One Earth Solar Farm

Preliminary Environmental Information Report [EN010159]

Chapter 19: Cumulative Effects

May 2024

One Earth Solar Farm Ltd

Contents

19. Interaction of Effects and Cumulative Effects

Defining Interaction and Cumulative Effects

19.1. Under the EIA Regulations (see **Chapter 2** for further details on the EIA Regulations) there is a requirement to report on the likely significant effects arising from our Project and the 'cumulation of effects with other existing and/or approved project"1.

19.2. The EIA Regulations, at regulation 5(2) states 'The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors:

(a) population and human health;

(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC2 and Directive 2009/147/EC3;

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

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

(e) the interaction between the factors referred to in sub-paragraphs (a) to (d)"

19.3. This Chapter sets out the potential for interactive effects and cumulative effects as a result of our Project. These effects are defined as:

- Interactive effects – the likely combination of significant environmental effects generated by a development on a single receptor. For example, the combination of individual likely significant effects for noise, dust and visual impacts arising from the construction phase of our Project on a residential property. The effect interactions may arise where combination of impacts, which have been identified in **Chapters 7 to 18**, are considered likely to result in a new or different likely significant effect, or an effect of greater significance, than any one of the impacts on their own.

- Cumulative effects – the likely significant environmental effects as a result of interactions between the effects associated with a number of other exiting and/or approved projects in an area. This includes the cumulative effects from our Project along with other solar DCO projects (those that are on the PINs website) within 15km from our Project. The effects from a number of projects may, on an individual basis be not significant, but together (i.e. cumulatively), result in a likely significant effect.

19.4. The above interactive and cumulative effects for our Project are considered in the following subheadings.

[1] schedule 4 paragraph 5(e)

Interactive Effects

Methodology

19.5. The European Commission (EC)[2] has produced guidelines for the assessment of interactive effects which are "not intended to be formal or prescriptive, but are designed to assist EIA practitioners in developing an approach which is appropriate to a project…"

19.6. These guidelines were reviewed, and a receptor group-based approach was developed. **Table 19.1** summarises the process used for to establish the preliminary interactive effects on the construction, operation and decommissioning phases of our Project.

Table 19-1: Preliminary Interactive Effects Assessment Process

Process	Description
Step 1: Identify and categorise receptor groups	All topic sensitive receptor groups and their geographical locations were identified. These were then categorised by type.
Step 2: Identify impacts	All topic impacts associated with sensitive receptor groups were identified.
Step 3: Screen receptors and associated impacts	A screening exercise was undertaken upon the identified receptor groups and impacts. Items were screened out from further assessment if they were: • Receptor groups where no topic impacts overlap; • Receptor groups with no temporal overlap for topic impacts; or • Receptor groups where topic impacts are identified as 'negligible'
Step 4: Assess effect interactions	Qualitative assessment was undertaken based on professional judgement of the effect interactions.

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

19.7. The study area, or Zone of Influence (ZOI) for the interactive preliminary effects assessment was defined by the study areas of each technical assessment as presented in **Chapters 7 to 18** with the justifications for such also provided in these Chapters as relevant.

19.8. As per the preliminary assessment process shown in **Table 7.1**, Steps 1 and 2 were undertaken within each technical assessment (as presented in **Chapters 7 to 18**) as part of the assessment of effects process. Steps 3 and 4 were undertaken by Logika (the EIA co-ordinators) for both the construction, operational and decommissioning phases of our Project. Professional judgement was used to determine if the potential in-combination preliminary effects could lead to an effect interaction. Where a resultant preliminary effect interaction is identified, this is further discussed qualitatively.

19.9. The assessment considers there is a preliminary potential likely significant effect when:

- one or more preliminary significant effects from different EIA aspects (i.e. air quality, noise and vibration) as presented in **Chapters 7 to 18** coincide on a receptor or receptor group, and at least one of those effects has been assessed as being significant;
- if two or more preliminary 'not significant' effects which are close to a significance threshold as presented in **Chapter 7 to 18** coincide on a receptor or receptor group.

19.10. Where multiple preliminary 'not-significant' effects as identified in **Chapters 7 to 18** interact, the resulting effect interaction is typically considered to be 'not significant'.

Interactive Effects of our Project during the Construction and Decomissioning Phase

19.11. As detailed in **Chapter 17: Human Health** an assessment has been undertaken which considers the interactive effect of the technical disciplines contained within the ES on human health (including air quality, noise and vibration, socio-economics and visual effects). The health assessment shows there is a likely significant positive effect in the generation of employment and increased income, this preliminary impact is not considered to interact with any other environmental effects and as such the combined effects are "not significant".

19.12. **Chapter 7: Biodiversity** has also considered the in-combination effect of the technical disciplines contained within the ES on biodiversity. In particular, the assessment considers the in-combination preliminary effects of air quality, transport, noise and vibration, lighting and hydrology on biodiversity. Consequently, the assessment shows during the construction and decommissioning stages of our Project the combined effects would be unlikely to have a likely significant adverse impact on biodiversity and as such the likely effect on this group of receptors is 'not significant'.

19.13. During the construction phase of our Project, **Chapter 11: Cultural Heritage** identifies significant adverse effects to built heritage due to the construction and decommissioning works on designated and non-designated heritage assets within 1km from our Project. This is also identified in **Chapter 12: Landscape and Visual**, although the same effects identified, are attributed to the change in local landscape. Consequently, there are no other effects to interact with these built heritage receptors and as such the combined effects are 'not significant'. Similarly, as detailed in **Chapter 10: Buried Heritage**, there are no other interactive effects to impact buried heritage receptors, and as such the combined effects are 'not significant'.

19.14. It is considered that there is no potential for interactive effects for any other technical aspect.

19.15. Based on the above there are no likely preliminary significant effect interactions on receptor groups attributable to the construction phase of our Project.

Interactive Effects during the Operational Phase

19.16. The interactive effects on human health from our Project once operational (including air quality, noise and vibration, socio-economic and visual effects) have been considered in **Chapter 17: Human Health**. In particular the impact on climate change mitigation and adaption has considered the interactive effects on changes to climate change on both climate anxiety and physical health impacts and shows there is a significant positive effective. The health assessment shows there is a likely significant positive effect for wider societal infrastructure and resource (such as the generation of electricity to reduce energy costs) which considers the benefits to socio-economics, this impact is not considered to interact with any other environmental effects and as such the preliminary effects are "not significant".

