

16. Assessment of Cumulative Effects

Introduction

16.1 Cumulative effects comprise the combined effects of reasonably foreseeable human induced changes within a specific geographical area and over a certain period of time and can be both direct and indirect.

16.2 This Chapter reports the assessment of cumulative effects in line with the EIA Regulations¹, including Regulation 4, Paragraph 2 which states:

'The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors —

(a) population and human health;

(b) biodiversity, with particular attention to species and habitats protected under [^{F1}any law implemented] Directive 92/43/EEC² and Directive 2009/147/EC³;

(c) land, soil, water, air and climate;

(d) material assets, cultural heritage and the landscape;

(e) the interaction between the factors referred to in sub-paragraphs (a) to (d).'
[emphasis added]

16.3 In addition, Schedule 4, Paragraph 5(e) of the EIA Regulations states the need to consider the following:

'...the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources.'

16.4 The Planning Practice Guidance (PPG)⁴ refers to the parts of the EIA Regulations noted above which require cumulative effects to be assessed and reported as part of an ES.

16.5 Therefore, to accord with the EIA Regulations and PPG, in terms of providing an assessment of cumulative effects, the following types of cumulative effects are reported in this Chapter:

- **Effect interactions:** The interactions and combination of the likely significant effects of the Project for Assessment affecting the same receptor, either within the Assessment Boundary or in the surrounding area (i.e. where defined technical study areas in **Technical Chapters 6 – 15** overlap); and
- **In-combination effects:** The interaction and combination of the likely significant effects of the Project for Assessment in conjunction with / alongside

environmental effects from other existingⁱ or approved projects ('Cumulative Projects'), affecting the same receptor.

- 16.6 Furthermore, as set out in **Chapter 2: Approach to EIA**, works are required to connect the Project for Assessment into the grid / network at the Rawtenstall Bulk Supply Point (BSP) to the north-west. These works will be undertaken by the District Network Operator (DNO). An appraisal of environmental effects arising from these works in conjunction with those from the Project for Assessment has been completed in addition to the two types of cumulative effects noted above to ensure that the combinations / interactions of such effects are considered and reported.

Summary of Consultation

- 16.7 An EIA Scoping Report (**Appendix 2.1**) was submitted to both RMBC and RBC on 16th December 2024, which outlined the approach and methodology to be adopted for the assessment of cumulative effects within the EIA process. At the time of writing (June 2026), no Scoping Opinion has been received.
- 16.8 The approach and methodology used broadly follow that in the EIA Scoping Report. However, updates have been made following further technical analysis and evaluation (e.g. the factors taken into consideration during the evaluation of in-combination effects). The full methodology adopted is set out below in this Chapter.
- 16.9 In addition, the EIA Scoping Report set out the list of projects to be considered as part of the assessment of in-combination effects (as noted above, these are referred to as 'Cumulative Projects').
- 16.10 No further consultation with RMBC, RBC or other stakeholders has been undertaken / completed regarding the assessment of cumulative effects during the preparation of this Chapter beyond that undertaken as part of the EIA Scoping process.

Approach and Methodology

Overview

- 16.11 There is no widely accepted current methodology or best practice for the assessment of cumulative effects for the EIA process under the Town and Country Planning Act 1990 regime (i.e. the EIA Regulations). However, it is recognised that there is guidance from NatureScot (e.g. Assessing the cumulative landscape and visual impact of onshore wind energy developments⁵ and Assessing the cumulative impacts of onshore wind farms on birds⁶) and the Planning Inspectorate (e.g. Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment⁷) (albeit this is focused on Nationally Significant Infrastructure Projects (NSIPs) and therefore it is not necessarily applicable to all projects / sectors).
- 16.12 Given this, the methodology adopted for the purposes of the assessment reported in this Chapter has used / drawn from the guidance listed above (where relevant) alongside consideration of the types of receptors assessed, the nature of the Project

ⁱ Noting that 'existing' projects may form part of the baseline and where this is the case, these projects have not been considered as part of the assessment of cumulative effects.

for Assessment and professional judgement, based on previous experience and knowledge at Turley. Such an approach is considered to be proportionate and robust.

- 16.13 The assessment of effect interactions is qualitative in nature. For the assessment of in-combination effects, a qualitative appraisal has largely been adopted. However, for some technical topics, data has been available (e.g. where modelling has been undertaken for shadow flicker), facilitating a quantitative analysis of cumulative effects. This is presented below where undertaken. The works at Rawtenstall BSP have been considered qualitatively.
- 16.14 Assumptions have been used based on professional judgement where information has not been available and these are stated alongside any uncertainty as part of the assessment below.

Effect Interactions

- 16.15 The assessment of effect interactions has followed a two-stage process:

- Stage 1: Identification of potential effect interactions; and
- Stage 2: Qualitative appraisal.

Stage 1: Identification of potential effect interactions

- 16.16 The assessment of effect interactions has considered the changes from baseline conditions (see **Chapter 2: Approach to EIA**) at 'common sensitive receptors' due to overlapping effects from the Project for Assessment. Common sensitive receptors for effect interactions are those receptors that have been assessed within two or more of the technical assessments within this ES.
- 16.17 To identify the common sensitive receptors, the receptors assessed within **Technical Chapters 6 – 15** have been categorised into the 'factors' / 'receptor groups' (termed 'receptor categories') as outlined in Regulation 4, Paragraph 2 and Schedule 4, Paragraph 4 of the EIA Regulations. These receptor categories are as follows:
- Population and human health;
 - Biodiversity (for example fauna and flora) (with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC);
 - Land (for example land take);
 - Soil (for example organic matter, erosion, compaction, sealing);
 - Water (for example hydromorphological changes, quantity and quality);
 - Air;
 - Climate (for example greenhouse gas emissions, impacts relevant to adaptation);
 - Material assets;
 - Cultural heritage, including architectural and archaeological aspects; and

- Landscape.
- 16.18 Only residual effects have been considered within the appraisal of effect interactions (i.e. following the implementation of project-specific secondary mitigation or enhancement).
- 16.19 Residual effects for the construction and operational stages then have been collated into matrices (**Tables 16.2 and 16.3**) so that it can be identified where more than one effect occurs on the receptor categories listed above and hence where there is a potential for effect interactions to occur. The outputs of the construction stage assessments have been used to inform the identification of potential effect interactions for the decommissioning stage as this is considered a 'proxy' (in line with the approach adopted across the ES – see **Chapter 2: Approach to EIA**).
- 16.20 Where no effects for a receptor category listed were identified, then this has not been included in **Tables 16.2 and 16.3**.
- 16.21 Since EIA Scoping, the threshold of a 'minor' level of effect has been disregarded and all residual effects reported in **Technical Chapters 6 – 15** have been included in the matrices. This is considered to address the potential for a number of effects that are not necessarily considered to be 'Significant' in isolation to become 'Significant' when they are considered collectively on a common sensitive receptor. However, where effects have been identified as unlikely / not significant and not assessed in **Technical Chapters 6 – 15** these have been excluded from further analysis.
- 16.22 In **Technical Chapters 6 – 11**, some of the conclusions have ranged across the receptors assessed and / or the assessment scenarios considered (i.e. the Existing Baseline Scenario and the Restored Baseline Scenario reported in **Chapter 11: Landscape and Visual** and **Chapter 12: Built Heritage**). Where this has occurred, the 'minimum' and 'maximum' conclusions have been presented in **Tables 16.2 and 16.3**.
- 16.23 Where potential effect interactions have not been identified through the application of the matrices (e.g. no specific common receptor(s) have been identified), then these effects / receptors categories are not taken forward to Step 2 as it is concluded that there are no effect interactions.
- 16.24 Where potential effect interactions have been identified, the relevant receptor categories have been taken forward to Step 2 (see below).

Step 2: Qualitative appraisal

- 16.25 To inform the qualitative appraisal of the relevant categories brought forward from Step 1, the specific receptor(s) (and their attributes, such as location, etc.) that 'contribute' to a potential effect interaction have been identified. Following further analysis, where no specific common receptor(s) has been identified, then there are no effect interactions and these effects / receptor categories are discounted from further appraisal.
- 16.26 Where specific common receptor(s) were identified, the appraisal considered, where applicable:

- Magnitude of change (or impact), including probability / likelihood of occurrence, complexity, frequency and reversibility;
- Sensitivity (or value, importance, etc.) of the receptor / receiving environment to change, including adaptability, tolerance to change or recoverability from a change;
- The assessment conclusions;
- Duration (of the effects individually and collectively utilising the short / medium / long-term criteria set out in **Chapter 2: Approach to EIA**);
- The geographical spatial extent of the individual effects;
- If the effects are temporary and / or permanent; and / or
- If the effects are experienced / occur concurrently or sequentially.

- 16.27 An overall qualitative appraisal of the effect interactions on the specific common sensitive receptor(s) for construction and operational stages has then been made using the information contained within this ES (including **Technical Chapters 6 – 15** and supporting appendices in **Volume 2**, where appropriate) alongside professional judgement. The outputs of the construction stage assessments have been used to inform the appraisal of decommissioning stage effects as this is considered a 'proxy' (in line with the approach adopted across the ES – see **Chapter 2: Approach to EIA**).
- 16.28 Where possible, a conclusion on effect interactions has been provided, discussing the likelihood of the effect interactions being '**Significant**' or '**Not Significant**'.
- 16.29 The above process is reported in the 'Assessment of Effect Interactions' section of this Chapter.

In-Combination Effects

- 16.30 The assessment of in-combination effects has followed a stepped approach:

- **Step 1: Identification of projects for consideration;** and
- **Step 2: Assessment of in-combination effects.**

- 16.31 'Common sensitive receptors' for in-combination effects are those that are affected / impacted by the Project for Assessment alongside the identified Cumulative Projects.

Step 1: Identification of Cumulative Projects

- 16.32 Step 1 was completed as part of the EIA Scoping Report (**Appendix 2.1**), with a list of Cumulative Projects identified for consideration.
- 16.33 Following the submission of the EIA Scoping Report, a further search using the following databases was undertaken in April 2026:
- RBC's and RMBC's online register of projects^{8, 9};

- Planning Inspectorate online register of projects¹⁰;
- Transport and Works Order Act online register of projects¹¹;
- Parliament Hybrid Bills online register¹²;
- The Landstackⁱⁱ map function to identify planning applications (in particular from RBC and RMBC); and
- Department for Energy Security and Net Zero (DESNZ) Renewable Energy Planning Database: quarterly extract¹³.

16.34 Where relevant, online registers of projects of other nearby / relevant local authorities were also reviewed in addition to the sources listed above (e.g. Bury Council, Hyndburn Borough Council and Blackburn-with Darwen and Calderdale Council).

16.35 The 'cut off' date used to identify Cumulative Projects and the associated available documentation was April 2026. This was set in order to ensure that there was time for information about the Cumulative Projects to feed into the modelling and assessment presented in this ES.

16.36 In line with the EIA Scoping Report (**Appendix 2.1**) and the EIA Regulations, the searches have focused on 'projects'. Therefore, sites allocated within local plans, core strategy documents or supplementary planning documents have not been considered. This is due to there being insufficient information to undertake a meaningful assessment of in-combination effects.

16.37 Due to the nature of the Project for Assessment, the location of the Assessment Boundary and relevant guidance, the search areas used were those set out in the EIA Scoping Report (**Appendix 2.1**), as follows:

- Landscape and visual – 45km search area for other wind turbine projects over 50m in height and 15km for other types of development¹⁴; and
- All other technical topics (see **Chapters 6 – 10** and **12 – 15**) – 15km search area.

