One Earth Solar Farm

Volume 6.0: Environmental Statement [EN010159]

Volume 2: Aspect Chapters

Chapter 18: Cumulative Effects

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Contents

Glossary

Term	Meaning
Intra-project Effects	Where two or more likely significant effects resulting from the Proposed Development combine to have effects on the same receptor. Also described as 'Interactive Effects'.
Inter-project Effects	the cumulative effects on the environment resulting from the Proposed Development in combination with existing and, or approved development ('Other Developments').
Other Developments	Existing and, or approved development which has the potential for an Inter-project Effect.
Study Area	A spatial area defined for an environmental aspect or issue for consideration in respect of the baseline, sensitive receptors and potential significant environmental effects.
Zone of Influence	Refers to the spatial area within which the environmental effects of the Proposed Development are expected to occur.

List of Abbreviations and Acronyms

Term	Meaning
AIS	Air Insulated Switchgear
ALC	Agricultural Land Classification
BESS	Battery Energy Storage System
BMV	Best and Most Versatile
CEA	Cumulative Effects Assessment
LPA	Local Planning Authority
NPS	National Policy Statement
PINS	Planning Inspectorate
PRoW	Public Rights of Way
ZoI	Zone of Influence

18. Cumulative Effects

18.1 Introduction

18.1.1 N.B. The document references have not been updated from the original submission. Please refer to the Guide to the Application [EN010159/APP/1.3.3] for the list of current versions of documents.

18.1.2 This Chapter of the Environmental Statement (ES) has been prepared by Logika with contributing input from all the authors of the technical aspect chapters (**Chapters 6 to 17 of ES Volume 2**) specialists (see **ES Volume 1, Chapter 1: Introduction [EN010159/APP/6.1]** with regards to professional accreditation). This Chapter presents a Cumulative Effects Assessment (CEA), considering two types of cumulative effect in relation to the Proposed Development:

- Intra-project Effects - i.e. two or more likely significant effects resulting from the Proposed Development combining to have effects on the same receptor (also referred to as Interactive Effects); and
- Inter-project Effects – i.e. the cumulative effects on the environment resulting from the Proposed Development in combination with existing and, or approved projects in an area ('Other Developments').

18.1.3 A description of the methodology used in the assessment is presented in this Chapter, along with the assessment of the likely significant effects of the Proposed Development during construction, operation and maintenance and during decommissioning; relevant and proportionate to the two types of cumulative effect. Each of the individual aspect Chapters (**Chapters 6 to 17 of ES Volume 2**), Figures (**ES Volume 3 [EN010159/APP/6.20]**) and Supporting Appendices (**ES Volume 3 [EN010159/APP/6.21]***)* present details in respect of relevant baseline conditions, future baseline conditions and sensitive receptors, along with the methodology for defining magnitude of effect. This information is not replicated within this Chapter.

18.1.4 This Chapter is supported by the following figures located within **ES Volume 3: Figures Supporting ES Volumes 1 and 2 [EN010159/APP/6.20]** and further detailed information contained within the following appendices located within **ES Volume 3: Technical Appendices Supporting ES Volumes 1 and 2 [EN010159/APP/6.21]**:

- **ES Volume 3 [EN010159/APP/6.20]**: Figures
  - **Figure 18.1**: Biodiversity Spatial Zone of Influence
  - **Figure 18.2:** Hydrology Spatial Zone of Influence
  - **Figure 18.3**: Land and Soils – Land and Groundwater Spatial Zone of Influence

- **Figure 18.4:** Land and Soils – Soils and BMV Spatial Zone of Influence
- **Figure 18.5:** Cultural Heritage and Landscape and Visual Spatial Zone of Influence
- **Figure 18.6:** Air Quality Spatial Zone of Influence
- **Figure 18.7:** Noise and Vibration Spatial Zone of Influence
- **Figure 18.8:** Human Health and Socio-Economics Spatial Zone of Influence
- **Figure 18.9** Best and Most Versatile (BMV) Agricultural Land and Other Developments

> **ES Volume 3 [EN010159/APP/6.21]**: Appendices

- **Appendix 18.1:** Intra-project Effects Assessment.
- **Appendix 18.2:** Other Development Long List Stages 1 and 2.
- **Appendix 18.3:** Summary of Other Developments included within the Cumulative BMV Assessment.
- **Appendix 18.4:** High Marnham Substation Cumulative Carbon Emissions.

18.2 Relevant Legislation, Policy and Technical Guidance

Legislation

18.2.1 The requirement for CEA is set out in the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 as amended[1] (hereafter referred to as the 'EIA Regulations'), whereby the likely significant effects of the development on the environment must be considered taking into account "…*the cumulation of the impact with the impact of other existing and/or approved development*" as indicated at Schedule 3 paragraph 3(g). At Schedule 4 paragraph 5(e) the EIA Regulations it is stated the Environmental Statement (ES) must include a description of the likely significant effects of the development on the environment resulting from "*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*".

National Planning Policy

[1] His Majesty's Office (HMSO) (2017) Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

18.2.2 In terms of National Policy, Paragraph 4.1.5 of National Policy Statement (NPS) EN-1[2] states that when weighing the adverse impacts of the Proposed Development against the benefits, the Secretary of State should take any long-term and cumulative adverse impacts, along with any measures to avoid, reduce, mitigate or compensate for adverse impacts, following the mitigation hierarchy.

18.2.3 In terms of the cumulative impacts of multiple developments (Inter-project Effects), paragraph 4.2.12 of EN-1 identifies that Applicants are required to consider how impacts will be compensated for as far as possible and how mitigation or compensation measures will be monitored and reporting agreed to ensure success, and that action is taken. At paragraph 4.4.5 EN-1 the impacts of more than one development should be considered where they may affect people simultaneously, and as such consider the cumulative impact on health in the ES where appropriate.

18.2.4 NPS EN-3[3] identifies the need for cumulative assessment in respect of solar voltaic generation at paragraph 2.10.26, in terms of site selection and nearby available grid export capacity: *"…applicants should consider the cumulative impacts of situating a solar farm in proximity to other energy generating stations and infrastructure."* With regard to this, details of site selection are presented within the Planning Statement in respect of EN-3.

18.2.5 At paragraph 2.10.94 NPS EN-3 identifies the approach to the assessment of cumulative landscape and visual impact, and at paragraph 2.10.157 identifies that the Secretary of State in their decision making will take into account any sensitive visual receptors, and the possible cumulative effect with any proposed development.

18.2.6 In respect of transport, EN-3 notes at paragraph 2.10.126 that *"Where a cumulative impact is likely because multiple energy infrastructure developments are proposing to use a common port and/or access route and pass through the same towns and villages, applicants should include a cumulative transport assessment as part of the ES. This should consider the impacts of abnormal traffic movements relating to the project in question in combination with those from any other relevant development. Consultation with the relevant local highways authorities is likely to be necessary."* Paragraph 2.10.141 further notes that "*Where cumulative effects on the local road network or residential amenity are predicted from multiple solar farm developments, it may be appropriate for applicants for various projects to work together to ensure that the number of abnormal loads and deliveries are minimised, and the timings of deliveries are*

[2] Department for Energy Security & Net Zero (DESNZ) (2023); Overarching National Policy Statement for Energy (EN-1).

[3] DESNZ (2023); National Policy Statement for Renewable Energy Infrastructure (EN-3).

managed and coordinated to ensure that disruption to residents and other highway users is reasonably minimised.".

18.2.7 EN-3 further notes at paragraph 2.10.27 that utility-scale solar farms may have a significant zone of visual influence, and may impact visual amenity and glint and glare[4] for nearby dwellings and that the cumulative impacts (paragraphs 2.10.93-2.10.101) should be considered iteratively with the emerging design of the Proposed Development.

Guidance

18.2.8 The primary guidance for undertaking cumulative effects, largely related to Inter-project Effects Assessments in the context of Nationally Significant Infrastructure Projects under the Planning Act 2008 (and considered within this assessment) is set out in PINS Advice published in September 2024[5]. This guidance acknowledges there is a range of public sector and industry guidance, but there is no single industry standard. The PINS Advice published in September 2024 supersedes PINS Advice Note Seventeen. For Intra-project Effects the European Commission guidance, such as Guidelines for the Assessment of Indirect and Cumulative Impacts, Impact Interactions[6] has primarily informed the assessment methodology.

18.3 Assessment Methodology

18.3.1 With regard to CEA, the principles of the approach were set out within the request for an EIA Scoping Opinion (see **ES Volume 3: Scoping opinion [EN010159/APP/6.23]**. The approach set out within this Chapter is presented in a staged manner, however it has been influenced over the pre-application stage through iterative approach, informed by the consultation responses and by the emerging aspect study areas and preliminary assessment work.

18.3.2 Any consultation elements relating to CEA, which have been raised and addressed post-scoping, are detailed within the **Consultation Report [EN010159/APP/5.1]**.

Intra-Project Effects Assessment Methodology

18.3.3 Intra-project effects typically arise where the combination of significant environmental effects generated by the Proposed Development occur to a single

[5] PINS (2024); Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment (September 2024). Available at: Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment - GOV.UK.

[6] European Community (1999); Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions.

receptor (i.e. the combination of individual effects for noise, air quality and visual on a single receptor). However, it is acknowledged that two effects even if not identified as significant in isolation; in combination could give rise to a significant effect by interacting with one another to affect a single receptor.

18.3.4 As noted previously, there is no singular established EIA methodology for assessing the nature and scale of effect interactions on a receptor. However, the European Commission has produced guidelines to assist EIA practitioners in developing an approach *"which are not intended to be formal or prescriptive, but are designed to assist EIA practitioners in developing an approach which is appropriate to a project…".*

18.3.5 These guidelines were reviewed, and a receptor group-based approach was developed. **Table 18.1** summarises the process used to establish interactive effects on both the construction, the operational (including maintenance) phase and decommissioning of the Proposed Development.

Table 18.1: Intra-Project Effects Assessment Process

Step	Description
Step 1: Identify and Categorise Sensitive Receptor Groups	All environmental aspect sensitive receptor groups and their geographical locations were identified.
Step 2: Identify Effects	All *potentially* significant environmental effects established that were associated with sensitive receptor groups were identified.
Step 3: Screen Sensitive Receptors and Associated Effects	A screening exercise was undertaken upon the identified receptor groups and where effects were subsequently identified by the assessment as **significant**, or **not significant**. Potential cumulative effects were screened out from further assessment if: > No potential environmental aspect overlap would arise in respect of the identified receptor group; or > There would be no temporal overlap of potential environmental aspect effects affecting receptor groups.
Step 4: Assess effect interactions	Qualitative assessment was undertaken based on professional judgement of the effect interactions and in consideration of the management plans and other embedded measures proposed. This judgement is informed by the methodology and thresholds considered by the individual aspect assessments.

