, NatureScot will be contacted and further mitigation measures agreed to ensure that nesting birds are not harmed and any breeding Schedule 1-listed species are not disturbed.	Pre-Construction & Construction
	Monitoring It is proposed that ornithological monitoring should take place post-construction, in line with NatureScot guidance. In line with NatureScot guidance, monitoring should take place annually during construction, and after the Development becomes operational, during years 1-3, 5, 10 and 15 as a minimum, with the requirement for further surveys to be determined based on previous survey results. Goshawk nest monitoring will be undertaken in liaison with the Lothian and Borders Raptor Study Group, to determine the operational impacts on breeding success.	Construction and Operation
Chapter 9: Geology, Ground Conditions and Peat	**Embedded Mitigation – Design** Design of the site layout avoiding key environmental constraints including avoidance of deepest peat (i.e., no turbines sited in peat > 1 m) or limiting the impacts on deep peat where possible, as well as taking cognisance of hydrological and ecological features and associated buffers.	Pre-Submission

Chapter	Proposed Mitigation	Timing
	Embedded Mitigation – Best Practice Best practice methods and works as outlined in the publication 'Good Practice during Wind Farm Construction'[2] will be adhered to during construction.	Pre-Construction & Construction
	Pre-Construction Surveys Intrusive site investigations will be undertaken across the infrastructure areas prior to construction, particularly at turbine locations to determine the extent and nature of any peat.	Pre-Construction
	Micrositing Where infrastructure associated with turbines is found to encroach on deep peat, this will be microsited (if possible) out with these areas in order to reduce the overall effect on peat disturbance, stability and loss of soils.	Pre-Construction & Construction
	Drainage Maintenance of existing drainage is critical to avoid compaction of soils, therefore, all existing drainage network channels would be maintained and, where necessary, channelled below the access track construction drainage ditches on the upslope of the track.	Pre-Construction & Construction
	Peat Slide Risk Assessment Slope stability monitoring will occur during pre-construction and construction phases of work, including for both peat stability and non-peat related stability.	Pre-Construction & Construction
	Outline Peat Management Plan Best practice measures for managing excavated peat and peaty soils are detailed in Appendix A9.2: Outline Peat Management Plan.	Pre-Construction & Construction

[2] Scottish Renewables et al. (2019) Good Practice during Wind Farm Construction, 4th Edition 2019 [Online]. Available at: https://www.nature.scot/sites/default/files/2020-12/Good%20Practice%20during%20wind%20farm%20construction%20-%204th%20Ed.pdf (Accessed 04/05/2021)

Chapter	Proposed Mitigation	Timing
Chapter 10: Hydrology and Hydrogeology	**Embedded Design** The following mitigation measures relating to the hydrological environment are embedded into the design and construction of the Development: • 50 m watercourse buffers for construction works with the exception of watercourse crossings and access tracks; and • 250 m buffer from turbines bases and groundwater abstractions via boreholes has been established in accordance with LUPS-31. The existing network of access tracks which serve the forestry operations have been utilised, where possible, limiting the requirement for additional felling and for new watercourse crossings.	Pre-Submission

Chapter	Proposed Mitigation	Timing
	Embedded Design - Water Construction Environmental Management Plan (WCEMP) Construction good practice methods and works for protection of hydrological receptors are outlined in the Appendix A10.1: WCEMP. The WCEMP describes water management measures to control surface water run-off and drain hardstanding's and other structures during the construction and operation of the Development. Embedded measures include; • Buffer zones around receptors where no construction works are to be carried out e.g., watercourses (50 m) or private water supplies (buffer zone is dependent on type and abstraction volume of supply); • Appropriate material storage and maintenance; • Silt management including silt traps, silt fencing, sediment mats and settlement lagoons; • Infiltration trenches and rock stockpiles to treat run-off before discharging back to the hydrological network; and • Vehicle washout facilities for washing of associated vehicles. • Water quantity mitigation measures to prevent changes to yield include, but are not limited to; • Settlement lagoons to attenuate run-off from turbine foundations and tracks; and • Permanent swales and drainage ditches adjacent to access tracks with outlets at specified intervals to reduce the volume of water collected in a single channel and the potential for erosion. This will form part of a Pollution Prevention Plan (PPP) to be implemented for the Development. The PPP will set out measures to be employed to avoid or mitigate potential effects for all phases of the Development, and will also include an Incident Plan to be followed should a pollution event occur.	Construction and Operation