16.38 In line with the guidance outlined above, criteria and professional judgment have been used to determine whether then to include or exclude projects from further assessment, informed by aspects such as temporal scale, nature of development and other factors.

16.39 Wind turbine schemes have been identified within the search area of 45km and are listed in **Table 16.1**. Their locations are shown in **Figure 11.3**. The schemes identified are over 50m in height and are existing and operational or pending consideration. While wind turbines at Sheepfold lie beneath the 50m height threshold (at 48m), these wind turbines have been included given their proximity to the Project for Assessment.

ⁱⁱ Landstack is an interactive mapping tool that displays all planning applications submitted to local planning authorities and automatically updates on a weekly basis.

Table 16.1: Other wind turbine schemes

Ref.	Name	No. of turbines	Distance from Assessment Boundary	Decommissioning date ⁱⁱⁱ
Existing / Operational				
1	Scout Moor	26	Within / adjacent	July 2033
2	Sheepfold (Sheep House Farm)	2	<500m to the north	Unknown
3	Stand Lees Farm	1	3.5km south-west	Unknown
4	Reaps Moss	3	3.7km north-east	March 2040
5	Crook Hill	11 ^{iv}	4km east	December 2040
6	Todmorden	5	5.2km north-east	September 2039
7	Wooley Lane Farm	1	5.5km north-west	Unknown
8	Hyndburn	12	8m north-west	October 2037
9	Coal Clough	8	7.5km north-east	May 2040
10	Hameldon Hill	6	9.5km north	April 2038
11	Ovenden Moor	9	20km north-east	January 2042
12	Promised Land	2	32km south-west	October 2039
13	Hazlehead	3	33km south-east	December 2036
14	Spicer Hill	3	34km south-east	February 2038
15	Royd Moor	13	34km south-east	December 2027
16	Blackstone Edge	3	34km south-east	March 2038
17	West Pimbo Industrial Estate	1	35km south-west	Unknown
18	Doughty	1	17km north-east	2050
19	Causeway Bridges	1	39km south-west	Unknown
20	Cliffs Farm	3	35km west	Unknown
21	Dewlay Cheese	1	42km north-west	Unknown
Approved				
22	Pimbo Road	1	35km south-west	Unknown

ⁱⁱⁱ Turley estimate based on operational date (confirmed via Renewable Energy Planning Database: quarterly extract) + 25 year temporary consent.

^{iv} There is planning permission for 12 wind turbines, though only 11 have been constructed and are operational.

Ref.	Name	No. of turbines	Distance from Assessment Boundary	Decommissioning date ⁱⁱⁱ
Pending Consideration				
23	Calderdale	34	14.4km North East	Unknown

16.40 The following criteria have been used to define the list of other Cumulative Projects to be considered:

- Applications dating from November 2019 onwards. It is anticipated that applications prior to this date will already have been built out and / or where subsequent applications have been submitted these would be captured within the search dates;
- Applications with a resolution to grant planning permission;
- Applications with planning permission, either under construction or not yet implemented (unless already considered as part of the baseline scenario);
- Applications submitted, which have the potential to be determined prior to the determination of the Project for Assessment;
- Applications which have been refused but subject to an appeal not yet determined; and
- Projects of a pertinent scale, which has been determined using professional judgment but informed by their scale, perceived impact or complexity. This includes projects that fall under the definitions of Schedule 1 and 2 development set out within the EIA Regulations.

16.41 The final list of Cumulative Projects considered is provided in **Table 16.2** and their locations are shown in **Figure 16.1**.

Table 16.2: List of Cumulative Projects

Map ID	Planning Application Reference / Address	Description	Distance, Direction and	Current status
A	RBC 2022/0451 Land west of Market Street, Edenfield	Full application for the erection of 238 no. residential dwellings (Use Class C3) and all associated works, including new access, landscaping and public open space.	Adjacent to the west	Approved with Conditions 21/11/2025
B	Bury Council 63533 ^e Land at Bevis Green Works (Tetrosyl), Bury	Residential development comprising 268 no. dwellings (Class C3) with associated access, car parking, landscaping and open space.	3.5km south-west	Under construction
C	RMBC 23/00650/HYBR Land At Stakehill, Off Rochdale Road, Middleton	Hybrid planning application (EIA development) seeking: — Full Planning permission for the erection of residential development of 233 dwellings (Use Class C3) with associated landscaping, means of access, drainage, and other necessary supporting infrastructure. — Outline planning permission with access (all other matters reserved) for residential development of up to 1147 dwellings (Use Class C3), mixed-use development, land for primary school extension, local centre and MUGA, landscaping, and supporting infrastructure.	8km south-east	Awaiting determination
D	RMBC 16/01399/HYBR South Heywood	Part full/part outline planning application for the development of land at South Heywood, including the demolition of a number of existing on-site buildings and structures. — Full consent sought for the construction of a new link road between Junction 19 of the M62 and Pilsworth Road, the widening of part of Pilsworth Road, together with associated junction improvements, landscaping, lighting and other works	7.3km south	Under construction

^e As amended by planning application reference: 71244.

Map ID	Planning Application Reference / Address	Description	Distance, Direction and	Current status
		including the importation of material and engineering works in order to construct the link road. — Outline consent (with all matters reserved for future approval except access) sought for a major mixed-use development comprising supporting residential uses comprising up to 1000 dwellings (Class C3); employment uses (Classes B2/B8) comprising up to 135,460m2 Gross Internal Area(GIA); a new primary school (Class D1); Class A1/A2/A3/A5 uses comprising up to 2500m2 GIA which includes no more than 499m2 of A1 uses; together with associated landscaping, open space and sports pitches, drainage, ecological enhancements, cycleway and footpath linkages, infrastructure and other works ancillary thereto. (Application accompanied by an Environmental Statement)		
E	RMBC 22/01190/FUL Land South Of Cowm Top Lane, Castleton, Rochdale	Residential development comprising 495 dwellings with associated access, car parking, landscaping and infrastructure.	7.5km south-east	Approved with Conditions 26/06/2025
F	RMBC 22/00588/FUL Crimble Mill, Heywood	The restoration of the existing mill, change of use of the upper floors to 33 dwellings and ground floor commercial floorspace (Classes E, F1 or F2), the replacement of the existing road bridge and the removal of the existing footbridge, restoration of the mill pond and leat, the construction of flood alleviation measures; the upgrading of Crimble Lane from Rochdale Road, the improvement of public rights of way, hard and soft landscaping, and other engineering works; the demolition of the other (non-listed) existing buildings, remediation of the site and the formation of a development platform and the construction of 31 dwellings and associated works and engineering operations; the construction of 150 dwellings accessed from Woodland Road and Crimble Lane and the regrading of the site together with associated engineering/retention works, the provision of surface water balancing ponds, open	5.4km south-east	Awaiting determination

Map ID	Planning Application Reference / Address	Description	Distance, Direction and	Current status
		space, and other works; together with other associated works including landscape and ecological improvements.		
G	RMBC 22/01364/FUL Land to the west of Smithy Bridge Road, Littleborough	Residential development: erection of up to 199 dwellings including vehicular access on to Smithy Bridge Road, with internal highways, car parking, footpaths, cycle paths, boundaries, gardens, open space and other associated works.	7km south-east	Awaiting determination
H	Hyndburn Borough Council 11/21/0657 Former Huncoat Power Station	Major Outline: Proposed redevelopment for up to 451 residential units, together with associated landscaping, open space, access and infrastructure'. The plans submitted for specific approval are the three listed on the drawing schedule (attached), ie the parameter plans on land uses, heights and access/movement.	11.4km north-east	Awaiting determination
I	RBC 2024/0404 Site Of Former Mayfield Chicks	The erection of a single storey 4,363 sqm GEA (4,110 sqm GIA) Class B8 storage & distribution building (which includes ancillary 470 sqm GIA offices / staff welfare facilities); the construction of a service yard / hardstanding for the purposes of outdoor storage; the retention and minor reconfiguration of the existing Cornerbrook lift training business at the western side of the site (part retrospective) and the provision of its own dedicated access; provision of a total 52 car parking spaces (of which 46 are standard spaces [14 of which are dedicated to the Cornerbrook business], 3 disability spaces and 3 spaces served with electric charging points), 22 HGV parking spaces and 8 cycle parking spaces; hard and soft landscaping; boundary fencing and security gates; external safety / security lighting; the widening / reconfiguration of the existing access from Blackburn Road and; the construction of a realigned / repositioned public footpath alongside the River Irwell.	275m west	Under construction
J	RMBC 24/00581/HYBR Proposed Development at Hollingworth Road and	Hybrid planning application (EIA development) seeking: — Full Planning permission for the erection of residential development of 312 dwellings (Use Class C3) with associated access, landscaping including works at	5.7km south-east	Approved with Conditions 19/12/2025

Map ID	Planning Application Reference / Address	Description	Distance, Direction and	Current status
	Rakewood Road, Littleborough	land off Hollingworth Road, alongside reconfiguration of and extension to the existing car park and associated works off Rakewood Road. — Outline planning permission with access (all other matters reserved) for the erection of primary school.		
K	Blackburn with Darwen Council 10/23/0269 Land at Bank Hey Farm Heys Lane Blackburn	Hybrid Application seeking Full Planning Permission for a phased development for the erection of 553 No. residential dwellings (Use Class C3) together with associated landscaping, open space, access and infrastructure and Outline Planning Permission for up to 45 dwellings with all matters reserved except access.	13km north-west	Approved
L	RMBC 25/00418/OUT Bury Council 71867 Northern Gateway (Land at Heywood / Pilsworth (PfE JPA 1.1 Allocation Site))	Mixed-use development of up to 1,024,540m ² of general industrial / storage and distribution and other non-residential uses and 200 dwellings.	7.5km south-west	Awaiting determination (validated April 2025)
M	RMBC 25/00427/CONS Land At Rochdale Road And Bamford Road Turn Village	Proposed battery storage facility with associated infrastructure.	1.2km south	Request completed 16/09/2025
N	25/00381/OUT Land North And East Of Stakehill Industrial Estate, Middleton	Outline planning application (with all matters reserved except the means access) for the development of up to 314 residential dwellings (Use Class C3) and employment uses (Use Class B2/B8 including ancillary office space (Use Class E)) comprising up to 13,047sqm Gross External Area together with associated parking, highway	7.6km south	Awaiting determination

Map ID	Planning Application Reference / Address	Description	Distance, Direction and	Current status
		infrastructure, works to public rights of way, areas of public open space, landscaping, drainage, ecological enhancements and other works ancillary thereto.		
O	OUT/354338/25 Former Civic Centre & Queen Elizabeth Hall West Street Oldham OL1 1UT	Hybrid planning application seeking: - 1. Permission for demolition of existing buildings. 2. Full planning permission for residential development (Block A) (Use Class C3) with associated access, servicing, parking, public realm and landscaping. 3. Outline planning permission for development of a mix of uses, comprising residential units (Use Class C3); ancillary commercial, business and service uses (Use Classes E and F1) with associated access, servicing, parking, public realm and landscaping. All matters reserved for future determination save for primary access.	11.8km south east	Approved 03/07/2025
P	TR010064 M60 Junction 18, three miles south of Bury M60/M62/M66 Simister Island	Construction of a new free-flow link (northern loop) from the M60 eastbound to M60 southbound carriageways. Realignment of the M66 southbound carriageway on the approach to the junction. Construction of a new two-lane free-flow road from the M60 northbound to the M60 westbound to replace the existing single-lane, and widen the M66 southbound to four lanes through junction 18. Conversion of the hard shoulder into a permanent traffic lane between M60 junctions 17 and 18, providing five lanes in both directions. Other works will include improvements to signage, signalling and drainage.	9km south west	Approved 09/09/2025
Q	Bury Council 71645 Land off Church Street & Scobell Street, Tottington, Bury, BL8 3DE	Outline application for erection of up to 275 no. units with associated car parking, landscaping and infrastructure works (access only to be considered).	8.6km south west	Awaiting determination
R	Hyndburn Council 11/26/0015 Land South of Ramsclough Farm, Haslingden Old	Major Full: Installation of ground mounted solar farm with associated ancillary development and infrastructure, including access improvements, ecological enhancement, landscaping and new access for a temporary period of 40 years.	5km north west	Awaiting determination

