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TABLES

19.0 CUMULATIVE AND COMBINED EFFECTS

19.1 Introduction

19.1.1 This chapter of the Environmental Statement (ES) provides an assessment of the potential for cumulative and combined effects to occur as a result of the Proposed Development. Cumulative and combined effects are defined as follows:

- **cumulative effects:** these occur when the environmental impacts and effects of the Proposed Development interact with those associated with other planned projects and developments located within a realistic geographical scope where environmental impacts could act together to result in a greater significance of effect on environmental resources and/or receptors; and
- **combined effects:** these are effects resulting from a single development i.e. on the Proposed Development on any one receptor that may collectively cause and effect /effects of greater significance, on environmental resources and/or receptors.

19.1.2 The assessment draws on the assessment of impacts provided in **Chapters 8 to 18** (ES Volume I – **Application Document Ref. 6.2**), and information in the public domain relating to other known developments that are proposed within the study area. This includes information on the Humber Low Carbon Pipelines proposal by National Grid Carbon, into which the Proposed Development is sited to connect, as well as other Nationally Significant Infrastructure Projects (NSIP) in the vicinity, and planning applications registered with the local planning authority that are already consented, that have not yet been constructed or begun operating.

19.1.3 The cumulative assessment does not consider developments that are already constructed and operating; such existing operational facilities are accounted for in the baseline conditions established for the main assessments reported within **Chapters 8 to 18** (ES Volume I – **Application Document Ref. 6.2**). Similarly, the assessment does not consider developments that are being constructed and would be operating in the future, prior to construction of the Proposed Development. Effects of such future operational facilities are accounted for in the future baseline conditions established for the main assessments within **Chapters 8 to 18** of this ES (ES Volume I – **Application Document Ref. 6.2**).

19.1.4 This chapter is supported by **Figure 19.1** and **19.2** (ES Volume III - **Application Document Ref. 6.4**) which illustrates the Proposed Development Site location in relation to other developments that have been considered in the cumulative effects assessment (CEA).

19.2 Legislation, Planning Policy and Guidance

19.2.1 Due to the potential for cumulative effects to occur as a result of the construction and operation (including maintenance) of the Proposed Development, a cumulative assessment has been undertaken as part of the Environmental Impact Assessment (EIA) in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('EIA Regulations') (HMSO, 2017) as amended (including as amended by the Environmental Assessments and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018 (SI 2018/1232)) and the assessment requirements of the National Policy Statement (NPS) for Energy (EN-1) (DECC, 2011).

19.2.2 The requirement for cumulative and combined effects assessments is stated in the EIA Regulations, as detailed below:

- Schedule 4 Part 5 of the EIA Regulations (HMSO, 2017) requires: *'A description of the likely significant effects of the development on the environment resulting from, inter alia […] (e) 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'*. The EIA Regulations state that this description of likely significant effects *"should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development'*;
- Paragraph 4.1.3 of the Overarching National Policy Statement (NPS) for Energy (EN-1) (DECC, 2011) states that:

  'In considering any proposed development, and in particular when weighing its adverse impacts against its benefits, the Infrastructure Planning Commission [now the Planning Inspectorate] should take into account:

  - *its potential benefits including its contribution to meeting the need for energy infrastructure, job creation and any long-term or wider benefits; and*
  - *its potential adverse impacts, including any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts';*
- Paragraph 4.2.5 of NPS EN-1 goes on to state that when considering cumulative effects, *'the Environmental Statement (ES) should provide information on how the effects of the applicant's proposal would combine and interact with the effects of other development (including projects for which consent has been sought or granted, as well as those already in existence). The IPC may also have other evidence before it, for example from appraisals of sustainability of relevant NPSs or development plans, on such effects and potential interactions. […]';* and

- Paragraph 4.2.6 of NPS EN-1 states that consideration should be given to *'how the accumulation of, and interrelationship between, effects might affect the environment, economy or community as a whole, even though they may be acceptable when considered on an individual basis with mitigation measures in place.'*

19.3 Assessment Methodology

Assessment of Combined Effects

19.3.1 The assessment of combined effects considers whether an individual environmental receptor or resource would be affected by more than one type of impact as a result of the Proposed Development. For example, a single receptor, such as a property or habitat, being subject to noise, air quality and visual impacts associated with the Proposed Development. The study area for the assessment of combined effects is defined by the study areas used in each of the environmental topics set out in **Chapters 8 - 18** (ES Volume I – **Application Document Ref. 6.2**).

19.3.2 The sources of data for the assessment of combined effects are the specialist environmental assessments presented within **Chapters 8 - 18** (ES Volume I – **Application Document Ref. 6.2**).

19.3.3 The assessment methodology for combined effects involves the identification of environmental resources and receptors where there is potential for more than one impact to be experienced and therefore potential for interactions between these. This enables the identification of the overall combined environmental effects of the Proposed Development.

19.3.4 The following environmental resources and receptor groups have been identified and considered in relation to the potential for more than one type of impact to be experienced by a single receptor:

- human receptors (residents, local community using community facilities);
- ecological receptors;
- geology and soils;
- waterbodies; and
- users and operators of local businesses and tourism amenities.

19.3.5 Geological strata and soils are not considered likely to be affected by impacts other than those identified within the assessment in **Chapter 13**: Geology, Hydrogeology and Land Contamination (ES Volume I – **Application Document Ref. 6.2**) and are therefore not subject to combined effects.

19.3.6 The potential interactions between individual effects have been identified by reviewing the likely significant residual effects assessments within the topic chapters presented in **Chapters 8 to 18** (ES Volume I – **Application**

Document Ref. 6.2). Some of these chapters have already addressed interactions between different types of impact relating to specified environmental resources and receptors, as described below:

- **Chapter 8**: Air Quality (ES Volume I – **Application Document Ref. 6.2**) includes an assessment of the potential impacts of construction dust and nitrogen deposition upon ecological receptors. These have also been taken into account in the assessment of effects upon terrestrial ecology and nature conservation as reported in **Chapter 11**: Biodiversity and Nature Conservation (ES Volume I - **Application Document Ref. 6.2**).
- **Chapter 11**: Biodiversity and Nature Conservation (ES Volume I – **Application Document Ref. 6.2**) takes into consideration the potential for air quality, dust and noise and vibration impacts and therefore how they could (in combination with other ecological impacts, such as habitat loss) affect ecological receptors. In addition, effects on the water environment set out in **Chapter 12**: Water Environment and Flood Risk (ES Volume I – **Application Document Ref. 6.2**) are considered including how they could in turn affect ecological receptors.
- **Chapter 12**: Water Environment and Flood Risk (ES Volume I – **Application Document Ref. 6.2**) considers the potential impacts of air quality upon water quality, as well as the potential impacts of climate change upon flood risk.
- **Chapter 13**: Geology, Hydrogeology and Land Contamination (ES Volume I – **Application Document Ref. 6.2**) considers the potential impacts of soils disturbance and mobilisation of contamination on ecological receptors.
- **Chapter 15**: Cultural Heritage (ES Volume I – **Application Document Ref. 6.2**) considers the effect of disturbance due to noise and physical damage due to vibration on the setting and fabric of built heritage assets.
- **Chapter 17**: Climate Change and Sustainability (ES Volume I – **Application Document Ref. 6.2**) includes an In-Combination Climate Change Impact (ICCI) assessment, which addresses the in-combination effects of a changing climate and the Proposed Development on receptors in the surrounding environment. Potential ICCI have been assessed by technical disciplines and collated within **Chapter 17**: Climate Change and Sustainability (ES Volume I – **Application Document Ref. 6.2**).

19.3.7 The effects due to the interaction of different types of impact which form an inherent part of the technical assessments listed above are not included within this combined effects' assessment. The combined effects assessment considers only those effects which could arise as a result of multiple impacts on single receptors which have not been identified elsewhere within this ES.

19.3.8 Therefore, as potential combined effects on ecological resources, geology and soils and waterbodies are considered in the above chapters, this chapter considers the combined effects on human receptors only. The types of

impacts that could be experienced by these receptors and which may interact are noise, air quality and visual effects, during both construction and operation.

19.3.9 The following effects have been considered for each topic:

- air quality – effects on receptors identified as being sensitive with respect to construction dust (i.e. at more than negligible risk) and receptors experiencing a minor adverse or worse effect during operation;
- noise and vibration – effects on receptors experiencing a minor adverse or worse effect during construction or operation; and
- visual effects – effects on receptors experiencing a minor adverse or worse effect during construction, opening (start of operation), and operation (15 years post-opening).

19.3.10 For definitions of these criteria please refer to: **Chapter 8**: Air Quality, (Section 8.3: Assessment Methodology); **Chapter 9**: Noise and Vibration, (Section 9.3: Assessment Methodology and Significance Criteria) and **Chapter 14**: Landscape and Visual Amenity (Section 14.3: Assessment Methodology and Significance Criteria) (ES Volume I – **Application Document Ref. 6.2**).

Assessment of Cumulative Effects

19.3.11 The assessment of cumulative effects considers the effects on environmental resources and receptors that will likely occur from the changes arising from the Proposed Development in conjunction with those associated with other planned developments. A combination of professional judgement and established guidance has been used to confirm the scope of the cumulative effects assessment and to aid the identification and (where necessary) mitigation of likely significant effects. With regard to cumulative effects, the ability to quantify the extent to which the environmental effects of other schemes can interact with those associated with the Proposed Development depends upon on the level of information available regarding such other schemes. Where environmental assessment information regarding other schemes is not available or is uncertain, the cumulative assessment will be necessarily qualitative and assessed using professional opinion.

19.3.12 When considering cumulative and combined effects, the mitigation measures set out in **Chapters 8 to 18** (ES Volume I – **Application Document Ref. 6.2**) have been taken into account (i.e. only residual (after mitigation) effects of the Proposed Development have been considered within the assessment). Cumulative and combined effects will be assessed to be neutral, minor, moderate or major. Moderate or major effects are considered to be significant, using the methodologies outlined in each technical chapter (refer to **Chapters 8** to **18** of this ES (ES Volume I – **Application Document Ref. 6.2**)).

19.3.13 PINS Advice Note Seventeen 'Cumulative effects assessment relevant to nationally significant infrastructure projects' (PINS, 2019a) sets out a four-stage approach to the assessment of cumulative effects:

- Stage 1: identify the Zone of Influence (ZOI) and establish a long list of 'other existing development and/or approved development';
- Stage 2: identify a shortlist of 'other existing development and/or approved development' for cumulative assessment;
- Stage 3: information gathering; and
- Stage 4: assessment.

19.3.14 This approach has been followed and is presented in this chapter.

Stage 1: Establishing the Long List of Other Existing Development and/ or Approved Development

19.3.15 Taking into account the staged approach of the PINS Advice Note Seventeen (PINS, 2019a), Stage 1 involved establishing (or for the final ES re-establishing, based on the final Proposed Development Site boundary) the Proposed Development's ZOI and identifying a long list of 'other development' and establishing their level of certainty, with levels of certainty defined as per Table 19.1.

Table 19.1: Level of certainty for each tier

Tier	Degree of certainty	Decreasing level of detail likely to be available
Tier 1	• Under construction;* • Permitted application(s), whether under the PA2008 or other regimes, but not yet implemented; and • Submitted application(s) whether under the PA2008 or other regimes but not yet determined.	
Tier 2	• Projects on the Planning Inspectorate's Programme of Projects where a scoping report has been submitted	
Tier 3	• 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 being given as they move closer to adoption) recognising that there will be limited information on any relevant proposals; and • Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.	

**Where other projects are expected to be completed before construction of the proposed NSIP and the effects of those projects are fully determined, effects arising from them should be considered as part of the baseline and may be considered as part of both the construction and operational assessment. The ES should clearly distinguish between projects forming part of the dynamic baseline and those in the CEA.* Adapted from Table 2 in PINS Advice Note Seventeen (PINS, 2019a).

19.3.16 An initial 'long list' of schemes in the vicinity of the Proposed Development was identified prior to the submission of the EIA Scoping Report (see **Appendix 1A** in ES Volume II - **Application Document Ref. 6.3**) and

subsequent to this, an initial short list of schemes considered to be of relevance to the cumulative assessment was provided in the Preliminary Environmental Information (PEI) Report (AECOM, 2020). This list was subsequently reviewed and updated in consultation with the local planning authorities, including taking account of feedback from statutory consultation.

Stage 2: Establishing the Short List of Other Existing Development and/ or Approved Development

19.3.17 A revised shortlist of other schemes considered to be of relevance to the cumulative assessment (as of May 2021) is presented in Section 19.4 of this chapter.