19.17. **Chapter 11: Cultural Heritage** identifies the likely significant effects to built heritage due to the presence of the built development changing the local asset setting at Whimpton Moor Scheduled Monument, and designated heritage assets in Ragnall. This is also identified in **Chapter 12: Landscape and Visual**, although the same effects are identified, attributed to the change in local landscape. Consequently, there are no other effects to interact with these built heritage receptors (for example the noise and transport assessment does not identify any preliminary likely significant effects) and as such the combined preliminary likely effects are considered to be 'not significant'.

19.18. It is considered that there is no potential for interactive effects during operation for any other technical aspect.

19.19. Based on the above there are no preliminary likely significant effect interactions during operation on receptor groups attributable to our Project.

Next Steps

19.20. To confirm (or otherwise) in the ES the results of the interactive effects made, a further interactive assessment and review of the potential of significant effects will be undertaken. This will consider the predicted results from the further technical assessments to be undertaken for the ES as detailed in **Chapters 7 to 18**, and the predicted likely significant effects that are considered to arise.

Cumulative Effects

Methodology

The Planning Inspectorate Advice Note 17: Cumulative Effects Assessment (October 2015 and republished version 2 in August 2019) has formed the basis of assessing our preliminary cumulative effects between other existing development and/or approved development and our Project.

The staged approach detailed in Advice Note 17 considers the level of certainty of surrounding projects and the need to assess development plans and future development consents; acknowledging that there will be limited information available on the relevant proposals to base such assessment on. This includes:

- Stage 1: establish the scheme's zone of influence (ZoI) and identify a long list of 'other development';
- Stage 2: identify a shortlist of 'other development' for the cumulative impact assessment;
- Stage 3: information gathering; and
- Stage 4: assessment.

19.21. Details of the other existing development and/or approved developments to be considered within our preliminary assessment have been identified based on information available on the host authorities planning registers for Town and Country Planning Act 190 development, on PINS website for nationally significant infrastructure projects and discussed during the consultation stages.

19.22. A ZoI as 15km from our Project has been used. As discussed in **Chapter 12: Landscape and Visual**, the ZTVs presented in **Figures 12-1 and 12-2** demonstrate that any visibility of our Project, will be limited to a maximum distance of 5km from our Site. In theory, sequential cumulative visual effects on users of linear routes (e.g. long-distance recreational footpaths) could be influenced by developments beyond the ZoI of our Project itself. In order to consider this scenario, a maximum distance of 15km from our Site has been used.

19.23. The long list of 'other development has been defined as developments:

- that have planning permission (or development consent) but are not yet built; or
- where a planning application (or DCO application) has been submitted but a decision not yet made; or
- major projects that is likely to occur due to existing policy (as set out in Local Plans).

19.24. The longlist and a figure showing the other existing development and/or approved developments is included in **Appendix 19-1**.

19.25. Following the formation of the long list, as per Stage 2, a shortlist of other existing development and/or approved developments have been derived taking account of the following criteria as detailed in Advice Note 17. This shortlist considers developments, that in combination with our Project, have the potential to result in significant cumulative effect due to the following reasons:

- The other existing development and/or approved development has a construction, operational and/or decommissioning phase that overlaps with any phase of our Project;
- The other existing development and/or approved development and our Project share common sensitive receptors/resources which are assessed and described in **Chapters 7 to 18**, and have the potential to be significantly affected by the combination of the other existing development and/or approved development and our Project;
- The other existing development and/or approved development has sufficient environmental assessment information freely and publicly available to inform the interproject cumulative effects assessment. The assessment of each existing development and/or approved development on the shortlist will be proportionate to the environmental assessment information available.

19.26. In addition to the above, Advice Note 17 suggests that professional judgement may also be used to supplement the threshold criteria and in order to avoid excluding other existing development and/or approved development.

19.27. Using the above, the other existing development and/or approved developments have therefore been screened for their potential to act in a cumulative way with our Project and a shortlist derived. These other existing development and/or approved developments are provided in **Table 19-2**. This short list was produced in April 2024 and will be kept under review and sough to be agreed with the host authorities prior to the completion of the ES to allow for a robust assessment of cumulative effects.

Table 19-2: Shortlist of other Existing Development and/or Approved Development

Scheme ID	Application Reference	Brief Description	Distance from our Project	Status
5	21/01147/FUL	Installation of a Solar Farm and Battery Storage Facility with Associated Infrastructure	1.62km	Approved. Construction no year provided. Construction programme as 7 months. Operation timeframe as 40 years.
6	21/01735/COU	Full Planning Application for Change of Use From Greyhound Centre Track for the Siting of 16 Lodges for Holiday Use, Construction of a Lake with Centre Island and Associated Landscaping	0.03km	Approved. No details on construction or operation years.
7	22/00707/FUL	The Construction and Operation of a Solar Photovoltaic(PV) Farm with other Associated Infrastructure Including Sub Stations, Security Cameras, Fencing, Storage Containers, Access Tracks and Landscaping	0.34km	Approved. No details on construction or operation years Operation timeframe as 35 years and 1 year for decomissioning.

14	23/00801/FUL	Proposed Construction and Operation of An 8 MW Electrolytic Green Hydrogen Production Plant, with Associated Infrastructure Including HGV and Multi Cylinder Pack (MCP) Loading Areas, Vehicle Maintenance Unit, Staff Welfare Facilities and Control Room, 11KV Customer Sub-Station, Boundary Fencing, Internal Access Roads, Landscaping, External Lighting and Works.	0.34km	Approved. Operation proposed for 2029.
15	23/01135/FUL	Full Planning Application for the Construction and Operation of a Prototype Facility for the Production of Hydrogen from Ammonia, and Associated HGV Loading and Unloading Areas, Staff Welfare Building, Boundary Fencing, Internal Access Roads, External Lighting and Works (EIA Development)	0.34km	Approved. No details on construction or operation years.
17	24/00033/FUL	Construction and Operation of Additional Plant for Electrolytic Green Hydrogen Production and Associated Works	0.34km	Awaiting decision. Operation proposed for 2029.
26	20/02225/ELE	Proposed sub station	0.22km	Approved. No details on construction or operation years
27	21/01577/FULM	Installation of a solar farm and battery storage facility with associated infrastructure.	1.60km	Approved. No construction or operation year provided. Construction to undertake 7 months. Operation timeframe as 40 years.