Map ID	Planning Application Reference / Address	Description	Distance, Direction and	Current status
	Road, Oswaldtwistle, Lancashire, BB5 3SN			
S	2025/0327 Land Bounded By Kingsway, Holcombe Road And Grane Road Helmshore Rossendale BB4 4QH	Erection of new production facility (Use Class B2/B8) and head office (Use Class E(g)(i)), with associated landscaping, parking, storage areas and the creation of a new vehicular access from Holcombe Road.	2.5km west	Awaiting determination
T	2025/0011 Interfloor Broadway Haslingden Rossendale Lancashire BB4 4LS	Full Planning Application for the demolition of buildings and structures, and remodelling, refurbishment and extension of existing industrial buildings (Use Classes B2, B8 and E(g)(iii)) with ancillary office space (Use Class E(g)(i)), remodelling of car park, service, vehicular circulation areas, landscaping and infrastructure works.	1.1km west	Awaiting determination

Step 2: Assessment of in-combination effects

- 16.42 While 23 other wind farm schemes have been identified in **Table 16.1** this does not necessarily mean that there will be an in-combination effect with the Project for Assessment for each wind farm scheme. Professional judgement has been used to identify the relevant wind farm schemes to be considered in the assessment, taking account of distance, intervening screening and land uses, alongside the outputs of available documentation.
- 16.43 For Cumulative Projects A – T listed in **Table 16.2**, it does not necessarily follow that there will be in-combination effects with the Project for Assessment as there needs to be an effect on the same receptor at the same time.
- 16.44 To identify this, the assessment stage has included a review of the available environmental information that supported the applications for development consent for Cumulative Projects A – T. This was to understand the exact receptors identified and therefore any commonality with the receptors assessed in **Technical Chapters 6 – 15** alongside the extent of any in-combination effects. Where suitable information has not been available, either professional judgement has been used to determine the cumulative effects or limitations set out (see ‘Assumptions and Limitations’ below).
- 16.45 Consideration has also been given to whether there is a concurrent construction or operational stage with the Project for Assessment from the available documentation. Where the Cumulative Projects A – T are under construction and where considered appropriate, it has been assumed that there is the potential for in-combination effects during construction and operation as a ‘worst-case’.
- 16.46 The assessment of in-combination effects is specific to the technical topics due to the nature of the technical assessments, the data utilised, etc. However, the evaluation undertaken at the receptor level for in-combination effects with Cumulative Projects A – T has considered the following, where applicable:
- Combined magnitude of change identified in the relevant technical assessments;
 - Sensitivity (or value, importance, etc.) of the receptor / receiving environment to change;
 - The overall assessment outputs;
 - The geographical scale / spatial extent of the effects; and
 - Duration and reversibility of effect.
- 16.47 In accordance with topic specific guidance (as outlined above) and through a combination of the evaluation and mitigation presented in this ES and the available documents for the wind farm schemes listed in **Table 16.1** and the Cumulative Projects outlined in **Table 16.2**, conclusions have been drawn as to:
- The likelihood for in-combination environmental effects;
 - The nature of in-combination effects (i.e. adverse or beneficial);

- Whether the in-combination effect is greater, the same or lesser than the effect identified for the Project for Assessment in isolation (i.e. reported in this ES); and
 - Whether the in-combination effect is **Significant** or **Not Significant**.
- 16.48 Where relevant, consideration has also been given to how the Project for Assessment contributes to the overall in-combination effect and / or whether it represents a 'tipping point' (i.e. results in a Not Significant effect becoming Significant).
- 16.49 The assessment of in-combination effects has considered each relevant wind farm scheme or Cumulative Project with the Project for Assessment and / or the collective in-combination effect arising from the wind farm schemes 1 – 23 and Cumulative Projects A – T with the Project for Assessment, where appropriate.
- 16.50 The in-combination assessment has focused on the technical topics / effects 'scoped in' (i.e. reported in **Technical Chapters 6 – 15**). However, climate change has not been considered as a technical topic within the in-combination effect assessment. This is on the basis that all global cumulative greenhouse gas (GHG) emission sources are relevant to climate change and are considered in defining the receptor (i.e. the global climate system is classified as at 'high' sensitivity to further emissions, as set out in **Chapter 15: Climate Change**). Given this, and as recognised by the Institute of Environmental Management and Assessment (IEMA) guidance¹⁵ and in light of relevant case law, the effects of GHG emissions from specific wind farm schemes and Cumulative Projects should not be individually assessed as there is no basis for selecting any particular (or more than one) project that has GHG emissions for assessment over any other. Furthermore, the contextualisation of GHG emissions / reductions incorporates the cumulative contributions from other GHG sources, whether in terms of baseline emissions or future carbon budgets. Where the contextualisation is geographically related, then the consideration of cumulative contributions to that context is within that boundary. The conclusion for climate change reported in **Chapter 15: Climate Change** is **Beneficial Significant**.
- 16.51 There may be effects at the project-level which require due consideration and management but these effects have not needed to be reconsidered as part of the assessment of in-combination effects.
- 16.52 The above is reported in the 'Assessment of In-Combination Effects' section of this Chapter.

Consideration of Works at Rawtenstall BSP

- 16.53 In addition to the existing operational wind farm schemes and Cumulative Projects A – T, the works at Rawtenstall BSP that will undertaken by the District Network Operator (DNO) have also been considered.
- 16.54 These works are anticipated to include reconfiguration of existing electrical infrastructure and additional transformers / switchgear to connect the cables from the wind farm to the existing network / grid.
- 16.55 A qualitative evaluation has been completed based on assumptions on the likely geographical scale / spatial extent of any associated effects, duration and reversibility

of these works. The combinations / interactions of these effects with that arising from the Project for Assessment have then been appraised.

16.56 The above is reported in the 'Works at Rawtenstall BSP' section of this Chapter.

Assessment of Effect Interactions

16.57 The matrices for the construction and operational stages are provided in **Tables 16.3** and **16.4**, respectively. These are followed by a qualitative appraisal of the potential effect interactions related to the receptor categories identified. Where the residual effects are '**Significant**' in **Technical Chapters 6 – 15**, these are shown in **Tables 16.3** and **16.4** in **bold**.

16.58 A textual appraisal of the potential effect interactions during decommissioning is provided below.

16.59 For consistency with the **Technical Chapters 6 – 15**, the effects are expressed as they are stated within each of the Chapters (e.g. using a '/' or 'to' to express ranges in effects). Where commas are used, this denotes that distinct levels of effect were reported for different receptors under a single effect.

Construction Stage

16.60 The matrix for the construction stage is provided in **Table 16.3**.

Table 16.3: Matrix for the construction stage

Technical chapter / effect or receptor ^f		Receptor category						
		Population and human health	Biodiversity	Landscape	Cultural heritage	Water	Soils	Climate
Chapter 6: Transport and Access								
Transport-related effects	Severance	Negligible adverse, Minor adverse						
	Driver delay	Negligible adverse						
	Pedestrian delay	Negligible adverse, Minor adverse						
	Non-motorised user amenity	Negligible adverse, Minor adverse						
	Fear and intimidation	Negligible adverse, Minor adverse						
	Road safety	Negligible adverse, Minor adverse						

^f Chapters have adopted either an 'effect-led' (e.g. **Chapter 6: Transport and Access**) or a 'receptor-led' approach (e.g. **Chapter 9: Ecology**).

Technical chapter / effect or receptor ^f		Receptor category						
		Population and human health	Biodiversity	Landscape	Cultural heritage	Water	Soils	Climate
	Abnormal loads	Negligible adverse, Minor adverse						
Chapter 7: Noise and Vibration								
Disturbance associated with construction noise		Not Significant						
Chapter 8: Shadow Flicker – Not applicable ^g								
Chapter 9: Ecology								
Knowl Moor SBI and Scout Moor BHS ^h			Negligible adverse					
Degraded blanket bog habitat ⁱ	M25 <i>Molinia caerulea</i> – <i>potentilla erecta</i> mire	Minor to moderate beneficial						
	M20 <i>Eriophorum vaginatum</i>	Minor to moderate beneficial						

^g All construction stage effects were 'scoped out' for shadow flicker.

^h Effects considered include habitat loss, modification of habitats through hydrological change and altered hydrological pathways.

ⁱ Effects considered include habitat loss, modification of habitats through hydrological change and altered hydrological pathways.

Technical chapter / effect or receptor ^f	Receptor category						
	Population and human health	Biodiversity	Landscape	Cultural heritage	Water	Soils	Climate
blanket and raised mire							
M3 <i>Eriophorum angustifolium</i> bog pool		Minor to moderate beneficial					
M6 <i>Carex echinata</i> - <i>Sphagnum recurva/auriculatum</i> mire		Minor adverse					
Acid grassland ^j		Minor adverse					
Species-poor soft rush ^k		Negligible adverse					
Waterbodies and watercourses ^l		Minor adverse					
Bats (foraging and commuting) ^m		Negligible adverse					

^j Effects considered include habitat loss.

^k Effects considered include habitat loss and modification of habitats through hydrological change.

^l Effects considered include habitat loss, modification of habitats through hydrological change and altered hydrological pathways.

^m Effects considered include disturbance (via noise and light) and fragmentation of species ranges of habitats.

Technical chapter / effect or receptor ^f	Receptor category						
	Population and human health	Biodiversity	Landscape	Cultural heritage	Water	Soils	Climate
Badger ⁿ		Negligible to minor adverse					
Water vole ^o		Negligible to minor adverse					
Otter ^p		Negligible to minor adverse					
Reptiles and amphibians ^q		Negligible to minor adverse					
Chapter 10: Ornithology							
Displacement due to loss and degradation of habitats, and disturbance		Negligible adverse, Minor adverse					
Population decline of breeding upland birds within the West Pennine Moors Site		Negligible adverse					

ⁿ Effects considered include disturbance (via noise and light), fragmentation of species ranges or habitats and injury / mortality from construction activities.

^o Effects considered include disturbance (via noise and light), altered hydrological pathways and injury / mortality from construction activities.

^p Effects considered include disturbance (via noise and light), fragmentation of species ranges or habitats, altered hydrological pathways and injury / mortality from construction activities.

^q Effects considered include fragmentation of species ranges of habitats, altered hydrological pathways and injury / mortality from construction activities.