19.3.18 This stage involved a review of the long list of planned developments, to identify those to be taken forward (shortlisted) into the cumulative assessment. In determining which of the developments should be shortlisted, a minimum level of information is necessary. Only those developments with at least a Scoping Report or ES (if EIA Development) or a planning application supported by relevant technical appendices (e.g. a Transport Assessment) available were considered for shortlisting. However, a few exceptions to this general principle were made, where it was considered that there was potential for significant cumulative effects to occur based upon professional judgement, (for example due to close proximity to the Proposed Development).

19.3.19 Land allocations were considered, but as there is no certainty that developers will come forward with projects within the timescale for the delivery of these sites and the nature for such projects and their associated environmental effects are currently unknown, these were not shortlisted.

19.3.20 Developments that are already in existence i.e. those which are completed and operational, are considered to form part of the environmental baseline conditions within which the Proposed Development will be implemented. They have therefore been accounted for through establishment of the current or future baseline within each technical assessment presented in **Chapters 8 - 18** (ES Volume I – **Application Document Ref. 6.2**) and were therefore not considered for shortlisting.

19.3.21 Similarly, where other developments are expected to be completed prior to Proposed Development construction, and where the effects of those projects are fully determined, these have also been considered within the environmental baseline adopted in the ES (ES Volume I – **Application Document Ref. 6.2**).

19.3.22 The shortlisting process was informed by interrogation of available development information, including information on environmental effects, and the professional judgement of the environmental specialists undertaking the EIA.

19.3.23 Where individual technical disciplines have scoped out assessment of developments included on the short list for the purposes of their cumulative assessment, the reasoning for this is set out in Section 19.6.

19.3.24 The schemes identified for cumulative assessment have been categorised into tiers to indicate the level of certainty associated with each scheme (Table 19.1). Those in Tier 1 are most certain, while those in Tier 3 are least certain, although they have been assessed, where possible, at a high level, in accordance with PINS Advice Note Seventeen (PINS, 2019a).

Stage 3: Information Gathering

19.3.25 This stage involved reviewing the available information relating to the shortlisted developments to establish the details of their likely environmental effects, considering factors including the zone of influence (ZOI) of the environmental topics assessed; the planned timescales for construction, operation and (where relevant) decommissioning; and details of their potential or likely significant effects.

Stage 4: Assessment

19.3.26 Those developments which met the criteria set out in the above stages i.e. are both reasonably foreseeable in terms of delivery (e.g. the applicable scheme has consent or is in the planning/ consenting process, and are geographically located in a position where environmental impacts are reasonably likely to act together to create an effect that is more (or less) significant overall than the effect of the individual developments alone) were incorporated into the cumulative effects' assessment. This involved identifying where effects are likely to occur and assessing the significance of those effects on environmental receptors and resources, taking into account any mitigation measures.

19.3.27 Operational impacts are generally long-term, and whilst construction impacts are often short-term and temporary, they can potentially be of a large magnitude. Consequently, when cumulative effects that could be associated with construction at one site and operation at another are considered, the difference in duration and reversibility is considered within the assessment.

19.3.28 When assessing cumulative effects, it is appropriate to also acknowledge the relative contributions that different schemes make to a cumulative effect, and carefully consider whether a cumulative effect could occur, at all. For example, effects associated with a large scale scheme may be significant, and whilst a smaller scheme may contribute to this effect, the cumulative effect of the schemes together may only be considered as being significant if it is of greater significance than the effect of either project in isolation. It follows that if the environmental effects associated with the Proposed Development are assessed as being negligible, cumulative effects could not be generated given that Proposed Development impacts would be very low/low, or the receptor sensitivity would be very low/low. Professional

judgement is required in order to determine whether cumulatively effects could become significant when added to those of another project.

19.3.29 The traffic and transport assessment presented in **Chapter 10**: Traffic and Transport (ES Volume I – **Application Document Ref. 6.2**) and the traffic-related construction air quality and noise impacts and effects reported in **Chapter 8**: Air Quality and **Chapter 9**: Noise and Vibration (ES Volume I – **Application Document Ref. 6.2**) are based on traffic data which includes traffic from other committed developments and are therefore inherently cumulative.

Study Area

19.3.30 Cumulative effects are generally unlikely to arise unless other proposed development sites are in close proximity to the Proposed Development Site, recognising that actual distance varies with the nature of the potential effect and the nature of the receptor (e.g. cumulative air quality effects could occur for developments a greater distance apart than say noise effects). Construction projects are, as a matter of routine, required to employ regulatory and managerial controls and good practice to mitigate environmental impacts, as far as reasonably practicable. Nevertheless, consideration has been given to the presence of common pathways from any nearby schemes to a single receptor, and whether there is potential for impacts of a sufficient magnitude whereby a particular receptor could experience cumulative effects that may be significant.

19.3.31 The study area for the consideration of cumulative and combined effects has been developed taking into account the predicted ZOI for each technical discipline/ extent of impacts associated with the Proposed Development as detailed within **Chapters 8** to **18** of this ES (ES Volume I – **Application Document Ref. 6.2**).

19.3.32 The study area for each environmental assessment topic is defined in the relevant ES technical chapters (**Chapters 8** to **18** (ES Volume I – **Application Document Ref. 6.2**)) and outlined in Table 19.2, below.

Table 19.2: ZOI Summary Table

Environmental Topic	Zone of Influence (ZOI)
Air Quality	**Construction:** up to 350m beyond the Proposed Development Site boundary and 50m from the construction traffic route (up to 500m from the Proposed Development Site entrance), for human health receptors. Up to 50m from the Proposed Development Site boundary and construction traffic route (up to 500m from the Proposed Development Site entrance) for ecological receptors. For

Environmental Topic	Zone of Influence (ZOI)
	construction road traffic emissions, properties and habitat sites within 200m of affected roads. **Operation:** up to 15km ZOI for ecological receptors (Special Protection Area (SPA), Special Areas of Conservation (SAC), Ramsar sites and Sites of Special Scientific Interest (SSSI)) from the Main Site and up to 2km for non-statutory designated ecological receptors including Local Wildlife Sites (LWS). Refer to **Chapter 8:** Air Quality (ES Volume I – **Application Document Ref. 6.2**)) for more information.
Noise and Vibration	**Construction and Operation:** 1km Refer to **Chapter 9:** Noise and Vibration (ES Volume I - **Application Document Ref. 6.2**) for more information.
Traffic and Transport	**Construction:** The A18 (west of the construction site access to Keadby 2 Power Station); A18 Station road (immediately to the west of King George V Bridge; A18 High Levels Bank (east of Tudworth Roundabout) and the A161 (between M180 Junction 2 and the A18). **Operation:** N/A Refer to **Chapter 10:** Traffic and Transport (ES Volume I - **Application Document Ref. 6.2**) for more information.
Biodiversity and Nature Conservation	Construction and Operation: A maximum ZOI of 15km has been applied: • 15km for international and national statutory designated sites; • 2km ZOI for local statutory and non-statutory designated sites; and • 1km for protected and notable habitats and species. Refer to **Chapter 11:** Biodiversity and Nature Conservation (ES Volume I - **Application Document Ref. 6.2**) for more information.
Water Environment and Flood Risk	**Construction and Operation:** 1km ZOI generally for water quality assessment and flood risk – as water effects propagate downstream and flood risk can affect upstream receptors, a wider study area based on professional judgement has also been applied where relevant. The River Trent is considered the

Environmental Topic	Zone of Influence (ZOI)
	final receiving waterbody that could conceivably be affected. For the flood risk assessment breach modelling, a modelled domain comprising a 9 x 7km grid with the River Trent as the eastern edge and the Stainforth and Keadby Canal as the southern edge comprises the zone of influence in the event of a breach of the tidal defences for the River Trent. Refer to **Chapter 12:** Water Environment and Flood Risk (ES Volume I - **Application Document Ref. 6.2**) for more information.
Geology, Hydrogeology and Land Contamination	**Construction and Operation:** The study area extends 250m from the Proposed Development Site extended for hydrogeology to a 1km ZOI. Refer to **Chapter 13:** Geology, Hydrogeology and Land Contamination (ES Volume I - **Application Document Ref. 6.2**) and Land Contamination for more information.
Landscape and Visual Amenity	**Construction and Operation:** 10km ZOI based upon the tallest element of the Proposed Development being the absorber stack (105m AGL). Refer to **Chapter 14:** Landscape and Visual Amenity Assessment (ES Volume I - **Application Document Ref. 6.2**) for more information.
Cultural Heritage	Construction and Operation: A maximum ZOI of 5km has been applied: • 5km for designated assets of highest value (World Heritage Sites, Scheduled Monuments and Grade I listed buildings); • 3km for other designated assets (grade II and II* listed buildings, conservation areas, registered parks and gardens, registered battlefields); and • 1km for non-designated assets, extended to include the Isle of Axholme Area of Special Historic Interest. Refer to **Chapter 15:** Cultural Heritage (ES Volume I - **Application Document Ref. 6.2**) for more information.
Socio-economics	Construction and Operation: This has been based on the Scunthorpe Travel to Work Area (TTWA).

Environmental Topic	Zone of Influence (ZOI)
	Refer to **Chapter 16:** Socio-economics (ES Volume I - **Application Document Ref. 6.2**) for more information.
Climate Change and Sustainability	The greenhouse gas (GHG) ZOI includes all GHG emissions from within the Proposed Development Site boundary arising during all stages of the construction and operation of the Proposed Development. It also includes emissions arising from offsite activities which are directly related to the onsite activities, such as transport, and treatment of materials and waste disposal. Refer to **Chapter 17:** Climate Change and Sustainability (ES Volume I - **Application Document Ref. 6.2**) for more information.

Consultation

19.3.33 A summary of consultation activities relevant to the cumulative and combined effects assessment is provided in Table 19.3 below.

Table 19.3: Consultation Summary

Consultee	Method of Consultation (Date)	Summary	Addressed
Planning Inspectorate	EIA Scoping Opinion for the Proposed Development (June 2020).	The Planning Inspectorate considers that other existing or approved development beyond the study area outlined in the scoping stage (2km for TCPA developments and 10km for NSIP) could give rise to cumulative effects on the same receptors. The Planning Inspectorate notes that the ES must clearly state and justify the study area applied for each aspect. Effort should be made to agree the scope of the cumulative assessment with relevant consultation bodies.	The study area outlined in the scoping stage has been increased in accordance with the study areas applied for each environmental assessment presented in this ES. This is because distance varies with the nature of the potential effect and the nature of the receptor. The study area is now 15km to reflect the largest zone of influence for the environmental assessments, and as advised in Advice Note Seventeen (PINS, 2019a).
Planning Inspectorate	EIA Scoping Opinion for the Proposed Development (June 2020).	The Planning Inspectorate noted that the Little Crow Solar Park NSIP is located approximately 10km to the south-east of the Proposed Development and should be included in the cumulative assessment.	The Little Crow Solar Park NSIP has been included in the long list of other developments. Other NSIP have also been reviewed within the ZoI, acknowledging those that are still at an early stage in the pre-application process.
Planning Inspectorate	EIA Scoping Opinion for the Proposed Development (June 2020).	The Planning Inspectorate commented that the Scoping Report does not include a methodology for assessing cumulative or combined effects and advises the Inspectorate's Advice Note 17: Cumulative	The approach to the assessment of cumulative effects set out in PINS Advice Note Seventeen (PINS, 2019a) has been adopted. Consultation has been undertaken with North

Consultee	Method of Consultation (Date)	Summary	Addressed
		Effects Assessment, which sets out the recommended approach to such assessments, is considered. The Inspectorate advises that any mitigation and/or design measures relied upon to exclude likely significant effects should be explained in the ES and appropriately secured.	Lincolnshire Council to agree the list of projects during Stage 2 statutory consultation and where significant effects are considered likely, any emerging developments noted by consultees have been included in this CEA.
Planning Inspectorate	EIA Scoping Opinion for the Proposed Development (June 2020).	The Planning Inspectorate notes that the Scoping Report does not define the scope of any combined effects and the ES should be clear as to which combinations of effects it is assessing, and clearly justify the approach taken.	The scope of potential combined effects has been defined and assessed within this chapter.
Marine Management Organisation (MMO).	EIA Scoping Opinion for the Proposed Development (June 2020).	The MMO welcomes consideration of cumulative and combined effects where appropriate. The MMO notes that none of the developments identified at the Scoping stage appear to be located near to, or have any connection to, the River Trent or other nearby waterbodies.	Comments noted. This ES has considered any potential cumulative effects that may arise due to proposed discharges to the marine environment. This includes discharges from Keadby 2 Power Station, which forms part of the future baseline for **Chapter 12:** Water Environment and Flood Risk (ES Volume I - **Application Document Ref. 6.2**). Additional searches have been undertaken upstream (to the tidal limits of the

Consultee	Method of Consultation (Date)	Summary	Addressed
		The MMO advises that the ES should also consider whether any existing operational activities (e.g. abstraction of water and discharge of effluent from existing sites) within the study area could result in cumulative or in-combination impacts to fish.	River Trent, south-east of Sutton on Trent) and within the study area of 15km to determine 'other development' that may be relevant; this is discussed further in Section 19.4. Existing operational activities form part of the current baseline and do not require assessment within this chapter.
Natural England	EIA Scoping Opinion for the Proposed Development (June 2020).	Natural England note the importance of considering cumulative effects of the proposal, including all supporting infrastructure, with other similar proposals and a thorough assessment of the 'in combination' effects of the proposed development with any existing developments and current applications. A full consideration of the implications of the whole scheme should be included in the ES. All supporting infrastructure should be included within the assessment. Natural England advises that the cumulative impact assessment should include other proposals currently at Scoping stage. Due to the overlapping timescale of their	The long list of other developments included within this chapter includes all other developments within the study area of 15km. This includes other developments at varying stages of the planning application or DCO process, including the EIA Scoping stage.

