Cottam Solar Project

Environmental Statement Chapter 12:

Minerals

Prepared by: Clover Planning

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Cottam
SOLAR PROJECT

Contents

Issue Sheet

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DCO Submission

Environmental Statement Chapter 12: Minerals

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12 Background

12.1 Introduction

12.1.1 Clover Planning has been commissioned to carry out a Mineral Resource Assessment, in response to the EIA Scoping Opinion, for the Cottam Solar Project (hereafter referred to as the 'Scheme'). A full description of the Sites and Cable Route Corridor which make up the Scheme, which is the subject of the Development Consent Order (DCO) application, are provided in Chapter 3 The Order Limits **[EN010133/APP/C6.2.3]** and Chapter 4 Scheme Description **[EN010133/APP/C6.2.4]** respectively, of this Environmental Statement (ES).

12.1.2 This Chapter describes the baseline geology, mineral resources planning policies, methodology, and the potential impact on identified mineral resources as a result of the development of the Scheme. This assessment is based on known and published information about the geology underlying the Scheme and the surrounding area.

12.1.3 The Scheme comprises of several land parcels (the 'Site' or 'Sites') described as Cottam 1, 2, 3a and 3b which accommodate the solar arrays; grid connection infrastructure and Energy Storage Facility (or 'BESS'); and the Cable Route Corridors connecting the solar array sites to the National Grid substation at Cottam Power Station. The operational life of the Scheme is anticipated to be 40 years. The Sites lie within 7 kilometres of Gainsborough, within the County of Lincolnshire, the Cable Route Corridor to Cottam Power Station does extend over the County boundary into Nottinghamshire.

12.1.4 Surface mineral resources that fall within the identified study area for the Scheme are assessed individually in this chapter The Scheme also lies within a much wider area of interest for oil and gas reserves. The potential implications for those reserves are assessed together.

12.1.5 Plans showing the extent of the identified mineral resources within study area are provided at **Figures 12.1 – 12.4** ('Minerals Resource Plans') of the ES **[EN010133APP/APP/C6.4.12.1 - C6.4.12.4].**

12.2 Consultation

12.2.1 Consultation and engagement has been ongoing as part of the pre-application process to identify and address any concerns raised by stakeholders relating to the Scheme. This has included engagement on project feasibility, non-statutory consultation, EIA scoping and statutory consultation stage.

12.2.2 The Applicant prepared a Scoping Report in January 2022 and the Planning Inspectorate, on behalf of the Secretary of State, published its Scoping Opinion **[EN010133APP/C6.3.2.2]** on 9th March 2022. Following publication of the Scoping Opinion, meetings took place with both Nottinghamshire and Lincolnshire County Councils (as the relevant Mineral Planning Authorities) on 14th April 2022.

12.2.3 A Preliminary Environmental Information Report (PEIR) was prepared by the Applicant and published as part of the statutory consultation stage in July 2022.

12.2.4 Table 12.1 provides a summary of the level and response to engagement including responses received following the statutory consultation stage. The consultation responses to this minerals assessment related to transport, access, cable routes and potential implications for mineral safeguarding. The relevant consultee comments and how this assessment has addressed each comment is set out in the table below:

Table 12.1: Consultation Process

Consultee	Comments / Matters Raised	Response / Matters Addressed
The Planning Inspectorate (PINS) Scoping Opinion Ref EN010133 9th March 2022	PINS stated in the Scoping Opinion: *"The Scoping Report states that approximately 50 hectares of Cottam one is identified in the Lincolnshire Minerals and Waste Local Plan as being within two sand and gravel mineral safeguarding areas and that 25 hectares of Cottam two lies within a sand and gravel mineral safeguarding area.* *The Scoping Report also identifies a small area of Cottam three which also lies within a sand and gravel mineral safeguarding area. The Scoping Report identifies that this area forms part of the 46 hectares of the site that lies within an identified Area of Search (sand and gravel) in the Lincolnshire Minerals and Waste Local Plan.* *Paragraph 5.9 of Appendix 11.1 confirms that "the proposed development does not require deep excavations or foundations and thus disturbance is limited to the surface layers rather than underlying deposits".* *The ES should demonstrate that the Minerals Planning Authority has been consulted in respect of the proposals and that the Proposed Development does not impact on future ambitions for minerals extraction within the region."*	Meetings took place with both Nottinghamshire and Lincolnshire County Councils as Mineral Planning Authorities on the 14th April 2022. Both Authorities confirmed that they did not consider the Scheme would have any impact on foreseeable plans for mineral extraction within their respective areas. Neither considered the Scheme would have any impacts on either authority being able to meet anticipated mineral supply needs.

Consultee	Comments / Matters Raised	Response / Matters Addressed
The Planning Inspectorate Scoping Opinion Ref EN010133 on 9th March 2022	PINS stated in the Scoping Opinion: *"Scoping Report Appendix 11 does not provide any figures identifying the location and extent of mineral safeguarding areas or the identified Area of Search. The Scoping Report confirms that the whole site is covered by a Petroleum Exploration and Development License (PEDL) as shale gas is located beneath the sites; this is currently prohibited to be extracted in the UK (Scoping Report Appendix 11).* *Two oil extraction sites are located 1km and 6km from Cottam one and three respectively although none of the Cottam array sites fall within the mineral consultation zones for these sites. It is unclear whether the cable routes do or not.* *The ES should include a figure identifying the location and extent of the PEDL and any mineral safeguarding within the zone of influence of the Proposed Development. An assessment of impacts from the Proposed Development on extraction activities should be provided where significant effects are likely to occur."*	A set of drawings have been prepared and are included in the ES (**Figures 12.1 – 12.4**) relating to this chapter of the ES to show the extent of mineral safeguarding affected by the Scheme. The potential implications of the proposed cable routing options on identified mineral reserves have been considered and included in this assessment see paragraphs 12.7.6 to 12.7.22 below. There are no impacts on existing extraction activities
Nottinghamshire County Council (NCC) – PEIR response19 July 2022	*"In terms of the specifics relating to 'Cottam Solar Farm' and the cabling options for connection to the national grid, the entire of western side of River Trent lies within a Sand and Gravel Mineral Safeguarding Area, but that given relatively small land take we do not foresee any issues."* Refers to the adopted Minerals Local Plan 2021 and Policy SP7 which needs to be taken into account.	The Cable Route Corridor for connection to the national grid has been refined since the publication of the PEIR. Policy SP7 is referred to below: see section 12.3.7. It has been considered as part of this assessment.