32	EN010162	Great North Road Solar Park	7.58km	Pre-application. No construction or operation year provided. Operation timeframe as 40 years
46	EN010132	West Burton Solar Project	5.28km	Examination. Construction Year 2024. Operation in Year 2026. Operation timeframe as 40 years.
48	EN010154	Fosse Green Energy	6.11km	Pre-application – Construction Year 2031 with a 24-30month construction period. Operation timeframe as 40 years.
50	EN020034	North Humber to High Marnham	0.34km	Pre-application Construction Year 2027. Operation by 2031.
51	147270	North Humber to High Marnham PINS consultation on behalf of the Secretary of State for its opinion (a scoping Opinion) as to the information to be provided in an Environmental Statement - EN020034	0.34km	Issued Construction Year 2027. Operation by 2031

Cumulative Effects of Our Project

19.28. **Table 19-3** presents the effects arising from our Project during construction and decommissioning and once operational in combination with the other existing development and/or approved developments on each technical aspects considered in the ES (as presented in **Chapter 7 to 18**). It is noted that for the ES further information will be provided and will be presented in accordance with the PINs example, as detailed in Advice Note 17.

Table 19-3: Cumulative Effects with Other existing Development and/or approved Developments

Technical Topic	Construction and Decomissioning	Operation
Biodiversity	All of the other existing development and/or approved developments have the potential to effect local biodiversity through the temporary habitat loss rising from the construction phases. However, it is important to note that any habitat losses as a result of the construction works would not occur simultaneously. Instead, these habitat losses are likely to be spread out over several years, with habitat mitigation and creation works replacing any losses in turn and overall leading to a greater amount of more species-rich habitat in the area than currently exists. Thus, it is highly unlikely for a significant amount of local habitat to be lost at the same time. In addition, all of the other existing development and/or approved developments are sufficiently spaced apart and distanced from our Project, such that the local nature networks would not be adversely affected by the construction works. Assuming management plans (such as a Construction Environmental Management Plan (CEMP) and the Decommissioning Management Plan) are also put in place for the other existing development and/or approved developments, effects in relation to biodiversity should not give rise to any significant cumulative effects with our Project. The effect is therefore ‘not significant’.	Assuming the other existing development and/or approved developments abide by local green space, ecological mitigation and biodiversity net gain requirements (where applicable) within their construction, it is likely that the cumulative effects of the completed other existing development and/or approved developments could increase the health and value of local biodiversity and help to expand and connect the local nature network. Overall, the effect on biodiversity is positive but still considered to be ‘not significant’.

Hydrology and Hydrogeology	Construction of the other existing development and/or approved developments in the shortlist may increase the likelihood of surface water drainage regime and water quality effects in the local area. Assuming CEMPs are also put in place for the other existing development and/or approved developments, effects in relation to surface water and foul drainage should not give rise to any significant cumulative effects in combination with our Project. The effect is therefore 'not significant'.	Cumulative effects are not considered to be significant on the basis the other existing development and/or approved developments would also be required to prepare a Flood Risk Assessments and Drainage Strategies outlining management and mitigation measures to ensure there are no likely significant effects.
Land and Soils	There is the potential for cumulative effects on land, soils or groundwater receptors to occur for other existing development and/or approved developments that fall within 1km of our Project. Possible sensitive receptors include geological units, minerals, soil, agricultural land and groundwater. There are eight other existing development and/or approved developments which are within 1km of our Site, this includes other existing development and/or approved developments 6, 7, 14, 15, 17, 26, 50 and 51.	Most possible effects relating to land, soil or groundwater receptors relate to construction and decommissioning activities when the land is disturbed, with less likelihood of effects occurring as a result of operational activities, when the developments are constructed. It is considered that once built there are no likely cumulative significant effects.

	Generally, construction works for the listed developments will include similar potentially contaminative activities to those assessed for our Project, such as use and storage of fuels or chemicals, dealing with accidental spillages, or dealing with unexpected existing contamination. These good practice mitigation measures would be secured in each other existing development and/or approved developments CEMP and, where relevant, SMP. Site 6 is located 30m from our Site boundary, so it is possible that a contamination event on that site could result in movement of pollutants towards our Site. The geological units are classified as secondary aquifers, and there is the potential for migration of contaminants within the groundwater. Due to the proximity of Site 6 to our Site, there is also the potential for accidental release of contaminants at our Site to affect that site. However as above, with the implementation of good practice measures, included within the CEMP, there are no preliminary likely significant effects.	The effect on agricultural land associated with our Project is reversible in nature, unlike most built development where best and most versatile (BMV) land could be lost. After 60 years the land of our Project will be returned to the landowners for farming. The other solar developments are also considered to be largely reversible resulting in a limited permanent loss of BMV land. Therefore, in the context of the regional BMV land resource, a significant cumulative effect from the use of BMV land of these developments is not anticipated and it is anticipated that mitigation will be put in place for these developments to ensure ongoing agricultural practices are considered. A further review will be undertaken to inform the full cumulative effects assessment to be reported in the ES.

All other other existing development and/or approved developments within 1km are located greater than 200m from our Site boundary (from 220m to 340m). Given the nature of the geology (not highly permeable) and the topography (generally fairly level), and based on professional judgement, migration of contamination via groundwater is not considered likely to extend a sufficient distance from the boundaries of these other existing development and/or approved developments to affect our Site. In addition, as above with the implementation of good practice measures, included within the CEMP, there are no likely cumulative significant effects.

Physical characteristics of soil would only be affected by direct events within our Site boundary, so would not be expected to be impacted by the activities undertaken by works undertaken at the other existing development and/or approved developments. This potential interaction of soils would be controlled with the implementation of good practice measures, included within the SMP. Assuming SMPs are also put in place for the other existing development and/or approved developments (where relevant) there are no likely cumulative significant effects.

Buried Heritage	There are no known discrete archaeological features which overlap and would be affected by both our Project and the other existing development and/or approved developments so as to give rise to a cumulative effect. However, the cumulative effects of construction on buried heritage assets would remain the same as if only our Site were being considered, which is therefore not significant.	No cumulative effects would arise on archaeology from the completed other existing development and/or approved developments and our Project since no further ground disturbance would occur. There are no likely cumulative significant effects.
Cultural Heritage	The other existing development and/or approved developments which may have an impact of heritage assets are considered to be: > The solar development and a green hydrogen production plant at the former High Marnham Power Station (Schemes 7, 14, 15, 17). > The substation consented west of Thorney (Scheme 26). > Solar development consented to the east of our Site, between Normanton on Trent and Tuxford/Scarthingmoor (Schemes 5, 27). > The development of 16 holiday lodges consented to the north of Whimpton Moor/Ragnall (Scheme 6). > The NSIP for a new electricity transmission line between North Humber and High Marnham (Schemes 50, 51 – currently in pre-application).	The combination of the other existing development and/or approved developments with our Project may compound the existing character of the wider landscape, already heavily characterised by power infrastructure. In particular, this may increase the magnitude of effects on heritage assets in High Marnham and Low Marnham in combination with our Project. However, given that power infrastructure is already well-established in their settings and the other existing development and/or approved developments may have some screening effects of our Project, using professional judgement it is anticipated this would be a minor increase only and may actually reduce the effects of our Project in some instances.