Consultee	Method of Consultation (Date)	Summary	Addressed
		progress through the planning system, cumulative impacts of the proposed development with those proposals currently at Scoping stage would be likely to be a material consideration at the time of determination of the planning application.	
North Lincolnshire Council	June 2020	North Lincolnshire Council have advised consideration should be given to running multiple power stations together (having Keadby 1, 2 and 3 supplying capacity at the same time).	Keadby 2 Power Station is under construction and has been noted in the potential short list of developments. However, as construction of this development is anticipated to be completed in 2022, prior to construction commencing for the Proposed Development, the inclusion in the short list is considered 'for information and as a basis for scoping out of the cumulative effects assessment' as it is considered more appropriate that the operational Keadby 2 Power Station including it's built infrastructure is considered in future baseline for the Proposed Development, as has been undertaken throughout this ES. As described in **Chapter 2**: Assessment Methodology (ES Volume I – **Application Document Ref. 6.2**)

Consultee	Method of Consultation (Date)	Summary	Addressed
			Keadby 1 Power Station has a contract to provide capacity to the grid until September 2022 and will have opportunities to secure further agreements in future auctions. Future plans for Keadby 1 Power Station will be confirmed by the Applicant in due course. It is however recognised that Keadby 1 Power Station would not be in operation concurrently with the Proposed Development because the capacity of the existing natural gas pipeline precludes a scenario in which the Proposed Development and Keadby 1 Power Station could operate concurrently. Therefore, abstractions and emissions/ discharges from Keadby 1 Power Station would not occur concurrently with those of the operational Proposed Development.
MMO	January 2021 (Stage II Consultation / PEI Report)	MMO recognise that an initial screening exercise has been undertaken to identify potential developments within a 15 km radius of the Proposed Development location (**Figure 19.1** (ES Volume III - **Application Document Ref. 6.4**)). Table	Existing activities, including abstractions from and discharges to watercourses used by fish form part of the existing baseline environment reported in the respective chapters including **Chapter 11**: Biodiversity and

Consultee	Method of Consultation (Date)	Summary	Addressed
		12.9 (**Chapter 19**: Cumulative and Combined Effects) shows an updated shortlist of projects with details of their current statuses and distances from the proposed development. This approach is appropriate; however, the ES should also consider whether any existing operational activities (e.g. abstraction of water and discharge of effluent from existing sites) within the study area could result in cumulative or in-combination impacts to fish.	Nature Conservation and **Chapter 12**: Water Environment and Flood Risk (ES Volume I – **Application Document Ref. 6.2**).
Public Health England	January 2021 (Stage II Consultation / PEI Report)	The consultation report identifies the potential for Keadby 1 to cease operation in 2022, subject to opportunities for further agreements in future auctions. The report notes that any future plans for Keadby 1 Power Station will be confirmed by the Applicant in due course. The decommissioning and removal of Keadby 1 structures should be considered within the cumulative effects assessment of the ES unless: • Suitable and sufficient evidence is available to demonstrate that the	**Chapter 2**: Assessment Methodology (ES Volume I – **Application Document Ref. 6.2**) confirms the future baseline scenarios considered for Keadby 1 Power Station and how they could relate to the construction and operation of the Proposed Development. **Chapter 14**: Landscape and Visual Amenity Assessment and **Chapter 15**: Cultural Heritage (ES Volume I - **Application Document Ref. 6.2**) have assessed two future baseline

Consultee	Method of Consultation (Date)	Summary	Addressed
		decommissioning and removal of Keadby 1 structures will definitely not overlap with the construction of Keadby 3; or • Embedded mitigation within the ES confirms that the operator will not decommission and remove Keadby 1 structures during the course of the construction of Keadby 3.	scenarios: the first (Scenario 1) whereby the Proposed Development is constructed and operates alongside the structures of the existing Keadby 1 Power Station and Keadby 2 Power Station (under construction); and a second alternative scenario (Scenario 2) with Keadby 1 Power Station structures removed, in order to consider whether this represents a worst-case. Given that the future plans for Keadby 1 Power Station are within the Applicant's control, it is not envisaged that there would be a scenario whereby any decommissioning/ demolition of Keadby 1 Power Station would coincide with construction of the Proposed Development. This is particularly the case because Keadby 1 Power Station contains strategic infrastructure that Keadby 2 Power Station relies on and there would be a need to ensure that Keadby 2 Power Station operates efficiently with the Proposed Development infrastructure

Consultee	Method of Consultation (Date)	Summary	Addressed
			before any decision would be taken on Keadby 1 Power Station being decommissioned or demolished. The worst-case assessment presented in **Chapter 10**: Traffic and Transport (ES Volume I - **Application Document Ref. 6.2**) therefore does not include consideration of Keadby 1 Power Station demolition.

19.4 Cumulative Effects Assessment (Stage 1 – 3)

19.4.1 Taking into account feedback provided in Table 19.3, the staged methodology advocated in the PINS Advice Note Seventeen (PINS, 2019a) was revisited to provide the basis for the final shortlist of developments to be assessed.

Stage 1: Establishing the ZOI and Identifying a Long List of 'Other Development'

19.4.2 The initial screening exercise (Stage 1 of the CEA) was revisited to identify any further potential major and other developments and plans within a 15km radius of the Proposed Development Site to create a final 'initial long list' for consideration within the CEA. Searches included applications within the marine environment (applying a 15km study area downstream and upstream), however no relevant marine licensable activities were noted that required consideration. Available information on schemes identified was obtained, with details regarding each being provided in Table 19.4. The location of the 'other developments' on the final long list are shown in **Figure 19.1** (ES Volume III - **Application Document Ref. 6.4**).

Table 19.4: Identification of 'Other Development' for the CEA (Stage 1 final long list)

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
1	Humber Low Carbon Pipelines PINS Ref: EN070006	National Grid Carbon. Construction of carbon dioxide (to facilitate CCUS) and hydrogen (H_2) transportation pipelines between Drax in North Yorkshire and Easington in East Riding of Yorkshire, connecting various emitters and generators, including the Proposed	Small section of connecting pipeline and Above Ground Installation (AGI) within the Proposed Development Site to connect to the wider Humber Low Carbon Pipelines CO_2 gathering network.	Application notified to PINS. DCO Application anticipated to be submitted to PINS in Q3 2022. Non-statutory consultation planned for Q3 2021. EIA scoping planned for Q4 2021. Further information is presented at https://www.zerocarbonhumber.co.uk/the-vision/ Given early-stage, awareness of project and implicit linkage between the Proposed Development and this future, third party development, scoped-in to the updated short-list.	Tier 3	Yes Would fall in the ZOI for majority of ES topics	Yes

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
		Development in the Humber					
2	Keadby 2 Power Station Keadby II S36 Consent	Keadby Developments Limited (part of SSE). Keadby 2 Section 36 Variation Application(s) 2016/2017/2018	On-site	Section 36 consent granted under the Electricity Act Under Construction – included in short list but anticipated to be constructed and operational prior to construction of the Proposed Development commencing and therefore scoped of cumulative effects assessment.	Tier 1	Yes Falls within ZOI for majority of topics scoped into ES.	Yes to explain rationale for scoping out
3	Keadby Wind Farm Extension EN010070	SSE. Keadby Windfarm Extension	Adjacent – Off-Site	Planning Inspectorate (DCO) Project on hold as of 27/05/15.	Tier 2	Yes Falls within ZOI for majority of topics scoped into ES.	Yes to explain rationale for scoping out

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
4	Biodiversity Enhancement Area PA/2020/952	Keadby Developments Limited (part of SSE). Keadby Developments Limited (part of SSE). Planning permission for the creation of a Biodiversity Enhancement Area (comprising the use of 70,000 m^3 of excavated soil).	Adjacent – Off-Site	North Lincolnshire Application. Submitted 30 June 2020 and application refused 26 March 2021. The Applicant is determining proposals to beneficially use the material and consenting route. The project is therefore included on a precautionary basis.	Tier 1	Falls within ZOI for majority of topics scoped into ES.	Yes to explain rationale for scoping out
5	30 residential dwellings at Old Railway Sidings PA/2019/1904	WFW Development Ltd. Planning permission to erect 30	1.5km south-east	North Lincolnshire Application. Submitted 21 November 2019. Application refused	Tier 1	Falls within ZOI for some of topics	No

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
		affordable dwellings with associated access and other works, Old Railway Sidings, A18 From Althorpe To Gunness, Althorpe, DN17 3HN				scoped into ES.	
6	27 residential dwellings PA/2017/1513	Roger Burnett Promotions, Retirement & Death Benefit Scheme. Outline planning permission to erect 27 dwellings with access and layout to be determined and	1.5km south-east	North Lincolnshire Application. Approved 14/01/2019	Tier 1	Falls within ZOI for some of topics scoped into ES.	Yes

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
		all other matters reserved for subsequent approval, Land off the A18, Althorpe					
7	14 residential dwellings at Old Railway Sidings PA/2017/464	Mr T Webster. Outline planning permission for up to 14 dwellings	1.5km south-east	North Lincolnshire Application. Appeal Allowed (May 2018)	Tier 1	Falls within ZOI for some of topics scoped into ES.	Yes
8	Mixed use development. PA/2020/660	Rafkins (Scunthorpe) Leisure Park Limited. Planning permission for mixed use development – hotel (Class C1), gym (Class D2),	3.6km south-east.	North Lincolnshire Application. Approved 27/04/21	Tier 1	Falls within ZOI for some of topics scoped into ES.	Yes

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
		retail units (Class A1), food and drink and drive-thru restaurants (Class A3/A5) – access, car parking, landscaping and associated works.					
9	11 industrial units. PA/2019/1807	Mr Singh. Planning permission to erect 11 industrial units.	4.2km east	North Lincolnshire Application. Undetermined	Tier 1	Falls within ZOI for some of topics scoped into ES.	Yes
10	North Lincolnshire Green Energy Park PINS Ref. EN010116	North Lincolnshire Green Energy Park Limited. Energy Recovery Facility converting up to 650,000	4.5km	Planning Inspectorate (DCO). Currently at DCO Scoping Stage. Scoping Opinion issued in December 2020. The application is expected to be submitted to the Planning Inspectorate in Q3 2021.	Tier 2	Falls within ZOI for some of topics	Yes

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
		tonnes per annum of Refuse Derived Fuel (RDF) to generate a maximum of 95 megawatts of electrical output (MWe) and/or 380 megawatts of thermal output (MWth) to provide power, heat and steam on the site of the operating Flixborough Wharf on the River Trent.				scoped into ES.	
11	29 dwelling residential development PA/2017/824	Mr C Muscroft. Outline planning permission for residential development.	3.5km south-west	North Lincolnshire Application. Undetermined	Tier 1	Falls within ZOI for some of topics	Yes