Technical chapter / effect or receptor ^f	Receptor category						
	Population and human health	Biodiversity	Landscape	Cultural heritage	Water	Soils	Climate
of Special Scientific Interest (SSSI)							
Chapter 11: Landscape and Visual							
Changes in landscape character and features			Minor / Moderate adverse, Moderate adverse				
Changes in views / visual amenity	Minor / Moderate adverse, Moderate adverse, Major adverse						
Chapter 12: Built Heritage							
Harm to the heritage significance (character and appearance) of Conservation Areas as a result of change within their setting				Moderate adverse			
Harm to the heritage significance (special architectural and historic				Negligible adverse,			

Technical chapter / effect or receptor ^f	Receptor category						
	Population and human health	Biodiversity	Landscape	Cultural heritage	Water	Soils	Climate
interest) of listed buildings as a result of change within their setting				Moderate adverse			
Harm to the heritage significance (special historic interest) of Registered Park and Gardens (RP&Gs) as a result of change within their setting				Moderate adverse			
Harm to the heritage significance of non-designated heritage assets as a result of change within their setting				Minor adverse			
Chapter 13: Archaeology							
Loss / disturbance to known archaeological assets				Negligible adverse, Minor adverse			
Loss / disturbance to potential / unknown buried archaeological remains				Negligible adverse to major adverse			
Loss / reduction in deposits preserving				Minor adverse			

Technical chapter / effect or receptor ^f	Receptor category						
	Population and human health	Biodiversity	Landscape	Cultural heritage	Water	Soils	Climate
palaeoenvironmental remains as a result of dewatering activities							
Chapter 14: Hydrology, Hydrogeology and Peat							
Surface water features					Minor adverse		
Private water supplies					Minor adverse		
Public water supplies					Minor adverse		
Groundwater Dependent Terrestrial Ecosystems (GWDTEs) ^r		Minor adverse			Minor adverse		
Peat deposits						Minor adverse	
Chapter 15: Climate Change							
GHG emissions during construction ^s							Moderate adverse
Potential effect interaction?	Yes	Yes	No	Yes	Yes	No	No

^r These are considered to fall under the 'biodiversity' and 'water' receptor categories.

^s The 'net' effect across both the construction, operational and decommissioning stages is reported in **Table 16.3**.

16.61 From **Table 16.3**, potential effect interactions were identified for the population and human health, biodiversity, cultural heritage and water receptor categories. The appraisal of these potential effect interactions during the construction stage is presented below.

Population and human health

16.62 The residual effects relevant to population and human health that are considered within **Table 16.3** comprise:

- Transport-related effects (severance, driver delay, pedestrian delay, non-motorised user amenity, fear and intimidation, road safety and abnormal loads) (**Chapter 6: Transport and Access**);
- Disturbance with construction noise (**Chapter 7: Noise and Vibration**); and
- Changes in views / visual amenity (**Chapter 11: Landscape and Visual**).

16.63 The receptors associated with the above construction stage effects identified as contributing to an effect interaction comprise users of the road network (including pedestrians, cyclists, vehicle drivers and other users of roads), users of public rights of way (PRoWs) (consisting of both on-site routes and those in the surrounding landscape) and residents in nearby properties and settlements along the A680 (e.g. in and around Edenfield). These receptors are broadly either 'static' (i.e. residents) or 'transient' (i.e. people or groups travelling through the area), although the two groups are not mutually exclusive as specific receptors can fall within each category (i.e. a resident leaving their dwelling and travelling through the area). The effects experienced by these receptors identified in **Table 16.3** are all adverse in nature and are a mixture of **Not Significant** and **Significant**.

16.64 There is the possibility for static receptors to experience a combination of these effects concurrently, such as residents near the access of Scout Moor from transport-related effects specifically pedestrian delay, non-motorised user amenity, fear and intimidation, road safety and abnormal loads) and disturbance from construction noise. There is also the potential for transient receptors to experience interactions of effects. For example, the recreational users of Rooley Moor, Knowl Moor and Scout Moor from transport-related effects (specifically pedestrian delay, non-motorised user amenity, fear and intimidation, road safety and abnormal loads) and changes in views / visual amenity.

16.65 There is also the potential for static receptors to become transient receptors and experience the effect interactions sequentially. For instance, a resident leaves their property in Whitworth and experiences changes to the character and amenity of views from different viewpoints as they travel around the area.

16.66 Overall, there is an effect interaction on both static and transient receptors. The occurrences of effect interactions are primarily linked with the exposure of the receptors to the works (i.e. the proximity of the works) as the transport and noise effects identified are localised and substantially diminish over distance. To a lesser extent, the interactions are associated with the phasing of construction, the types of activities and as well as the sensitivity of receptors. Effect interactions during

construction are likely to occur temporarily, albeit this can be on a short or medium basis depending on the effect / receptor. A number of the effects that contribute to the effect interaction are also negligible adverse, indicating that there is unlikely to be a noticeable change from the baseline. However, due to the number of effects and how they may interact, any effect interaction is likely to be greater than the effects individually. Given the levels / significance of the effects that contribute to an effect interaction on population and human health receptors, the effect interactions are perceived to be **Significant** (as a number of the contributing effects are **Significant** individually).

Biodiversity

16.67 The residual effects relevant to biodiversity that are considered within **Table 16.3** comprise:

- Habitat loss, modification of habitats through hydrological change and altered hydrological pathways on Knowl Moor SBI and Scout Moor BHS, M25 *Molinia caerulea – potentilla erecta* mire, M20 *Eriophorum vaginatum* blanket and raised mire, M3 *Eriophorum angustifolium* bog pool, M6 *Carex echinata - Sphagnum recurva/auriculatum* mire, acid grassland, species-poor soft rush, waterbodies and watercourses (**Chapter 9: Ecology**),
- Disturbance (via noise and light), altered hydrological pathways, fragmentation of species ranges or habitats and injury / mortality from construction activities on bats (foraging and commuting), badger, water vole, otter and reptiles and amphibians (**Chapter 9: Ecology**);
- Displacement due to loss and degradation of habitats, and disturbance and population decline of breeding upland birds within the West Pennine Moors SSSI (**Chapter 10: Ornithology**); and
- Erosion and sedimentation effect, alteration of flow, natural drainage patterns / run off volume and rates and potential pollution events affecting GWDTEs (**Chapter 14: Hydrology, Hydrogeology and Peat**).

16.68 The assessment presented in **Chapter 9: Ecology** is 'receptor-led', with multiple relevant effects considered on each receptor. Therefore, effect interactions have already been assessed in **Chapter 9: Ecology** and are discounted from further assessment in this Chapter.

16.69 Following analysis of the above construction stage effects identified as contributing to an effect interaction, the common sensitive receptors are lapwing (*Vanellus Vanellus*), dunlin (*Calidris alpina*), curlew (*Numenius Arquata*), and merlin (*Falco columbarius*). However, the populations of these birds within the Assessment Boundary and that within the West Pennine Moor SSSI are separated (see further details in **Chapter 10: Ornithology**). Therefore, there are no effect interactions.

16.70 The assessment presented in **Chapter 14: Hydrology, Hydrogeology and Peat** considers multiple effects on GWDTEs on a receptor-led basis. GWDTEs represent a subset of habitats that are specifically dependent on groundwater to maintain their ecological function. In contrast, the habitats identified in **Chapter 9: Ecology** are defined on the

basis of their ecological characteristics; while some may overlap with GWDTes, they are assessed individually as ecological receptors rather than as components of a groundwater-dependent system.

- 16.71 As a result, there is potential for interaction between effects identified in these chapters, although this is difficult to quantify at the individual receptor level. Notwithstanding this, any such interactions are not considered likely to result in effects greater than those presented as part of the individual assessments within **Chapter 9: Ecology** and **Chapter 14: Hydrology, Hydrogeology and Peat**.

Cultural heritage

- 16.72 The residual effects relevant to cultural heritage that are considered within **Table 16.3** comprise:

- Harm to the heritage significance (character and appearance) of Conservation Areas as a result of change within their setting, harm to the heritage significance (special architectural and historic interest) of listed buildings as a result of change within their setting, harm to the heritage significance (special historic interest) of RP&Gs as a result of change within their setting and harm to the heritage significance of non-designated heritage assets as a result of change within their setting (**Chapter 12: Built Heritage**); and
- Loss / disturbance to known archaeological assets, loss / disturbance to potential / unknown buried archaeological remains and loss / reduction in deposits preserving palaeoenvironmental remains as a result of dewatering activities (**Chapter 13: Archaeology**).

- 16.73 Following analysis of the above construction stage effects identified as contributing to an effect interaction, it has been determined that there are no common sensitive receptors as the effects are considered on an asset-by-asset basis. Therefore, there are no effect interactions.

Water

- 16.74 The receptors relevant to water that are considered within **Table 16.3** comprise:

- Surface water supplies, private water supplies, public water supplies and GWDTes (**Chapter 14: Hydrology, Hydrogeology and Peat**).

- 16.75 The assessment presented in **Chapter 14: Hydrology, Hydrogeology and Peat** is 'receptor-led', with multiple relevant effects considered on each receptor. Therefore, effect interactions have already been assessed in **Chapter 14: Hydrology, Hydrogeology and Peat** and are discounted from further assessment in this Chapter.

Operational Stage

- 16.76 The matrix for the operational stage is provided in **Table 16.4**.

Table 16.4: Matrix for the operational stage

Technical chapter / effect or receptor ^t	Receptor category						
	Population and human health	Biodiversity	Landscape	Cultural heritage	Water	Soils	Climate
Chapter 6: Transport and Access – Not applicable ^u							
Chapter 7: Noise and Vibration							
Disturbance associated with operational noise	Not Significant						
Chapter 8: Shadow Flicker							
Shadow flicker	Negligible adverse						
Chapter 9: Ecology							
Bats (foraging and commuting) ^y	Minor adverse						
Other fauna (badgers, otter, water vole and herpetofauna) ^w	Negligible adverse						
Chapter 10: Ornithology							
Increased mortality due to collision	Negligible adverse / Minor adverse						

^t Chapters have adopted either an ‘effect-led’ (e.g. **Chapter 7: Noise and Vibration**) or a ‘receptor-led’ approach (e.g. **Chapter 9: Ecology**).

^u All operational stage effects were ‘scoped out’ for transport and access.

^v Effects considered include disturbance (via noise and light), fragmentation of species ranges and habitats and injury / mortality from collision.

^w Effects considered include disturbance (via noise and light), fragmentation of species ranges or habitats and altered hydrological pathways.

Technical chapter / effect or receptor ^t	Receptor category						
	Population and human health	Biodiversity	Landscape	Cultural heritage	Water	Soils	Climate
Displacement due to loss and degradation of habitats, and disturbance		Negligible adverse					
Population decline of breeding upland birds within the West Pennine Moors SSSI		Negligible adverse					
Chapter 11: Landscape and Visual^x							
Changes in landscape character and features			Minor adverse, Moderate / Major adverse				
Changes in views / visual amenity	Negligible adverse / Major adverse						
Effects on special qualities of designated landscapes			Minor adverse, Minor / Moderate adverse				
Night-time landscape and visual effects	Moderate adverse,		Minor / Moderate adverse,				

^x Where relevant, the conclusions presented account for both scenarios assessed (i.e. Existing Baseline Scenario and Restored Baseline Scenario). See **Chapter 11: Landscape and Visual**.

Technical chapter / effect or receptor ^t	Receptor category						
	Population and human health	Biodiversity	Landscape	Cultural heritage	Water	Soils	Climate
	Moderate / Major adverse		Moderate adverse				
Chapter 12: Built Heritage^y							
Harm to the heritage significance (character and appearance) of Conservation Areas as a result of change within their setting				Moderate adverse			
Harm to the heritage significance (special architectural and historic interest) of listed buildings as a result of change within their setting				Negligible adverse / Moderate adverse			
Harm to the heritage significance (special historic interest) of RP&Gs as a result of change within their setting				Moderate adverse			
Harm to the heritage significance of non-designated				Minor adverse			

^y Where relevant, the conclusions presented account for both scenarios assessed (i.e. Existing Baseline Scenario and Restored Baseline Scenario). See **Chapter 12: Built Heritage**.