	The combination of the other existing development and/or approved developments with our Project may increase the magnitude of effects to identified heritage assets during the construction and decommissioning phases, should these coincide. This would be due to the further presence of visible construction infrastructure (i.e. cranes), noise, dust and traffic. However, due to the smaller scale of many of these projects, it is anticipated at this stage that this would be a slight increase or consolidation of the effects of our Project only.	While there are consented developments near Thorney and Normanton on Trent, it is anticipated that these would be largely screened (i.e. by existing woodland in Thorney and by our Project) or at a sufficient distance away from both our Project and heritage assets (i.e. with Normanton on Trent) so that any additional effects would likely be minor or slight only. The holiday lodges consented to the north of Whimpton Moor/Ragnall may introduce further development to the setting of Whimpton House (Grade II) and Whimpton Moor (SM), albeit due to its scale and location, this is not anticipated to lead to additional effects in combination with our Project. With the exception of heritage assets mentioned, the immediate settings of most heritage assets considered in this assessment would not be further affected by cumulative development. As such no new cumulative effects are predicted although the magnitude may worsen. There are no likely cumulative significant effects.
Landscape and Visual	Cumulative Landscape Effects[3]	Cumulative Landscape Effects[18]

[3] Cumulative landscape effects may result where effects arising from several developments combine, increasing the prevalence of such development within a landscape to an extent where they may become a defining characteristic. The likely significance of these effects relates to the number of developments affecting the landscape, their scale, their inter-relationship and the sensitivity and ability of the particular landscape to accommodate this type of development.

Given its programme and proximity to our Project other existing development and/or approved developments 50 and 51 (the NSIP for a new electricity transmission line between North Humber and High Marnham) has the potential to result in cumulative landscape effects to landscape policy areas MNF PZ: 09 East Drayton and MNF PZ:12 Normanton on Trent during construction. It is noted there will be significant effects at these receptors with our Project in isolation, and as such no new cumulative effects are predicted, although the magnitude of impact may worsen due to the presence of additional construction works.	Year 1 The impact of other existing development and/or approved developments 6, 7, 14, 15, 17, 26, 50 and 51 would combine with impacts of our Project. The resulting cumulative effect on the character of the Site would be major adverse (significant).
Cumulative Visual Effects[4]	Other existing development and/or approved developments 5, 7, 14, 15, 17, 27, 50 and 51 would be located within MNF PZ: 12, increasing the amount of solar and associated infrastructure, increasing the impact on MNG PZ: 12 and therefore result in a cumulative effect of major adverse (significant). However, it is considered each scheme would include landscape enhancements to reduce their visual impacts. A further review will be undertaken to inform the full cumulative effects assessment to be reported in the ES.

[4] Cumulative visual effects may result where effects arise from several developments that combine to increase the appearance and dominance of the developments within the visual amenity experienced by a receptor. The likely significance of these effects relates to the number of developments visible and their scale, location and inter-relationship to each other within a view.

Given the distance, scale, typology and construction programme, only other existing development and/or approved developments 50 and 51 have the potential to result in cumulative landscape effects during construction with our Project. Significant effects resulting from the combination of our Project and other existing development and/or approved developments 50 and 51 are identified below:

- People travelling on the Sustrans route (VP34)
- Residents of Skegby (VP35): Potential for major adverse (significant) cumulative visual effect.
- Residents of Wells Farm (VP 37): Potential for major adverse (significant) cumulative visual effects.
- People walking on PRoW within the western edge of our Site, west of Main Street (VP40): major adverse (significant) cumulative visual effect.
- Residents of America Farm (VP44): Potential for major adverse (significant) cumulative visual effect.
- Residents of Darlton (VP45): Potential for major adverse (significant) cumulative visual effect.

Cumulative scheme 50 (North Humber to High Marnham) would physically and perceptually impact several landscape receptors found to be impacted by our Project. MNF PZ: 09 would be physically altered by our Project and cumulative scheme 50 and therefore the cumulative impact has potential to be major adverse given the extent of area impacted.

Other existing development and/or approved developments 32, 46 and 48 are NSIP scale solar projects. Their location means that there would not be cumulative impacts on local or regional landscape character areas, however they would all be within National Character Area (NCA) 48: Trent and Belvoir Vales. Given the scale of the projects they have potential to impact NCA 48,and considering NCA 48 is already characterised by energy infrastructure, the effects are considered negligible to minor adverse (significant).

No other landscape receptors would experience cumulative impacts given the location, scale and typology of the other existing development and/or approved developments identified.

Year 15

- People walking on PRoW north west of our Site (VP47 and VP48): Potential for major adverse (significant) cumulative visual effect.

It is noted there will be significant effects at these receptors with our Project in isolation, and as such no new cumulative effects are predicted, although the magnitude of impact may worsen due to the presence of additional construction works.

The cumulative landscape effects would remain as reported for Year 1, and therefore the cumulative impact on Site, MNF PZ: 12 and MNF PZ: 09 would be major adverse (significant).

Cumulative Visual Effects[19]

Year 1

No other existing development and/or approved developments of the same or related typology would be visible in the same view as our Project other than cumulative scheme 50 which is likely to introduce new overhead lines and towers on, or close to, our Site. The list below sets out the list of receptors likely to experience cumulative visual significant effects as a result:

- Residents of Wells Farm (VP 37): Potential for major adverse (significant) cumulative visual effects.
- People walking on PRoW within the western edge of our Site, west of Main Street (VP40): major adverse (significant) cumulative visual effect.
- Residents of America Farm (VP44): Potential for major adverse (significant) cumulative visual effect.

- Residents of Darlton (VP45): Potential for major adverse (significant) cumulative visual effect.
- People walking on PRoW north west of our Site (VP47 and VP48): Potential for moderate adverse (significant) cumulative visual effect.

It is noted there will be significant effects at these receptors with our Project in isolation, and as such no new cumulative effects are predicted.

Year 15

The visual impact of our Project would typically be reduced by year 15 given the establishment of mitigation planting. The level of cumulative visual impact therefore also typically reduces by year 15. The list below sets out receptors identified as being likely to experience significant cumulative visual effects at Year 15.

- Residents of Wells Farm (VP 37): Potential for major adverse (significant) cumulative visual effects.
- People walking on PRoW within the western edge of our Site, west of Main Street (VP40): major adverse (significant) cumulative visual effect.