18.3.6 Only adverse effects are considered within the assessment. The scale of an effect interaction has not been assigned as part of this assessment (i.e. minor, moderate of major); it is only where the in-combination effect is considered to be significant or not that has been considered.

18.3.7 When one or more effects from different environmental aspects (i.e. air quality, noise and vibration) coincide on a receptor or receptor group, if one or more of the individual effects are deemed to be 'significant' in isolation, the effect interaction is also considered to be 'significant'. As noted previously, where multiple 'not-significant' effects interact, the resulting effect interaction is typically considered to be 'not significant'. It should be noted that Biodiversity, Landscape and Visual and Human Health aspect chapters already consider effect interactions relevant to the aspect and issues being assessed.

Inter-Project Effects Assessment Methodology

18.3.8 As above, the EIA Regulations set out that a description of the likely significant effects of the Proposed Development on the environment resulting from cumulation of effects with other existing and, or approved projects needs to be provided. These projects are hereafter described as the 'Other Developments'. In order to identify which other existing and, or approved projects are included within the assessment, a Long List of Other Developments has been compiled based on a series of criteria.

18.3.9 An iterative process as set out below has informed the preparation of the Long List of Other Developments. At the time of the submission of the request for an EIA Scoping Opinion (see **ES Volume 3: Scoping opinion [EN010159/APP/6.23]**) the approach to identifying Other Development was informed by PINS Advice Note Seventeen (this was superseded in September 2024). Although the criteria used to identify Other Developments were set out within the request for an EIA Scoping Opinion, no details of the Other Developments were presented, taking account that the list of other existing and, or approved projects was likely to evolve from the scoping stage to the production of the ES.

18.3.10 On receipt of the Scoping Opinion (see **ES Volume 3: Scoping opinion [EN010159/APP/6.23]**), along with the emerging aspect study areas and preliminary assessment work, a list of Other Developments were prepared and presented as part of the Preliminary Environmental Information Report (PEIR) in May 2024 for consultation. This list was further refined by the consultation responses to the PEIR (see **Consultation Report [EN010159/APP/5.1]**) and consultation with the host authorities, after which additional Other Developments were included. The cut-off date for the Long List of Other Developments was 14th January 2025. During examination, two further schemes were added to the Long List of Other Developments as recommended by Lincolnshire County Council. The fixed Long List has been agreed with the host authorities for inclusion within the assessment and is presented in **ES Volume 3: Technical Appendices Supporting ES Volumes 1 and 2 [EN010159/APP/6.21]**. Furthermore, it is confirmed that the approach undertaken with regard to consultation with the host authorities remains in accordance with the PINS Advice published in September 2024.

18.3.11 Details of the criteria used to identify the Long List of Other Developments is set out as Stage 1.

Stage 1 Establishing the long list of other existing and, or approved development

18.3.12 As indicated previously, consideration of possible Other Developments and the establishment of the Long List has been undertaken throughout the EIA process to ensure, if necessary, any potentially significant cumulative effects were considered iteratively within the development and design of the Proposed Development.

18.3.13 As indicated in the EIA Scoping Report (see **ES Volume 3, Appendix 2.1: Scoping Report [EN010159/APP/6.21]**, the following criteria were defined for an early iteration of the Long List at EIA Scoping:

- Other projects within the local vicinity (within 5km of the Proposed Development):
  - that have planning permission (or development consent) but are not yet built; or
  - schemes where a planning application (or DCO application) has been submitted but a decision not yet made; or
  - major projects likely to occur due to existing policy.

18.3.14 The above criteria, were refined and consideration of the certainty of these Other Developments made (which subsequentially affects the assessment approach) as indicated by the following Tiers set out within the PINS Advice at that time (and which now remains in the latest advice) was undertaken:

Tier 1 Other existing and, or approved development:

- Under construction
  - Permitted applications under the Planning Act or other regimes but not yet implemented
  - Submitted applications under the Planning Act or other regimes but not yet determined
  - All refusals subject to appeal procedures not yet determined

Tier 2 Other existing and, or approved development:

- Projects on the Planning Inspectorate's programme of projects

Tier 3 Other existing and, or approved development:

- Projects on the Planning Inspectorate's programme of projects where a scoping report has not been submitted

- Identified in the relevant Development Plan and emerging Development Plans, with appropriate weight given as they near adoption, recognising that there will be limited information available on the relevant proposals
- Identified in other plans and programmes, as appropriate, which set the framework for future development consents or approvals, where such development is reasonably likely to come forward

18.3.15 Beyond EIA Scoping through the establishment of study areas within the early stages of the EIA (refer to **ES Volume 1, Chapter 2: EIA Methodology [EN010159/APP/6.2]**), the potential ZoI of the Proposed Development's construction, operation (including maintenance) and decommissioning has been considered by each environmental aspect.

18.3.16 The term ZoI refers to the spatial area within which the environmental effects of the Proposed Development are expected to occur. The ZoI differs depending on the environmental aspect, and for some follow a more established approach defined by specialist aspect guidance, and for others a more bespoke approach is undertaken.

18.3.17 Although ZoI have been established in each of the specialist aspect chapters of this ES, it is important though to note that the ZoI for the cumulative assessment is used in a somewhat different way to that in the aspect specific assessments. Here the ZoI is used to guide the assessment as a way of identifying the Other Developments that might generate environmental effects that could combine with an effect(s) of the Proposed Development. The combination of these effects could impact a receptor within the ZoI, but it is much less likely outside of the ZoI because of how environmental effects may interact, which in most cases is not a linear additive effect. On this basis the ZoI of the Proposed Development and that of any Other Development, is not considered to combine and therefore expand.

18.3.18 The ZoI established within each of the individual aspect chapters of this ES, are set out for clarity within **Table 18.2**.

Table 18.2: Environmental Aspect Spatial Zone of Influence

Environmental Aspect	Definition of the Spatial ZoI	Rationale
Biodiversity	ZoI from the Order Limits: > International/European Sites: 10km > Statutory Designated Sites: 2km > Non-Statutory Designated Sites: 2km > Priority Habitats: 2km > Legally protected and notable species: 2km > Waterbodies and water courses: 500m > Habitats: 50m See **ES Volume 3, Figure 18.1: Biodiversity Spatial Zone of Influence [EN010159/APP/6.20]**	The ZoI have been determined by consideration of the potential effects that could be realised in combination during the construction, operation (including maintenance) and decommissioning of the Proposed Development. This follows CIEEM (2018, updated 2024) guidance on Ecological Impact Assessment (EcIA)[7].
Hydrology	Other Development sites are considered to be within the ZoI if they lie upstream and within the same hydrological catchment as the Proposed Development. See **ES Volume 3, Figure 18.2: Hydrology Spatial Zone of Influence [EN010159/APP/6.20]**	ZoI are defined on a case-by-case basis dependent upon hydrological characteristics and connectivity. The ZoI has been designed to reflect existing hydrological catchments and topography. Impacts associated with the construction, operation (including maintenance) or decommissioning of Other Developments outside of the Proposed Development's hydrological catchment are unlikely to lead to likely significant cumulative effects due to the lack of hydrological connectivity with the Order Limits.
Land and Soils	Land and groundwater: 1km from the Order Limits See **ES Volume 3, Figure 18.3: Land and Soils – Land and Groundwater Spatial Zone of Influence [EN010159/APP/6.20]**	A 1km buffer has been considered with regard to identifying land and groundwater related receptors that could be impacted by the construction, operation (including maintenance) and/or decommissioning of the Proposed Development.

[7] Charted Institute of Ecology and Environmental Management (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater, Coastal and Marine. Version 1.3 updated September 2024.

Environmental Aspect	Definition of the Spatial ZoI	Rationale
		An area up to 1km from the Order Limits is considered appropriate as a ZoI for land and groundwater, as it is highly unlikely that any significant effects on land or groundwater would extend further than 1km from the Order Limits. The size of the ZoI has been selected based on professional judgement, with consideration given to issues such as contamination from existing pollution, which would be highly unlikely to travel over 1km under any circumstances. Also, pollution caused due to the Proposed Development would not be extensive due to the environmental measures, and equally any pollution as a result of Other Developments would be expected to be limited in volume, so any transport of pollution within the ground or migrating within groundwater would be over much smaller distances than 1km. This ZoI would therefore allow assessment of any situation that could result in a cumulative effect, and in most cases would result in consideration of situations where there would not be a detectable impact.
	Soils and Best and Most Versatile (BMV) land: The Lincolnshire and Nottinghamshire County Boundaries See **ES Volume 3, Figure 18.4: Land and Soils – Soils and BMV Spatial Zone of Influence [EN010159/APP/6.20]**	Consideration of soil resources and the cumulative availability of BMV is considered and assessed using a different approach to land and groundwater, whereby the regional availability and the regional and national impact on BMV land is considered. The Agricultural Land Classification (ALC) system is a nationally standardised framework used to assess the quality and versatility of agricultural land across England. As such, the significance of any proposed development affecting ALC graded land should be evaluated not only in the local planning context but also in terms of its national implications, particularly when it involves the loss of Best and Most Versatile (BMV) soils Grades 1, 2, and Subgrade 3a.
Buried Heritage	Within the Order Limits	Physical works associated with the construction of Other Developments have the potential to physically impact archaeological assets only where these assets fall within the boundary of more than one development or if any Other Development falls entirely or in part within the Order Limits.