Consultee	Comments / Matters Raised	Response / Matters Addressed
Nottinghamshire County Council – PEIR response19 July 2022	*"There is an area of concern however. The northern cabling route option, the buffer zone for which, runs through or at least very close to the permitted sand and gravel site at Sturton Le Steeple quarry (1/46/06/00014/). This site is operated by TARMAC. As this site is not presently active, it may not have been picked up as part of the initial scoping exercise. NCC would draw attention to Adopted Minerals Local Plan March 2021 (**Policy MP2c**) and Policies Map Inset 4.* *Sturton le Steeple Quarry is an important source of sand and gravel and is a significant contributor to the resource landbank, as identified within the Adopted Nottinghamshire Minerals Local Plan March 2021."*	The Cable Route Corridor for connection to the national grid has been refined since the publication of the PEIR and the northern cabling route option has not been pursued as part of the Scheme. Sturton le Steeple Quarry is approximately 3 km north of the cable route to Cottam Power Station and falls outside the study area. Sturton le Steeple Quarry is unaffected by the Scheme.
Lincolnshire County Council (LCC) – PEIR response 27 July 2022	*"The proposed development is partially located within a Mineral Safeguarding Area (MSA) for Sand and Gravel. Within an MSA applications for non-minerals development should be accompanied by a Minerals Assessment. This should provide an appropriate assessment of the mineral resource, its potential for use in the forthcoming development and an assessment of whether it is feasible and viable to extract the mineral resource ahead of development to prevent unnecessary sterilisation. The assessment should also assess the potential for proximal sterilisation of mineral resources in adjacent land.* *The potential sterilisation of mineral resources should therefore be 'scoped in' to the EIA and addressed*	This minerals assessment has been prepared taking account of the policies and proposals contained in the Lincolnshire Minerals and Waste Local Plan The relevant policies from this Local Plan are set out in paragraphs 12.3.7 to 12.3.25

Consultee	Comments / Matters Raised	Response / Matters Addressed
	through a minerals assessment as part of the ES. We acknowledge for example that the vast majority of the PV site itself does not lie within the MSA, and the potential sterilisation of mineral resources may therefore be very limited."	
Lincolnshire County Council – PEIR response 27 July 2022	*"The proposed grid connection corridors, however, require more detailed consideration. All of the connection options pass through the sand and gravel MSA situated between the A156 and River Trent. Whilst the final footprint of the grid connection may be limited, by dissecting the MSA it could introduce a constraint to the potential for any future extraction of the sand and gravel resources in the surrounding land. The minerals assessment as part of the ES should therefore include consideration of this matter and it should be given due consideration when determining the final route/method of the grid connection."*	Consideration has been given to the Cable Route Corridors and the potential impact on safeguarded mineral resources, as part of this assessment. See Section 12.7.
Lincolnshire County Council – PEIR response 27 July 2022	*Refers to the Development Plan for the area affected by the project includes the Lincolnshire Minerals and Waste Local Plan (currently under review) and also the Central Lincolnshire Local Plan (also under review).* *"In terms of the PV sites themselves, the PEIR notes that only a very small part of the sites actually affect safeguarded mineral resources, and these are predominantly isolated and constrained deposits. When considering the nature and characteristics of proposals, it is confirmed that there would be negligible impact in terms of any sterilisation of mineral resources.*	Noted

Consultee	Comments / Matters Raised	Response / Matters Addressed
	Whilst there are some existing oil sites in proximity to the proposals, all elements of the scheme are outside of their associated safeguarding areas and so again, no safeguarding implications identified. *Regarding the proposed cable corridors, the PEIR notes that there is still on-going assessment work in relation to the cable route which will inform the final corridor to be proposed in the DCO application. The route options affect safeguarded sand and gravel resources, but the PEIR recommends that wherever possible cable routes follow existing infrastructure corridors such as roads, railways, drainage routes or existing pipelines or cables routes or alternatively follow the edge of significant landscape features such as woods rather than directly crossing open fields. This approach is supported which aligns with previous discussions with the developer, and provided it is followed, it will ensure minimal sterilisation of resources".*	
West Lindsey District Council– PEIR response 27 July 2022	*"It is noted that Cottam 1 (50ha), Cottam 2 (25ha) and less than 1.5ha of Cottam 3 are identified as falling within Sand and Gravel Mineral Safeguarding areas. The Preliminary findings conclude a "minor" magnitude of impact upon Cottam 1 & 2, and "moderate/minor" for Cottam 3 and the route corridor, although it is considered mitigation is only necessary for the route corridors.* *We will defer to the advice of Lincolnshire County Council, as the*	Noted