	> Residents of America Farm (VP44): Potential for moderate adverse (significant) cumulative visual effect. > Residents of Darlton (VP45): Potential for moderate adverse (significant) cumulative visual effect. > People walking on PRoW north west of our Site (VP47 and VP48): Potential for moderate adverse (significant) cumulative visual effect. It is noted there will be significant effects at these receptors with our Project in isolation, and as such no new cumulative effects are predicted.
Transport and Access	A review has been undertaken on the likely network the other existing development and/or approved developments could take, which identifies there is capacity on the strategic road network. Based on the future baseline and potential traffic routing the preliminary likely effects are defined as 'not significant'. For the ES further work will be undertaken, using the latest cumulative scheme traffic information to quantify the effects.

Air Quality	The IAQM guidance[5] is clear that, with appropriate mitigation measures in place, any construction dust effects from an individual site would be 'not significant'. The guidance also suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Work would also have to be taking place in areas of both sites that are close to a receptor in order for cumulative effects to occur. In accordance with the Construction Environmental Measures Register (see **Appendix 4-2 in Chapters 1-6**) if there is concurrent construction work on sites within 500m of each other, the construction contractors for our Project would liaise with the construction contractors for other construction sites within 500m of our Site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.	The only cumulative effects associated with the operation of our Project and the operation of the other existing development and/or approved developments are changes in traffic emissions. Emissions from road traffic generated by our Project during operation have been scoped out as it is expected that our Project will generate up to 10 Light Goods Vehicles trips per day. There the effects of our Project with the other existing development and/or approved developments are considered 'not significant' in relation to road traffic emissions.

[5] Institute of Air Quality Management (2024) Assessment of dust from demolition and construction. Available at: Construction-Dust-Guidance-Jan-2024.pdf (iaqm.co.uk)

	It is expected that all other existing development and/or approved developments would adopt appropriate mitigation measures to limit emissions of dust; would hold the liaison meetings recommended above; and would ensure that plans are co-ordinated to minimise impacts upon the most sensitive receptors. With these measures in place, the cumulative effect of construction and decommissioning activities, should be 'not significant'. At this stage a qualitative assessment of air quality impacts from traffic emissions has been undertaken. Based on a review of the location of the other existing development and/or approved developments; the likely construction traffic routes the other existing development and/or approved developments would take; the background air quality concentrations; and the anticipated construction programme of our Project and the other existing development and/or approved developments it is unlikely there will be cumulative effects to local air quality, and the effects to road traffic emissions are considered 'not significant'. This will be quantified in the ES, through air quality dispersion modelling.
Carbon and Climate Change	Greenhouse Gases

The Institute of Environmental Management and Assessment (IEMA) Guidance for evaluation greenhouse gases makes it clear that climate change is "*the largest interrelated cumulative environmental effect*" and therefore the assessment of GHG emissions which contribute to climate is intrinsically cumulative.

On this point IEMA state that, "*The atmospheric concentration of GHGs and resulting effect on climate change is affected by all sources and sinks globally, anthropogenic and otherwise. As GHG emission impacts and resulting effects are global rather than affecting one localised area, the approach to cumulative effects assessment for GHGs differs from that for many EIA topics where only Projects within a geographically bounded study area of, for example, 10km would be included*".

The GHG assessment as presented in **Chapter 15: Carbon and Climate Change** considers the effects of our Project in the context of national and regional cumulative totals. Since the national totals assume that other developments will contribute GHGs, the assessment considers their implications in determining significance. In addition, the geographical location of emissions has no relevance to the assessment. Therefore, the effects of our Project are independent of any local cumulative emissions.

Taking this into account, an assessment of the GHG emissions associated with cumulative developments was not undertaken and the cumulative GHG effects are considered to be the same as those for our Project.

This is consistent with IEMA Guidance which states that, "*Effects of GHG emissions from specific cumulative Projects therefore in general should not be individually assessed, as there is no basis for selecting any particular (or more than one) cumulative Project that has GHG emissions for assessment over any other*".

As detailed in **Chapter 15: Carbon and Climate Change** our Project is expected to have a significant beneficial effect on climate as a result of the zero-carbon electricity it will generate during operation and the fossil fuel electricity generation that it is expected to displace as part of the UK National Grid.

<u>Climate Change Resilience</u>

	The climate resilience assessment considers the impacts of climate change on our Project and as such, the receptors for the assessment are our Project and its users. The changes in climate variables described in the baseline section will be experienced by all developments in the vicinity of our Project. However, the potential impacts from climate change may alter as a result of cumulative developments. Effects associated with higher summer temperatures and more extreme temperature events could be exacerbated by cumulative developments if they result in a large increase in hard surface in the vicinity of our Project (urban heat island effect). However, our Project is not in an urbanised region, and there are no major developments in sufficient proximity to our Project to materially affect the resilience of our Project to heatwaves. Cumulative effects with respect to climate resilience are therefore not significant.	
Noise and Vibration	There is the potential for cumulative construction traffic noise or vibration effects, as well as cumulative construction plant noise effects for the other existing development and/or approved developments within the area surrounding the High Marnham Power Station (other existing development and/or approved developments 7, 14, 15, 17, 50 and 51). Potential impacts would, however, be localised to this area. There are only a small number of properties in that area including Station House and the neighbouring residential properties on Fledborough Road. The potential for cumulative construction noise and vibration impacts between the High Marnham Power Station projects and our Project is therefore considered minimal.	As detailed in **Chapter 16: Noise and Vibration**, the majority of our Site will not contain plant or equipment that is likely to generate substantial levels of noise, and, where practical to do so, noise generating plant and equipment will be located away from noise sensitive receptors. As such in isolation it is unlikely that there will be significant operational noise effects. Taking into account the distances of the other existing development and/or approved developments, it is considered there would be no cumulative effects during operation.

	There is the potential for cumulative construction noise effects from our Project with other existing development and/or approved developments 50 and 51. At this stage, the schemes are at pre-application stage, therefore no information is available on likely construction activities or construction programme for that project. No detailed assessment of cumulative construction noise impacts can therefore be carried out at this stage for this project, however further information may become available prior to the production of the EIA. A further review will be undertaken to inform the full cumulative effects assessment to be reported in the ES. Given the above, the cumulative construction noise or vibration impacts are considered 'not significant.	
Human Health	In terms of cumulative effects on 'health related behaviours', there would continue to be opportunities for physical activity as infrastructure for walking and cycling within the vicinity of our Project would still be accessible during the construction phase. Based on the transport review and based on the information in **Table 7-2** it is unlikely that cumulative construction activities (such as increased construction traffic) will affect the same receptors at the same time. As such there are no likely cumulative significant effects.	With regard to 'social environment' determinants of health, during this phase there are unlikely to be additional effects on access to social and community infrastructure as a result of our Project coming forward in conjunction with the other existing development and/or approved developments. Cumulative effects in terms of transport and landscape and how these affect the community are considered elsewhere in this report.