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
						scoped into ES.	
12	14 Dwelling development PA/2019/943	Planning permission to erect 14 dwellings including associated works.	4.6 km west	North Lincolnshire Application. Approved 14/05/21	Tier 1	Falls within ZOI for some of topics scoped into ES.	Yes
13	144 dwellings. PA/2020/1333	DDM Agriculture Ltd. Outline planning permission to erect 144 dwellings with appearance, landscaping, layout and scale reserved for subsequent consideration.	4.9km south-east	North Lincolnshire Application. Undetermined	Tier 1	Falls within ZOI for some of topics scoped into ES.	Yes

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
14	88 dwellings. PA/2019/1607	Harron Homes. Planning permission to erect 88 dwellings with associated roads, drainage, service infrastructure and public open space (including demolition of existing agricultural buildings).	5.5km south-east	North Lincolnshire Application. Undetermined	Tier 1	Falls within ZOI for some of topics scoped into ES.	Yes
15	10 dwellings PA/2020/1417	R. Mills Planning permission to erect ten dwellings including associated works	6.1km south-west	North Lincolnshire Application. Undetermined	Tier 1	Falls within ZOI for some of topics scoped into ES.	Yes

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
16	Engineering operations for railway line extension. PA/2020/537	Mr Bailey – Crowle Peatland Railway Society. Planning permission to carry out engineering operations in connection with laying a 373 m railway line extension and construction of two railway platforms 12.2m x 2.3m.	6.4km south-west	North Lincolnshire Application. Approved 27/10/20	Tier 1	Falls within ZOI for some of topics scoped into ES.	Yes
17	Residential development (110 dwellings) PA/2020/1207	Moorwalk Limited Outline planning permission for residential development (up to 110 dwellings),	7.5km south-east	North Lincolnshire Application. Application refused 15/01/21	Tier 1	Falls within ZOI for some of topics	No

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
		with public open spaces, the creation of a play area and sustainable drainage systems (SUDs) including detention basins with appearance, landscaping, layout and scale reserved for subsequent consideration.				scoped into ES.	
18	12 dwellings PA/2020/211	Mr and Mrs Schofield and Mrs Waters	8km south-east	North Lincolnshire Application. Undetermined	Tier 1	Falls within ZOI for some of topics scoped into ES.	Yes

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
19	88 dwellings PA/2019/1088	Linden Homes. Planning permission to erect 88 dwellings with associated access, drainage and landscaping.	8.9km south-east.	North Lincolnshire Application. Approved 19/02/21	Tier 1	Falls within ZOI for some of topics scoped into ES.	Yes
20	122 dwellings PA/2019/1107	Linden Homes. Planning permission to erect 122 dwellings with associated access, drainage and landscaping.	9.5km south-east	North Lincolnshire Application. Approved 19/02/21	Tier 1	Falls within ZOI for some of topics scoped into ES.	Yes
21	Little Crow Solar Park	INRG SOLAR (Little Crow) Ltd. Energy scheme comprising ground mounted solar photovoltaic	10km south-east	Planning Inspectorate (DCO). Application in Examination stages.	Tier 1	Falls within ZOI for some of topics	Yes

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
		arrays, electrical storage, grid connection infrastructure and other infrastructure integral to the construction and/or operation of the energy scheme. The solar park will have an installed maximum capacity of 150MW and battery storage of up to 90MW.				scoped into ES.	
22	66 dwellings PA/2019/1414	Mark Simmonds Planning Services.	13km north-east	North Lincolnshire Application. Application refused 23/11/20	Tier 1	Falls within ZOI for some of	No

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
		Outline planning permission for residential development of up to 66 dwellings with all matters reserved or subsequent approval.				topics scoped into ES.	
23	Solar PV farm and associated infrastructure 20/01345/FUL	Lightsource BP. Variation of condition 3 of planning permission 14/01554/FULM (Solar Photovoltaic (PV) Farm with associated infrastructure (ancillary equipment	14.2km north-west	Doncaster Council Application. Planning permission granted 25/08/20	Tier 1	Falls within ZOI for some of topics scoped into ES.	Yes

'Other development' details						Stage 1 (long list)	
ID	**Application reference**	**Applicant for 'other development' and a brief description**	**Distance from the Proposed PCC Site**	**Status**	**Tier**	**Within ZOI**	**Progress to Stage 2?**
		includes inverters, transformers, small embedded substations, and a grid connection building)) granted on 20/04/15 to allow for an additional 15 years of operation.					

Stage 2: Identify Short List of 'Other Development' for the CEA

19.4.3 Following Stage 1, PINS Advice Note Seventeen (PINS, 2019a) advises that the Applicant should identify a short list of other developments for assessment. The Stage 1 long list in Table 19.4 has therefore been re-screened based on the ZOI for each of the technical disciplines considered within this ES (as detailed in Table 19.2). In addition to the ZOI threshold criteria, the geographical and temporal scope of the 'other development' has been considered in relation to the geographical and temporal scope of the Proposed Development, and professional judgement applied to identify the short list of development to be considered further for the CEA (Stage 3 and 4). Information on the 'other developments' within the short list is detailed in Table 19.5.

19.4.4 It is noted that a small number of developments that had previously been considered for inclusion in the CEA at the PEI Report stage (AECOM, 2020)) have now been scoped out of the CEA on the basis that they have:

- recently become operational and are included in the reported baseline for relevant technical **Chapters 8-18** (ES Volume I – **Application Document Ref. 6.2**); or
- are no longer being progressed (for example, planning permission refused).

19.4.5 Where other developments have not been short-listed, this has been on the basis of professional judgement by relevant discipline leads, using available information, in order to determine whether cumulatively, effects of the Proposed Development could become significant when added to those of the particular scheme.

Table 19.5: Identification of 'Other Development' for the CEA (Stage 2 short list)

ID	Name	Screening for detailed CEA			
		Overlap in temporal scope?	**Scale and nature of development likely to have a significant effect?**	**Other factors**	**Progress to Stage 3/4?**
1	Humber Low Carbon Pipelines PINS Ref: EN070006	Yes – application due to be submitted to PINS in Q3 2022.	Yes – the potential for significant environmental effects that merit consideration within the CEA.	n/a	**Yes**
2	Keadby 2 Keadby II S36 Consent	No – operation due to commence prior to construction of the Proposed Development.	As the construction period for Keadby 2 Power Station is due to finish early in 2022, before the Proposed Development construction period commences, there is no potential for cumulative construction phase impacts and effects. Operationally, the Keadby 2 Power Station project is considered as part of the baseline in each of **Chapters 8 – 18** (ES Volume I – **Application Document Ref. 6.2**) and not taken further for the CEA.	n/a	*No – considered as part of the future baseline operations in all relevant technical chapters*
3	Keadby Wind Farm Extension EN010070	Yes	Yes – however the Application has been on hold since 2015 and there is currently no intention to continue with the application.	n/a	*No – any future application submitted for this scheme would be expected to take account of the Proposed*

ID	Name	Screening for detailed CEA			
		Overlap in temporal scope?	**Scale and nature of development likely to have a significant effect?**	**Other factors**	**Progress to Stage 3/4?**
					Development in the cumulative assessment of that EIA.
4	Biodiversity Enhancement Area PA/2020/952	The temporal scope for this application is not certain given that the application has been refused. However, movement of material associated with this application is required to facilitate pre-construction ground investigations for the Proposed Development and will require to have been completed prior construction of the Proposed PCC Site. No potential for overlap with construction phase of Proposed Development..	No – overlap in timescales would not occur.	n/a	*No*
6	27 residential dwellings PA/2017/1513	Potential overlap with construction phase of Proposed Development.	No – due to distance from the Proposed Development Site (1.5km) and small-scale nature of the proposal. This Application has been considered as one of several small scale committed development within **Appendix 10A:** Transport	n/a	*No*

ID	Name	Screening for detailed CEA			
		Overlap in temporal scope?	**Scale and nature of development likely to have a significant effect?**	**Other factors**	**Progress to Stage 3/4?**
			Assessment (ES Volume II - **Application Document Ref. 6.3**) and dismissed from further assessment.		
7	14 residential dwellings at Old Railway Sidings PA/2017/464	Unlikely – Appeal Allowed (May 2018). Construction timescales with Proposed Development considered unlikely.	Unlikely due to distance from the Proposed Development Site (1.5km) and small-scale nature of the proposal. This Application has been considered as one of several small scale committed development within **Appendix 10A:** Transport Assessment (ES Volume II - **Application Document Ref. 6.3**) and dismissed from further assessment.	n/a	*No*
8	Mixed use development. PA/2020/660	Possible – planning permission approved 27/04/21. Potential for overlap in construction periods.	Unlikely due to distance from the Proposed Development Site (3.6km). This Application has been considered as a committed development within **Appendix 10A:** Transport Assessment (ES Volume II - **Application Document Ref. 6.3**) and dismissed from further assessment.	n/a	*No*

ID	Name	Screening for detailed CEA			
		Overlap in temporal scope?	**Scale and nature of development likely to have a significant effect?**	**Other factors**	**Progress to Stage 3/4?**
9	11 industrial units. PA/2019/1807	Possible – planning permission not yet determined. Potential for overlap in construction periods.	Unlikely due to distance from the Proposed Development Site (4.2km) and small-scale nature of the proposal. This Application has been considered as one of several small scale committed development within **Appendix 10A:** Transport Assessment (ES Volume II - **Application Document Ref. 6.3**) and dismissed from further assessment.	n/a	*No*
10	North Lincolnshire Green Energy Park. PINS Ref. EN010116	Yes – potential overlap during construction and operation phase given project timescales in the EIA Scoping Report which state '*assuming that the DCO Application is submitted in Q3 2021, the earliest approval would be Q4 2022. Construction would therefore begin no sooner than Q1 2023 and will take three years to complete. Operation is expected to begin in 2025/26 and to operate for 25-40 years*'.	Yes – the potential for significant environmental effects that merit consideration within the CEA.	n/a	**Yes**

ID	Name	Screening for detailed CEA			
		Overlap in temporal scope?	**Scale and nature of development likely to have a significant effect?**	**Other factors**	**Progress to Stage 3/4?**
11	29 dwelling residential development PA/2017/824	Yes – potential for construction phase overlap.	Unlikely due to distance from the Proposed Development Site (3.5 km). This Application has been considered as one of several small scale committed development within **Appendix 10A:** Transport Assessment (ES Volume II - **Application Document Ref. 6.3**) and dismissed from further assessment.	n/a	*No*
12	14 Dwelling development PA/2019/943	Yes – potential for construction phase overlap.	Unlikely due to distance from the Proposed Development Site (4.6km). This Application has been considered as one of several small scale committed development within **Appendix 10A:** Transport Assessment (ES Volume II - **Application Document Ref. 6.3**) and dismissed from further assessment.	n/a	*No*
13	144 dwellings. PA/2020/1333	Application undetermined but potential for construction phase overlap.	Unlikely due to distance from the Proposed Development Site (4.9km). This Application has been considered as one of several small scale committed development within	n/a	*No*

ID	Name	Screening for detailed CEA			
		Overlap in temporal scope?	**Scale and nature of development likely to have a significant effect?**	**Other factors**	**Progress to Stage 3/4?**
			Appendix 10A: Transport Assessment (ES Volume II - **Application Document Ref. 6.3**) and dismissed from further assessment.		
14	88 dwellings. PA/2019/1607	Yes – potential for construction phase overlap.	Unlikely due to distance from the Proposed Development Site (5.5km). This Application has been considered as one of committed developments within **Appendix 10A:** Transport Assessment (ES Volume II - **Application Document Ref. 6.3**) and dismissed from further assessment by other disciplines.	n/a	*No*
15	10 dwellings PA/2020/1417	Yes – potential for construction phase overlap.	Unlikely due to distance from the Proposed Development Site (6.1km). This Application has been considered as one of several small scale committed development within **Appendix 10A:** Transport Assessment (ES Volume II - **Application Document Ref. 6.3**) and dismissed from further assessment.	n/a	*No*

ID	Name	Screening for detailed CEA			
		Overlap in temporal scope?	**Scale and nature of development likely to have a significant effect?**	**Other factors**	**Progress to Stage 3/4?**
16	Engineering operations for railway line extension. PA/2020/537	Yes – potential for construction phase overlap.	Unlikely due to distance from the Proposed Development Site (6.4km).	n/a	*No*
18	12 dwellings PA/2020/211	Yes – potential for construction phase overlap.	Unlikely due to distance from the Proposed Development Site (8km). This Application has been considered as one of several small scale committed development within **Appendix 10A:** Transport Assessment (ES Volume II - **Application Document Ref. 6.3**) and dismissed from further assessment.	n/a	*No*
19	88 dwellings PA/2019/1088	Yes – potential for construction phase overlap.	Unlikely due to distance from the Proposed Development Site (8.9km). This Application has been considered as one of the committed development within **Appendix 10A:** Transport Assessment (ES Volume II - **Application Document Ref. 6.3**) and dismissed from further assessment by technical disciplines.	n/a	*No*