Consultee	Comments / Matters Raised	Response / Matters Addressed
	Minerals Planning Authority, in this regard."	
The Coal Authority – PEIR response 27 July 2022	*"I have checked the site location plan against the information held by the Coal Authority and can confirm that the proposed development site is located outside of the defined coalfield. Accordingly, the Coal Authority has no specific detailed comments / observations to make and there is no requirement for the Local Planning Authority to consult us on any future application for this site."*	Noted.
Bassetlaw District Council– PEIR response 27 July 2022	*"The safeguarding of minerals is given local and national importance in the Section 17 of the NPPF (facilitating the sustainable use of minerals) and the Policy SP7 of the NCC Minerals Local Plan. It is recommended that ongoing consultation is done with the County Planning Authorities at NCC and LCC to properly determine whether this approach it acceptable. Given that Bassetlaw will only include the cabling it is very possible that there will be no mineral safeguarding consideration as the final routing of cables will only include a very small section of the search area for potential cable routes."*	Noted
Tarmac Aggregates Ltd– PEIR response 15 July 2022	*"Rampton Quarry is partially situated within the southern limits of Cottam solar project's cable route search corridor. The quarry has been fully restored to agriculture and nature conservation after uses under permissions 1/15/01688/CDM and 1/15/01689/CDM.* *It appears that an east-west margin to the north of the quarry is*	The Cable Route Corridor has been refined since the PEIR was published. The corridor with the Site does not affect the area of Rampton Quarry. The area of Rampton Quarry that was affected has already been worked for mineral and therefore there is now

Consultee	Comments / Matters Raised	Response / Matters Addressed
	situated within the cable corridor comprising land restored to agriculture. This land is currently undergoing aftercare in accordance with statutory requirements. *With regard to the areas of restored quarry that are located within the cable corridor, the respective land, subject to written confirmation from the MPA, will be out of aftercare with effect from 1 October 2022 as the anticipated solar project construction start date is understood to be 2024, it is confirmed that Tarmac does not wish to make any specific comments insofar as the quarry is concerned.* *It is essential that the potential presence of mineral resources is given adequate consideration, particularly within the cable corridor, which appears to be located within MSAs identified within the NCC and LCC minerals Local Plans. This is of paramount importance to avoid any unnecessary sterilisation of minerals.* *It is acknowledged that the proposed areas for the solar panels and associated development are generally located outside of MSAs."*	no mineral resource for the Scheme to affect

12.3 Policy Context

12.3.1 Minerals are important national resources and adequate and steady supplies are vital for development and sustaining the economy and society. Minerals are a finite natural resource that can only be worked where they are found. A key aspect of sustainable development is the conservation and safeguarding of non-renewable resources for future generations. As such it is important that other development does not needlessly prevent the future extraction of mineral resources.

National Policy Statement for Energy

12.3.1 The overarching National Policy Statement (NPS) for Energy (EN-1) (Ref 1) was designated in July 2011. It sets out general principles and impacts to be taken into account for all types of energy Nationally Significant Infrastructure Projects (NSIP) development covered by the Energy NPSs. It forms the primary basis for determining if development consent should be granted and is underpinned by the principle that the development of large scale renewable energy generation projects are needed (amongst other types of generation capacity) in order to meet the demand for energy generation in the United Kingdom, and to reduce greenhouse gas emissions from energy generation in order to meet the Government's decarbonisation targets.

12.3.2 Paragraph 5.10.9 of the 2011 EN-1 states that applicants should safeguard any mineral resources on the proposed site as far as possible, taking into account the long-term potential of the land use after any future decommissioning has taken place.

12.3.3 Paragraph 5.10.22 states that where a proposed development has an impact upon a Mineral Safeguarding Area, the Secretary of State should ensure that appropriate mitigation measures have been put in place to safeguard mineral resources.

Draft National Policy Statement for Energy

12.3.4 The Government is currently reviewing and updating the Energy NPSs and as part of the review process, the Government published a suite of Draft Energy NPSs for consultation in September 2021.

12.3.5 Draft NPS (EN-1) (Ref 2) sets out general principles and impacts to be taken into account for all types of energy NSIP development covered by the Energy NPSs. Once designated it will form the primary basis for determining if development consent should be granted and is underpinned by the principle that the development of large scale renewable energy generation infrastructure is urgently needed in order for the Government's targets and commitments for the UK energy system to be met.

12.3.6 Paragraph 5.11.9 of the draft EN-1 replicates paragraph 5.10.9 of the 2011 EN-1. It makes clear that applicants should safeguard any mineral resources on the proposed site as far as possible, taking into account the long-term potential of the land use after any future decommissioning has taken place. Likewise, paragraph 5.11.21 replicates paragraph 5.10.22 of the 2011 EN-1. It states that where a proposed development has an impact upon a Mineral Safeguarding Area, the Secretary of State should ensure that appropriate mitigation measures have been put in place to safeguard mineral resources.

National Policy Statement for Renewable Energy Infrastructure (EN-3)

12.3.7 The National Policy Statement for Renewable Energy Infrastructure (EN-3) (Ref 3) sets out additional policies for nationally significant renewable energy infrastructure. This relates to energy from biomass and/or waste (>50 megawatts

(MW)), Offshore wind (>100MW) and Onshore wind (>50MW) and does contain any technology specific policies applicable to solar NSIPs.

Draft Policy Statement for Renewable Energy Infrastructure (EN-3)

12.3.8 Draft NPS EN-3 September 2021 (Ref 4) sets out additional policies for nationally significant renewable energy infrastructure, including policies specific to the development of solar NSIPs.

12.3.9 Paragraph 1.7.4. acknowledges that solar, biomass or energy from waste facilities will occupy land and as such potentially result in a whole range of terrestrial impacts this includes the impact on resources. These include matters that applicants should consider in selecting a site, how assessments should be undertaken and how mitigation should be provided. There are no specific references to mineral safeguarding in draft EN-3. However, paragraph 2.49.13 is of relevance as it states that the extent to which the site will return to its original state after decommissioning may also be a relevant consideration.