Technical chapter / effect or receptor ^t	Receptor category						
	Population and human health	Biodiversity	Landscape	Cultural heritage	Water	Soils	Climate
heritage assets as a result of change within their setting							
Chapter 13: Archaeology							
Loss / reduction in deposits preserving palaeoenvironmental remains as a result of dewatering activities				Minor adverse			
Chapter 14: Hydrology, Hydrogeology and Peat							
Surface water features					Minor adverse		
Public water supplies					Minor adverse		
Private water supplies					Minor adverse		
GWDTEs ^z		Minor adverse			Minor adverse		
Peat deposits						Minor beneficial	
Chapter 15: Climate Change							
GHG emissions, savings (annual)							Moderate beneficial

^z These are considered to fall under the 'biodiversity' and 'water' receptor categories.

Technical chapter / effect or receptor ^t	Receptor category						
	Population and human health	Biodiversity	Landscape	Cultural heritage	Water	Soils	Climate
Net GHG effect							Major beneficial
Potential effect interaction?	Yes	Yes	Yes	Yes	Yes	No	No

16.77 From **Table 16.4**, potential effect interactions were identified for the population and human health, biodiversity, landscape, cultural heritage and water receptor categories. The appraisal of these potential effect interactions during the operational stage is presented below.

Population and human health

16.78 The residual effects relevant to population and human health that are considered within **Table 16.4** comprise:

- Disturbance with operational noise (**Chapter 7: Noise and Vibration**);
- Shadow flicker (**Chapter 8: Shadow Flicker**); and
- Changes in views / visual amenity and night-time landscape and visual effects (**Chapter 11: Landscape and Visual**).

16.79 The receptors associated with the above operational stage effects identified as contributing to an effect interaction comprise users of PRoWs and residents in nearby properties / communities / settlements. These receptors are broadly either 'static' (i.e. residents) or 'transient' (i.e. people or groups travelling through the area), although the two groups are not mutually exclusive as specific receptors can fall within each category (i.e. a resident leaving their dwelling and travelling through the area). The effects experienced by these receptors identified in **Table 16.4** are all adverse in nature and are a mixture of **Not Significant** and **Significant**.

16.80 There is the possibility for static receptors to experience a combination of these effects concurrently, such as residents of nearby isolated properties and the nearest communities (e.g. Cowpe and Catley Lane Head) which could experience disturbance from operational noise, shadow flicker and changes in views / visual amenity during daytime. Effect interactions could also be experienced at night-time by static receptors due to changes in night-time views from lighting and operational noise. There is the potential for static receptors to become transient receptors and experience effects sequentially (e.g. if a resident left their property and used an on-site PRoW and experienced changes in views / visual amenity).

16.81 Overall, there is an effect interaction predominantly on static receptors, and potentially when they become transient receptors. The occurrence of effect interactions will be linked to the types of effects occurring, the proximity of the receptors and their sensitivity. Effect interactions during the operational stage are considered to be long-term and temporary. A number of the effects that contribute to the effect interaction are also negligible adverse, indicating that there is unlikely to be a noticeable change from the baseline. However, due to the number of effects and how they may interact, any effect interaction is likely to be greater than the effects individually. Given the levels / significance of the effects that contribute to an effect interaction on population and human health receptors, the effect interactions are perceived to be **Significant** (as a number of the contributing effects are **Significant** individually).

Biodiversity

16.82 The residual effects relevant to biodiversity that are considered within **Table 16.4** comprise:

- Disturbance (via noise and light), fragmentation of species ranges or habitats and injury / mortality from collision, and altered hydrological pathways on Bats (foraging and commuting) and other fauna (badger, water vole, otter and herpetofauna) (**Chapter 9: Ecology**);
- Increased mortality due to collision, displacement due to loss and degradation of habitats, and disturbance and population decline of breeding upland birds within the West Pennine Moors SSSI (**Chapter 10: Ornithology**); and
- Erosion and sedimentation effect, alteration of flow, natural drainage patterns / run off volume and rates and potential pollution events affecting GWDTEs (**Chapter 14: Hydrology, Hydrogeology and Peat**).

16.83 The assessment presented in **Chapter 9: Ecology** is 'receptor-led', with multiple relevant effects considered on each receptor. Therefore, effect interactions have already been assessed in **Chapter 9: Ecology** and are discounted from further assessment in this Chapter.

16.84 Following analysis of the above operational stage effects, the common sensitive receptors are lapwing, dunlin, curlew and merlin. The relevant effects identified in **Table 16.4** on these receptors are adverse in nature (negligible adverse to minor adverse (**Not Significant**)). The effects would be experienced concurrently / sequentially.

16.85 As noted above for the construction stage, the populations of these birds within the Assessment Boundary and that within the West Pennine Moor SSSI are not the same and there is no pathway for impact on the SSSI population (see further details in **Chapter 10: Ornithology**).

16.86 No effect interactions with GWDTEs are anticipated during the operational stage. Other effects identified relate solely to impacts on fauna; therefore, there are no shared receptors and no pathway for interaction with GWDTE's.

16.87 While the on-site populations of birds may experience overlapping effects associated with collision, the effect interaction will be experienced at different geographical scales, with collision localised to areas adjacent to the wind turbines and displacement on a site-wide basis. In addition, both of the effects are concluded to be negligible adverse to minor adverse, indicating that there is unlikely to be considerable change.

16.88 Therefore, the effect interactions are likely to be no greater than the effects individually and would be **Not Significant**.

Landscape

16.89 The residual effects relevant to landscape that are considered within **Table 16.2** comprise:

- Changes in landscape character and features, effects on the special qualities of designated landscapes and night-time landscape and visual effects (**Chapter 11: Landscape and Visual**).
- 16.90 Following analysis of the above operational stage effects, the common sensitive receptors are LCA A1: Scout Pennine Moors, LCA 24: Knowl and Rooley Moors, Frignes and Foothills, residents and settlements (Catley Lane Head, Whitworth, Bacup, Newchurch, Stacksteads, Rawtenstall, Cowpe), recreational users (Holcombe Moor / Stubbins Estate and Peel tower) and designated landscapes (Peak District National Moor).
- 16.91 The relevant effects identified in **Table 16.4** are adverse in nature (minor / moderate adverse to major adverse and a mixture of **Not Significant/ Significant**).
- 16.92 The effects would be experienced largely sequentially, with only a limited overlap, as the effect interaction relates to the experience in daytime (considered in changes in landscape character and features, changes in views / visual amenity from designated landscapes) and in night-time (night-time landscape and visual effects). Given this, the effect interactions are considered to be no greater than that identified individually. However, with the levels and significance of the effects that contribute to an effect interaction on landscape receptors, the effect interactions are perceived to be **Significant** (as the effects are **Significant** individually).

Cultural heritage

- 16.93 The residual effects relevant to cultural heritage that are considered within **Table 16.4** comprise:
- Harm to the heritage significance (character and appearance) of Conservation Areas as a result of change within their setting, harm to the heritage significance (special architectural and historic interest) of listed buildings as a result of change within their setting, harm to the heritage significance (special historic interest) of RP&Gs as a result of change within their setting and harm to the heritage significance of non-designated heritage assets as a result of change within their setting (**Chapter 12: Built Heritage**); and
 - Loss / reduction in deposits preserving palaeoenvironmental remains as a result of dewatering activities (**Chapter 13: Archaeology**).
- 16.94 Following analysis of the above operational stage effects identified as contributing to an effect interaction, it has been determined that there are no common sensitive receptors as the effects are considered on an asset-by-asset basis. Therefore, there are no effect interactions.

Water

- 16.95 The receptors relevant to water that are considered within **Table 16.4** comprise:
- Surface water supplies, private water supplies, public water supplies and GWDTEs (**Chapter 14: Hydrology, Hydrogeology and Peat**).

- 16.96 The assessment presented in **Chapter 14: Hydrology, Hydrogeology and Peat** is 'receptor-led', with multiple relevant effects considered on each receptor. Therefore, effect interactions have already been assessed in **Chapter 14: Hydrology, Hydrogeology and Peat** and are discounted from further assessment in this Chapter.

Decommissioning Stage

- 16.97 Using the construction stage as a 'proxy', where considered appropriate, the relevant effects during the decommissioning stage are summarised as follows:

- Disturbance associated with construction noise (**Chapter 7: Noise and Vibration**);
- Effects on Knowl Moor SBI and Scout Moor BHS, degraded blanket bog habitat, acid grassland, species-poor soft rush, waterbodies and watercourses, bats (foraging and commuting), badger, water vole, otter, reptiles and amphibians (**Chapter 9: Ecology**);
- Displacement due to loss and degradation of habitats, and disturbance and population decline of breeding upland birds within the West Pennine Moors SSSI (**Chapter 10: Ornithology**);
- Changes in landscape character and features and changes in views / visual amenity (**Chapter 11: Landscape and Visual**);
- Harm to the heritage significance (character and appearance) of Conservation Areas as a result of change within their setting, harm to heritage significance (special architectural and historic interest) of listed buildings as a result of change within their setting, harm to the heritage significance (special historic interest) of RP&Gs as a result of change within their setting and harm to the heritage significance of non-designated heritage assets as a result of change within their setting (**Chapter 12: Built Heritage**);
- Loss / disturbance to known archaeological assets, loss / disturbance to potential / unknown buried archaeological remains and loss / reduction in deposits preserving palaeoenvironmental remains as a result of dewatering activities (**Chapter 13: Archaeology**);
- Effects on surface water features, private water supplies, public water supplies, GWDTEs and the peat resource (**Chapter 14: Hydrology, Hydrogeology and Peat**); and
- GHG emissions, savings and net GHG effect (**Chapter 15: Climate Change**).

- 16.98 Based on the above receptors / effects and using the outputs of the construction stage matrix, effect interactions may occur on the following receptor categories:

- Population and human health;
- Biodiversity;
- Landscape;

- Cultural heritage; and
- Water.

16.99 The effect interactions on the above receptor categories would be no greater than that reported for the construction stage above.

Assessment of In-combination Effects

16.100 The assessment of in-combination effects has been set out in line with the order of the technical topics in **Chapters 6 – 15**.

Transport and Access

16.101 The wind farm schemes listed in **Table 16.1** are not relevant to the assessment of in-combination transport and access effects as there are limited operational traffic movements and / or the vehicular routes are not anticipated to overlap with the Project for Assessment due to their relative location to the Assessment Boundary.

16.102 Cumulative Projects A – H and J – T are largely not identified to have a direct impact on the study area within the road network considered for the Project for Assessment or not at the same time as the construction stage. Therefore, no in-combination effects are anticipated to arise with these Cumulative Projects.

16.103 Where there is potential overlap on the Strategic Road Network or A-road network specifically with Cumulative Project I, the traffic flows in-combination are considered to be limited in the context of baseline traffic flows. Therefore, in-combination effects are likely to be the same as that identified for the Project for Assessment in isolation (negligible adverse to minor adverse in **Chapter 6: Transport and Access**) and would be **Not Significant**.