ID	Name	Screening for detailed CEA			
		Overlap in temporal scope?	**Scale and nature of development likely to have a significant effect?**	**Other factors**	**Progress to Stage 3/4?**
20	122 dwellings PA/2019/1107	Yes – potential for construction phase overlap.	Unlikely due to distance from the Proposed Development Site (9.5km). This Application has been considered as one of several small scale committed development within **Appendix 10A:** Transport Assessment (ES Volume II - **Application Document Ref. 6.3**) and dismissed from further assessment.	n/a	*No*
21	Little Crow Solar Park	Yes – potential for construction phase overlap.	No – the Little Crow Solar Park is located beyond the ZOI of most environmental topics, with the exception of Landscape and Visual Amenity and Biodiversity in relation to potential air quality effects on statutory designated ecological sites (i.e. within 15km). A review of the ES for the application outlines that landscape and visual effects would be highly limited and given the distance (10km) between this development and the Proposed Development is considered there is not the potential for significant	n/a	*No*

ID	Name	Screening for detailed CEA			
		Overlap in temporal scope?	**Scale and nature of development likely to have a significant effect?**	**Other factors**	**Progress to Stage 3/4?**
			cumulative effects. No significant effects on statutory ecological sites are predicted and given the distance of the application from the Proposed Development, there is not considered the potential for significant cumulative effects. Significant cumulative Traffic and Transport effects during construction are also not anticipated as the proposed routes to site would use different junctions from the M180 and associated minor roads.		
23	Solar PV farm and associated infrastructure 20/01345/FUL	No – Solar PV farm already built so no construction phase overlap with the Proposed Development.	No – Solar PV farm already built so no construction phase overlap with the Proposed Development. Extension to operational period not considered to result in cumulative effects with the Proposed Development.	n/a	*No*

19.4.6 On the basis of the above short list, the following developments identified in Table 19.5 are considered to have the potential to generate significant cumulative effects when considered alongside the Proposed Development, by virtue of their nature, proximity to the Proposed Development Site and/ or temporal scope (i.e. the planned timescales for construction and operation):

- ID1 - Humber Low Carbon Pipelines (PINS Ref: EN070006); and
- ID10 - North Lincolnshire Green Energy Park (PINS Ref: EN010116).

19.4.7 The locations of the shortlisted developments in relation to the Proposed Development are shown on **Figure 19.2** (ES Volume III – **Application Document Ref. 6.4**).

19.4.8 These developments have therefore been progressed to Stage 3 and 4 of the CEA and have been assessed in relation to each environmental topic included in the ES (ES Volume I, **Application Document Ref. 6.2**), with the exceptions of Climate Change and Sustainability and Major Accidents and Disasters (discussed below).

19.4.9 **Chapter 17:** Climate Change and Sustainability (ES Volume I - **Application Document Ref. 6.2**) assesses the contribution that the Proposed Development makes to climate change as a result of GHG-emitting activities. Climate change is the result of cumulative impacts as it is the result of innumerable GHG-emitting activities from sources across the UK and beyond. The cumulative effects of GHG emissions on the global climate are acknowledged as being potentially significant, but it is not possible to quantitatively assess these effects within this assessment. Whilst the emissions from the Proposed Development alone can be estimated and compared against sectoral national carbon budgets, as has been undertaken in **Chapter 17:** Climate Change and Sustainability (ES Volume I – **Application Document Ref. 6.2**) and determined to be not significant, the combined effect together with all other GHG-emitting activities cannot be assessed due to data not being available.

19.4.10 Once neighbouring industries are able to connect to the Humber Low Carbon Pipeline network and carbon can be captured from existing sources, it is envisaged that the Proposed Development will form part of a decarbonised cluster that could result in a net reduction in carbon emissions from current levels.

19.4.11 The Climate Change Resilience (CCR) assessment reported in **Chapter 17:** Climate Change and Sustainability (ES Volume I - **Application Document Ref. 6.2**) and supported by **Appendix 17A**: Sustainability Review (ES Volume II – **Application Document Ref. 6.3**) considers the influence of climate change upon the Proposed Development itself and therefore a cumulative or combined assessment of CCR is not applicable.

19.4.12 With regards Major Accidents and Disasters, cumulative effects assessment has not been undertaken in this chapter given the assessment of cumulative

effects is inherent in **Chapter 18**: Major Accidents and Disasters (ES Volume I – **Application Document Ref. 6.2**) which considers potential effects of other projects and developments; in particular domino effects. The chapter specifically identifies sites which are (or have the potential to be given previous hazardous substances consent status) licenced under the Control of Major Accident Hazard (COMAH) Regulations (HM Government, 2015), be classified under the Pipelines Safety Regulations (PSR) (HM Government, 1996) as a Major Accident Hazard Pipeline (MAHP) or require Hazardous Substances Consent (HSC) under the Planning (Hazardous Substances) Regulations as amended (HM Government, 2015).

19.4.13 The measures to reduce the risk to As Low as Reasonably Practicable (ALARP) in **Chapter 18**: Major Accidents and Disasters (ES Volume I – **Application Document Ref. 6.2**) are considered appropriate for any future potential COMAH, MAHP or HSC development and on this basis, it has been concluded that there would be no significant residual effects as a result of the Proposed Development. As there would be no residual effects, either during construction or operation of the Proposed Development, consideration of cumulative effects due to major accidents and disasters has been scoped out of this assessment.

Stage 3: Information Gathering

19.4.14 Following an initial information search on the short-listed developments at Stage 2, a search for more detailed information was made for the short-listed developments. In line with PINS Advice Note Seventeen (PINS, 2019a), this included searching for and noting the following information, where available:

- development design and location information;
- construction, operation and decommissioning information; and
- any accompanying environmental assessment information detailing baseline data and effects arising from other development.

19.4.15 As discussed in Section 19.4, the information gathered at this stage was primarily from the public domain (including North Lincolnshire Council, Doncaster Council planning portals and the Planning Inspectorate website).

19.4.16 Information available for each of the schemes carried forward for CEA is described below:

- ID1 – Humber Low Carbon Pipelines (PINS Ref. EN070006):
  - As the proposal is at a very early stage in development, limited information is available. The assessment has been based on the information available on PINS website (minutes of meetings), the project website, direct interaction with the Applicant and from knowledge of similar schemes.
- ID10 – North Lincolnshire Green Energy Park (PINS Ref. EN010116):

- EIA Scoping Report;
- EIA Scoping Opinion and late consultation responses; and
- the project website.

19.5 Cumulative Effects Assessment (Stage 4)

19.5.1 This section presents the results from the detailed CEA conducted for the two developments scoped into the CEA (a Tier 2 and Tier 3 development). These developments are shown on **Figure 19.2** (ES Volume III - **Application Document Ref. 6.4**). Section 19.6 considers in turn each 'scoped in' environmental discipline and assesses whether effects associated with each short-listed development would be able to interact with the effects associated with the Proposed Development in a manner that has the ability to generate potentially significant cumulative effects.

19.5.2 Where the location of a development (e.g. ID10, 4.5km from the Proposed Development Site) falls outside of the study area for a topic (e.g. noise and vibration - 1km), this development has been scoped out for that topic on the basis of distance and there being no reasonable pathway by which effects could propagate, unless otherwise stated.

Air Quality

Table 19.6: Air Quality Cumulative Effects Assessment

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Air Quality						
10	2	EN010116	North Lincolnshire Green Energy Park Limited Energy Recovery Facility converting up to 650,000 tonnes per annum of Refuse Derived Fuel (RDF) to generate a maximum of 95 megawatts of electrical output (MWe) and/or 380 Mega Watts of thermal output (MWt) to provide power, heat and steam on the site of the operating Flixborough Wharf on the River Trent.	This scheme is located on the eastern bank of the River Trent at Flixborough. It is at an early stage (EIA scoping opinion received). The scoping report (ERM, 2020) notes that *'if the DCO Application is submitted in Q3 2021, the earliest approval would be Q4 2022. Construction would therefore begin no sooner than Q1 2023 and will take three years to complete. Operation is expected to begin in 2025/26'.* There is therefore potential for temporal scope overlap	Other than the mitigation measures already proposed (refer to **Chapter 8**: Air Quality (ES Volume I – **Application Document Ref. 6.2**)), no further mitigation measures to reduce potential cumulative air quality effects are required within this Application. It will be for the North Lincolnshire Green Energy Park NSIP to consider the need for additional mitigation should that be required, although based on distance and the nature of emissions, cumulative effects are considered unlikely.	No significant residual effects are anticipated, as reported in **Chapter 8**: Air Quality (ES Volume I – **Application Document Ref. 6.2**) and no cumulative effects are anticipated.

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Air Quality						
				and releases of substances to air that require cumulative effects assessment. This NSIP will be submitted (anticipated later in 2021) after the Proposed Development. It is therefore a requirement that this application considers the Proposed Development. PINS has advised that Applicant (Section 51 advice, PINS website) that a number of other NSIP require consideration, including the cumulative effects of North Lincolnshire Green Energy Park with the		

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Air Quality						
				Proposed Development in that application.		

Noise and Vibration

19.5.3 An assessment of potential cumulative noise and vibration effects due to the Proposed Development and ID1 is presented in Table 19.7.

Table 19.7: Noise and Vibration Cumulative Effects Assessment

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Noise and Vibration						
1	3	EN070006	National Grid Carbon. Construction of carbon dioxide (to facilitate CCUS) and hydrogen (H_2) transportation pipelines between Drax in North Yorkshire and Easington in East Riding of Yorkshire, connecting various emitters and generators, including the Proposed Development in the Humber.	The exact location of pipeline construction is currently unknown although it will be linked directly to the Proposed Development (an indicative connection location has been identified in the north-west corner of the Proposed PCC Site where the carbon dioxide compression infrastructure is proposed to be sited). The assessment has therefore been based upon information from other pipeline projects and professional judgement. Noise assessments of similar	Other than the mitigation measures already proposed (refer to **Chapter 9**: Noise and Vibration (ES Volume I – **Application Document Ref. 6.2**)), no further mitigation measures to reduce potential cumulative noise and vibration effects are required within this Application. It	No significant residual effects are anticipated, as reported in **Chapter 9**: Noise and Vibration (ES Volume I – **Application Document Ref. 6.2**) and no cumulative

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Noise and Vibration						
				pipeline projects show there is potential for short-term minor adverse effects where pipeline construction is within 120 m of a noise sensitive receptor (NSR). If pipeline construction is simultaneous with construction of the Proposed Development and is within 120m of the NSR included in **Chapter 9:** Noise and Vibration (ES Volume I – **Application Document Ref. 6.2**) there is a potential for significant cumulative effects. It is noted that a detailed cumulative assessment will be included as part of the Humber Low Carbon Pipelines application (anticipated Q3 2022) and that it will be a requirement for the Humber	will be for the Humber Low Carbon Pipeline NSIP to consider the need for additional mitigation.	effects are anticipated.

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Noise and Vibration						
				Low Carbon Pipelines to take account of the effects of the Proposed Development as a committed development.		

Traffic and Transport

19.5.4 An assessment of potential cumulative traffic and transport effects due to the Proposed Development, ID1 and ID10 is presented in Table 19.8.

Table 19.8: Traffic and Transport Cumulative Effects Assessment

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Traffic and Transport						
1	3	EN070006	National Grid Carbon. Construction of carbon dioxide (to facilitate CCUS) and hydrogen (H_2) transportation pipelines between Drax in North Yorkshire and Easington in East Riding of Yorkshire, connecting various emitters and generators, including the Proposed Development in the Humber.	Limited construction overlap with pipeline. Details on traffic movements for the development are not yet available; however, vehicle movements are not expected to affect the immediate highway network in the vicinity of the Proposed Development. The application for the Humber Low Carbon Pipelines project would be expected to consider the cumulative effects of	Other than the mitigation measures already proposed (refer to **Chapter 10**: Traffic and Transport (ES Volume I – **Application Document Ref. 6.2**)), no further mitigation measures to reduce potential traffic and transport effects are required within this Application. It will be for the Humber Low Carbon Pipeline NSIP to consider the need for additional mitigation.	No significant residual effects are anticipated, as reported in **Chapter 10**: Traffic and Transport (ES Volume I – **Application Document Ref. 6.2**) and no cumulative effects are anticipated.