National Planning Policy Framework

12.3.10 The National Planning Policy Framework (NPPF) 2021 (Ref 5), together with the accompanying Planning Practice Guidance (PPG) set out the Government's planning policies for England for the particular purpose of making development plans and deciding applications under the Town and Country Planning Act 1990.

12.3.11 The need to safeguard mineral resources is reflected in NPPF, in paragraph 209 it states:

'It is essential that there is a sufficient supply of minerals to provide the infrastructure, buildings, energy and goods that the country needs. Since minerals are a finite natural resource, and can only be worked where they are found, best use needs to be made of them to secure their long-term conservation.'

12.3.12 It goes on in paragraph 210 to state that planning policies should:

12.3.13 *'c) safeguard mineral resources by defining Mineral Safeguarding Areas and Mineral Consultation Areas; and adopt appropriate policies so that known locations of specific minerals resources of local and national importance are not sterilised by non-mineral development where this should be avoided (whilst not creating a presumption that the resources defined will be worked);'*

12.3.14 Designating mineral safeguarding areas (MSA) is the means by which the planning system ensures that potential mineral resources are not needlessly sterilised. The presence of a MSA does not necessarily preclude other forms of development being permitted nor confer any presumption that the mineral will be worked. It is a policy tool to raise awareness that minerals may be sterilised by proposed development and that this should be taken into account in the decision-making process.

National Planning Practice Guidance (PPG) Minerals (2014)

12.3.15 The Minerals PPG (2014) (Ref 6) confirms that minerals 'make an essential contribution to the Country's prosperity and quality of life'. Section 3 of the Minerals PPG states that: "Mineral planning authorities are encouraged to plan for minerals extraction using Ordnance Survey-based proposals maps and relevant evidence provided by the minerals industry and other appropriate bodies. This approach will allow mineral planning authorities to highlight areas where mineral extraction is expected to take place, as well as managing potentially conflicting objectives for use of land."

12.3.16 Section 3 advises MPAs that they should plan for the steady and adequate supply of minerals, including in the following way:

"1. Designating Specific Sites – where viable resources are known to exist, landowners are supportive of minerals development and the proposal is likely to be acceptable in planning terms. Such sites may also include essential operations associated with mineral extraction…"

Local Policy

Lincolnshire Minerals Policy

12.3.17 The Sites all lie within Lincolnshire and therefore the relevant development plan documents include the **Lincolnshire Minerals and Waste Local Plan Core Strategy and Development Management Policies (June 2016)** (the 'Local Plan') (Ref 7) which sets out the key principles to guide the future winning and working of minerals in the County up to 2031. It also sets out the development management policies against which planning applications for minerals and waste development will be considered. It also seeks to ensure the protection of mineral resources from the risk of sterilisation by development which potentially prevents future extraction. Known locations of mineral resources of national and local importance need to be protected and safeguarded to ensure the long-term security of minerals supply and to ensure their presence is factored into decisions about future land-use when proposals for other development arise. Safeguarding mineral resources does not create a presumption that the resources defined will ever be worked.

12.3.18 Lincolnshire Minerals and Waste Local Plan Core Strategy Policy M2: Providing for an Adequate Supply of Sand and Gravel states:

'The County Council will ensure a steady and adequate supply of sand and gravel for aggregate purposes by making provision over the period 2014 -2031 (inclusive) for the extraction of 42.66 million tonnes of sand and gravel (2.37 million tonnes per annum). This will be divided between the three Production Areas (as shown on the Key Diagram) as follows:

- *18.00 million tonnes (1.00 million tonnes per annum) from the Lincoln/ Trent Valley Production Area;*
- *9.00 million tonnes (0.50 million tonnes per annum) from the Central Lincolnshire Production Area; and*

- *15.66 million tonnes (0.87 million tonnes per annum) from the South Lincolnshire Production Area.*

The County Council will make provision for the release of sand and gravel reserves in the Site Locations Document. This will give priority to extensions to existing Active Mining Sites. New quarries will be allocated where they are required to replace existing Active Mining Sites that will become exhausted during the Plan period and where they are located in the relevant Areas of Search as shown on the Policies Map (Figure 5), namely:

- *west of Lincoln and north/ south of Gainsborough for the Lincoln/ Trent Valley Production Area;*
- *Tattershall Thorpe for the Central Lincolnshire Production Area; and*
- *West Deeping/ Langtoft for the South Lincolnshire Production Area.'*

12.3.19 Policy M4: Proposals for Sand and Gravel Extraction states that:

'Sites allocated in the Site locations Document will be granted planning permission for sand and gravel extraction for aggregate purposes provided that:

- *in the case of an extension to an existing Active Mining Site, extraction would follow on after the cessation of sand and gravel extraction from the existing areas supplying the plant site; and*
- *in the case of a new quarry, it is required to replace an existing Active Mining Site that is nearing exhaustion.*

For sites not allocated in the Site locations Document, planning permission will be granted for sand and gravel extraction for aggregate purposes where the site is required to meet:

- *a proven need that cannot be met from the existing permitted reserves; or*
- *a specific shortfall in the landbank of the relevant Production Area and either:*

(i) forms an extension to an existing Active Mining Site; or

(ii) is located in the relevant Area of Search as shown on the Policies Map (Figure 5) and will replace an existing Active Mining Site that is nearing exhaustion.

In all cases the proposal must accord with all relevant Development Management Policies and Restoration Policies set out in the Plan.'

12.3.20 Policy M11 concerns Safeguarding of Mineral resources, it states:

'Sand and gravel, blown sand and limestone resources that are considered to be of current or future economic importance within the Minerals Safeguarding Areas shown on Figure 1, together with potential sources of dimension stone for use in building and restoration projects connected to Lincoln Cathedral/Lincoln Castle within the areas shown on Figure 2, and chalk resources included on Figure 3, will be protected from permanent sterilisation by other development.