Chapter	Proposed Mitigation	Timing
	Private Water Supplies (PWS) Mitigation measures are outlined in Technical Appendix A10.2: Private Water Supply Risk Assessment. A programme of private water supply monitoring will be undertaken at selected properties, to ensure that PWS is reinstated to baseline water quality and quantity conditions following the construction phase.	Pre-Construction & Construction

Chapter	Proposed Mitigation	Timing
Chapter 11: Noise	**Construction Noise Good Practice** • Operations shall be limited to times agreed with Scottish Borders Council (the Council); • Deliveries of turbine components, plant and materials by HGV to site shall only take place by designated routes and within times agreed with the Council; • The site contractors shall be required to employ the best practicable means of reducing noise emissions from plant, machinery and construction activities, as advocated in BS 5228; • Where practicable, the work programme will be phased, which would help to reduce the combined effects arising from several noisy operations; • Where necessary and practicable, noise from fixed plant and equipment will be contained within suitable acoustic enclosures or behind acoustic screens; • All sub-contractors appointed by the main contractor will be formally and legally obliged, and required through contract, to comply with all environmental noise conditions and / or Construction Environmental Management Plans; • Where practicable, night-time working will not be carried out. Local residents shall be notified in advance of any night-time construction activities likely to generate significant noise levels, e.g., turbine erection; and • Any plant and equipment normally required for operation at night (23:00 - 07:00), e.g., generators or dewatering pumps, shall be silenced or suitably shielded to ensure that the night-time lower threshold of 45 dB, LAeq, night shall not be exceeded at the nearest noise-sensitive receptors. In the event that stone is required to be extracted from borrow pits by blasting, the following process would be employed to ensure that the effects of blasting noise and vibration on nearby properties are adequately controlled: • Compliance with planning conditions specifying limits to vibration resulting from blasting, restrictions on times of blasting, and a requirement for vibration monitoring; • Trial blasting, using progressively larger charge loads, to establish suitable acceptable charge; and • Provision of information on blasting to neighbouring residents.	Construction

Chapter	Proposed Mitigation	Timing
Chapter 12: Traffic and Transportation	**Construction Traffic Management Plan** A Construction Traffic Management Plan (CTMP) is proposed and will include specific mitigation measures, including: • As far as reasonably possible, deliveries should be scheduled outside of church service times; • Drivers of all delivery vehicles to be made aware during induction of the presence of schools, hospital and other amenities within settlements; • Delivery times will be scheduled to ensure that deliveries do not arrive in a convoy; • Timing of the deliveries will be outlined within the CTMP to ensure construction vehicles avoid potentially congested networks at peak hours; and • Communications with local communities should be undertaken for planned activities such as turbine deliveries and concrete delivery days (if onsite batching is not possible).	Pre-Construction and Construction
Chapter 13: Forestry	**Tree Planting & Compensatory Tree Planting** Any tree crops permanently removed to accommodate the Development will be replanted on a like-for-like area basis either within the Site or at a suitable substitute location.	Construction and Operation
Chapter 14: Aviation and Radar	**Infra-red Lighting** Infra-red lighting will be installed to ensure the Development is visible to pilots of low flying aircraft.	Operation
Chapter 15: Socio-Economics, Land-Use, Recreation and Tourism	**Access Management Plan** Access Management Plan to be drafted and agreed with the Council prior to construction. The Access Management Plan may include a gating system operated by banksman at required locations; in addition, the Access Management Plan may include appropriate health and safety signage local route diversions (if required), and traffic management measures.	Construction

Chapter	Proposed Mitigation	Timing
Chapter 16: Climate Change and Carbon Balance	**Embedded Design** The design choices made as a consequence of the key constraints are considered to be mitigation which is 'embedded' in the design; the following are most relevant for the climate change impact assessment: • Development infrastructure is built to withstand strong windspeeds and to harness energy; • Turbine spacing is sufficient to reduce turbulence effects on turbines downwind; • The turbines are located to maximise energy generation while minimising environmental impacts; • The Development design aims to reduce impacts on peat – e.g., through use of existing track layout and avoiding areas of deep peat; • Implementation of a CEMP, PMP etc. during construction to minimise environmental impacts and peat disturbance; and • Buffers from watercourses incorporated in layout design, protecting water quality and also protecting Development infrastructure from flooding.	Pre-Construction & Construction