	With regard to ‘social environment’ determinants of health (such as impacts on schools/ doctors/ play areas), during this phase there is unlikely to be an influx of families as the construction workers are likely to already live in the region or will be staying in temporary accommodation in the wider area. Consequently, there should be no change to how people access and connect to local services and social infrastructure. There are no likely cumulative significant effects.	In terms of the ‘economic environment’ determinants of health, several of the other existing development and/or approved developments are renewable energy-related projects, meaning the cumulative effect on building this specialist skills base will be positive as this is an increasingly important sector of the national economy and will be key to achieving net zero carbon in the future. As such there is the potential for a likely significant positive cumulative effect. Notwithstanding, there are unlikely to be any additional or new effects as a result of our Project coming forward in conjunction with the other existing development and/or approved developments.

	The data available from planning applications does not present a full picture of the total employment and training impacts resulting from the other existing development and/or approved developments. Although the schemes will not necessarily be built out at the same time, the other existing development and/or approved developments represent hundreds of millions of pounds of investment in the local construction sector. Combined, the schemes are likely to support hundreds of construction jobs per annum over the several years in which they are completed. As such, the cumulative effect on the 'economic environment' determinants of health is likely to be significantly positive considering the contributions towards mental health outcomes. It is assumed that the relevant local authorities and their partner organisations would work with developers to maximise the potential positive effects to the area of the construction activity for the other existing development and/or approved developments through measures, including identifying supply chain opportunities and support for training and apprenticeship provision. These would be subject to individual agreements with the relevant developers.	Considering the localised effects of electro-magnetic fields, potential for cumulative effects would be where cable routes run in close proximity to other cables of 132 kilovolts or more. Cumulative scheme 27 is also proposed to run underground cables to connect the approved 49.9mw solar farm to the existing High Marnham Substation (subject to the necessary licenses and permissions being sought). Cumulative scheme 50 and 51 seeks to reinforce the 400 kilovolt power network connecting to High Marnham Substation. As the National Grid are co-ordinating the various projects at High Marnham Substation, they will be ensuring electricity is transported safely and will be compliant with current regulations and guidance regarding electro-magnetic fields. As such there are no likely cumulative significant effects. Cumulatively the schemes would make a positive contribution towards wider societal infrastructure by providing the energy, houses and supporting infrastructure required to live healthy lives. As such there is the potential for a likely significant positive cumulative effect. Notwithstanding, there are unlikely to be any additional or new effects as a result of our Project coming forward in conjunction with the other existing development and/or approved developments on the 'institutional and built environment' determinants of health.

	> The other existing development and/or approved developments would only be actively contributing towards wider societal infrastructure and resources (such as clean and resilient electricity infrastructure) once they are operational, albeit there would be positive contributions to society in terms of economic development during this construction phase. As such, there would not be significant adverse cumulative effects in terms of the 'institutional and built environment' determinants of health.	
Socio-Economics	The construction phase of a number of other existing development and/or approved developments are expected to overlap with that of our Project and therefore the number of construction related jobs in the study area that are directly and indirectly supported may increase further when considered cumulatively. As our Project is expected to have a significant positive effect in isolation, any cumulative effects would not alter the significance of effect, but may increase the magnitude of the effect.	The operational phase of a number of other existing development and/or approved developments and our Project are likely to results in an increase in direct and indirect jobs in the study area. As our Project is expected to have a significant positive effect in isolation, any cumulative effects would not alter the significance of effect but may increase the magnitude of the effect. .

	With regards to the effect on PRoWs, no change to the significant cumulative effects identified are expected as the effects of our Project would be very localised and wholly contained within our Site boundary. This would also be the case for the other existing development and/or approved developments; thus, there is no overlap in terms of study area for effects on PRoWs. Furthermore, the effects would be temporary during the construction and decommissioning phases. As such no cumulative effects are predicted.	

19.29. **Table 19-3** shows there are no new significant cumulative effects to occur during the construction and decommissioning phases of our Project or once our Project is completed and operational.

Next Steps

19.30. To confirm (or otherwise) in the ES the results of the cumulative effects made, this cumulative assessment will be reviewed. In doing this we will consider the predicted results from the further technical assessments to be undertaken for the ES as detailed in **Chapters 7 to 18**, and the predicted likely significant effects. Further details on the long list and the short list, as well as the ZOI's used for the assessments will be included in the ES. An assessment cut-off date relating to the other existing development and/or approved developments to be considered within the cumulative assessments, will be reported within the ES, as advised in PINS Advice Note 17.

Appendices

Appendix 19-1: Long List of Existing Development and/or Approved Development

Appendix 19-1: Long List of Existing Development and/or Approved Development

Figure 19-1: Existing Development and/or Approved Development within 15km of Our Project