Applications for non-minerals development in a minerals safeguarding area must be accompanied by a Minerals Assessment. Planning permission will be granted for development within a Minerals Safeguarding Area provided that it would not sterilise mineral resources within the Mineral Safeguarding Areas or prevent future minerals extraction on neighbouring land. Where this is not the case, planning permission will be granted when:

- *the applicant can demonstrate to the Mineral Planning Authority that prior extraction of the mineral would be impracticable, and that the development could not reasonably be sited elsewhere; or*
- *the incompatible development is of a temporary nature and can be completed and the site restored to a condition that does not inhibit extraction within the timescale that the mineral is likely to be needed; or*
- *there is an overriding need for the development to meet local economic needs, and the development could not reasonably be sited elsewhere; or*
- *the development is of a minor nature which would have a negligible impact with respect to sterilising the mineral resource; or*

the development is, or forms part of, an allocation in the Development Plan.'

12.3.21 It should be noted that it has been demonstrated in **Review of the Lincolnshire Minerals and Waste Local Plan (Feb 2021)** (Ref 8) that Policy M11, in its current form, does not provide a practical or an efficient approach for safeguarding mineral resources. It states that the policy would therefore benefit from being updated. The policy is generating too many consultations that fall within the exemptions to the policy and could be considered too extensive in terms of the areas covered.An alternative policy has yet to be drafted.

12.3.22 Policy M12 concerns Safeguarding of Existing Mineral Sites and Associated Minerals Infrastructure. It states:

Mineral sites (excluding dormant sites) and associated infrastructure that supports the supply of minerals in the County will be safeguarded against development that would unnecessarily sterilise the sites and infrastructure or prejudice or jeopardise their use by creating incompatible land uses nearby.'

12.3.23 The Local Plan also states in paragraph 5.90:

'Incompatible development close to a MSA may lead to sterilisation of part of the resource. The BGS good practice advice suggests that it may therefore often be appropriate to extend the MSA beyond the resource boundary to take account of such risks, the extent of which will vary between minerals and the likely method of extraction. The County Council proposes to extend the boundary of MSAs beyond the area of the resource to prevent residential development encroaching on a mineral extraction to the extent that the amenity of residents could be affected by noise, visual intrusion or blast vibration. The resource areas shown on Figure 1 include a buffer zone of 250m around

sand and gravel and blown sand resources and 500m around limestone resources to ensure an adequate safeguarding margin.'

12.3.24 Paragraph 5.89 states:

'It is not proposed to define MSAs for hydrocarbons as prospects can only be identified after extensive exploration activity. In any event, oil and gas deposits are found at much greater depths than other minerals exploited within the County and are therefore less threatened by surface development.'

12.3.25 The Lincolnshire Minerals and Waste Local Plan Site Locations (December 2017) Policy SL2 safeguards specific mineral allocations made in the plan it states:

'Allocated sites, as set out in Policy SL1, including an area of 250 metres surrounding each site, will be safeguarded against development that would unnecessarily sterilise the sites or prejudice or jeopardise their use by creating incompatible land uses nearby.'

Nottinghamshire Minerals Policy

12.3.26 Although all of the solar array Sites comprised within this Scheme are confined to Lincolnshire, some of the Cable Route Corridor which connects the individual Sites to the grid connection at the National Grid substation at Cottam Power Station site, lies within Nottinghamshire. Therefore, consideration has also given to the relevant development plan document namely the **Nottinghamshire Minerals Local Plan (March 2021)** (Ref 9). This Plan also seeks to ensure the protection of mineral resources from the risk of sterilisation by development which potentially prevents future extraction.

12.3.27 Minerals Plan Policy SP7 addresses Minerals Safeguarding, Consultation Areas and Associated Minerals Infrastructure. It states:

'Minerals Safeguarding Areas

1. Locally and nationally important mineral resources, permitted reserves, allocated sites and associated minerals infrastructure will be safeguarded from needless sterilisation by non-minerals development through the designation of minerals safeguarding areas as identified on the Policies Map.

2. Non-minerals development within minerals safeguarding areas will have to demonstrate that mineral resources will not be needlessly sterilised as a result of the development and that the development would not pose a serious hindrance to future extraction in the vicinity.

3. Where this cannot be demonstrated, and where there is a clear and demonstrable need for the non-minerals development, prior extraction will be sought where practicable.

Minerals Consultation Areas

4. District and Borough Councils within Nottinghamshire will consult the County Council as Minerals Planning Authority on proposals for non minerals development within the designated Mineral Consultation Area, as shown on the Policies Map.

5. The Minerals Planning Authority will resist inappropriate non-minerals development within the Minerals Consultation Areas.

6. Where non-minerals development would cause an unacceptable impact on the development, operation or restoration of a permitted minerals site, mineral allocation, or associated minerals infrastructure, suitable mitigation should be provided by the applicant prior to the completion of the development.'

12.4 Assessment Methodology and Significance Criteria

12.4.1 The assessment of impact identifies how the Scheme is predicted to affect identified mineral resources and the significance of those effects. The assessment process has taken account of published good practice guides such as the Mineral Safeguarding in England Good Practice Advice British Geological Survey 2011 (Ref 10).

12.4.2 The predicted significance of the effect is determined through a standard method of assessment based on professional judgement which considers both sensitivity and magnitude of change as detailed in Table 12.2 below.

12.4.3 The mineral resources that have been assessed have been identified by the British Geological Survey (BGS) in their Mineral Resource Reports for Lincolnshire (Ref 11) and Nottinghamshire (Ref 12) and through allocations, areas of search and mineral safeguarding areas contained in the Adopted Lincolnshire Minerals and Waste Local Plan Core Strategy, Lincolnshire Minerals and Waste Local Plan Site Locations and the Nottinghamshire Minerals Local Plan. Assessment of the impacts of the Scheme on the mineral interests has considered a number of parameters including extent, magnitude, duration and reversibility of the Scheme as well as the extent, likely quality and situation of the mineral reserve. The significance of the impacts on identified mineral resources is assessed having regard to national and local planning policy.