Noise and Vibration

16.104 As part of the assessment of operational noise presented in **Chapter 7: Noise and Vibration**, the neighbouring wind farms set out in **Table 16.1**, namely Scout Moor Wind Farm (ref. 1) and Reaps Moss (ref. 4) have already been considered. All other wind developments were found to either be located at sufficient distance that predicted noise levels were below the threshold requiring a cumulative assessment, or, in the case of Sheep House Farm (ref. 2), have been excluded from assessment due to their small scale (see Appendix 7.2, Annex 12). Therefore, the in-combination effects are likely to be no greater than that assessed within **Chapter 7: Noise and Vibration** (i.e. **Not Significant**).

16.105 Cumulative Projects A – T are located away / at a distance from where main construction activities will occur within the Assessment Boundary (such as a distance of 1.2km between Cumulative Project A and the establishment of the laydown area off Scout Moor Road). Therefore, no in-combination effects are anticipated to arise associated with construction noise with the Cumulative Projects.

16.106 Cumulative Projects A – T are located at a distance from the proposed wind turbines and none are of the same nature (wind farms). Therefore, no in-combination effects are anticipated to arise associated with operational noise with the Cumulative Projects.

Shadow Flicker

16.107 A cumulative shadow flicker study has been undertaken and is presented in **Figure 16.2**). This indicates that none of the Shadow Flicker Assessment Locations (SFALs) that have been assessed are within 10 rotor diameters of the Project for Assessment and any other neighbouring wind farm (listed in **Table 16.1**). Therefore, no in-combination effects are anticipated for shadow flicker.

16.108 Cumulative Projects A – T are not relevant to the assessment of in-combination shadow flicker effects as they are not of the same nature (i.e. wind farms).

Ecology

16.109 The wind farm schemes listed in **Table 16.1** are not relevant to the assessment of ecological in-combination effects. However, Cumulative Projects A – T have been considered further with respect to ecology.

16.110 The evaluation of in-combination effects has been undertaken with respect to the receptor groups considered in **Chapter 9: Ecology** (i.e. designated sites, habitats and species of conservation concern). These are addressed in turn below.

Effects on designated sites

16.111 The designated sites assessed in **Chapter 9: Ecology** comprise:

- Knowl Moor Site of Biological Importance (SBI) and Scout Moor Biological Heritage Sites (BHS).

16.112 Effects are anticipated to occur on both of these receptors during both the construction and decommissioning stages.

16.113 A review of the available documentation for the Cumulative Projects indicates that no impacts on these designated sites have been identified. Therefore, there is no in-combination effect.

Effects on habitats

16.114 The habitats assessed in **Chapter 9: Ecology** comprise:

- Blanket bog (M25 *Molinia caerulea* - *Potentilla erecta* mire, M20 *Eriophorum vaginatum* blanket and raised mire, M3 *Eriophorum angustifolium* bog pool and M6 *Carex echinata* - *Sphagnum recurva/auriculatum* mire);
- Acid grassland;
- Species-poor soft rush; and
- Waterbodies and watercourses.

16.115 The effects occur on all of the receptors outlined above during the construction and decommissioning stages.

16.116 From a review of the available documentation for the Cumulative Projects, the common sensitive habitat receptors include:

- Acid grassland – identified at Cumulative Project A; and
- Waterbodies and watercourses – identified at Cumulative Projects A, D, E, F, G, I, K, L and R.

16.117 Given the distance between the Assessment and the majority of these Cumulative Projects, the potential for direct in-combination effects (i.e. habitat loss) is considered unlikely. However, it is possible that across the sub-regional area (i.e. the Assessment Boundary and surrounding locale) there could be a 'perceived' in-combination effect where the same types of habitats are being impacted (by habitat loss or modification of habitats through hydrological change and altered hydrological pathways). As such, there is a potential 'sub-regional' in-combination effect. However, these habitats are relatively common and widespread and it is assumed that appropriate mitigation will be implemented at the Cumulative Projects to reduce impacts / provide enhancements through a landscape strategy (or similar, that will ensure broadly comparable / similar or higher distinctiveness habitats will be provided).

16.118 Therefore, overall the in-combination effects during the construction and decommissioning stages are no greater than that identified for the Project for Assessment in isolation (minor adverse for acid grassland and for waterbodies and watercourses as identified in **Chapter 9: Ecology**) and would be **Not Significant**.

Effects on species of conservation concern

16.119 The species of conservation concern assessed in **Chapter 9: Ecology** comprise:

- Bats (foraging and commuting);
- Badger;
- Water vole;
- Otter;
- Reptiles; and
- Amphibians.

16.120 Effects occur on all of the receptors outlined above during the construction and decommissioning stages and these are evaluated in **Table 16.5**.

Table 16.5: Evaluation of in-combination effects for species of conservation concern during construction / decommissioning

Identified common receptor	Relevant Cumulative Project ID	Evaluation
Bats (foraging and commuting)	A – G and I – T	There is a potential for in-combination effects on bats (foraging and commuting) with respect to disturbance (via noise and light) and fragmentation of species ranges or

Identified common receptor	Relevant Cumulative Project ID	Evaluation
		habitats. There is the potential for fragmentation of habitats occurring with the Project for Assessment and the relevant Cumulative Projects to occur at a wider geographical scale. However, mitigation (e.g. reducing disturbance impacts through measures outlined in the Construction Environmental Management Plan (CEMP)) is proposed for the Project for Assessment and is assumed for the Cumulative Projects, which would reduce the potential for effects to occur. On this basis, the in-combination effects are the same as that for the Project for Assessment in isolation (negligible adverse in Chapter 9: Ecology) and would be Not Significant .
Badger	B, C, E, F, I, J, K, L, Q, R, S	There is a potential for in-combination effects on badger with respect to disturbance (via noise and light), fragmentation of species ranges or habitats and injury / mortality from construction activities. There is the potential for fragmentation of habitats occurring with the Project for Assessment and the relevant Cumulative Projects to occur at a wider geographical scale. However, mitigation (e.g. reducing disturbance impacts through measures outlined in the CEMP and pre-construction checks and use of licensing) is proposed for the Project for Assessment and is assumed for the Cumulative Projects, which would reduce the potential for effects to occur. Overall, the in-combination effects are the same as that for the Project for Assessment in isolation (negligible to minor adverse in Chapter 9: Ecology) and would be Not Significant .
Water vole	C, E, G, L and R	There is a potential for in-combination effects on water vole with respect to disturbance (via noise and light), altered hydrological pathways and injury / mortality from construction activities. Mitigation (e.g. reducing disturbance impacts through measures outlined in the CEMP and pre-construction checks and use of licensing) is

Identified common receptor	Relevant Cumulative Project ID	Evaluation
		proposed for the Project for Assessment and is assumed for the Cumulative Projects, which would reduce the potential for effects to occur. On this basis, the in-combination effects are the same as that for the Project for Assessment in isolation (negligible to minor adverse in Chapter 9: Ecology) and would be Not Significant .
Otter	G, I, L and R	There is a potential for in-combination effects on otter with respect to disturbance (via noise and light), fragmentation of species ranges or habitats, altered hydrological pathways and injury / mortality from construction activities. There is the potential for fragmentation of habitats occurring with the Project for Assessment and the relevant Cumulative Projects to occur at a wider geographical scale. However, mitigation (e.g. reducing disturbance impacts through measures outlined in the CEMP and pre-construction checks and use of licensing) is proposed for the Project for Assessment and is assumed for the Cumulative Projects, which would reduce the potential for effects to occur. Overall, the in-combination effects are the same as that for the Project for Assessment in isolation (negligible to minor adverse in Chapter 9: Ecology) and would be Not Significant .
Reptiles	F, K, L, M and R	There is a potential for in-combination effects on reptiles with respect to fragmentation of species ranges or habitats, altered hydrological pathways and injury / mortality from construction activities. There is the potential for fragmentation of habitats occurring with the Project for Assessment and the relevant Cumulative Projects to occur at a wider geographical scale. However, mitigation (e.g. phased vegetation clearance and use of licensing) is proposed for the Project for Assessment and is assumed for the Cumulative Projects, which would reduce the potential for effects to occur. Overall, the in-combination effects are the same as that for the Project for Assessment in isolation

Identified common receptor	Relevant Cumulative Project ID	Evaluation
		(negligible to minor adverse in Chapter 9: Ecology) and would be Not Significant .
Amphibians	B, C, E, F, G, I, J, K, L and M	There is a potential for in-combination effects on amphibians in regard to fragmentation of species ranges or habitats, altered hydrological pathways and injury / mortality from construction activities. There is the potential for fragmentation of habitats occurring with the Project for Assessment and the relevant Cumulative Projects to occur at a wider geographical scale. However, mitigation (i.e. phased vegetation clearance and use of licensing) is proposed for the Project for Assessment and is assumed for the Cumulative Projects, which would reduce the potential for effects to occur. Overall, the in-combination effects are the same as that for the Project for Assessment in isolation (negligible to minor adverse in Chapter 9: Ecology) and would be Not Significant .

16.121 Effects also occur during the operational stage on all of the receptors outlined above and these are evaluated in **Table 16.6**.

Table 16.6: Evaluation of in-combination effects for species of conservation concern during operation

Identified common receptor	Relevant Cumulative Project ID	Evaluation
Bats (foraging and commuting)	A – G and I – T	There is a potential for in-combination effects on bats (foraging and commuting) in regard to disturbance (via noise and light) and fragmentation of species ranges and habitats. Due to the nature of the identified Cumulative Projects (i.e. not wind farms), no in-combination effects will occur with regard to injury / mortality from collision. The maturation of the moorland restoration proposals will reduce such effects for the Project for Assessment, and it is anticipated that similarly the establishment of landscaping measures will reduce habitat fragmentation from the Cumulative Projects. Therefore, overall, the in-combination effects are the same as that for

Identified common receptor	Relevant Cumulative Project ID	Evaluation
		the Project for Assessment in isolation (negligible to minor adverse in Chapter 9: Ecology) and would be Not Significant .
Badger	B, C, E, F, I, J, K, L, Q, R, S	No further works are anticipated during the operational stage of the Project for Assessment that will disturb these species and therefore there are no effects that could contribute to an in-combination effect. Therefore, there are no in-combination effects.
Water vole	C, E, G, L and R	
Otter	G, I, L and R	
Reptiles	F, K, L, M and R	
Amphibians	B, C, E, F, G, I, J, K, L and M	

Ornithology

16.122 Only the wind farm schemes listed in **Table 16.1** have been considered with respect to the bird species assessed in **Chapter 10: Ornithology**.

Curlew

Increased mortality due to collision

16.123 Information was available for collision risk for Scout Moor Wind Farm (ref. 1) from an application for extension in 2015^{aa}. From this data the mean annual collision risk for the existing Scout Moor Wind Farm for Curlew can be calculated as 0.325 as shown in **Table 16.7**.

Table 16.7: Data for Scout Moor Wind Farm

Date	Corrected Annual Risk	Number of years per collision	Number of birds colliding over 25 years
2009 – 2011	0.015	66.67	0.37
2012	0.085	11.76	2.18
Average	0.0325	30.76	0.8125

16.124 At Todmorden Moor Wind Farm (ref. 6) a total of three breeding Curlew nests were found on-site and required disturbance distances from wind turbines to be implemented during construction. Within the submitted information^{bb}, it was evaluated there was a slight collision risk due to very short aerial displays recorded in the air during vantage point surveys. However, no collision risk modelling was carried

^{aa} RBC planning reference: 2015/0112 and RMBC reference: 15/00395/FUL.

^{bb} Hyndburn Borough Council planning reference: 11/09/0512.

out within the assessment. Part of the rationale was that reported collisions in Europe were low and therefore it was considered unlikely that there would be significant impacts on the regional Curlew population due to collision.