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Traffic and Transport						
				the Proposed Development.		
9	2	EN010116	North Lincolnshire Green Energy Park Limited. Energy Recovery Facility converting up to 650,000 tonnes per annum of Refuse Derived Fuel (RDF) to generate a maximum of 95 megawatts of electrical output (MWe) and/or 380 Mega Watts of thermal output (MWt) to provide power, heat and steam on the site of the operating Flixborough Wharf on the River Trent.	The only data available at present is the EIA Scoping Report and EIA Scoping Opinion. Given the early stage (scoping) of this NSIP, limited data is available to enable a quantitative assessment of any likely cumulative impacts. It is noted that PINS has advised the applicant of the energy park of the needs to take the Proposed Development into account in its assessment of cumulative effects. Based upon the timeline advised to PINS, initial information on	Other than the mitigation measures already proposed (refer to **Chapter 10**: Traffic and Transport (ES Volume I – **Application Document Ref. 6.2**)), no further mitigation measures to reduce potential cumulative noise and vibration effects are required within this Application. It will be for the North Lincolnshire Green Energy Park NSIP to consider the need for additional mitigation.	No significant residual effects are anticipated, as reported in **Chapter 10**: Traffic and Transport (ES Volume I – **Application Document Ref. 6.2**) and no cumulative effects are anticipated.

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Traffic and Transport						
				cumulative effects in relation to transport may accompany the statutory consultation planned for Q2 2021, with a final assessment of cumulative effects which takes into account the Proposed Development and other relevant developments to be published on submission of the DCO application in Q4 2021. No further assessment has therefore been undertaken because this NSIP will be submitted after the Proposed Development Application. Consequently, the cumulative effects of the projects will be		

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Traffic and Transport						
				considered in the cumulative assessment for North Lincolnshire Green Energy Park.		

Biodiversity and Nature Conservation

19.5.5 An assessment of potential cumulative biodiversity and nature conservation effects due to the Proposed Development, ID1 and ID10 is presented in Table 19.9.

Table 19.9: Biodiversity and Nature Conservation Cumulative Effects Assessment

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Biodiversity and Nature Conservation						
1	3	N/A	National Grid Carbon. Construction of carbon dioxide (to facilitate CCUS) and hydrogen (H_2) transportation pipelines between Drax in North Yorkshire and Easington in East Riding of Yorkshire, connecting various emitters and generators, including the Proposed Development in the Humber	The exact location of the pipeline is currently unknown although it will be connected to the Proposed Development. Without knowledge of the location of this pipeline it is not possible to assess the exact effects. However, the ecological impact assessment presented in **Chapter 11:** Biodiversity and Nature Conservation (ES Volume I - **Application Document Ref. 6.2**) identifies few ecological	Other than the mitigation measures already proposed (refer to **Chapter 11**: Biodiversity and Nature Conservation (ES Volume I – **Application Document Ref. 6.2**)), no further mitigation measures to reduce potential cumulative effects are required within this Application. It will be for the Humber Low Carbon Pipeline NSIP to consider the need for additional mitigation.	No significant residual effects are anticipated, as reported in **Chapter 11**: Biodiversity and Nature Conservation (ES Volume I – **Application Document Ref. 6.2**) and no cumulative effects are anticipated.

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Biodiversity and Nature Conservation						
				features likely to be affected by both developments to cause a cumulative effect. The Proposed Development Site has been chosen to minimise the potential for impacts and effects on notable habitats and species. The only ecological feature with potential to experience a cumulative effect, and then only during construction works (should these coincide) is the ornithological interest of the Humber Estuary SPA and Ramsar site. This has been assessed in detail in the Habitats Risk Assessment (HRA) Screening Report (**Application Document**		

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Biodiversity and Nature Conservation						
				Ref. 5.12). Within this report it is concluded that it is unlikely that construction works in-combination would exceed the 70db threshold set for an adverse noise effect on birds at the location of habitats of importance for the designated ornithological interest.		
9	2	N/A	North Lincolnshire Green Energy Park Limited. Energy Recovery Facility converting up to 650,000 tonnes per annum of Refuse Derived Fuel (RDF) to generate a maximum of 95 megawatts of electrical output	The only potential pathway for a cumulative effect is emissions to air from operation of the two developments. This scheme is at an early stage (EIA scoping opinion received) and consequently the DCO for the Proposed Development will have	Other than the mitigation measures already proposed (refer to **Chapter 11**: Biodiversity and Nature Conservation (ES Volume I – **Application Document Ref. 6.2**)), no further mitigation measures to reduce potential cumulative effects are required within this	No significant residual effects are anticipated, as reported in **Chapter 11**: Biodiversity and Nature Conservation (ES Volume I – **Application Document Ref. 6.2**) and no

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Biodiversity and Nature Conservation						
			(MWe) and/or 380 Mega Watts of thermal output (MWt) to provide power, heat and steam on the site of the operating Flixborough Wharf on the River Trent.	been submitted prior to any application for this scheme. Given the limited information available, the stated timeline and because it is not certain that this project will be approved, it is not proportionate to consider it part of the future baseline against which the Proposed Development should be assessed. It will be the responsibility of the developer pursuing this project to ensure that the Proposed Development is taken account as part of the cumulative assessment for this project at the time	Application. It will be for the North Lincolnshire Green Energy Park NSIP to consider the need for additional mitigation.	cumulative effects are anticipated.

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Biodiversity and Nature Conservation						
				of submission of the DCO application.		

Water Environment and Flood Risk

19.5.6 An assessment of potential cumulative water environment and flood risk effects due to the Proposed Development, ID1 and ID10 is presented in Table 19.10.

Table 19.10: Water Environment and Flood Risk Cumulative Effects Assessment

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Water Environment and Flood Risk						
1	3	EN070006	National Grid Carbon. Construction of carbon dioxide (to facilitate CCUS) and hydrogen (H_2) transportation pipelines between Drax in North Yorkshire and Easington in East Riding of Yorkshire, connecting various emitters and generators, including the Proposed Development in the Humber	The exact location of the pipeline is currently unknown although it will be connected to the Proposed Development. Without knowledge of the location of this pipeline it is not possible to assess the exact effects. Further construction works at the Proposed Development Site would be required to connect the pipeline, and an indicative location in the north-west of the Proposed PCC Site has been identified. There	Other than the mitigation measures already proposed (refer to **Chapter 12**: Water Environment and Flood Risk (ES Volume I – **Application Document Ref. 6.2**)), no further mitigation measures to reduce potential cumulative effects are required within this Application. It will be for the Humber Low Carbon Pipeline NSIP to consider the need for additional mitigation.	No significant residual effects are anticipated, as reported in **Chapter 12**: Water Environment and Flood Risk (ES Volume I – **Application Document Ref. 6.2**) and no cumulative effects are anticipated.

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Water Environment and Flood Risk						
				would be no cumulative effect on flood risk as the Flood Risk Assessment for the Proposed Development (**Appendix 12A** (ES Volume II – **Application Document Ref. 6.3**)) has determined that there is only residual risk of flooding at the Proposed Development Site as a result of a breach in flood defences. If there is overlap between construction of the pipeline and Proposed Development there is the potential for short term, temporary construction related pollutants generated from both sites to impact		

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Water Environment and Flood Risk						
				on watercourses in the study area. However, provided that standard and good practice mitigation is implemented on the above construction sites through their respective Construction Environmental Management Plans (CEMP) and as per the conditions of the relevant construction permits and licences, the cumulative risk can be effectively managed and there would not be a significant increase in the risks to any waterbodies. Given the nature of the pipeline there are not expected to be any		

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Water Environment and Flood Risk						
				operational cumulative effects, and so no adverse cumulative effects with the Proposed Development.		
9	2	EN010116	North Lincolnshire Green Energy Park Limited. Energy Recovery Facility converting up to 650,000 tonnes per annum of Refuse Derived Fuel (RDF) to generate a maximum of 95 megawatts of electrical output (MWe) and/or 380 Mega Watts of thermal output (MWt) to provide power, heat and steam on the site of the operating Flixborough Wharf on the River Trent.	Should there be overlap between construction of the North Lincolnshire Green Energy Park and the Proposed Development there is the potential for short term, temporary construction related pollutants generated from both sites to impact on the River Trent. However, provided that standard and good practice mitigation is implemented on the construction sites through their respective	Other than the mitigation measures already proposed (refer to **Chapter 12**: Water Environment and Flood Risk (ES Volume I – **Application Document Ref. 6.2**)), no further mitigation measures to reduce potential cumulative effects are required within this Application. It will be for the North Lincolnshire Green Energy Park NSIP to consider the need for additional mitigation.	No significant residual effects are anticipated, as reported in **Chapter 12**: Water Environment and Flood Risk (ES Volume I – **Application Document Ref. 6.2**) and no cumulative effects are anticipated.

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Water Environment and Flood Risk						
				CEMP and as per the conditions of the relevant permits and licences, the cumulative risk can be effectively managed and there would not be a significant increase in the risks to the River Trent. It is assumed that a drainage strategy for the North Lincolnshire Green Energy Park will be produced with reference to the relevant policies and guidance documents outlined in **Chapter 12:** Water Environment and Flood Risk (ES Volume I – **Application Document Ref. 6.2**). The Proposed Development assessed in this chapter will		

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Water Environment and Flood Risk						
				similarly be designed to ensure no long-term deterioration in water quality or increase in flooding. Attenuation and treatment will be provided for runoff from the Proposed Development prior to discharge to waterbodies. As such, provided that all the mitigation measures are implemented for both schemes, then the cumulative impacts from the Proposed Development and the above schemes will have negligible impact on flooding and water quality.		

Geology, Hydrogeology and Land Contamination

19.5.7 An assessment of potential cumulative geology, hydrogeology and land contamination effects due to the Proposed Development, ID1 is presented in Table 19.11.

Table 19.11: Geology, Hydrogeology and Land Contamination Cumulative Effects Assessment

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Geology, Hydrogeology and Land Contamination						
1	3	N/A	Humber Low Carbon Pipelines	Details of the Humber Low Carbon Pipelines development are not currently available, but it is assumed that trenching and minor dewatering may be required during construction. Based on the contaminated land risk and impact assessment in **Chapter 13:** Geology, Hydrogeology and Land Contamination (ES Volume I – **Application Document Ref. 6.2**), there may be some temporary minor adverse effects during construction from ground disturbance or where groundwater controls may inadvertently mobilise contamination or create preferential pathways. It is assumed that the Humber Low Carbon Pipeline development will have its own CEMP to mitigate impacts during	Other than the mitigation measures already proposed (refer to **Chapter 13**: Geology, Hydrogeology and Land Contamination (ES Volume I – **Application Document Ref. 6.2**)), no further mitigation	No significant residual effects are anticipated, as reported in **Chapter 13**: Geology, Hydrogeology and Land Contamination (ES Volume I – **Application Document Ref. 6.2**) and no cumulative

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Geology, Hydrogeology and Land Contamination						
				construction and therefore no resulting significant adverse effects are anticipated. There may be beneficial effects associated with remediation if the pipeline development affects contaminated land that results in removal of potential contaminant sources or mitigation. However, it is not considered that this will result in any significant beneficial effects. There is unlikely to be any potential for cumulative effects.	measures to reduce potential cumulative effects are required within this Application. It will be for the North Lincolnshire Humber Low Carbon Pipeline NSIP to consider the need for additional mitigation.	effects are anticipated.

Landscape and Visual Amenity

19.5.8 An assessment of potential landscape and visual effects due to the Proposed Development, ID1 and ID10 is presented in Table 19.12.

Table 19.12: Landscape and Visual Amenity Cumulative Effects Assessment

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Landscape and Visual Amenity						
1	3	EN070006	National Grid Carbon. Construction of carbon dioxide (to facilitate CCUS) and hydrogen (H_2) transportation pipelines between Drax in North Yorkshire and Easington in East Riding of Yorkshire, connecting various emitters and generators, including the Proposed Development in the Humber	Details of the Humber Low Carbon Pipelines development is not known but it is assumed that the scheme will include open trenching works that will be of short duration and of a temporary nature. Any permanent structures will be relatively small in scale. Due to the scale of the Humber Low Carbon Pipelines development and the temporary nature of the construction works it is unlikely that there is any	Other than the mitigation measures already proposed (refer to **Chapter 14**: Landscape and Visual Amenity (ES Volume I – **Application Document Ref. 6.2**)), no further mitigation measures to reduce potential cumulative effects are considered possible or necessary within this Application. It will be for the Humber Low Carbon Pipeline NSIP to consider the need for additional mitigation.	No significant residual cumulative effects are anticipated.