12.4.4 The impact of the Scheme has been considered as a whole, there being no distinction in terms of impact on mineral resources between construction, operation and decommissioning phases on the basis that as soon as construction commences the impact on mineral resources effectively occurs and remains until such time as the Scheme is fully decommissioned.

12.4.5 For the purposes of this assessment the impact on mineral resources has included the full extent of the area occupied by the Scheme, together with margin extending 250 metres from the Site boundaries of each. The 250 metre boundary is based on the buffer zones adopted by Lincolnshire County Council and applied around their mineral safeguarding areas. Incompatible development close to mineral safeguarding areas may lead to sterilisation of part of the resource. The BGS good practice advice suggests that it may therefore often be appropriate to extend the mineral safeguarding areas beyond the resource boundary to take account of such risks. Although the solar arrays are not considered to be particularly sensitive developments, adopting a 250 margin does ensure that all potential impacts on mineral resources including existing mineral extraction Sites, are considered.

12.4.6 Assessment of the impacts of the Scheme on the mineral interests has considered a number of parameters including extent, magnitude, duration and reversibility of the development as well as the extent, likely quality and situation of the mineral reserve. The significance is assessed on the impacts on identified mineral resources in relation to national and local planning policy.

12.4.7 The significance of the impact for mineral resources can be ranked using professional judgement in terms of the national and local policy objectives. A high sensitivity receptor is an existing quarry or site specific allocation for future mineral working: this is because these sites have already been through a selection process and are either making a contribution or will be making a contribution to sustaining the economy and society. A high sensitivity site would also include safeguarded nationally scarce mineral resources or mineral resources of exceptional quality. A medium sensitivity receptor is an identified local or widespread mineral resource which is protected so other development does not needlessly prevent the future extraction of mineral resources to ensure non-renewable resources are conserved and safeguarded for future generations. A low sensitivity site does not contain any known mineral resources of economic interest. Table 12.2 ranks the significance of the effect taking into account the status of the receptor.

Table 12.2: Criteria for Assessing sensitivity of receptor

Sensitivity	Definition
High	Allocated or existing mineral working.
Medium	Safeguarded local or widespread mineral resource
Low	No identified mineral resource

12.4.8 In terms of the magnitude of impacts for mineral resources this can be ranked from a major impact which prevents the future exploitation of a known mineral resource through to a neutral impact where there is no change from baseline conditions.. This can either be through direct destruction of the resource through ground disturbance or effectively physically preventing access to a mineral resource by way of surface development. A moderate impact development for a mineral resource would add further significant constraints for future exploitation. This could either be in the form of introducing sensitive land uses adjacent to the mineral resource or by bisecting the resource with for example a roadway, cable or pipeline. These add constraints to future mineral working which would inhibit the full exploitation of the resource. A minor development either does not inhibit future exploitation of the mineral resource or includes mitigation to ensure the mineral resource is not sterilised, for example, by winning and working the mineral reserve prior to the development taking place. Table 12.3 ranks the significance of the impact.

Table 12.3: Criteria for Assessing Magnitude of Impacts (positive or negative)

Magnitude	Definition

Major	The total loss or major change/substantial alteration to key elements/features of the baseline (pre-development) conditions, such that the post development character/composition/attributes will be fundamentally changed, such as the permanent sterilisation of identified mineral resource.
Moderate	Loss or alteration to one or more key elements/features of the baseline conditions, such that post development character/composition/attributes of the baseline will be materially changed such as permanent constraint to future exploitation of identified mineral resource.
Minor	A minor shift away from baseline conditions. As change arising from the loss/alteration will be discernible/detectable but not material. The underlying character/composition/attributes of the baseline condition will be similar to the pre-development circumstances/situation such as a temporary constraint to future exploitation of identified mineral resource.
Negligible	Very little change from baseline conditions. The change will be barely distinguishable and approximating to a non-change situation.
Neutral	No change from baseline conditions.

12.4.9 Taking account of the nature of the mineral resource affected and the nature of the development proposed Table 12.4 shows the significance of the impact of the Scheme.

Table 12.4 Magnitude of Impact

Sensitivity / Magnitude	High	Medium	Low
High	Major	Major/Moderate	Moderate
Medium	Major/Moderate	Moderate	Moderate/Minor
Low	Moderate	Moderate/Minor	Minor
Negligible	Moderate/Minor	Minor	Negligible
Neutral	Neutral	Neutral	Neutral

12.5 Baseline Conditions

12.5.1 The baseline is the current geological strata, changes to which occur in timescales which are irrelevant to the proposed Scheme.

12.5.2 The likely mineral resource within the area has been assessed using published geological information of BGS published geological and information relevant available borehole information.

12.5.3 The BGS Mineral Resource Maps (Ref 13) provides the best available geological and resource information on the broad extent of minerals resources in Lincolnshire and

has been used assist the identification of mineral resources in the Lincolnshire Minerals and Waste Local Plan. The Scheme has been considered in the context of the applicable mineral resource planning policies.

Baseline - Bedrock

12.5.4 The bedrock underlaying the Sites is a series of sedimentary formations which are broadly aligned north south and get progressively younger progressing west to east across the Sites.

12.5.5 A review of the BGS published geological information indicates that the bedrock underlying the Cable Route Corridor starting at the Cottam Power Station is Mercia Mudstone Group. This sedimentary bedrock formed between 252.2 and 201.3 million years ago during the Triassic period. This Group consists of predominantly red, mudstones and subordinate siltstones.