- 16.125 At Coal Clough Wind Farm (ref. 9) curlew were identified as a receptor with a potential collision risk. Within the most recent application^{cc}, two collision rates were presented using 98% and 99% avoidance rates. However, NatureScot guidance (NatureScot, 2018)¹⁶ requires a 98% avoidance rate for this species so it is the 98% estimate which has been used in **Table 16.8**.

Table 16.8: Data for Coal Clough Wind Farm

	Number of collisions year	Number of years per collision	Number of birds colliding over 25 years
2015 – 8 turbines	0.14	7	3.5

- 16.126 The collision risk to Curlew from the Project for Assessment is 0.007. It is estimated that less than 1 Curlew could be lost over the full operational period of the Project for Assessment. This was concluded to be negligible adverse and Not Significant (see **Chapter 10: Ornithology**).

- 16.127 While there is a marginally increased collision risk for this species, given the population within the wider area, the overall in-combination effects related to collision risk on curlew are likely to be no greater than that identified for the Project for Assessment in isolation (negligible adverse in **Chapter 10: Ornithology**) and **Not Significant**.

Population decline of breeding upland birds within the West Pennine Moors SSSI

- 16.128 It is considered the combined populations within the Scout Moor Wind Farm site and the Project for Assessment are an established local population that form part of the wider regional population, which includes the SSSI population. However, it is not expected that the Curlew population within the SSSI will be impacted by the Project for Assessment, as they are likely a separate, local population given the widespread presence of this species in the region. Even in the instance that the population on-site supports the SSSI through the dispersal of young, the calculated collision risks above would not cause mortality rates of Curlew that would give rise to a significant effect on the West Pennine Moors SSSI located 4.9km west and as Curlew are widespread in the area, any short term displacement effects would likely be dispersed across multiple suitable areas of habitat in the wider landscape rather than the SSSI alone.

- 16.129 Overall, the in-combination effects are likely to be up to minor adverse and therefore greater than that identified for the Project for Assessment in isolation (negligible adverse in **Chapter 10: Ornithology**) but would be Not Significant.

^{cc} Planning Inspectorate appeal reference: APP/2009/0758.

Breeding Kestrel

Increased mortality due to collision

- 16.130 There is limited information from other existing wind farm schemes in the area, although it is known that collision risk modelling was undertaken for Hyndburn Wind Farm (ref. 8) and that the species was not recorded in the air for long enough to make meaningful collision risk assessments for Todmorden Wind Farm (ref. 6), meaning any risk will be very low.
- 16.131 Partly due to the limited information available, the in-combination effect on Kestrel is therefore largely due to the impact assessed for the Project for Assessment. While there could be an interaction between the Project for Assessment and Scout Moor Wind Farm (ref. 1), the impact is not quantifiable. However, the occurrence of high levels of Kestrel activity in the vicinity of the Scout Moor Wind Farm suggests that it is not having a significant adverse impact on Kestrel populations.
- 16.132 Given the above, the in-combination effects are likely to be up to minor adverse and therefore no greater than that identified for the Project for Assessment in isolation (minor adverse in **Chapter 10: Ornithology**) and would be **Not Significant**.

Breeding Lapwing

Increased mortality due to collision

- 16.133 There is limited information from other existing wind farm schemes in the area, although it is known that this species was 'scoped out' of further assessment for Scout Moor Wind Farm (ref. 1) as a result of low activity and that for Hyndburn Wind Farm (ref. 8) collision risk modelling was carried out for Lapwing however no further information was available.
- 16.134 Given the absence of any further quantitative data from other projects and the implication of low activity for this species as a result, in-combination effects would be largely as a result of the Project for Assessment.
- 16.135 Therefore, the in-combination effects are likely to be no greater than that identified for the Project for Assessment in isolation (negligible adverse in **Chapter 10: Ornithology**) and would be **Not Significant**.

Displacement due to loss and degradation of habitats, and disturbance

- 16.136 Given the implication of low activity for this species across projects for which information was available, the in-combination effects would be largely as a result of the Project for Assessment.
- 16.137 Therefore, the in-combination effects are likely to be no greater than that identified for the Project for Assessment in isolation (negligible adverse in **Chapter 10: Ornithology**) and would be **Not Significant**.

Population decline of breeding upland birds within the West Pennine Moors SSSI

- 16.138 It is not expected that the Lapwing population within the SSSI will be impacted by the Project for Assessment given the intervening distance.

16.139 Therefore, the in-combination effects are likely to be no greater than that identified for the Project for Assessment in isolation (negligible adverse in **Chapter 10: Ornithology**) and would be **Not Significant**.

Breeding Dunlin

Displacement due to loss and degradation of habitats, and disturbance

16.140 There is no information on the impacts from other developments in the region, though fieldwork carried has shown the presence of breeding Dunlin in proximity to Scout Moor Wind Farm (ref. 1).

16.141 Given the absence of any further quantitative data from other projects and the implication of low activity for this species as a result, in-combination effects would be largely as a result of the Project for Assessment.

16.142 Therefore, the in-combination effects are likely to be no greater than that identified for the Project for Assessment in isolation (negligible adverse in **Chapter 10: Ornithology**) and would be **Not Significant**.

Population decline of breeding upland birds within the West Pennine Moors SSSI

16.143 It is not expected that the Dunlin population within the SSSI will be impacted by the Project for Assessment given the intervening distance.

16.144 Therefore, the in-combination effects are likely to be no greater than that identified for the Project for Assessment in isolation (negligible adverse in **Chapter 10: Ornithology**) and would be **Not Significant**.

Merlin

Increased mortality due to collision

16.145 There was no information on this species from other projects. Given the absence of any further quantitative data from other projects and the implication of low activity for this species as a result, in-combination effects would be largely as a result of the Project for Assessment.

16.146 Therefore, the in-combination effects are likely to be no greater than that identified for the Project for Assessment in isolation (minor adverse in **Chapter 10: Ornithology**) and would be **Not Significant**.

Displacement due to loss and degradation of habitats, and disturbance

16.147 There was no information on this species from other projects. Given the absence of any further quantitative data from other projects and the implication of low activity for this species as a result, in-combination effects would be largely as a result of the Project for Assessment.

16.148 Therefore, the in-combination effects are likely to be no greater than that identified for the Project for Assessment in isolation (negligible adverse in **Chapter 10: Ornithology**) and would be **Not Significant**.

Population decline of breeding upland birds within the West Pennine Moors SSSI

16.149 It is not expected that the Merlin population within the SSSI will be impacted by the Project for Assessment given the intervening distance.

16.150 Therefore, the in-combination effects are likely to be no greater than that identified for the Project for Assessment in isolation (negligible adverse in **Chapter 10: Ornithology**) and would be **Not Significant**.

Landscape and Visual

16.151 Only the wind farm schemes listed in **Table 16.1** have been considered further with respect to landscape and visual.

16.152 As reported in **Chapter 11: Landscape and Visual**, the majority of wind farm schemes identified are operational (none under construction) and all operational sites within 45km are shown on Viewpoints 1 – 25, where relevant. The implications of the existing baseline (termed ‘Scenario 1’ in **Chapter 11: Landscape and Visual**) are considered in the main assessment reported in this Chapter (not separated out within the cumulative (in-combination) assessment).

16.153 There is one consented scheme within the cumulative search area / study area (termed ‘Scenario 2’ in **Chapter 11: Landscape and Visual**) called Pimbo Road (Ref 22). This scheme only consists of a single turbine with a tip height of 125m located 35km south west of the Assessment Boundary, as such, is not considered to result in significant in-combination effects and was not assessed further.

16.154 As noted in **Table 16.1**, there is only one cumulative scheme awaiting determination (termed ‘Scenario 3 in **Chapter 11: Landscape and Visual**); Calderdale Wind Farm (Ref 23). This scheme published a Preliminary Environmental Assessment Report (PEIR) in April 2026 as part of formal consultation which indicated a total of 34 turbines at a tip height of up to 200m located approximately 15km from the Assessment Boundary. Whilst this is not the final scheme, the PEIR provides sufficient information to assess the potential cumulative effects as this scheme has the potential to be experienced in combination, in successive views and sequentially with the Project for Assessment and has been assessed in detail as part of **Chapter 11: Landscape and Visual**. The assessment found that the additional change brought about by the addition of the Project for Assessment to a baseline of the operational, consented and Calderdale schemes would be no greater in the level of effect, than was assessed in the main assessment (for the Project for Assessment in isolation) for those few receptors located on high ground. Total combined cumulative effects were also considered where relevant, and there were only a few locations where there could be the potential for any notable increases in effect including on LCA A1: South Pennine Moors (the host for both sites), LCA C1: Rossendale Hills (located between the two), and for users of the Pennine Bridleway (route traverses both sites).

Built Heritage

16.155 Existing, operational wind turbines have been taken into account and considered as part of the baseline scenario in the assessment of impacts upon the heritage significance of built heritage assets as set out in **Chapter 12: Built Heritage**.

- 16.156 A single approved turbine, Pimbo Road (ref. 22), is situated 35km to the south-west of the Project for Assessment. This turbine lies beyond the identified study area for the assessment of impacts from the Project for Assessment and there would be no significant in combination effects arising from the Pimbo Road turbine in combination with the Project for Assessment.
- 16.157 The Calderdale Wind Farm, which is comprised of 34 turbines (ref. 23) is located 14.4km to the north-east of the Project for Assessment. The effects of the Calderdale Energy Park are not considered to interact / combine with effects from the Project for Assessment on the setting of heritage assets.
- 16.158 Cumulative Projects A – L are not considered to interact / combine with effects from the Project for Assessment on the setting of heritage assets. However, there are potential in-combination effects with Cumulative Project M on the Peel Monument.
- 16.159 Cumulative Project M is located circa 4.1km to the east of the Peel Monument. The Project for Assessment would also be located to the east of the Peel Monument, with the closest wind turbine approximately 7.7km from the listed building.
- 16.160 As a local landmark feature, the Peel Monument is visible from a number of places across the surrounding area, in particular in views when moving north to south along the Irwell Valley. The Project for Assessment would be seen in a different part of the view from the Peel Monument (the Project for Assessment is on the eastern side of the valley and the Peel Monument is on the western side) and would not affect its landmark status. There is a limited number of locations in proximity to Cumulative Project M, where the BESS may filter or obscure some views of the listed building, available from Rochdale Road, but its overall landmark status within the surrounding area would be maintained.
- 16.161 The extensive views from the Peel Monument contribute to its heritage significance. Both the Project for Assessment and Cumulative Project M would be visible within views to the east from the listed building. It is the extensive and panoramic nature of the views out from the listed building, rather than their composition, which contributes to the significance of the listed building. The views out are already highly varied and include both developed areas and areas of open, rural landscape. While change would be introduced by both the Project for Assessment and Cumulative Project M, the significance which the listed building derives from long-distance views would be maintained.
- 16.162 The historic interest of the monument, due to its association with Sir Robert Peel, a local man who twice served as Prime Minister would be unaffected by either the Project for Assessment and / or Cumulative Project M.
- 16.163 The Heritage Statement¹⁷ to accompany the planning application for Cumulative Project M concludes that the architectural and historic interest (heritage significance) of the Peel Monument would be sustained.
- 16.164 Therefore, the in-combination effects are likely to be the same as that identified from the Project for Assessment in isolation (minor adverse in **Chapter 12: Built Heritage**) and are **Not Significant**.