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Landscape and Visual Amenity						
				potential for cumulative effects.		
10	2	EN010116	North Lincolnshire Green Energy Park Limited. Energy Recovery Facility converting up to 650,000 tonnes per annum of Refuse Derived Fuel (RDF) to generate a maximum of 95 megawatts of electrical output (MWe) and/or 380 Mega Watts of thermal output (MWt) to provide power, heat and steam on the site of the operating Flixborough Wharf on the River Trent.	Cumulative landscape and visual effects unlikely due to the distance from and lack of intervisibility with the Proposed Development Site.	Other than the mitigation measures already proposed (refer to **Chapter 14**: Landscape and Visual Amenity (ES Volume I – **Application Document Ref. 6.2**)), no further mitigation measures to reduce potential cumulative effects are considered possible or necessary within this Application. It will be for the North Lincolnshire Green Energy Park NSIP to consider the need for additional mitigation.	No significant residual cumulative effects are anticipated.

Cultural Heritage

19.5.9 An assessment of potential cultural heritage effects due to the Proposed Development, ID1 and ID10 is presented in Table 19.13.

Table 19.13: Cultural Heritage Cumulative Effects Assessment

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Cultural Heritage						
1	3	EN070006	National Grid Carbon. Construction of carbon dioxide (to facilitate CCUS) and hydrogen (H_2) transportation pipelines between Drax in North Yorkshire and Easington in East Riding of Yorkshire, connecting various emitters and generators, including the Proposed Development in the Humber	Details of the Humber Low Carbon Pipelines development are not known, but it is assumed that open trenching and minor dewatering may be required during construction and that the development will link directly to the Proposed Development Site. In terms of buried archaeological assets, open trenching associated with the 'other development' has the potential to impact peat deposits that may also be impacted by the Proposed	Other than the mitigation measures already proposed (refer to **Chapter 15**: Cultural Heritage (ES Volume I – **Application Document Ref. 6.2**)), no further mitigation measures to reduce potential cumulative effects are required within this Application. It will be for the Humber Low Carbon Pipeline NSIP to consider the need for additional mitigation.	No significant residual effects are anticipated on below ground assets, as reported in **Chapter 15**: Cultural Heritage (ES Volume I – **Application Document Ref. 6.2**) and no cumulative effects are anticipated.

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Cultural Heritage						
				Development. The peat deposits have the potential to contain important palaeoenvironmental data and archaeological remains. The dewatering may result in changes to local hydrology which may affect peat deposits and archaeological remains. The open trenching and dewatering associated with the 'other development' would likely impact only a very small proportion of the deposits/ archaeological remains and the spatial extent of the impact would be localised to the construction corridor. The significance of effect of the 'other development' on peat deposits and archaeological		

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Cultural Heritage						
				remains is unlikely to be greater than the effect reported for the Proposed Development. In terms of the setting of heritage assets and changes to historic landscape character, as the scheme will be predominantly below ground, any impacts would be of temporary duration and linked to construction activities such as traffic, lighting and noise. Any permanent structures are likely to be relatively small in scale. Due to the scale of the Humber Low Carbon Pipelines development and the temporary nature of the construction works it is unlikely that there is any potential for cumulative		

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Cultural Heritage						
				effects through change to the setting of heritage assets and changes to historic landscape character.		
10	2	N/A	North Lincolnshire Green Energy Park Limited. Energy Recovery Facility converting up to 650,000 tonnes per annum of Refuse Derived Fuel (RDF) to generate a maximum of 95 megawatts of electrical output (MWe) and/or 380 Mega Watts of thermal output (MWt) to provide power, heat and steam on the site of the operating Flixborough Wharf on the River Trent.	Due to the distance involved, the development would not result in impacts to buried archaeological assets that could also be impacted by the Proposed Development. As such, cumulative effects are not anticipated. Cumulative effects through change to the setting of heritage assets and changes to historic landscape character are unlikely due to the distance from the Proposed Development Site and the lack of impacts reported in the **Chapter 15**: Cultural Heritage (ES Volume I – **Application Document**	Other than the mitigation measures already proposed (refer to **Chapter 15**: Cultural Heritage (ES Volume I – **Application Document Ref. 6.2**)), no further mitigation measures to reduce potential cumulative effects on built heritage are required within this Application. It will be for the North Lincolnshire Green Energy Park NSIP to consider the need for additional mitigation.	No significant residual effects are anticipated on built heritage assets, as reported in **Chapter 15**: Cultural Heritage (ES Volume I – **Application Document Ref. 6.2**) and no cumulative effects are anticipated.

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Cultural Heritage						
				Ref. 6.2) arising from the Proposed Development in the area north-east of the Proposed Development Site between it and the 'other development'.		

Socio-economics

19.5.10 An assessment of potential socio-economic effects due to the Proposed Development and ID1, and ID10, is presented in Table 19.14.

Table 19.14: Socio-economics Cumulative Effects Assessment

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Socio-economics						
1	3	EN070006	National Grid Carbon. Construction of carbon dioxide (to facilitate CCUS) and hydrogen (H_2) transportation pipelines between Drax in North Yorkshire and Easington in East Riding of Yorkshire, connecting various emitters and generators, including the Proposed Development in the Humber	Details of the Humber Low Carbon Pipelines development are not known, but it will link into the Proposed Development Site. The construction of the scheme is likely to overlap with the Proposed Development and therefore may place added pressure on construction employees and the need for temporary worker accommodation. However, due to the size of the regional labour pool	Other than the mitigation measures already proposed (refer to **Chapter 16**: Socio-economics (ES Volume I – **Application Document Ref. 6.2**)), no further mitigation measures to reduce potential cumulative effects on are required within this Application. It will be for the Humber Low Carbon Pipelines NSIP to consider the need for additional mitigation.	No significant adverse residual effects are anticipated on, as reported in **Chapter 16**: Socio-economics (ES Volume I – **Application Document Ref. 6.2**) and no cumulative effects are anticipated.

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Socio-economics						
				and availability of hotel and rental accommodation, it is anticipated that there would not be a significant adverse residual cumulative effect in relation to temporary worker accommodation. The nature of the development means that no significant operational employment is likely to be generated and thus potential cumulative socio-economic effects would not be apparent during the schemes' operation.		
10	2	EN010116	North Lincolnshire Green Energy Park Limited. Energy Recovery Facility converting up to 650,000 tonnes per annum of	The scale of construction employment required for the NLEP is unclear at this stage and will likely be	Other than the mitigation measures already proposed (refer to **Chapter 16**: Socio-economics (ES Volume I	No significant adverse residual effects are anticipated on, as reported in

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Socio-economics						
			Refuse Derived Fuel (RDF) to generate a maximum of 95 megawatts of electrical output (MWe) and/or 380 Mega Watts of thermal output (MWt) to provide power, heat and steam on the site of the operating Flixborough Wharf on the River Trent.	included in the scheme's PEIR and ES. There is potential for construction phase overlap with the Proposed Development. However, due to the size of the regional labour pool and availability of hotel and rental accommodation it is anticipated that there would not be a significant adverse residual cumulative effect in relation to temporary worker accommodation. The nature of the develop suggests no operational employment would be generated and thus potential cumulative socio-economic effects would	– **Application Document Ref. 6.2**)), no further mitigation measures to reduce potential cumulative effects on are required within this Application. It will be for the Humber Low Carbon Pipelines NSIP to consider the need for additional mitigation.	**Chapter 16**: Socio-economics (ES Volume I – **Application Document Ref. 6.2**) and no cumulative effects are anticipated.

ID	Tier	Application Reference	Applicant for 'other development' and brief description	Assessment of cumulative effect with NSIP	Proposed mitigation applicable to NSIP including any apportionment	Residual cumulative effect
Socio-economics						
				not be apparent during the schemes' operation.		

19.6 Combined Effects Assessment

19.6.1 Combined effects are those that may arise when several different impacts resulting from the Proposed Development have the potential to affect a single receptor.

19.6.2 Each of the technical assessments reported in the ES (ES Volume I, **Application Document Ref. 6.2**) has identified effects which may occur as result of the Proposed Development, ranging from negligible or minor (**not significant**) to moderate and major (significant). Multiple effects upon one or more common receptors could theoretically interact or combine, to result in a combined effect which is more or less significant than the effects individually.

19.6.3 As described in Section 19.3, some of the technical assessments have already considered effects that result from the combination or interaction of different types of impacts on individual receptors. For example, the potential for multiple effects to affect the Humber Estuary SSSI, SAC and Ramsar sites is considered within **Chapter 11**: Biodiversity and Nature Conservation and **Chapter 12**: Water Environment and Flood Risk (ES Volume I – **Application Document Ref. 6.2**). Any effects arising from the interaction of impacts on individual receptors which have already been assessed within the technical assessments are not repeated here. This section considers only those combined effects which have not been identified elsewhere within the technical assessments. As such, this chapter considers only the potential combined effects on human receptors.

19.6.4 When considering combined effects, the mitigation measures as set out in **Chapters 8 to 18** (ES Volume I – **Application Document Ref. 6.2**) (including embedded mitigation measures built into the Proposed Development's design and measures embedded in the Framework CEMP (**Application Document Ref. 7.1**)) must be taken into account. Therefore, only residual effects (post-mitigation) are considered.

19.6.5 In assessing potential combined effects, human receptors experiencing effects of minor or greater magnitude have been considered. The types of impacts that could be experienced by these receptors and which may interact are noise, air quality, traffic and transport, visual and socio-economic effects, during construction noise, air quality, visual and socio-economic effects during operation.

19.6.6 Mitigation of any combined effects identified is best achieved through management and control measures employed to prevent or reduce the individual effects in the first instance, thereby reducing the likelihood of the effects interacting and combining.

19.6.7 The following sections provide a qualitative assessment of the potential for combined effects to arise, following a review of **Chapters 8-18** (ES Volume I – **Application Document Ref. 6.2**). Common receptors have been identified.

Combined Effects During Construction (Air Quality, Noise and Vibration, Traffic and Transport, Landscape and Visual and Socio-economics)

19.6.8 **Chapter 8**: Air Quality (ES Volume I – **Application Document Ref. 6.2**) considers air quality effects of road traffic emissions during the construction stage and for dust effects which have the potential during the construction phase to combine with noise, vibration and visual effects at some individual receptors located within 350m of the Proposed Development Site – this includes residents at Viewpoint 1 (Chapel Lane West Keadby), Viewpoint 2 (Gate Keepers Residence, Keadby). Transient receptors using PRoW are not identified as being sensitive for the air quality or noise assessments and have therefore not been considered in the combined effects assessment, although it is recognised that these receptors are sensitive to visual and amenity and traffic and transport effects, as identified in the respective chapters.

19.6.9 **Chapter 10**: Traffic and Transport (ES Volume I – **Application Document Ref. 6.2**) considers a range of different traffic-related effects on roadside receptors, including severance, pedestrian amenity, fear and intimidation, highway safety and driver delay. There is potential for receptors located close to the road network to experience combined effects from traffic (severance, pedestrian amenity, highway safety etc.), noise, vibration and air emissions during construction of the Proposed Development. However, given the controls on construction traffic that will be implemented, including HGV arriving/ departing the Proposed Development Site on the A18 from the west, the construction traffic assessment does not identify any significant effects on roadside receptors, (severance, pedestrian amenity, fear and intimidation or highway safety). As the air quality and noise assessments also do not identify any significant effects on sensitive receptors located close to the road network, it follows that combined effects on roadside properties due to road traffic and related air/ noise emissions are not anticipated to be significant.

19.6.10 **Chapter 16**: Socio-economics (ES Volume I – **Application Document Ref. 6.2**) considers the potential for construction of the Proposed Development to generate short-term disruption to the amenity of receptors in close proximity to the Proposed Development Site. Impacts on amenity include disruption to landscape and visual amenity, temporary noise effects, disruption through increased traffic movements and construction dust. The chapter indicates that with the implementation of appropriate mitigation and avoidance measures, no significant residual (combined) effects from construction noise, traffic and dusts are predicted to occur, although significant adverse visual effects on residents at Viewpoint 1 and Viewpoint 2 during construction would remain. The average estimated 1,076 net jobs during the construction phase of the Proposed Development is considered a major (**significant**) beneficial effect on the local area although the effect of this on individual receptors cannot be quantified/ assessed and for this reason, is not taken into consideration in the combined effects assessment.