12.5.6 Following the Cable Route Corridor east towards Cottam 1 and beyond the A156 south of Marston, the bedrock changes and the route crosses a relatively narrow band (approx. 200 metres wide) of mudstone bedrock belonging to the Penarth Group which formed approximately 201 to 210 million years ago in the Triassic Period. These sedimentary rocks are shallow-marine in origin. They are detrital, ranging from coarse- to fine-grained (locally with some carbonate content) forming interbedded sequences.

12.5.7 East of the Penarth Group the bedrock changes to the Scunthorpe Mudstone Formation. This sedimentary bedrock formed approximately 191 to 210 million years ago in the Jurassic and Triassic Periods. These sedimentary rocks are shallow-marine in origin. They are detrital and biogenic, generally comprising fine-grained sediments, with carbonate material (coral, shell fragments) forming interbedded sequences. Much of the Cottam Sites are underlain by the Scunthorpe Mudstone Formation.

12.5.8 The Cottam 1 Site however extends further east and the BGS published geological information indicates that the eastern two thirds of Cottam 1 Site is underlain by the Charmouth Mudstone Formation. This sedimentary bedrock formed approximately 183 to 199 million years ago in the Jurassic Period. These deposits are shallow-marine in origin and described as detrital, ranging from coarse- to fine-grained (locally with some carbonate content) forming interbedded sequences.

12.5.9 In the furthest western tip of the Cottam 3a Site the underlying bedrock is a mudstone belonging to the Penarth Group described above.

12.5.10 There is no evidence to suggest that any of these bedrock formations which are underlying the Sites have worked in the past as a mineral resource and none have been identified as being of potential mineral interest. The potential impact of the Scheme on the underlying bedrock has not been considered further as part of this mineral resource assessment.

12.5.11 The whole of the Scheme is however within a Petroleum Exploration and Development License (PEDL) area where oil and gas extraction is licensed under the Petroleum Act 1998. A PEDL allows the pursuit a range of oil and gas exploration activities, subject to necessary drilling/development consents and planning permission. The oil and gas deposits in this location occur at depths below the bedrock formations. Owing to nature of oil and gas extraction the potential impacts on this resource have been dealt with separately below.

Baseline – superficial deposits

12.5.12 The BGS published geological information shows the bedrock formations are overlain with superficial deposits. These are the youngest geological formations and in the case of this Site are largely unconsolidated sediments deposited during the Pleistocene (Quaternary) glacial episodes.

12.5.13 The BGS identify a number of superficial deposits occurring within the Sites. Beneath the Cottam Power Station and then heading east, the bedrock is overlain by the Holme Pierrepont Sand and Gravel Member. These sedimentary sand and gravels formed between 2.6 million and 12 thousand years ago during the Quaternary period. These deposits occur both sides of the River Trent and in the relation to Cable Route Corridor from the Power Station extends east as far as the Sheffield to Lincoln Railway Line. These deposits are overlain by more recent alluvium deposits which occur on both sides of the current course of the River Trent. These alluvium deposits are a mix of clay, silt, sand and gravel. BGS Mineral Resource Information identifies the Holme Pierrepont Sand and Gravel and the Alluvium deposits as being a potential sand and gravel mineral resource. There are a number of current and historic sand and gravel workings associated with these deposits, the nearest to the Site being immediately south of Cottam Power Station.

12.5.14 The entire length of the cable route within Nottinghamshire, i.e. the length running from Cottam Power Station to the River Trent is identified in the Nottinghamshire Minerals Local Plan as being within a sand and gravel mineral safeguarding area. This safeguarding area continues across the River Trent for approximately 0.4 km into Lincolnshire. The Lincolnshire Minerals and Waste Local Plan not only identifies the sand and gravel deposit as a mineral safeguarding area but also identifies as an Area of Search for future mineral extraction. The Area of Search is more extensive than the mineral safeguarding area and extends approximately 1.7 km into Lincolnshire from the River Trent along the cable route. The safeguarded areas and Area of Search relate to the Holme Pierrepont Sand and Gravel Member and the overlying Alluvium deposits identified by the BGS.

12.5.15 Within the Cottam 1 Site, the Charmouth Mudstone Formation bedrock is overlain by superficial deposits comprising Mid Pleistocene Till and Alluvium. The Till deposits formed up to 2 million years ago in the Quaternary Period. They are sedimentary glacigenic deposits and are described as detrital, created by the action of ice and meltwater, they can form a wide range of deposits and geomorphologies associated with glacial and inter-glacial periods.

12.5.16 This Till is separated up by bands of Alluvium (clay, silt, sand and gravel). The bands of Alluvium occur within most of the parcels of land which form the Cottam 1 Site. These deposits formed up to 2 million years ago in the Quaternary Period. These sedimentary deposits are fluvial in origin. They are detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river. The Alluvium deposits run east west and north south across the Site reflecting path of old river channels.

12.5.17 Within the southern part of the parcel of land nearest Willingham by Stow (at Cottam 1) the presence of River Terrace deposits of sand and gravel has been identified. These superficial sedimentary deposits are fluvial in origin and formed up to 3 million years ago in the Quaternary Period. They are detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river.

12.5.18 The BGS Mineral Resource Information identifies the fluvial Alluvium and the River Terrace deposits as being a potential sand and gravel mineral resource. It does not identify any current or historic mineral workings associated with these sand and gravel deposits.

12.5.19 Approximately 50 hectares of the Cottam 1 Site is identified in the Lincolnshire Minerals and Waste Local Plan as being within two sand and gravel mineral safeguarding areas. The first and affecting a larger part of the Site is an isolated safeguarded area lying south east of Willingham by Stow, between Normanby Gorse and Bowfield Farm. The second is also an isolated safeguarded area which lies to the east of Sturton by Stow and just clips the south western part of the Cottam 1 Site. The safeguarded areas are centred on the River Terrace Deposits identified by the BGS. Five parcels of land forming the Cottam 1 Site are partially affected.