Archaeology

- 16.165 The wind farm schemes listed in **Table 16.1** are not relevant to the assessment of archaeological in-combination effects. However, Cumulative Projects A – T set out in **Table 16.2** have been considered further with respect to archaeology.
- 16.166 Groundworks and plant movement required for Cumulative Projects A - T would be restricted to land outside the Assessment Boundary and, as such, no identified or known assets within the Assessment Boundary would be directly impacted. Therefore, the in-combination effects are likely to be the same as that identified from the Project for Assessment in isolation (negligible adverse to major adverse in **Chapter 13: Archaeology**) and **Not Significant / Significant**.
- 16.167 For palaeoenvironmental remains, the peat deposits within the Assessment Boundary are part of a wider system of peat bog which could be directly impacted (though any such direct impacts upon assets also impacted by the Project for Assessment would not exceed the potential predicted large adverse impacts). Cumulative indirect effects upon the peat deposits within the Assessment Boundary are considered possible between the Project for Assessment and Cumulative Project M in localised areas where there are potential effects upon ground conditions within the Assessment Boundary (due to ongoing effects of new drainage systems etc.) that could affect the preservation of any buried peats and preserved organic deposits. However, it is understood that superficial deposits that underlie Cumulative Project M comprise diamicton till. Therefore, the in-combination effects are likely to be the same as that identified from the Project for Assessment in isolation (minor adverse in **Chapter 13: Archaeology**) and are **Not Significant**.

Hydrology, Hydrogeology and Peat

- 16.168 The wind farm schemes listed in **Table 16.1** are not relevant to the assessment of in-combination hydrology, hydrogeology and peat effects. However, Cumulative Projects A – T set out in **Table 16.2** have been considered further with respect to hydrology, hydrogeology and peat.
- 16.169 The evaluation of in-combination effects has been undertaken with respect to the key receptor groups considered in **Chapter 14: Hydrology, Hydrogeology and Peat** (i.e. surface water features, private water supplies, public water supplies). These are addressed in turn below.

Surface water features

- 16.170 Cumulative Projects A – T are all topographically situated below the main plateau within the Assessment Boundary and at a distance from the surface water features considered within the assessment. Therefore, there will be no direct in-combination effects on these receptors. However, there is the potential for the interaction of effects downstream of the Assessment Boundary, particularly at Main Rivers (e.g. River Irwell and River Spodden) where the tributaries / watercourses that run from / through the Assessment Boundary and the sites of other Cumulative Projects meet.
- 16.171 These Main Rivers are located at a distance from the main construction activities (e.g. circa 1.4km at the closest point from the creation of the laydown area on Scout Moor Road to the River Irwell and 1.6km to the River Spodden). Therefore, the pathway by which polluted surface water could reach these rivers is a minimum of 1km. At this

distance, it is likely that any sediment laden surface water or sediment caused by disturbance associated with clean surface water will have settled out. Similarly, should any low-level pollutants be present in the discharged water, this would likely be diluted.

16.172 In addition, it is assumed that appropriate control measures will be implemented at Cumulative Projects A – T to prevent /reduce any pollution, as set out for the Project for Assessment.

16.173 Therefore, in-combination effects are likely to be no greater than that identified for the Project for Assessment in isolation (minor adverse in **Chapter 14: Hydrology, Hydrogeology and Peat**) and would be **Not Significant**.

Private water supplies

16.174 Cumulative Projects A – T are all topographically situated below the main plateau within the Assessment Boundary and at a distance from the source of the private water supplies identified (i.e. beyond the 250m threshold commonly used as a screening criterion in England to assess potential risk to private water supplies based on guidance from the Environment Agency (see further details in **Appendix 14.6**)).

16.175 In addition, it is assumed that appropriate control measures will be implemented at the Cumulative Projects to prevent /reduce any pollution to surface or groundwater, as set out for the Project for Assessment.

16.176 Therefore, overall, the in-combination effects related to private water supplies are likely to be no greater than that identified for the Project for Assessment in isolation (minor adverse in **Chapter 14: Hydrology, Hydrogeology and Peat**) and would be **Not Significant**.

Public water supplies

16.177 Cumulative Projects A – T are all topographically situated below the main plateau within the Assessment Boundary, outwith the same Drinking Water Safeguarded Zone and at a distance from the surface watercourses that feed the public water supply reservoirs assessed (the closest point between Cumulative Project A and Cowpe Reservoir is 4.3km).

16.178 Cumulative Project M lies within the same Drinking Water Safeguarded Zone. However, it is also situated topographically below the main plateau within the Assessment Boundary and at a distance from the reservoirs considered within the assessment (circa 3km to Naden Higher Reservoir).

16.179 In addition, it is assumed that appropriate control measures will be implemented at Cumulative Projects A – T to prevent /reduce any pollution to surface or groundwater, as set out for the Project for Assessment.

16.180 Therefore, overall, the in-combination effects related to public water supplies are likely to be no greater than identified for the Project for Assessment in isolation (minor adverse in **Chapter 14: Hydrology, Hydrogeology and Peat**) and would be **Not Significant**.

GWDTEs

16.181 Cumulative Projects A – T are all topographically situated below the main plateau within the Assessment Boundary and at a distance from the GWDTE considered within the assessment. Therefore, there will be no in-combination effects on the receptors identified.

Peat deposits

16.182 Peat deposits within the Assessment Boundary form part of a wider peat resource regionally / nationally. Based on Natural England's peat soils map¹⁸ and a review of available documentation, Cumulative Projects A – K, N – Q and S – T are not underlain by peat.

16.183 There are some recorded peat deposits at Cumulative Project sites L, M and R, though the peat resource is anticipated to be limited and not connected to the peat deposits within the Assessment Boundary.

16.184 Therefore, overall, the in-combination effects related to peat (loss and disturbance) are likely to be no greater than identified for the Project for Assessment in isolation (minor adverse in **Chapter 14: Hydrology, Hydrogeology and Peat**) and would be **Not Significant**.

Works at Rawtenstall BSP

16.185 As noted above, works at the Rawtenstall BSP are anticipated to include reconfiguration of existing electrical infrastructure and additional transformers / switchgear to connect the cables from the wind farm to the existing network. These works will be undertaken by the District Network Operator (DNO).

16.186 Based on a high-level desk study, there are no environmental designations within or immediately adjacent to the Rawtenstall BSP^{dd}.

16.187 While there would be a minor increase in traffic during the works, this is unlikely to be at a level that would generate significant transport effects in respect to severance, amenity and delay. The increase would also be temporary and short-term. In addition, it is assumed that such environmental effects would be controlled / managed through the implementation of a CEMP (or similar).

16.188 The works would give rise to emissions related to air quality, noise and vibration as well as lighting. However, effects would be short-term and temporary and localised to the site. In addition, it is assumed that such environmental effects would be controlled / managed through the implementation of a CEMP (or similar).

16.189 While there would be new infrastructure, it is likely to be modest in scale and seen in the context of the existing substation building, adjacent sewage works and nearby commercial / industrial premises. The Rawtenstall BSP is also partially screened from its surrounds due to existing vegetation. As such, the works are considered to

^{dd} <https://magic.defra.gov.uk/> and <https://mario-lancashirecounty.hub.arcgis.com/>.

represent a limited change from the existing baseline conditions and effects related to changes in character and views would be limited.

16.190 There is unlikely to be any substantial excavation and earthwork required. Therefore, effects related to flood risk, ground conditions and contamination are unlikely to occur. In addition, it is assumed that such environmental effects would be controlled / managed through the implementation of a CEMP (or similar).

16.191 The works associated with the Project for Assessment in the vicinity of the Rawtenstall BSP are limited to below-ground electrical cable installation. Therefore, significant effects associated with these works are unlikely (see **Technical Chapters 6 – 15** and the EIA Scoping Report (**Appendix 2.1**)).

16.192 Therefore, there are unlikely to be significant effects from the works at the Rawtenstall BSP or in-combination effects with the Project for Assessment.

Summary

16.193 A summary of the outputs of the assessments and appraisals above is provided below.

Assessment of Effect Interactions

16.194 The assessment of effect interactions considers multiple effects generated by the Project for Assessment impacting upon the same receptor.

16.195 The qualitative appraisal identified the following for the construction stage:

- **Population and human health** – effect interactions likely to be greater than the effects individually and perceived as **Significant**;
- **Biodiversity** – there are no effect interactions;
- **Cultural heritage** – there are no effect interactions; and
- **Water** – there are no effect interactions

16.196 The qualitative appraisal identified the following for the operational stage:

- **Population and human health** – effect interactions likely to be greater than the effects individually and perceived as **Significant**;
- **Biodiversity** – effect interactions are likely to be no greater than the effects individually and would be **Not Significant**;
- **Landscape** – effect interactions likely to be no greater than the effects individually but would be **Significant**;
- **Cultural heritage** – there are no effect interactions; and
- **Water** – there are no effect interactions.

16.197 The qualitative appraisal determined that the effect interactions during the decommissioning stage would be no greater than that determined for the construction stage.

Assessment of In-combination Effects

16.198 The assessment of in-combination effects considers effects generated by the Project for Assessment and other existing wind farm schemes and Cumulative Project(s) impacting upon the same receptor. The assessment considered 23 existing wind farm schemes and 20 Cumulative Projects.

16.199 As set out above, climate change has not been specifically considered within the assessment of in-combination effects but it is noted that the overall net effect was concluded to be **Major Beneficial** and **Significant** as stated within **Chapter 15: Climate Change**.

16.200 A summary of the evaluation of in-combination effects with the Cumulative Projects is provided in **Table 16.9**.

Table 16.9: Summary of in-combination assessment

Technical topic	Summary of appraisal
Transport and access	In-combination effects were not identified with a number of Cumulative Projects. Where in-combination adverse effects are likely to occur, these are the same as that identified for the Project for Assessment in isolation and would be Not Significant .
Noise and vibration	In-combination effects were not identified with a number of Cumulative Projects. Where there are potential interactions with other existing wind farm schemes, these have inherently been considered as part of the assessment presented in Chapter 7: Noise and Vibration . Therefore, the effects would be Not Significant .
Shadow flicker	There are no in-combination shadow flicker effects.
Ecology	In-combination ecological effects are largely either the same or no greater than that identified for the Project for Assessment in isolation and would be Not Significant . For some receptors there are no in-combination effects.
Ornithology	In-combination ornithological effects are largely the same or no greater than that identified for the Project for Assessment in isolation, with some that would be greater. However, all in-combination effects would be Not Significant .
Landscape and visual	The assessment found that the additional change from Calderdale Wind Farm would lead to levels of effect no greater than was assessed in the main assessment (for the Project for Assessment in isolation). Where there are

Technical topic	Summary of appraisal
	potential interactions with other existing wind farm schemes, these have inherently been considered as part of the assessment presented in Chapter 11: Landscape and Visual (where the effects are a mixture of Significant / Not Significant).
Built heritage	Where there are potential interactions with other existing wind farm schemes, these have inherently been considered as part of the assessment presented in Chapter 12: Built Heritage. The in-combination effects with other Cumulative Projects are likely to be the same as that identified for the Project for Assessment in isolation and would be Not Significant.
Archaeology	In-combination archaeological effects are the same as that for the Project for Assessment in isolation and would be Not Significant / Significant .
Hydrology, hydrogeology and peat	There is a mixture of no in-combination effects or where these are anticipated, the in-combination hydrology, hydrogeology and peat effects are no greater than that for Project for Assessment in isolation and would be Not Significant .

Works at Rawtenstall BSP

16.201 There are unlikely to be significant effects from the works at the Rawtenstall BSP or in-combination effects with the Project for Assessment.

References

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