Environmental Aspect	Definition of the Spatial ZoI	Rationale
Cultural Heritage	2km from the Order Limits See **ES Volume 3, Figure 18.5: Cultural Heritage and Landscape and Visual Spatial Zone of Influence [EN010159/APP/6.20]**	The study area for cultural heritage assessment of the Proposed Development has been agreed during consultation with the host authorities and Historic England, at a 2km radius of the Order Limits. Beyond this distance there are unlikely to be significant effects to heritage assets. As such, it is considered that cumulative schemes which fall outside of the 2km radius are unlikely to lead to significant effects to the value and settings of identified heritage assets when considered in conjunction with the Proposed Development.
Landscape and Visual	2km from the Order Limits See **ES Volume 3, Figure 18.5: Cultural Heritage and Landscape and Visual Spatial Zone of Influence [EN010159/APP/6.20]**	A 2km Landscape and Visual Impact Assessment (LVIA) study area has been defined as a proportionate and representative geographic area to identify significant landscape and visual effects, which has been agreed with the host authorities during consultation. This is based on an initial review of ZTVs up to 5km and then verified through fieldwork.
Transport and Access	The ZoI is reflective of the Study Area presented within **ES Volume 2, Chapter 12: Transport and Access [EN010159/APP/6.12]**, i.e. based on those roads that are expected to experience increased traffic flows associated with the construction of the Proposed Development. The geographic scope of the Study Area was determined through a review of the other developments in the area, Ordnance Survey (OS) plans.	The assessment of transport and access effects within the ES presents a worst case scenario whereby the impact of construction traffic flows from the Proposed Development are considered against the future baseline in isolation of any other developments, i.e. there are fewer additional traffic flows on the network so the impact of the Proposed Development is more easily recognised. However for consistency, a “Cumulative Development Sensitivity Test” is presented within the Transport Assessment whereby impact of construction traffic flows from the Proposed Development are considered against the future baseline with Other Developments on the road network. The Transport Assessment is presented as **ES Volume 3: Technical Appendices Supporting ES Volumes 1 and 2 [EN010159/APP/6.21]**. As such, the transport and access assessment already inherently considers the Other Developments. The construction traffic flows derived for the assessment of the Proposed Development used within the Air Quality and Noise assessments presented within the ES inherently include the flows from Other Developments in the Long List.

Environmental Aspect	Definition of the Spatial ZoI	Rationale
Air Quality	Construction dust: 250m from the Order Limits Construction traffic: 200m from the Order Limits and roads identified by the Transport and Access assessment See **ES Volume 3, Figure 18.6: Air Quality Spatial Zone of Influence [EN010159/APP/6.20]**	Guidance documents published by Environmental Protection UK and the Institute of Air Quality Management (IAQM)[8] define these distances, within which potential dust and air quality effects may occur, respectively. With respect to air quality effects arising from construction exhaust emissions, the traffic flows considered within the air quality assessment presented of the Proposed Development have already accounted for Other Developments within the future baseline. As such, the cumulative effects from traffic during the construction of the Proposed Development are inherently included in the assessment in **ES Volume 2, Chapter 13: Air Quality [EN010159/APP/6.13]**.
Carbon and Climate Change	Greenhouse Gas Assessment: Not Applicable Resilience and Adaptation Assessment: The Site In Combination Climate Change Assessment (ICCI): The ZoI is guided by the other environmental aspects relevant to each assessment.	The receptor for the greenhouse gas assessment is the global climate and associated effects. Given the scale of the receptor, the whole assessment is intrinsically cumulative (i.e. any single project would not cause significant effects in isolation without the baseline of cumulative global Greenhouse Gas emissions) and as such the approach does not need to consider emissions from a specific project list (see **ES Volume 2, Chapter 14: Carbon and Climate Change [EN010159/APP/6.14]**). No Other Developments are relevant as the effects are limited to within the Order Limits. The ICCI examines the effect of climate change on environmental effects at receptors in each of the other ES topics. As such the ZoI is defined by the ZoI of each other individual ES assessments.
Noise and Vibration	Operational noise: 600m from the Order Limits Construction noise: 400m from the Order Limits See **ES Volume 3, Figure 18.7: Noise and Vibration Spatial Zone of Influence [EN010159/APP/6.20]**	Operational noise: there is the potential for projects within about 500-600m to have cumulative effects on the basis that the operational noise study area for the Proposed Development is 500m from proposed plant locations. On this basis for a conservative assessment the Order Limits have been used as the point of measurement.

[8] Institute of Air Quality Management (2024) Guidance on the Assessment of Dust from Demolition and Construction. Available at: https://iaqm.co.uk/guidance/

Environmental Aspect	Definition of the Spatial ZoI	Rationale
		Construction noise: there is the potential for projects within 300-400m to have cumulative effects when constructed at the same time as the Proposed Development. This is on the basis that the study area for construction noise is 300m from works areas and access tracks. On this basis for a conservative assessment the Order Limits have been used as the point of measurement.
Human Health	Local Study Area (Bassetlaw 015D, Bassetlaw 015F, Newark & Sherwood 004C and West Lindsey 007C) See **ES Volume 3, Figure 18.8: Human Health and Socio-Economics Spatial Zone of Influence [EN010159/APP/6.20]**	The ZoI is based on the extent and characteristics of the Proposed Development and the proximity of communities to the Order Limits. Based on this, it has been determined that Human Health impacts are most likely to occur in the four Lower Layer Super Output Areas where the Site is located, and this area is considered to represent the most appropriate statistical fit for local health and population profiles. Where the Human Health assessment draws on other chapters of the ES, it reflects the ZoI used within these other technical assessments.
Socio-Economics	Local Study Area (Bassetlaw 015D, Bassetlaw 015F, Newark & Sherwood 004C and West Lindsey 007C). See **ES Volume 3, Figure 18.8: Human Health and Socio-Economics Spatial Zone of Influence [EN010159/APP/6.20]**	The potential for significant socio-economic effects by the Proposed Development are at the local level and primarily within the Order Limits itself. The Local Area, defined by the three lower-layer super output areas within which the Order Limits falls, is the smallest area for which baseline population and employment data are readily available, therefore the significance of effects has been determined using baseline data at this level.

18.3.19 The spatial ZoI have been mapped in relation to the Proposed Development (see **ES Volume 3, Figures 18.1 to 18.8 [EN010159/APP/6.20]**).

18.3.20 With the emergence of ZoI early and the criteria first used at EIA Scoping, other existing and, or approved developments have been routinely reviewed using the information available on the local authorities' planning registers, on the PINS website and in consultation with local authorities.

18.3.21 The above culminated in the following criteria used to establish the final Long List presented in **ES Volume 3, Appendix 18.2: Other Development Long List Stages 1 and 2 [EN010159/APP/6.21]**:

- Tier 1, 2 or 3 projects within 10km of the Proposed Development:

- that are considered major schemes (4 dwellings or more, or size equivalent); and
- have planning permission (or development consent) but are not yet built; or
- schemes where a planning application (or DCO application) has been submitted, but a decision has not been made or a refusal with subsequent appeal not yet determined; or
- major projects likely to occur due to existing planning policy;
- projects on the Planning Inspectorate's programme of projects; or
- projects on the Planning Inspectorate's programme of projects where a scoping report has not been submitted; or
- identified in the relevant Development Plan and emerging Development Plans, with appropriate weight given as they near adoption, recognising that there will be limited information available on the relevant proposals; or
- identified in other plans and programmes, as appropriate, which set the framework for future development consents or approvals, where such development is reasonably likely to come forward.

> beyond 10km of the Proposed Development, any other Battery Energy Storage System (BESS) or Solar Farm Schemes:

- within Nottinghamshire or Lincolnshire: and
- that have a capacity of at least 10MW; and
- a development area of greater than 20 Hectares (ha)[9]; and
- where the application was submitted within the past 5 years; and
- that have planning permission (or development consent) but are not yet built; or
- schemes where a planning application (or DCO application) has been submitted, but a decision has not yet been made[10]; or

[9] The 20ha threshold is in accordance with the Institute of Environmental Management and Assessment (IEMA) Guide: A New Perspective on Land and Soil in Environmental Impact Assessment published in 2022, where a permanent land loss of over 20ha is considered a high magnitude of change from the baseline. It is also mandatory to consult Natural England if a proposed development is likely to cause the loss, or likely cumulative loss, of 20ha or more of Best and most Versatile (BMV) land. This threshold of 20 ha has been applied within this cumulative assessment, in the absence of other more specific guidance, such that any site occupying 20ha or greater has been considered in combination with the Proposed Development.

[10] Given the lack of quantitative detail available projects / schemes where no planning application has been submitted, i.e. the Teir 2 and 3 projects.

- Any other major projects identified through consultation with LPAs.

18.3.22 The Long List of 109 Other Developments is presented in **ES Volume 3, Appendix 18.2: Other Development Long List Stages 1 and 2 [EN010159/APP/6.21]** and **ES Volume 3, Figure 18.1: Biodiversity Spatial Zone of Influence [EN010159/APP/6.20]**. The Long List also identifies where the other existing and, or approved developments are expected to be completed before construction of the Proposed Development and therefore considered as part of both the construction and operational assessment for the Proposed Development, i.e. the future baseline.

Stage 2 Establishing a shortlist of other existing and, or approved development

18.3.23 The distance and / or location of each of the Other Developments set out in the Long List, from the Proposed Development was reviewed against the ZoI defined for each environmental aspect as set out in **Table 18.2**. This measurement was taken as the closest point of the Order Limits and the centre point of the Other Development. Where the Other Development under consideration was spatially located beyond the ZoI it was no longer considered relevant to the CEA for that environmental aspect and was effectively screened or sifted out from further assessment given it would be unlikely to give rise to any significant environmental effects in combination with the Proposed Development. This exercise is presented within **ES Volume 3, Appendix 18.2: Other Development Long List Stages 1 and 2 [EN010159/APP/6.21]**.

18.3.24 Where Other Developments remain within the spatial ZoI, Stage 2 as presented within **ES Volume 3, Appendix 18.2: Other Development Long List Stages 1 and 2 [EN010159/APP/6.21]**, considered the following in respect of the relevant environmental aspect to support the use professional judgement thereby allowing the creation of a Short List of Other Developments:

- The temporal scope of the Proposed Development – i.e. the relative construction, operation and decommissioning programmes of the Other Development, and that of the Proposed Development to establish whether there is overlap and any potential for interaction.
- The scale and nature of Development – i.e. if the Other Development and the Proposed Development are likely to interact.
- Other factors – these are defined on a case-by-case basis and are set out within **ES Volume 3, Appendix 18.2: Other Development Long List Stages 1 and 2 [EN010159/APP/6.21]**.

18.3.25 The Short List is presented in **Table 18.3** and by **ES Volume 3, Figure 18.3: Land and Soils – Land and Groundwater Spatial Zone of Influence [EN010159/APP/6.20]**.