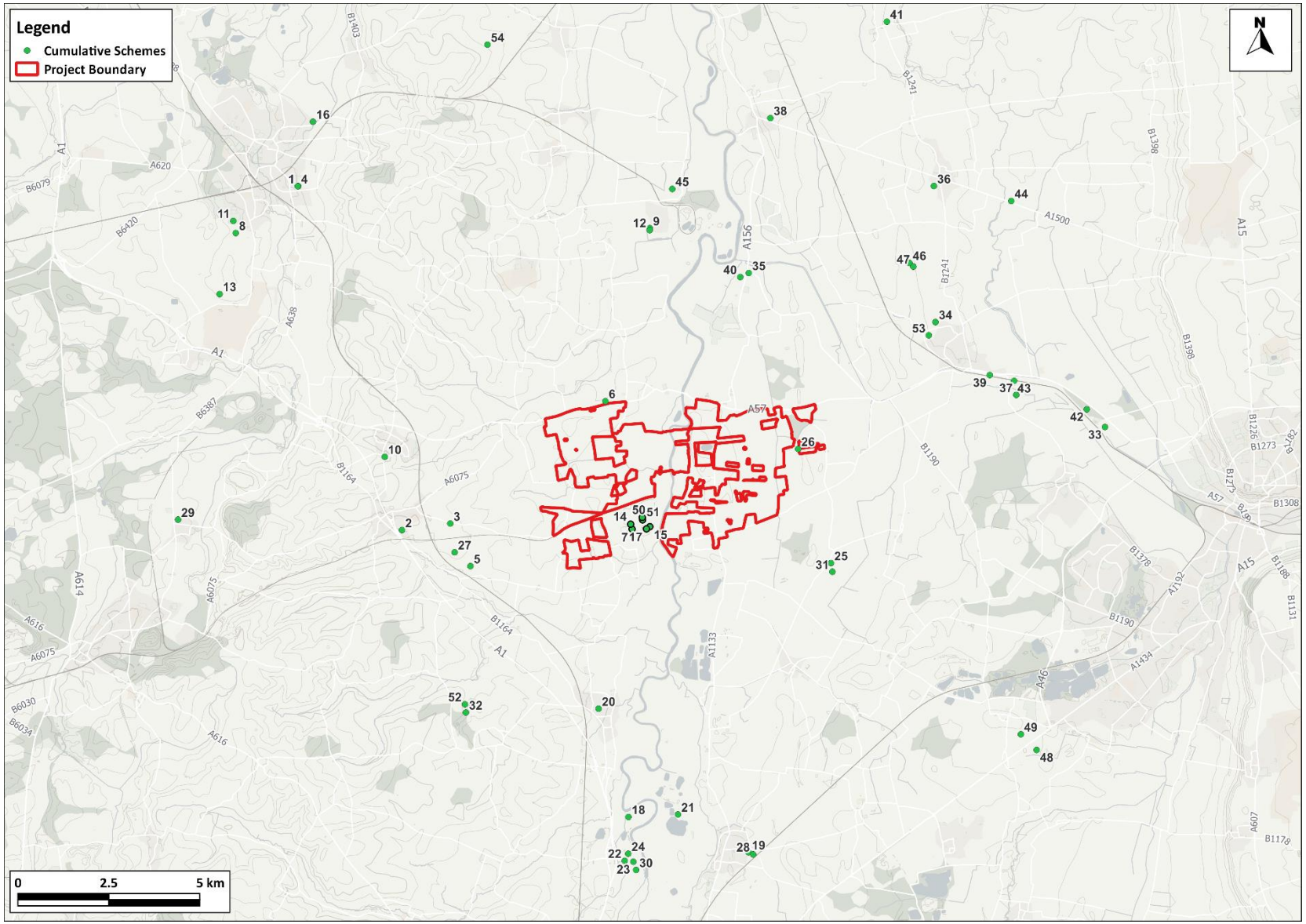

Table 1: Longlist of other Existing Development and/or Approved Development

Scheme ID	Application Reference	Brief Description	Distance from our Project	Status
1	19/00765/OUT	Outline Planning Application with Some Matters Reserved (Approval Being Sought for Access) for Residential Development of up to 71 Dwellings (Resubmission of 18/00747/OUT)	8.7km	Approved
2	19/01165/RES	Reserved Matters Application For Approval of Appearance, Landscaping, Layout, and Scale Following Outline P/A 15/00690/OUT For Residential Development of 86 Dwellings	3.9km	Approved
3	20/00298/FUL	Erect Manager's Lodge and Siting of Ten Static Caravans	2.4km	Approved
4	21/00554/RES	Reserved Matters Application for the Approval of Appearance, Landscaping, Layout and Scale for Residential Development of 71 Dwellings Following Outline P.A. 19/00765/OUT	8.7km	Approved
5	21/01147/FUL	Installation of a Solar Farm and Battery Storage Facility with Associated Infrastructure	1.6km	Approved
6	21/01735/COU	Full Planning Application for Change of Use From Greyhound Centre Track for the Siting of 16 Lodges for Holiday Use, Construction of a Lake with Centre Island and Associated Landscaping	0.03km	Approved
7	22/00707/FUL	The Construction and Operation of a Solar Photovoltaic(PV) Farm with other Associated Infrastructure Including Sub Stations, Security Cameras, Fencing, Storage Containers, Access Tracks and Landscaping	0.3km	Approved

8	22/01633/OUT	Outline Application With Some Matters Reserved (Approval Being Sought for Access) For Residential Development, a Local Centre, School, Community Hub, Sports Pitches, Extra Care Facility, Community Park, Landscaping, Supporting Infrastructure and Means of Access	9.6km	Awaiting decision
9	23/00224/NSIP	Notification of a Nationally Significant Infrastructure Project from The Planning Inspectorate under Section 56 of the Planning Act 2008 - Solar and Energy Storage Project	4.4km	Examination
10	23/00083/FUL	Demolition of Existing Agricultural Buildings and Construction of 12 no. New Build Dwellings with Associated Highways and Hard and Soft Landscaping	3.9km	Awaiting decision
11	23/00463/FUL	Sixteen Bay Golf Driving Range, Video Room, Ball Wash and Floodlights	9.7km	Awaiting decision
12	23/00295/NSIP	Notification of a Nationally Significant Infrastructure Project from The Planning Inspectorate under Section 56 of the Planning Act 2008 - Solar and Energy Storage Project	4.4km	Recommendation
13	23/00656/FUL	Installation of a Solar Farm with an Output of Approximately 45.4MW and Ancillary Works	9.2km	Approved
14	23/00801/FUL	Proposed Construction and Operation of An 8 MW Electrolytic Green Hydrogen Production Plant, with Associated Infrastructure Including HGV and Multi Cylinder Pack (MCP) Loading Areas, Vehicle Maintenance Unit, Staff Welfare Facilities and Control Room, 11KV Customer Sub-Station, Boundary Fencing, Internal Access Roads, Landscaping, External Lighting and Works.	0.3km	Approved

15	23/01135/FUL	Full Planning Application for the Construction and Operation of A Prototype Facility for the Production of Hydrogen from Ammonia, and Associated HGV Loading and Unloading Areas, Staff Welfare Building, Boundary Fencing, Internal Access Roads, External Lighting and Works (EIA Development)	0.3km	Approved
16	23/01302/FUL	Erection of 28 No. Dwellings Together with Access, Open Spaces, Drainage and Service Infrastructure	9.8km	Awaiting decision
17	24/00033/FUL	Construction and Operation of Additional Plant for Electrolytic Green Hydrogen Production and Associated Works	0.3km	Awaiting decision
18	19/00100/CMM	Proposed extraction of 1.8 million tonnes of sand and gravel together with the erection of mineral processing plant and associated ancillary infrastructure. The provision of a new access, and the progressive restoration of the site to nature conservation over a period of 9 years. To view application, please use following link: https://www.nottinghamshire.gov.uk/planningsearch/plandisp.aspx?AppNo=ES/3953	6.4km	No Objection
19	19/00072/RMAM	Erection of 60 extra care units with associated communal facilities and infrastructure within Phase 5 of the wider development	6.7km	Approved
20	19/00981/FUL	The installation of 5 x 4000 litre underground tanks with associated Secondary Regulator Housing Cabinet and amendments to the already approved equipped play area.	2.8km	Approved