Table 19.15: Potential for Significant Combined Effects (Construction)

Receptor	Receptor	Value/ sensitivity	Air Quality	Dust	Noise	Vibration	Visual	Socio-economics	Mitigation	Combined Effect
NSR1 **Viewpoint 2** **CDR1**	Vazon Bridge	High	NR	NR	NR	Minor adverse NR (sheet piling canal water abstraction option cofferdam)	Moderate adverse short term (**significant**) visual effects due to close range views of construction activity associated with the Proposed Development	NR	Mitigation will be employed such that the BS 5228 ABC noise limits are met, and the section 9.5 mitigation guidance is followed	Moderate adverse short term (no change)
NSR1A	Roe Farm	High	NR	NR	NR	NR	NR	NR	Mitigation will be employed such that the BS 5228 ABC noise limits are met, and the section 9.5 mitigation guidance is followed	No combined effect
NSR2	Hawthorne House	High	NR	NR	NR	NR	Moderate adverse short term	NR	Mitigation will be employed	Moderate adverse

Receptor	Receptor	Value/ sensitivity	Air Quality	Dust	Noise	Vibration	Visual	Socio-economics	Mitigation	Combined Effect
Viewpoint 1 **CDR2**							(**significant**) visual effects due to close range views of construction activity associated with the Proposed Development		such that the BS 5228 ABC noise limits are met, and the section 9.5 mitigation guidance is followed	short term (no change)
NSR3	Keadby Village	High	NR	NR	NR	NR	NR	NR	Mitigation will be employed such that the BS 5228 ABC noise limits are met, and the section 9.5 mitigation guidance is followed	No combined effect
NSR4 **CDR10 (Trentside Keadby)**	Mariners Arms Flats Blacksmiths Cottage	High	NR	NR	NR	Minor adverse NR (sheet piling river water abstraction option cofferdam)	NR	NR	Mitigation will be employed such that the BS 5228 ABC noise limits are met, and the	Minor adverse (**not significant**)

Receptor	Receptor	Value/ sensitivity	Air Quality	Dust	Noise	Vibration	Visual	Socio-economics	Mitigation	Combined Effect
									section 9.5 mitigation guidance is followed	
NSR5	Trent Side	High	NR	NR	NR	NR	NR	NR	Mitigation will be employed such that the BS 5228 ABC noise limits are met, and the section 9.5 mitigation guidance is followed	No combined effect
NSR6	Queens Crescent	High	NR	NR	NR	NR	NR	NR	Mitigation will be employed such that the BS 5228 ABC noise limits are met, and the section 9.5 mitigation guidance is followed	No combined effect

Receptor	Receptor	Value/ sensitivity	Air Quality	Dust	Noise	Vibration	Visual	Socio-economics	Mitigation	Combined Effect
NSR7	Keadby Grange	High	NR	NR	NR	NR	NR	NR	Mitigation will be employed such that the BS 5228 ABC noise limits are met, and the section 9.5 mitigation guidance is followed	No combined effect
NSR8 **CDR15**	North Pilfrey Farm	High	NR	NR	NR	NR	NR	NR	Mitigation will be employed such that the BS 5228 ABC noise limits are met, and the section 9.5 mitigation guidance is followed	No combined effect
NSR9 **Viewpoint 7**	Ealand Poultry Farm	High	NR	NR	NR	NR	NR	NR	Mitigation will be employed such that the BS 5228	No combined effect

Receptor	Receptor	Value/ sensitivity	Air Quality	Dust	Noise	Vibration	Visual	Socio-economics	Mitigation	Combined Effect
									ABC noise limits are met, and the section 9.5 mitigation guidance is followed	
NSR10	North Moor Farm	High	NR	NR	NR	NR	NR	NR	Mitigation will be employed such that the BS 5228 ABC noise limits are met, and the section 9.5 mitigation guidance is followed	No combined effect
NSR11 **CDR11**	South Pilfrey Farm	High	NR	NR	NR	NR	NR	NR	Mitigation will be employed such that the BS 5228 ABC noise limits are met, and the section 9.5 mitigation	No combined effect

Receptor	Receptor	Value/ sensitivity	Air Quality	Dust	Noise	Vibration	Visual	Socio-economics	Mitigation	Combined Effect
									guidance is followed	

NSR = Noise Sensitive Receptor; CDR = Construction Dust Receptor; TR = Transport Receptor (construction); NR = No Residual Effect

Combined Effects During Operation (Air Quality, Noise and Vibration and Landscape and Visual)

19.6.11 **Chapter 8**: Air Quality (ES Volume I – **Application Document Ref. 6.2**) considers air quality effects of emissions from the stack(s) within the Proposed PCC Site, whilst the effects of road traffic emissions on air quality during the operational phase are screened out. As a result, there is no potential for significant combined air quality effects due to stack emissions and road traffic emissions on receptors.

19.6.12 The air quality assessment of operational impacts has assumed that the emission limit values (ELV) will be met for the operational plant as required under the Industrial Emissions Directive (IED) (European Commission, 2010) and in accordance with use of BAT under the environmental permitting regime. The residual environmental effects from operation of the Proposed Development (which also considers the operation of Keadby 2 Power Station in-combination) have been identified as negligible adverse (**not significant**) at all human health receptors during the operation phase.

19.6.13 **Chapter 9**: Noise and Vibration (ES Volume I – **Application Document Ref. 6.2**) concludes that there would be residual negligible to minor adverse effects at all NSR with the application of practical sound mitigation to reduce relevant noise at source for certain plant within the Proposed PCC site during operation.

19.6.14 Operational vibration was scoped out of further assessment (refer to **Chapter 9**: Noise and Vibration, Section 9.3 (ES Volume I – **Application Document Ref. 6.2**) and is therefore not applicable to the combined effects assessment.

19.6.15 Operational road traffic effects were also scoped out of further assessment (refer to **Chapter 10**: Traffic and Transport, Section 10.3 (ES Volume I – **Application Document Ref. 6.2**) and is therefore not applicable to the combined effects assessment.

19.6.16 **Chapter 14**: Landscape and Visual Amenity Assessment (ES Volume I – **Application Document Ref. 6.2**) identifies that there would be a moderate adverse effect on visual receptors including recreational users at three viewpoints (Viewpoint 1 - Chapel Lane West, Keadby; Viewpoint 2 – Gate Keepers Residence, Vazon Bridge, Keadby; and Viewpoint 4 - PRoW (KEAD9, KEAD10) north of Keadby) during operation of the Proposed Development, due to the close proximity and prominence of structures associated with the Proposed Development. In addition, in the future baseline operation assessment (scenario 2) with Keadby 1 Power Station structures removed, significant effects at Viewpoint 6 (Trunk Road, Keadby) would occur as a result of the close distance to the Proposed Development Site and lack of intervening vegetation.

19.6.17 There would be minor adverse effects on visual receptors at Viewpoint 5 PRoW (GUNN179), north-east Gunness, Viewpoint 8 PRoW (East8) Eastoft,

Viewpoint 9 Meredyke Road, Luddington, Viewpoint 10 Middle Lane, Amcotts, Viewpoint 11 PRoW (BURT171) accessed off Chafer Lane, Burton upon Stather, Viewpoint 12 Mill Road, Crowle and Viewpoint 13: PROW (BELT30/ BELT 34) Isle of Axholme.

19.6.18 **Chapter 16**: Socio-economics (ES Volume I – **Application Document Ref. 6.2**) identifies that there would be a minor/ negligible adverse effect associated with community disruption/ demographic change. No other residual effects on socio economics have been identified during operation. There would therefore be no combined socio-economic effects.

19.6.19 On the basis of the above, the potential for combined effects during operation is set out in Table 19.16 below.

Table 19.16: Potential for Significant Combined Effects (Operation)

Receptor	Receptor	Value/ sensitivity	Air Quality	Noise	Visual	Socio-economics	Mitigation	Combined Effect
NSR1 **OR10** **Viewpoint 2**	Vazon Bridge	High	NR	NR	Moderate adverse long term (**significant**) visual effects due to close range views of construction activity associated with the Proposed Development	NR	Application of practical sound mitigation to reduce relevant noise sources. Mitigation measures would not be effective in reducing visibility in relation to visual amenity effects, so none are proposed.	Moderate adverse long term (no change)
NSR1A	Roe Farm	High	NR	NR	NR	NR	Application of practical sound mitigation to reduce relevant noise sources	No combined effect
NSR2 **Viewpoint 1** **OR**	Hawthorne House	High	NR	NR	Moderate adverse long term (**significant**) visual effects due to close range views of construction activity associated with the Proposed Development	NR	Application of practical sound mitigation to reduce relevant noise sources. Mitigation measures would not be	Moderate adverse long term (no change)

Receptor	Receptor	Value/ sensitivity	Air Quality	Noise	Visual	Socio-economics	Mitigation	Combined Effect
							effective in reducing visibility in relation to visual amenity effects, so none are proposed.	
NSR3 **OR2**	Keadby Village	High	NR	NR	NR	NR	Application of practical sound mitigation to reduce relevant noise sources	No combined effect
NSR4 (Trentside Keadby)	Mariners Arms Flats Blacksmiths Cottage	High	NR	NR	NR	NR	Application of practical sound mitigation to reduce relevant noise sources	No combined effect
NSR5	Trent Side	High	NR	NR	NR	NR	Application of practical sound mitigation to reduce relevant noise sources	No combined effect
NSR6	Queens Crescent	High	NR	NR	NR	NR	Application of practical sound mitigation to reduce relevant noise sources	No combined effect

Receptor	Receptor	Value/ sensitivity	Air Quality	Noise	Visual	Socio-economics	Mitigation	Combined Effect
NSR7 **OR4**	Keadby Grange	High	NR	NR	NR	NR	Application of practical sound mitigation to reduce relevant noise sources	No combined effect
NSR8 **OR3**	North Pilfrey Farm	High	NR	NR	NR	NR	Application of practical sound mitigation to reduce relevant noise sources	No combined effect
NSR9 **Viewpoint 7**	Ealand Poultry Farm	High	NR	NR	NR	NR	Application of practical sound mitigation to reduce relevant noise sources	No combined effect
NSR10 **OR11**	North Moor Farm	High	NR	NR	NR	NR	Application of practical sound mitigation to reduce relevant noise sources	No combined effect
NSR11 **OR8**	South Pilfrey Farm	High	NR	NR	NR	NR	Not required	No combined effect

NSR = Noise Sensitive Receptor; OR = Operational Air Quality Receptor; NR = No Residual Effect

19.7 Limitations or Difficulties

19.7.1 The cumulative assessment is based on information available at the time of the assessment regarding the environmental effects of the other potential or committed schemes in the vicinity of the Proposed Development Site that have been scoped into the assessment.

19.7.2 Any limitations that were encountered during the individual technical assessments are detailed within **Chapters 8-18** of this ES (ES Volume I – **Application Document Ref. 6.2**).

19.8 Summary of Likely Significant Residual Effects

19.8.1 The assessment of combined effects has considered the potential for the effects of minor significance and above, identified within each of the technical assessments reported within **Chapters 8 to 18** (ES Volume I – **Application Document Ref. 6.2**), to interact and combine to affect common receptors, and has concluded that there would be no new significant combined effects during either construction or operation of the Proposed Development. Those significant adverse residual effects assessed in relation to landscape and visual amenity during both construction and operational phases would remain classified as moderate adverse (**significant**) effects. The design and impact avoidance and mitigation measures proposed for noise and vibration and air quality would mean the new significant combined effects are avoided.

19.8.2 The assessment of cumulative effects has considered other developments within 15 km of the Proposed PCC Site (identifying 23 developments for consideration at Stage 1 in the long list, and 20 for inclusion in the shortlist of developments, although the majority (18) of these were determined by topic specialists to be not relevant to their assessment given their small scale nature/ limited effects and thus have only been considered in future growth forecasts for the traffic and transport assessment (**Appendix 10A**: Traffic and Transport – **Application Document Ref. 6.3**).

19.8.3 Two schemes, both NSIP in very early (pre-Scoping)/ early (Scoping) stages were taken forward into assessment at Stages 3 and 4; and the potential for cumulative effects to arise, from one or both of these developments in combination with the Proposed Development has been assessed qualitatively using information available in the public domain. The assessment has concluded that based on the currently available information, significant cumulative effects are considered unlikely. However, available information is limited at this early stage of the development of these other projects. As such, the onus will be on the other respective NSIP projects to consider any potentially significant combined effects with this Proposed Development, taking into account information in this ES which will be in the public domain.

19.9 References

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