Stage 3 Information Gathering

18.3.26 For each of the Other Developments on the defined Short List the following information was sought using publicly available information to inform the Stage 4 assessment:

- Proposed design and location information.
- Proposed programme of construction, operation and decommissioning.
- Environmental assessments that set out baseline data and effects arising from the other existing and, or approved development.

18.3.27 Where relevant this information is presented in **Table 18.3.**

Stage 4 Assessment

18.3.28 Stage 4 comprises the assessment of the cumulative effects between the Proposed Development with each of the Other Developments identified within the Short List using the information gathered in Stage 3. This assessment is undertaken individually with the Other Developments, and where appropriate of all Other Developments collectively.

18.3.29 Negligible effects from the Proposed Development are excluded from the cumulative assessment, as these effects are generally minimal or imperceptible and are not anticipated to contribute to or elevate the impacts of the effects associated with Other Developments.

18.3.30 In cases where the Proposed Development generates minor, moderate, or major effects with the potential to interact with impacts from Other Developments, a statement clarifying whether the cumulative effect differs from the effect attributed to the Proposed Development is provided. Where the cumulative effect differs to the effect of the Proposed Development in isolation, the significance of the cumulative effect is identified.

18.3.31 The criteria for determining the significance of any cumulative effects is based upon the assessment methodology established for the particular environmental aspect and also the:

- Duration of effect (temporary or permanent);
- Extent of effect (geographical area);
- Type of effect (additive or synergistic);
- Frequency of the effect;
- Value and resilience of the receptor affected; and
- Likely success of mitigation.

18.3.32 The measures envisaged to avoid, prevent, reduce, offset any identified cumulative effects, are provided. The means of monitoring where required and securing the delivery of these measures is explained where relevant.

18.3.33 Where the assessment of BMV is conducted, this is a collective assessment for Other Developments within a county, rather than against each of the individual Other Developments. Further details of this are set out in the Summary of the Proposed Development's Potentially Significant Inter-Project Cumulative Effects.

18.4 Intra-Project Effects Assessment

18.4.1 Consideration of the receptors against which the Intra-project assessment has been undertaken for significant and no significant effects is presented within **ES Volume 3, Appendix 18.1: Intra-project Effects Assessment [EN010159/APP/6.21]**. This indicates that the effects arising from the Proposed Development in isolation that are deemed not significant, would not in combination give rise to significant environmental effects. As noted within the methodology, only where the individual aspect assessments have identified an adverse effect that is significant, are they taken into account.

18.4.2 The following is a summary of the assessment with regard to the effects of the Proposed Development were deemed to be significant.

Construction and Decommissioning

18.4.3 This section presents the intra-project effects assessment and identifies the potential for effect interactions throughout construction works, and decommissioning. In respect of construction and decommissioning the significant environmental effects identified by the Proposed Development in isolation are:

In respect of Cultural Heritage:

- An indirect, temporary local effect of moderate significance to the setting of Pigeoncote and Attached Stable Blocks and Outbuilding at Hall Farm;
- An indirect, temporary local effect of minor significance to the setting of Manor House;
- An indirect, temporary local effect of moderate to major significance to the setting of Whimpton Moor medieval village and moated site;
- An indirect, temporary local effect of moderate to major significance to the setting of Church of St Gregory (grouping);
- An indirect, temporary local effect of moderate significance to the setting of Roman Vexillation Fortress;
- An indirect, temporary local effect of moderate to major significance to the setting of Church of St Leonard (grouping);

- An indirect, temporary local effect of moderate to major significance to the setting of Ragnall House, Barn At Ragnall Stables;
- An indirect, temporary local effect of moderate to major significance to the setting of Ragnall Hall And Attached Outbuildings;
- An indirect, temporary local effect of moderate significance to the setting of Skegby Manor and Pigeoncote;

In respect of Landscape and Visual:

- Construction
  - A direct, short term adverse effect of major significance to the Site's landscape character;
  - Direct, short term adverse effects of moderate to major significance to the landscape character of published landscape character areas (ENS PZ 01: North Clifton Village Farmlands; TW PZ 20: Dunham on Trent Village Farmlands; TW PZ 44: Fledborough Holme River Meadowlands; MNF PZ 09: East Drayton; MNF PZ 12: Normanton-On-Trent);
  - Direct, short term adverse effects of moderate to major significance to the landscape character of published landscape character areas (Fledborough; North Clifton; Ragnall; Skegby);
  - Direct, short term adverse effects of moderate to major significance to selected viewpoints;
- Decommissioning
  - A direct, short term adverse effect of major significance to the Site's landscape character;
  - Direct, short term adverse effects of moderate significance to the landscape character of published landscape character areas (ENS PZ 01: North Clifton Village Farmlands; TW PZ 20: Dunham on Trent Village Farmlands; TW PZ 44: Fledborough Holme River Meadowlands; MNF PZ 09: East Drayton; MNF PZ 12: Normanton-On-Trent);
  - Direct, short term adverse effects of moderate to major significance to the local village character areas (Fledborough);
  - Direct, short term adverse effects of moderate to major significance to selected viewpoints;

18.4.4 Where the setting of designated cultural heritage assets is affected during construction, this relates to the same impacts as for landscape and visual, with the asset forming a component of the landscape character and / or visual amenity considered. As such, the cumulative interaction is already considered.

18.4.5 In conclusion, there would be no significant intra-project cumulative effects during construction or decommissioning.

Operation

18.4.6 This section presents the in-combination effects assessment and identifies the potential for effect interactions once the Proposed Development is operational. As noted within the methodology, only where the individual aspect assessments have identified an adverse effect that is significant, are they taken into account. In respect of operation these are:

In respect of Landscape and Visual:

- At Year 1
  - Direct, short term major adverse effects to limited number of people travelling along the PRoW network that pass adjacent to or through the Order Limits, short sections of the local road network, as well as residents of isolated farmsteads to the east of the A1133;
  - Direct, short term adverse effects of moderate to major significance to the landscape character of published landscape character areas (ENS PZ 01: North Clifton Village Farmlands; TW PZ 20: Dunham on Trent Village Farmlands; MNF PZ 09: East Drayton; MNF PZ 12: Normanton-On-Trent);
  - Direct, short term adverse effects of moderate to major significance to selected viewpoints;
- At Year 15
  - Direct, long term moderate adverse effects to limited number of people travelling along the PRoW network that pass adjacent to or through the Order Limits, short sections of the local road network, as well as residents of isolated farmsteads to the east of the A1133.
  - Direct, short term adverse effects of moderate significance to the landscape character of published landscape character areas (ENS PZ 01: North Clifton Village Farmlands; TW PZ 20: Dunham on Trent Village Farmlands);
  - Direct, short term adverse effects of moderate to major significance to the local village character areas (Fledborough);
  - Direct, long term adverse effects of moderate to major significance to selected viewpoints;

In respect of cultural heritage:

- Indirect long term, local adverse effect of moderate significance to the setting of Whimpton Moor Medieval Village;

- Indirect, local adverse effect of moderate significance in the medium term to the setting of the Church of St Leonard (grouping);
- Indirect, local adverse effect of moderate significance in the medium term to the setting of Ragnall House Barn at Ragnall Stables;
- Indirect, local adverse effect of moderate significance in the medium term to the setting of Ragnall Hall and Attached Outbuildings;

18.4.7 Where the setting of designated cultural heritage assets is affected during construction, this relates to the same impacts as for landscape and visual, with the asset forming a component of the landscape character and / or visual amenity considered. As such, no cumulative interaction not already considered, would arise.

18.4.8 In conclusion, there would be no significant intra-project cumulative effects during operation.

18.5 Inter-Project Effects Assessment

18.5.1 The Short List defined in Stage 2 (Other Developments which fall within the ZoI) is presented within **Table 18.3**, along with the additional information defined in Stage 3 and the assessment as defined by Stage 4.

18.5.2 As indicated within the methodology at Stages 3 and 4, each of the Other Developments were considered in respect of the aspects with regard to any overlap in temporal scope; the scale and nature of development and the potential effects of the Proposed Development along with embedded environmental measures.

18.5.3 Consideration of potentially significant cumulative effects of the Proposed Development and the forthcoming application for the expansion of the High Marnham substation is presented separately to **Table 18.3**.

Table 18.3 Inter-Project Cumulative Effects Assessment

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
Landscape and Visual				
14	**23/00801/FUL** Proposed Construction and Operation of An 8 MW Electrolytic Green Hydrogen Production Plant, with Associated Infrastructure Including HGV and Multi Cylinder Pack (MCP) Loading Areas, Vehicle Maintenance Unit, Staff Welfare Facilities and Control Room, 11KV Customer Sub-Station, Boundary Fencing, Internal Access Roads, Landscaping, External Lighting and Works.	The construction and operation of the Proposed Development and Other Development would both have direct effects on the character of the MNF PZ 12: Normanton on Trent. Both schemes would also have the potential to be experienced by residents of High Marnham, Normanton on Trent, Ragnall, North Clifton, and South Clifton, as well as users of the Trent Valley Way, NCN Route 647, and users of Fledborough Road. Landscape With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a High magnitude of change on MNF PZ 12: Normanton on Trent at construction, and a Low magnitude of change at year 15 of operation. The magnitude of change for Other Development ID 14 on MNF PZ 12 is given in the respective LVIA as Negligible at both construction and operation. Visual With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a Low magnitude of change on residents of High Marnham at construction, and no effect at year 15 of operation.	N/A	**No significant cumulative effect interaction would be anticipated, and the effect would remain as with the Proposed Development in isolation.**

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
		The magnitude of change for Other Development ID 14 on residents of High Marnham is given in the respective LVIA as Negligible at both construction and operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a Low magnitude of change on residents of Normanton on Trent at construction, and Very Low at year 15 of operation. The magnitude of change for Other Development ID 14 on residents of Normanton on Trent is given in the respective LVIA as no effect at both construction and operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a Medium magnitude of change on residents of Ragnall at construction, and Very Low at year 15 of operation. The magnitude of change for Other Development ID 14 on residents of Ragnall is given in the respective LVIA as no effect at both construction and operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a Medium magnitude of change on residents of North Clifton at construction, and Medium at year 15 of operation. The magnitude of change for Other Development ID 14 on residents of North Clifton		

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
		is given in the respective LVIA as no effect at both construction and operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a no effect on residents of South Clifton at both construction and year 15 of operation. The magnitude of change for Other Development ID 14 on residents of South Clifton is given in the respective LVIA as no effect at both construction and operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a Medium magnitude of change on users of the Trent Valley Way at construction, and a Very Low magnitude of change at year 15 of operation. The magnitude of change for Other Development ID 14 on users of the Trent Valley Way is given in the respective LVIA as Negligible at both construction and operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a Low magnitude of change on users of the NCN Route 647 at construction, and a Very Low magnitude of change at year 15 of operation. The magnitude of change for Other Development ID 14 on users of the NCN Route 647 is given in the respective LVIA as Low at both construction and operation.		