21	19/01929/CMM	Planning application for an eastern extension to Besthorpe Quarry, (with retention of existing plant site, access and ancilliary facilities) along with restoration to water based nature conservation To view application; www.nottinghamshire.gov.uk/planningsearch/plandisp.aspx?AppNo=RefES/4058	7.9km	Decision by County Council Approve
22	19/02231/CMM	Proposed southern extension to the quarry for the extraction of approximately 550,000 tonnes of sand and gravel, with restoration to nature conservation. THIS APPLICATION IS BEING TWIN TRACKED WITH THE IDENTICAL APPLICATION ES/4082. To view application, please use following link: https://www.nottinghamshire.gov.uk/planningsearch/plandisp.aspx?AppNo=ES/4081	5.5km	Decision by County Council Approve
23	19/02232/CMM	Proposed southern extension to the quarry for the extraction of approximately 550,000 tonnes of sand and gravel, with restoration to nature conservation. THIS APPLICATION IS BEING TWIN TRACKED WITH THE IDENTICAL APPLICATION ES/4081 To view application, please use following link: https://www.nottinghamshire.gov.uk/planningsearch/plandisp.aspx?AppNo=ES/4082	5.5km	Decision by County Council Approve
24	20/00578/CMA	Proposed southern extension to the quarry for the extraction of approximately 550,000 tonnes of sand and gravel, with restoration to nature conservation. To view this application, please follow the link; http://www.nottinghamshire.gov.uk/planningsearch/plandisp.aspx?AppNo=ES/4081	5.5km	No Objection

25	21/02478/CMA	Creation of Fish Farming Ponds to involve incidental mineral extraction, processing and export of minerals, forming pre phase of the wider development granted under Appeal Decision ref: 19/00551/FULM. Details of the planning application are available on www.nottinghamshire.gov.uk/planningsearch/plandisp.aspx?AppNo=F/4338	3.9km	Objection Raised
26	20/02225/ELE	Proposed sub station	0.2km	Approved
27	21/01577/FULM	Installation of a solar farm and battery storage facility with associated infrastructure.	1.6km	Approved
28	21/02182/FULM	Residential development of 29 retirement bungalows with extra care (Use Class C2) with associated garages, parking and landscaping	8.4km	Approved
29	21/02607/FULM	Construction of 19 dwellings	9.9km	Approved
30	22/01790/CMA	Proposed southern extension to the quarry for the extraction of approximately 550,000 tonnes of sand and gravel with restoration to agriculture and nature conservation. For further details and to view this application please see the following link; https://www.nottinghamshire.gov.uk/planningsearch/plandisp.aspx?AppNo=ES/4441	6.4km	No objection
31	22/01612/FULM	Creation of Fish Farm Facility from Agricultural Land as a Farm Diversification Business	0.6km	Approved, Pre-construction
32	EN010162	Great North Road Solar Park	7.6km	Pre-application

33	138861	Application for lawful development certificate for the proposed use class and commencement of works of the 100 extra care dwellings, visitor centre and associated works in planning permission 138295	7.9km	Approved
34	138818	Application for approval of reserved matters for residential development of 111no. dwellings, to include associated estate roads and open space, considering appearance, landscaping, layout and scale, following outline permission 131174 allowed on appeal 09 December 2015.	4.3km	Approved
35	140171	Planning application to increase the 22 permanent residential units permitted in planning permission 137250 granted 22 September 2011 to 40 permanent residential units.	1.7km	Approved
36	140375	Planning application for the demolition of 20no. garages and the construction of 14no. affordable dwellings	6.3km	Approved
37	140696	Outline planning application for the material change of use of land, erection of buildings and associated development for employment uses falling within any of use classes B1 Business, B2 General Industrial and B8 Storage and Distribution, with means of access, layout of internal estate roads and drainage attenuation features to be considered. Layout (aside from internal estate roads and drainage attenuation features), appearance, landscaping and scale are reserved for future consideration	5.3km	Approved
38	141141	Application for approval of reserved matters for 39no. dwellings with associated parking & landscaping considering access, appearance, landscaping, layout & scale following hybrid application 133907 granted 24 October 2017.	5.8km	Approved

39	141455	Planning application to erect building for use as Storage and Distribution (B8) with ancillary offices (B1)including details of associated parking, landscaping and external lighting/signage	5.5km	Approved
40	141731	Application for approval of reserved matters considering access, appearance, landscaping, layout and scale following outline planning permission 140259 granted 30 December 2019 to erect 5no. dwellings.	1.6km	Approved
41	142225	Planning application for change of use of land from agricultural to siting of up to 12no. touring caravan pitches (4no. hardstanding and 8no. grass pitches), 2no. bell tents, 2no. glamping pods, creation of a permanent natural pond, associated access and parking and retention of building for welfare facilities.	9.4km	Approved
42	142592	Planning application for 26no. single storey modular homes for occupation by over 55 year olds, including access arrangements, parking and landscaping.	7.9km	Approved
43	145657	Application for approval of reserved matters to expand existing construction company site, with 3no. B1/B2/B8 buildings considering access, appearance, landscaping, layout and scale - following outline planning permission 142207 granted 16 February 2021.	7.6km	Approved
44	142207	Outline planning application to expand existing construction company site, with 3 no. /B1/B2/B8 buildings, with all matter reserved.	7.6km	Approved
45	146147	PINS consultation on Section 55 on adequacy of consultation request for application for an Order Granting Development Consent - Cottam Solar Project.	9.2km	Issued
46	EN010132	West Burton Solar Project	5.3km	Examination

47	146527	Consultation - Adequacy of consultation request	5.3km	Awaiting decision
48	EN010154	Fosse Green Energy	6.1km	Pre-application
49	146954	PINS consultation on behalf of the Secretary of State for its opinion (a scoping Opinion) as to the information to be provided in an Environmental Statement - EN010154	6.1km	Issued
50	EN020034	North Humber to High Marnham	0.3km	Pre-application
51	147270	PINS consultation on behalf of the Secretary of State for its opinion (a scoping Opinion) as to the information to be provided in an Environmental Statement - EN020034	0.3km	Issued
52	147577	PINS consultation on behalf of the Secretary of State for its opinion (a scoping Opinion) as to the information to be provided in an Environmental Statement - EN010162	7.6km	Awaiting decision
53	147672	Outline planning application for residential development of up to 100no. dwellings, including new junction to Sykes Lane, estate roads and associated infrastructure with all matters reserved.	3.5km	Awaiting decision
54	20/00117/FUL	Installation and Operation of a Solar Farm Comprising an Array of Ground Mounted Solar PV Panels with Associated Infrastructure Including Housing for Inverters a Substation Compound, Point of Connection Mast, Fencing, Security Cameras, Cabling, Access Tracks and a Temporary Construction Compound.	8.6km	Approved

one earth

solar farm