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
		With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a High magnitude of change on users of Fledborough Road at construction, and a Low magnitude of change at year 15 of operation. The magnitude of change for Other Development ID 14 on users of Fledborough Road is given in the respective LVIA as no effect at both construction and operation. <u>Conclusion</u> Given the scale of the Other Development relative to the Order Limits and the fact the Other Development is encompassed by the Order Limits, it is considered that at construction and operation (year 15) there would be no notable difference between the landscape and visual effects of the Proposed Development, and the cumulative landscape and visual effects of the Proposed Development in addition with Other Development ID 14.		

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
26	**20/02225/ELE** Proposed sub station	The construction and operation of the Proposed Development and Other Development would both have direct effects on the character of the East Nottinghamshire Sandlands Policy Zone 02: Wigsley Village Farmlands with Plantations (ENS PZ 02). However, given the relatively high woodland cover around Thorney, it is unlikely that both the schemes would be experienced together by the same visual receptors. The Other Development ID 26 constitutes permitted development and as such it has been established that it will generate no significant effects on the environment. <u>Conclusion</u> Given the scale of the cumulative site relative to the Order Limits and the fact the Other Development is largely consumed by the settlement edge of Thorney with little intervisibility between the two schemes, it is considered that at construction and operation (year 15) there would be no notable difference between the landscape and visual effects of the Proposed Development, and the cumulative landscape and visual effects of the Proposed Development in addition with Other Development ID 26.	N/A	**No significant cumulative effect interaction would be anticipated, and the effect would remain as with the Proposed Development in isolation.**

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
27	**21/01577/FULM** Installation of a solar farm and battery storage facility with associated infrastructure.	The construction and operation of the Proposed Development and Other Development would both have direct effects on the character of the Mid-Nottinghamshire Farmlands Policy Zone 12: Normanton on Trent. Both schemes would also have the potential to be experienced by residents of Skegby, residents of High Marnham, residents of isolated farmsteads, users of NCN Route 647, and users of A6075 Darlton Road. <u>Landscape</u> With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a High magnitude of change on MNF PZ 12: Normanton on Trent at construction, and a Low magnitude of change at year 15 of operation. The magnitude of change for Other Development ID 27 on MNF PZ 12 is given in the respective LVIA as Low at both construction and operation. <u>Visual</u> With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a High magnitude of change on residents of Skegby at construction, and a Low magnitude of change at year 15 of operation. The magnitude of change for Other Development ID 27 on residents of Skegby is given in the respective LVIA as Medium at construction, and Low at operation.	N/A	**A moderate to major adverse cumulative effect interaction (significant) would arise for construction and operation respectively to the landscape character of MNF PZ 12.**

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
		With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a Low magnitude of change on residents of High Marnham at construction, and no effect at year 15 of operation. The magnitude of change for Other Development ID 27 on residents of High Marnham is given in the respective LVIA as Medium at construction, and no effect at operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a Low magnitude of change on users of the NCN Route 647 at construction, and a Very Low magnitude of change at year 15 of operation. The magnitude of change for Other Development ID 27 on users of the NCN Route 647 is given in the respective LVIA as Very Low at both construction and operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a Very Low magnitude of change on users of Darlton Road (A6075) at construction, and no effect at year 15 of operation. The magnitude of change for Other Development ID 27 on users of Darlton Road (A6075) is given in the respective LVIA as Very Low at both construction and operation.		

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
		With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a varied magnitude of change on residents of isolated farmsteads, from no effect (Ruddings Farm), Very Low (Mount Pleasant Farm, and Low (Wells Farm / Woodcotes) at construction, and from no effect (Ruddings Farm and Mount Pleasant Farm) to Very Low (Wells Farm) at year 15 of operation. The magnitude of change for Other Development ID 27 on residents of isolated farmsteads given varied judgements in the respective LVIA from Very Low (Wells Farm / Woodcotes), Low (Mount Pleasant Farm), and High (Ruddings Farm) at construction, and Very Low (Wells Farm / Woodcotes), Low (Mount Pleasant Farm), and Medium (Ruddings Farm) at operation. <u>Conclusion</u> With regard to MNF PZ 12, the addition of the Other Development ID 27 with the Proposed Development would noticeably increase the extent over which changes to the landscape character would be perceived at both construction and operation, extending across the south-western area of the PZ. At construction, this would likely result in a High magnitude of change which assessed against the Medium sensitivity of the PZ would result in Major adverse effect, which is significant. At operation, this would likely result in a Medium magnitude of change which assessed against the Medium sensitivity of the PZ would result in a Moderate adverse effect, which is significant.		

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
		Otherwise, it is considered that at construction and operation (year 15) there would be no notable difference between the other landscape and visual effects of the Proposed Development, and the cumulative landscape and visual effects of the Proposed Development in addition with Other Development ID 27.		
50	**EN020034** North Humber to High Marnham	The construction and operation of the Proposed Development and Other Development would both have direct effects on the character of the Regional LCT 3a: Floodplain Valley and Regional LCT 4a Unwooded Vales. Both schemes would also have the potential to be experienced by residents of High Marnham, Skegby, Fledborough, Ragnall, Darlton and East Drayton, as well as users of NCN Route 647, and local PRoW. Users of the A57, Fledborough Road and other local roads would also have the potential to experience views of the two schemes. The EIA Scoping Report associated with Other Development ID 50 did not provide an appraisal of receptors but concluded that there was potential for significant effects on regional LCTs and residents of local communities and individual properties, as well as people engaged in recreational activities within the respective study area. <u>Conclusion</u>	N/A	**A moderate to major adverse cumulative effect interaction (significant) would arise for construction and operation respectively to the visual amenity of users of PRoW to the south of East Drayton.**

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
		With regard to users of public rights of way to the south of East Drayton, the addition of the Other Development ID 50 with the Proposed Development would noticeably increase the extent over which changes to the visual amenity would be perceived at both construction and operation, extending across a larger portion of the view and within a closer distance. At construction, this would likely result in a High magnitude of change which assessed against the Medium sensitivity of the users of local PRoW would result in Major adverse effect, which is significant. At operation, this would likely result in a Medium magnitude of change which assessed against the Medium sensitivity of the users of local PRoW would result in a Moderate adverse effect, which is significant. Otherwise, it is considered that at construction and operation (year 15) there would be no notable difference between the other landscape and visual effects of the Proposed Development, and the cumulative landscape and visual effects of the Proposed Development in addition with Other Development ID 50.		

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
55	**24/00717/SCR** Screening Opinion - Proposed Battery Energy Storage Systems (BESS) Substation and Associated Infrastructure and Works	The construction and operation of the Proposed Development and Other Development would both have direct effects on the character of the Mid-Nottinghamshire Farmlands Policy Zone 12: Normanton on Trent. Both schemes would also have the potential to be experienced by residents of High Marnham, Low Marnham and Normanton on Trent, as well as users of NCN Route 647, and users of Fledborough Road. The EIA Screening Request associated with Other Development ID 55 did not provide an appraisal of receptors but concluded that impacts would be limited by topography and intervening vegetation, and that the existing landscape would be protected through enhanced screening and biodiversity improvements. The respective EIA Screening Opinion also concluded that the scheme would not be likely to have significant environmental effects by virtue of its nature, size and location. <u>Conclusion</u> Given the scale of the cumulative site relative to the Order Limits and the fact the Other Development is encompassed by the Order Limits, it is considered that at construction and operation (year 15) there would be no notable difference between the landscape and visual effects of the Proposed Development, and the cumulative landscape and visual effects of the Proposed Development in addition with Other Development ID 55.	N/A	**No significant cumulative effect interaction would be anticipated, and the effect would remain as with the Proposed Development in isolation.**

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
57	**24/00735/SCR** Screening Opinion - Proposed Battery Energy Storage System (BESS) and Associated Plant and Equipment	The Other Development ID 57 comprises two land parcels to the north of the Order Limits. The second land parcel falls within the 2km LVIA study area and is proposed as compensatory flood mitigation in lieu of changes arising from the proposed BESS development within the first land parcel, which is located outside of the 2km LVIA study area. The construction and operation of the Proposed Development and Other Development (second land parcel only) would both have direct effects on the character of the Mid-Nottinghamshire Farmlands Policy Zone 09: East Drayton (MNF PZ 09). Both schemes would also have the potential to be experienced by residents of Laneham and residents of Dunham-on-Trent. The EIA Screening Request associated with Other Development ID 57 did not provide an appraisal of receptors but concluded that there would be no significant landscape and visual effects arising from the flood compensation area. The respective EIA Screening Opinion also concluded that the compensatory flood management works is not EIA development i.e. it would not give rise to significant environmental effects. <u>Conclusion</u> Given the scale of the cumulative site relative to the Order Limits and the fact the relevant land parcel of the Other Development only involves flood compensation works i.e. no built form or structures, it is considered that at construction and operation (year 15) there would be no notable difference between the landscape and visual effects of the Proposed Development, and the cumulative landscape and visual effects of the Proposed Development in addition with Other Development ID 57.	N/A	**No significant cumulative effect interaction would be anticipated, and the effect would remain as with the Proposed Development in isolation.**

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
81	**24/01240/SCR** Screening Request - Battery Energy Storage System (BESS) - Regulation 6 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017	The Other Development ID 81 is similar to Other Development ID 57, albeit the red line boundary has been extended to include more land area. As with Other Development ID 57, it is the second land parcel that falls within the 2km LVIA study area and is proposed as compensatory flood mitigation in lieu of changes arising from the proposed BESS development within the first land parcel, which is located outside of the 2km LVIA study area. The construction and operation of the Proposed Development and Other Development (second land parcel only) would both have direct effects on the character of the Mid-Nottinghamshire Farmlands Policy Zone 09: East Drayton (MNF PZ 09). Both schemes would also have the potential to be experienced by residents of Laneham and residents of Dunham-on-Trent. The EIA Screening Request associated with Other Development ID 81 did not provide an appraisal of receptors but concluded that there would be no significant landscape and visual effects arising from the flood compensation area. The respective EIA Screening Opinion also concluded that the compensatory flood management works is not EIA development i.e. it would not give rise to significant environmental effects. <u>Conclusion</u> Given the scale of the cumulative site relative to the Order Limits and the fact the relevant land parcel of the Other Development only involves flood compensation works i.e. no built form or structures, it is considered that at construction and operation (year 15) there would be no notable difference between the landscape and visual effects of the Proposed Development, and the cumulative landscape and visual effects of the Proposed Development in addition with Other Development ID 81.	N/A	**No significant cumulative effect interaction would be anticipated, and the effect would remain as with the Proposed Development in isolation.**

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
83	**24/01138/FUL** Battery Energy Storage System, Substation, Associated Infrastructure and Works	The construction and operation of the Proposed Development and Other Development would both have direct effects on the character of the MNF PZ 12: Normanton on Trent. Both schemes would also have the potential to be experienced by residents of Skegby, Normanton on Trent, High Marnham and Low Marnham, as well as users of the NCN Route 647. The users of local roads would also have the potential to be experience views of both schemes, including those travelling along Skegby Road, Fledborough Road, and Tuxford Road. <u>Landscape</u> With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a High magnitude of change on MNF PZ 12: Normanton on Trent at construction, and a Low magnitude of change at year 15 of operation. The magnitude of change for Other Development ID 83 on MNF PZ 12 is given in the respective LVIA as Very Low at both construction and at year 15 of operation. <u>Visual</u> With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a High magnitude of change on residents of Skegby at construction, and a Low magnitude of change at year 15 of operation.	N/A	**No significant cumulative effect interaction would be anticipated, and the effect would remain as with the Proposed Development in isolation.**

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
		The magnitude of change for Other Development ID 83 on residents of Skegby is given in the respective LVIA as Medium at construction, and Medium to Low at year 15 of operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a Low magnitude of change on residents of Normanton on Trent at construction, and Very Low at year 15 of operation. The magnitude of change for Other Development ID 83 on residents of Normanton on Trent is given in the respective LVIA as Low at both construction and at year 15 of operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a Low magnitude of change on residents of High Marnham at construction, and no effect at year 15 of operation. The magnitude of change for Other Development ID 83 on residents of High Marnham is given in the respective LVIA as Low at both construction and year 15 of operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a Low magnitude of change on residents of Low Marnham at construction, and Very Low at year 15 of operation.		

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
		The magnitude of change for Other Development ID 83 on residents of Low Marnham is given in the respective LVIA as Low at both construction and year 15 of operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a Low magnitude of change on users of the NCN Route 647 at construction, and a Very Low magnitude of change at year 15 of operation. The magnitude of change for Other Development ID 83 on users of the NCN Route 647 is given in the respective LVIA as High to Medium at construction and Medium at year 15 operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a High magnitude of change on users of Skegby Road at construction, and a Low magnitude of change at year 15 of operation. The magnitude of change for Other Development ID 83 on users of Skegby Road is given in the respective LVIA as Medium at construction and Medium to Low at year 15 of operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in a High magnitude of change on users of Fledborough Road at construction, and a Low magnitude of change at year 15 of operation.		

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
		The magnitude of change for Other Development ID 83 on users of Fledborough Road is given in the respective LVIA as Medium at construction and Medium to Low at year 15 of operation. With reference to **ES Volume 2, Chapter 11: Landscape and Visual [EN010159/APP/6.11]**, it is anticipated that the Proposed Development would result in no effect on users of Tuxford Road at both construction and at year 15 of operation. The magnitude of change for Other Development ID 83 on users of Tuxford Road is given in the respective LVIA as Low at both construction and at year 15 of operation. <u>Conclusion</u> Given the scale of the cumulative site relative to the Order Limits and the fact the Other Development is encompassed by the Order Limits, it is considered that at construction and operation (year 15) there would be no notable difference between the landscape and visual effects of the Proposed Development, and the cumulative landscape and visual effects of the Proposed Development in addition with Other Development ID 83.		
Cultural Heritage				

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
6	**21/01735/COU** Full Planning Application for Change of Use From Greyhound Centre Track for the Siting of 16 Lodges for Holiday Use, Construction of a Lake with Centre Island and Associated Landscaping. The lodges would be at a minimum distance of c.139 meters to the north of the Site boundary and positioned around the proposed circular lake which broadly tracks the former greyhound centre track. The lodges would be set back from the A57 beyond existing built form which relates to Field House Farm and be accompanied by 75 new trees with an initial planting size of 250 – 300mm in height.	The Proposed Development has been assessed as having an adverse effect of major - moderate significance with regard to the setting of Whimpton Moor Scheduled Monument during construction and a moderate adverse effect once operational. Based on the ZTV, the Other Development would not be seen within the context of the Proposed Development nor the informative setting of Whimpton Moor Scheduled Monument or Whimpton House (Grade II). The existing built form within Field House Farm and the existing dense vegetation would limit or prevent views of the lodges from within the setting of the mentioned assets. During consultation with the host authorities, this Other Development was not considered by Officers to harm the setting of the Whimpton Moor Scheduled Monument or Whimpton House and would be sufficiently distanced and screened as to not compound the effects of the Proposed Development. As such, it is concluded that no significant cumulative effect interaction would be anticipated.	N/A	**No significant cumulative effect interaction would be anticipated, and the effect would remain as with the Proposed Development in isolation.**

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
69	**WL/2024/00123** Planning application for extension to existing water treatment works including the installation a new vehicle access, the erection of a nitrate buildings, salt and brine tanks and other associated infrastructure including connecting pipework, landscaping and fencing. The proposed 8m tall tanks proposed within WL/2024/00123 are to be finished in green to match the existing WTW and surroundings, whilst a wildflower seeded landscaped bund is proposed to the north, and a new native species hedgerow to the east. Buffer zones of wildflower meadows and native grassland are proposed to the southwest of the WL/2024/00123 application Site.	The location of this Other Development is outside of the Order Limits, but within proximity, and near to the Scheduled Monument of the Roman Vexillation Fortress and Royal Observer Corps Monitoring Post. The Officer's Response to the Other Development application noted that the scheme would impact the setting of the Schedule Monument *"…but not adversely in the context of the existing WTW"*. In **ES Volume 2, Chapter 10: Cultural Heritage [EN010159/APP/6.10]**, the Proposed Development is assessed as having a minor neutral effect on the setting of the Scheduled Monument. Given this cumulative scheme is not anticipated to cause adverse effects and there would be limited interrelationship between this scheme and the Proposed Development due to the distance between them / the topography, there is unlikely to be any additive or synergistic cumulative impact on the setting of this heritage asset.	N/A	**No significant cumulative effect interaction would be anticipated, and the effect would remain as with the Proposed Development in isolation.**

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
Human Health[11]				
50	**EN020034** North Humber to High Marnham	A Health Impact Assessment has not yet been submitted meaning it is not possible to make a quantitative assessment. This Other Development includes a new high voltage electricity transmission line which will increase electricity transmission capabilities between the north of England and the Midlands. There would be an increase in the contribution towards energy infrastructure and supporting the grid network's transition towards cheaper, cleaner and more secure forms of energy, having positive wider societal effects for public health. **ES Volume 3, Appendix 2.4: Electro-Magnetic Fields Impact Report [EN010159/APP/6.21]** discusses the potential for cumulative electro-magnetic field exposure due to interactions between the underground export cabling and existing National Grid overhead lines. These effects would also apply to the proposed new high voltage electricity transmission line but the location and design of this scheme has not been finalised as the project is still in the early design stages.	If the final electricity transmission line passes over the underground export cabling of the Proposed Development, it should not be located near to PRoWs or residential properties so that magnetic field strengths would remain below the ICNIRP reference level of 100 microteslas (μT).	***It is unlikely that a cumulative effect will arise as the Proposed Development (and Other Development)***

[11] It is assumed that all cumulative schemes will adhere with industry best practice and the cumulative effects associated with human health covered in the hydrology and hydrogeology, climate change, land and soils, landscape and visual, transport and access, air quality, noise and vibration and socio-economics sections of this chapter are not duplicated.

ID	Other Development Ref and Description	Assessment of Cumulative Effect with Proposed Development	Proposed mitigation applicable to Proposed Development including any apportionment	Cumulative effect
				Will be subject to further design and assessment, along with the commitment to suitable mitigation (such as the Export Cable Route Construction Method Statement EN010159/APP/7.13).

Collective Assessment of Inter-Project Effects – Land and Agricultural Use

18.5.4 For land and the agricultural use of this land, as indicated within the Stage 4 methodology section the assessment of BMV is only considered collectively in respect of a county, rather than individually against each Other Development. As the Proposed Development is situated in both Nottinghamshire and Lincolnshire, individual county assessments are presented, as well as for the two counties combined.

18.5.5 An extract of the regional plan of Agricultural Land Classification (East Midlands Region)[12] has been used to map the Order Limits / Red Line Boundaries for each of the Other Developments, where available (see **ES Volume 2, Figure 18.9: Best and Most Versatile (BMV) Agricultural Land and Other Developments [EN010159/APP/6.20]**).

18.5.6 In England, agricultural land represents between 69% and 70% of the total land within the country. Natural England estimates that around 42% of agricultural land within England is of BMV quality (with a roughly even split of 21% as Grades 1 and 2 and 21% Grade 3a (as quoted in TIN049)). The 'county scale' BMV soils maps available are the Provisional ALC maps which do not differentiate between Grade 3a and Grade 3b. Therefore, accurately estimating the BMV for Lincolnshire and Nottingham is difficult. The proportion of BMV in Lincolnshire is estimated to be around 71.2%, which is significantly above the national average. Assuming an even split of Grade 3a and Grade 3b land within the mapped areas of Grade 3 land shown on the ALC Map for the East Midlands (Natural England, 2010), the proportion of BMV in Nottinghamshire is calculated to be approximately 49.0%, which is also significantly higher than the national average. Therefore, in the context of the counties where the Proposed Development will be located, BMV land is abundant.

18.5.7 The percentage of agricultural land within Lincolnshire was approximately 73.7% of the total land area (based on data from 2022). For Nottinghamshire, this percentage was approximately 85%[13].

18.5.8 The area of BMV agricultural land within Lincolnshire is estimated to be in the region of 402,900 ha. The area of BMV agricultural land within Nottinghamshire is estimated to be over 105,700 ha.

18.5.9 The land within the Order Limits that is classified as BMV land occupies 660.9 ha. Of this, approximately 123.48 ha will be permanently removed from agricultural land use (for ecological enhancement areas), and 571.05 ha will be used

[12] East Midlands Region 1:250,000 Series Agricultural Land Classification. Natural England, 2010. Map reference 10.111e. Available at: https://publications.naturalengland.org.uk/publication/143027?category=5954148537204736

[13] Official Statistics, Land use statistics: England 2022, Published 27 October 2022. Available at: https://www.gov.uk/government/statistics/land-use-in-england-2022/land-use-statistics-england-2022

temporarily (for solar PV infrastructure, substation and BESS sites) and will return to agricultural land use after the operational stage of the Proposed Development.

18.5.10 A large number of other developments being considered are also solar farm developments, therefore the majority of land used within these schemes will be out of agricultural land use temporarily, and will be returned to agricultural use at the end of the operational period for the scheme. Therefore, after the operational stage of the Proposed Development, inter-project cumulative effects are considered minimal in the context of the remaining BMV available at a county level. Of the projects that have been considered in this cumulative development assessment, approximately 174.13 ha of land will be permanently taken out of agricultural land use within Lincolnshire and Nottinghamshire, by projects such as residential developments and quarry extensions.

18.5.11 Without the Proposed Development, if all other proposed developments for both temporary and permanent use on agricultural land were to be undertaken the total loss of BMV land within Nottinghamshire would be 2,186.09 ha (0 ha Grade 1, 35.3 ha Grade 2 and 2,150.79 ha Grade 3a). When the Proposed Development is added, the cumulative total is 2,718.00 ha which is 2.57% of the BMV within the county.

18.5.12 Without the Proposed Development, if all other proposed development for both temporary and permanent use on agricultural land were to be undertaken the total loss of BMV land within Lincolnshire would be 6,915.77 ha (436.91 ha Grade 1, 3,161.27 ha Grade 2 and 3,317.59 ha Grade 3a). When the Proposed Development is added, the cumulative total is 7,044.00 ha which is 1.75% of the BMV within the county.

18.5.13 The total BMV land take of all temporary and permanent developments considered is 10,201.86 ha which is 0.061% of the total Utilised Agricultural Area (UAA) within the UK[14]. The total BMV land take of all other developments and the Proposed Development have a combined total of 10,862.76 ha which is 0.065% of UAA. The total land take of all land, not just BMV for all other proposed developments and the Proposed Development (both temporary and permanent) is 22,064.62 ha which is 0.126% of UAA. All possible land-use changes are less than 1% at a national scale and therefore in accordance with the IEMA Guidance[15] the cumulative effects of BMV land will not be significant. .

18.5.14 The overall sensitivity of BMV land is very high (Grades 1 and 2) and high (Grade 3a) however the overall sensitivity of soil physical properties is medium due to the structural resistance of the soil. In line with the IEMA land and soil guidance[15] a

[14] https://www.gov.uk/government/publications/farming-evidence-pack-a-high-level-overview-of-the-uk-agricultural-industry/farming-evidence-key-statistics-accessible-version#:~:text=The%20UK%20agriculture%20industry%20is,than%2020%20hectares%20in%20size.

[15] Institute of Environmental Management & Assessment (IEMA) (2022) A New Perspective on Land and Soil in Environmental Impact Assessment.

permanent loss of land over 20 ha is considered to be a high magnitude, however the majority of the developments within both Lincolnshire and Nottinghamshire are within solar projects and will be returned to agricultural use at decommissioning therefore are classified as temporary land take. Impacts on BMV land has been minimised in all proposed developments design by avoiding 'hard development' on BMV land wherever possible. The vast majority of the BMV land taken within Lincolnshire and Nottinghamshire will be within the PV Array areas. Within this area soil will be managed and given the opportunity to improve overall soil quality during the operation phase by reduced agricultural pressure and potential grazing in some proposed developments. Therefore, at a regional scale the inter-project cumulative effects are considered minimal in the context of the remaining BMV available.

18.5.15 During construction, operation (including maintenance) and decommissioning soils will be managed in accordance with the **Outline Soil Management Plan [EN010159/APP/7.10]** (oSMP) to prevent damage to soil structure, as well as potential damage to field drains (and subsequent effects on drainage of agricultural land). The level of information available for each of the cumulative solar DCOs is subject to the planning stage the development is at, however there would be expected to be either a commitment to follow similar principles, or similar alternative chapters and outline soil management plans, submitted as part of the applications.

18.5.16 Additionally, cable and grid connection works involve a temporary disruption to agricultural land during construction, with restoration thereafter, which again will be managed in accordance with the **Outline Soil Management Plan [EN010159/APP/7.10].** Given the extensive mitigation practices outlined within the outline soil management plans of other proposed DCO solar projects the overall cumulative impact on soil and agriculture is deemed non-significant. Especially, as although BMV land will be temporarily lost the soil quality will temporarily improve having a neutral overall effect.

Table 18.4: Summary of BMV Cumulative Assessment

Sensitivity	Magnitude	Effect	**Significance**
Very High / High	No Change	Neutral	Not Significant

18.5.17 The topic of food security has been considered as part of this assessment of cumulative effects. The UK Food Security Index 2024 has been consulted to inform this assessment[16]. Based on the research that has been undertaken, it can be seen that there is a generally stable relationship between food production in the

[16] https://www.gov.uk/government/publications/uk-food-security-index-2024/uk-food-security-index-2024

UK, and the amount of food supplied to the UK market. The dataset also indicates a degree of strengthening of food security over recent years due to improved production efficiency. With respect to applying the amount of land in agricultural use as an indicator of food security, it should be noted that this is only considered to provide a high-level view of the use of land. The research document states that there is not a direct link between the area of utilised agricultural land and the amount of food that is produced, citing the example of a decreased availability of land, combined with an increase in efficiencies, having the potential to increase overall food production. A change in land use in the range 0.05% to 5.0% is considered to be 'normal'. Based on the areas of BMV land within the Order Limits, the temporary change in land use as a result of the Proposed Development will affect 0.03% of BMV land within Lincolnshire and 0.5% of BMV land within Nottinghamshire. If all the 'reasonably foreseeable' schemes (including the Proposed Development) within Lincolnshire proceed, the change in land use would be 1.75% (including temporary and permanent schemes). The change in land use in Nottinghamshire, including the Proposed Development (for temporary and permanent schemes) would be 2.57%.

Collective Assessment of Inter-Project Effects – Landscape and Visual

18.5.18 As indicated within **Table 18.3** a significant landscape and visual cumulative effect is anticipated with the addition of Other Development ID 27 with the Proposed Development; and the addition of the Other Development ID 50 with the Proposed Development.

18.5.19 The addition of the Other Development ID 27 with the Proposed Development would noticeably increase the extent over which changes to the landscape character of MNF PZ 12 would be perceived at both construction and operation, extending across the south-western area of the PZ. At construction, this would likely result in a High magnitude of change which assessed against the Medium sensitivity of the PZ would result in Major adverse effect, which is significant. At operation, this would likely result in a Medium magnitude of change which assessed against the Medium sensitivity of the PZ would result in a Moderate adverse effect, which is significant.

18.5.20 The addition of the Other Development ID 50 with the Proposed Development would noticeably increase the extent over which changes to the visual amenity of users of PRoW to the south of East Drayton would be perceived at both construction and operation, extending across a larger portion of the view and within a closer distance. At construction, this would likely result in a High magnitude of change which assessed against the Medium sensitivity of the users of local PRoW would result in Major adverse effect, which is significant. At operation, this would likely result in a Medium magnitude of change which assessed against the Medium sensitivity of the users of local PRoW would result in a Moderate adverse effect, which is significant.

18.5.21 Otherwise, for reasons presented in **Table 18.3**, it is considered that at construction and operation there would be no notable difference between the

landscape and visual effects of the Proposed Development, and the cumulative landscape and visual effects of the Proposed Development in addition with the Other Developments assessed.

Consideration of EN020034 North Humber to High Marnham and High Marnham Sub Station Expansion

18.5.22 As indicated within **ES Volume 1, Chapter 5: Description of the Proposed Development [EN010159/APP/6.5]** the Applicant has secured a connection agreement with National Grid which will allow export and import of electricity to the proposed National Grid High Marnham Substation which is sited within the Order Limits, but outside of the ownership and control of the Applicant.

18.5.23 Separate to the Proposed Development, National Grid Electricity Transmission (NGET) are proposing to reinforce the transmission network between a new substation close to the existing Creyke Beck Substation, in Yorkshire and a new substation close to the existing High Marham Substation in Nottinghamshire. Between these two sub stations would be a new overhead 400 kilovolt (kV) electricity transmission line over a distance of approximately 90 kilometres (km). The project is listed on Planning Inspectorate's programme of projects as EN020034 North Humber to High Marnham. As indicated by the EIA Scoping Report, the DCO application does not include the proposals for the new substations and these are to be brought forward as separate applications.

18.5.24 As detailed within **Table 18.3** the inter-project effect assessment considers EN020034 North Humber to High Marnham high voltage line where is falls within the ZoI for Landscape and Visual and Human Heath and there is potential for cumulative effects to arise. Given the stage of the proposals for EN020034 North Humber to High Marnham the final preferred alignment has not yet been confirmed.

18.5.25 It is reasonable to assume that the point of connection for the Proposed Development as agreed with National Grid may alter to that of the proposed expanded substation. Although the Proposed Development the substation expansion are being brought forward independently of one another, given their proximity and potential connectivity, further cumulative assessment detail has been set out within **Table 18.4**, based on a series of assumptions. At such a time a more detailed information is made available this assessment can be revisited and updated as necessary.

18.5.26 Using publicly available information[17] the following has been established the application for the High Marnham Substation will comprise:

[17] National Grid (2024). The Great Grid update: Brinsworth to High Marnham, Project summary document. High Marnham Substation. April 2024.

- A Town and County Planning Application will be sought for approval from Bassetlaw District Council, with the application targeted for early 2025. Following which a Spring 2025 decision is anticipated with construction commencing in the summer of 2026 which the substation fully operational in the winter of 2029. A 2.5 to 3 year construction programme. The substation will be located to the west of the existing site in High Marnham;
- The substation will be Air Insulated Switch Gear (AIS);
- The compound will be approximately 490 metres x 220 metres, and include approximately 20 bays, network stability equipment, standard substation plant and control infrastructure;
- Overhead line gantries would connect the overhead cable from EN020034 North Humber to High Marnham, which would be the highest structures at approximately 12m;
- The compound would likely be surrounded by an electrified palisade fence;
- The access route is under consideration but would likely be from om Main Street, on the west side of the site, during both the construction and operational phases;
- Some temporary diversions of existing overhead lines within proximity to the substation would be necessary during construction, these would likely be in place for 3 years;
- Two additional pylons would be constructed to the north, and seven to the south. 26 existing pylons would be removed;
- The application will be supported by an Environmental Assessment Report (EAR), which will include an Ecological Appraisal, Landscape and Visual Assessment.

Table 18.4: Consideration of Potential Cumulative Effects

Environmental Aspect	Discussion
Biodiversity	**Construction** During construction there is the potential for disturbance and displacement of a variety of fauna from both the working area associated with National Grid's works and those associated with the delivery of the Proposed Development. The majority of activity for the Proposed Development and National Grid's works are within large open arable fields. Disturbance and displacement of fauna for either project will be localised and unlikely to alter the size, fitness or status of local populations of any given ecological feature. This remains the case regardless of whether or not the activities taking place are in relative proximity (i.e. in adjacent fields). For much of the construction programme it is likely that there would be adequate separation for even low level effects to be avoided. **Operation**

Environmental Aspect	Discussion
	Once both the Proposed Development and High Marnham substation are complete and operational, cumulative effects would be restricted to the potential benefit to biodiversity from the delivery of Biodiversity Net Gain. However, there is insufficient information available with regards National Grid's plans to understand whether or not the benefit would be considered significant.
Hydrology	**Construction** As with the Proposed Development a site-specific Construction Environmental Management Plan (CEMP) will ensure that potential impacts to hydrology and hydrogeology are managed and minimised as far as practicable. As such no significant cumulative effect interaction is anticipated during construction. **Operation** A site-specific Flood Risk Assessment (FRA) along with supporting Surface Water Drainage Strategy will be required and agreed with the Environment Agency (EA) and Lead Local Flood Authority (LLFA). This will demonstrate no increase to flood risk as a result of the proposals. As such no significant cumulative effect interaction is anticipated.
Land and Soils	**Construction and Operation** There is the potential for contamination from the Proposed Development to occur alongside contamination from the High Marnham substation development. The effect is not expected to be significant, assuming similar management plans are required for the High Marnham substation to prevent contamination as are required for the Proposed Development. Potential contamination of groundwater resources could occur as a result of the Proposed Development being progressed alongside High Marnham substation. However, assuming similar management plans to protect groundwater are in place for the High Marnham substation as are required for the Proposed Development, the potential risk to groundwater would not be expected to increase, and the cumulative effect on this receptor is not considered to be significant. The effect on availability of BMV land for the Proposed Development is temporary (with BMV land being available for agricultural use after decommissioning). Although the land use for the High Marnham substation is assumed to be permanent, the land area required by this other development is considerably smaller than for the Proposed Development, and therefore the cumulative inter-project effect is considered to be low adverse and not significant during construction and operation, and will be minimised further after decommissioning of the Proposed Development, resulting in a residual inter-project cumulative effect that is not significant.
Buried Heritage	**Construction**

Environmental Aspect	Discussion
	It is expected that any direct or indirect impact arising from construction activities relating to the High Marnham Substation proposals will be assessed by the relevant LPAs, and a suitable programme of archaeological investigation and mitigation will be carried out as part of the application. Therefore, it is not expected that the cumulative effect be greater than the predicted effects arising from any individual development, which will be assessed and mitigated separately, as the above measures will minimise cumulative effects with the Proposed Development on buried heritage assets Considering that the Proposed Development is only anticipated to have minor adverse effects which are not significant, and that the area adjacent to High Marham substation has already been heavily disturbed as part of the present power infrastructure, it is concluded that no significant cumulative effect interaction would be anticipated, and no additional mitigation is required.
Cultural Heritage	**Construction** The construction works and traffic routes are not currently known for the High Marnham substation proposals, and it is not yet possible to provide a detailed review of the potential impact, but the existing and historic context of assets in High Marnham, as well as distance from these heritage assets, would be relevant here. There may be additive adverse impacts, depending on the nature of demolition and construction works, however this likely would be a small change from what has been assessed thus far and would be temporary and reversible only. **Operation** The High Marnham substation proposals would stand within the Site boundaries in an area proposed for below ground cabling. This area of the Site is stated within the baseline assessment to not inform the value of any heritage assets, including that of Marnham Hall (Grade II) and Marnham Hall UPG. As such, whilst this would be a cumulative consolidation of power infrastructure, there would be no synergistic cumulative impacts on these heritage assets due to the lack of effects to identified heritage assets arising from the Proposed Development. There are unlikely to be additive cumulative impacts due to the existing context of the area already being heavily informed by the power infrastructure, both historically and currently.
Landscape and Visual	**Construction and Operation** The construction and operation of the Proposed Development and the High Marnham substation proposals would both have direct effects on the character of the Mid-Nottinghamshire Farmlands Policy Zone 12: Normanton on Trent. Both schemes would also have the potential to be experienced by residents of High Marnham, as well as people travelling along Hollowgate Lane, Main Street and National Cycle Network Route 647.

Environmental Aspect	Discussion
	An appraisal of receptors is not yet available and it is anticipated impacts would be limited by the nature of the area and the existing intervening vegetation extending from the Site, which would be retained in line with the mitigation hierarchy. Given the scale of the High Marnham substation proposals relative to the Order Limits and the fact the High Marnham substation proposals is encompassed by the Order Limits, it is considered that at construction and operation (year 15) there would be no notable difference between the residual landscape and visual effects of the Proposed Development, and the cumulative landscape and visual effects of the Proposed Development in addition with the High Marnham substation.
Transport and Access	**Construction** Traffic flows are not available for the High Marnham Substation proposals and as such it is not yet possible to provide a detailed review of the potential impact. However, construction flows are considered to be circa 100-150 movements per days. This is unlikely to result in significant cumulative impacts on the Proposed Development study area, assuming construction vehicle access is via the main A and B class road network. **Operation** Likely traffic levels are predicted to be very low and generally relate to occasional maintenance trips. No significant traffic impact will be associated with this phase.
Air Quality	**Construction** IAQM construction guidance states that with appropriate measures embedded in the CEMP (as identified by the construction dust risk assessment) there will be no significant effects. The Proposed Development will already implement the highest level of measures, therefore any potential cumulative effects will also be not significant.
Carbon and Climate Change	Refer to separate detail within **ES Volume 3, Appendix 18.4: High Marnham Substation Cumulative Carbon Emissions [EN010159/APP/6.21]**.
Noise and Vibration	**Construction** Plant and equipment requirements for the construction of the High Marnham substation are not currently known, however it is considered likely that these will involve typical construction activities such as earthworks, concreting and craneage / materials movement. Whilst it is possible that these activities could overlap with construction activities of the Proposed Development, noise and vibration impacts associated with the Proposed Development are considered at worst minor, due to the short durations of impact involved. As such, due to the short durations of noise and vibration impacts associated with the Proposed Development, it is very unlikely that cumulative impacts would occur during construction, and cumulative construction noise and vibration effects are considered not significant.

Environmental Aspect	Discussion
	Operation The main sources of operational noise associated with the Proposed Development are situated around the proposed BESS and substation compounds. As such, the receptors which are anticipated to experience greater than negligible noise impacts due to the operation of the Proposed Development are located around Ragnall, Fledborough and North Clifton. Whilst there is currently insufficient information to consider the potential noise impacts of the proposed High Marnham substation, the majority of receptors of relevance for the Proposed Development are over 1km from the proposed High Marnham site. As such, cumulative noise impacts are extremely unlikely at these receptors. The exceptions to this are receptors to the south of Fledborough, including Station House, Station Cottages and Fledborough House. These properties are all predicted to experience Negligible impacts during the day and Minor impacts during the night due to operational noise from the Proposed Development, and are all approximately 500m or more from the proposed High Marnham substation. As such, cumulative operational noise impacts are unlikely and cumulative operational noise significant effects are considered not significant.
Human Health	**Construction and Operation** During construction, the diversions of existing overhead lines within proximity to the substation may alter the visual landscape, and therefore exacerbate community anxiety and stress. There are no Public Rights of Way within the site or within its immediate surroundings, so no impacts on physical activity are expected. The location of the Substation should be at a sufficient distance (ie more than 300m away) from any residential dwellings, so that the strength of EMFs will be below the ICNIRP guidelines. Once constructed, there may also be some permanent alterations to the visual landscape of the area, which could cause anxiety within the community. However, there would be an increase in the contribution towards energy infrastructure and climate change mitigation, having positive wider societal effects for public health.
Socio-Economics	**Construction and Operation** <u>Employment</u> The high Marnham substation proposals have the potential to generate additional employment during construction and operation, of a range of technical specialisms. It will be built on the site of a former power station, so is not expected to result in the loss of any agricultural land/jobs, thus there may be a significant net increase in jobs, although no specific information is available to quantify the impacts. There is therefore the potential for significant beneficial cumulative effects on employment in the Local Area, given the positive net change also anticipated as a result of the Proposed Development. Based on the anticipated effects on employment, the scheme may also increase demand for accommodation locally during the construction phase. <u>Amenity, PRoW and Tourism</u>

Environmental Aspect	Discussion
	The high Marnham substation proposals are not expected to impact any PRoW during either construction or operation. Construction works may overlap with those of the Proposed Development, so additional cumulative effects on amenity are possible. Other potential cumulative amenity effects during operation, are possible, due to this schemes proximity to sensitive receptors in High Marnham to the south, and these are addressed further in the relevant sections: Landscape and Visual, Air Quality and Noise. This scheme has the potential to negatively impact amenity (as discussed above) and therefore tourism, specifically on visitors to the caravan park in High Marnham. This may be offset somewhat by the increased demand for accommodation during the construction phases of both the high Marnham substation proposals and the Proposed Development. The Proposed Development is not expected to have a large impact on this site during operation, given the distance and therefore lack of amenity effects, so any cumulative effects are not expected to be significant. <u>Land Use</u> The potential cumulative effects on land use (including agricultural land supply) are considered in the Land and Soils assessment. Resultant effects on jobs are discussed above, under 'Employment'.

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