12.5.20 The Cable Route Corridor which extends northwards to linking the Cottam 1 and 2 Sites and much of the Cottam 2 Site is also underlain by the same Mid Pleistocene Till and Alluvium deposits. However along the eastern edge the of Cottam 2 Site, the BGS identify a narrow strip of superficial deposit comprised of Alluvium. This deposit is similar to that identified within the Cottam 1 Site. In this case the deposit is closely associated with the course of Yewthorpe Beck which forms the eastern boundary of the Cottam 2 Site.

12.5.21 To the west of Cottam 2, beyond the Site boundary and covering the area occupied by the village of Corringham and extending northwards 1.4 km towards Aisby, the BGS identify 4 surface deposits of Mid Pleistocene Sand and Gravel. This superficial deposit formed up to 2 million years ago in the Quaternary Period and are glaciofluvial in origin. They are detrital, generally coarse-grained, they form beds, channels, plains and fans associated with meltwater. The BGS Mineral Resource Information identifies this glaciofluvial deposit, together with concealed glaciofluvial deposits immediately surrounding it which extend into the western side Cottam 2 Site, as being a potential sand gravel resource. This deposit also extends north and

underlies the whole of the cable route north to the Cottam 3b Site as well as the southern edge of the Cottam 3b Site.

12.5.22 Approximately 25 hectares of the Cottam 2 Site and 4 hectares of the Cottam 3b Site and virtually the entire length of the Cable Route Corridor linking these 2 parts of the Site is identified in the Lincolnshire Minerals and Waste Local Plan as being within a sand and gravel mineral safeguarding area. The safeguarded area is an isolated deposit of sand and gravel extending from just south of Corringham to Pilham in the north. It extends eastwards across the western part of the Cottam 2 Site and includes the area beyond but largely enclosed by the Cottam 2 Site which is occupied by Corringham Grange. The safeguarded area is centred on the glaciofluvial deposits identified by the BGS. These deposits identified occur at the surface in a more limited area and are partially concealed by Mid Pleistocene Till and Alluvium deposits.

12.5.23 At the surface the BGS mapping shows the cable route extending northward from Cottam 2 to Cottam 3a and 3b, the whole of the Cottam 3b Site and much of Cottam 3a Site as being covered with Mid Pleistocene Till and Alluvium deposits which are not identified as being of any economic mineral interest. However, as referred to above, these surface alluvium deposit conceals glaciofluvial deposits which are of potential economic interest.

12.5.24 The furthest western tip of Cottam 3a Site the BGS identify the same superficial sand and gravel deposit as that found within the Cottam 2 and 3b Sites. This is a much more extensive deposit that stretches north and west of the Cottam 3b Site. The BGS Mineral Resource Information identifies this glaciofluvial deposit together the river terrace and alluvial deposits which extend westwards beyond the Site as a potential sand gravel resource.

12.5.25 The very most western area of the Cottam 3a Site is identified in the Lincolnshire Minerals and Waste Local Plan as being within a sand and gravel mineral safeguarding area. In addition approximately 46 hectares of the Cottam 3a Site is within an identified Area of Search for sand and gravel referred to as 'West of Lincoln and north/south of Gainsborough for the Lincoln/ Trent Valley Production Area'. The Area of Search runs through the western third of the Site.

12.5.26 Neither the Lincolnshire Minerals and Waste Local Plan nor the Nottinghamshire Minerals Local Plan make any allocations for future mineral extraction in the vicinity of the Site.

12.5.27 There is no record of any mineral extraction taking place within any part of the Scheme. The nearest identified mineral workings are a former sand and gravel quarry immediately south of Cottam Power Station and an historic limestone quarry to east of Ingham and the B1298. The Glentworth Oil wells are located 1 km north and 1 km north east of the Cottam 1 Site. The Corringham Oil and Gas Field lies approximately 500 metres to the east of the Cottam 2 Site and approximately 1.25 km to the south east of Cottam 3b Site. The Minerals Consultation Area associated with Corringham oil field is within 150 metres of the Cottam 2 Site.

12.6 Embedded Mitigation

12.6.1 The only embedded mitigation for mineral resources within the Scheme is the proposal for decommissioning and removal of plant and structures. Such measures will essentially restore the baseline condition for the identified mineral resources. Where infrastructure is left in the ground such as cable ducts after decommissioning these are not anticipated to present any significant constraint to future mineral extraction and would be removed as part of the removal of overburden or extraction of mineral with the same excavation equipment.

12.7 Identification and Evaluation of Likely Significant Effects

Assessment of Impact on Mineral Resources

12.7.1 The National Planning Policy Framework requires local authorities to define mineral safeguarding areas to protect the known locations of specific minerals from sterilisation. The local authority must also define mineral consultation areas based on the safeguarding areas. In this case Lincolnshire County Council have identified that the Scheme is within a Mineral Safeguarding Area (MSA) for sand and gravel. They advise that the potential sterilisation of mineral resources should therefore be addressed through a minerals assessment as part of this ES. They also acknowledge for example that the vast majority of the Scheme does not lie within the MSA, and the potential sterilisation of mineral resources may therefore be very limited." This assessment addresses this requirement, identifies how the Scheme is predicted to affect identified mineral resources and the significance of those effects.

12.7.2 The Scheme has 3 potential impacts for mineral resources and supply. Depending upon the level of disturbance the Scheme has the potential:

- to disturb a mineral deposit to the extent the deposit becomes unviable to exploit;
- that the presence of the Scheme imposes a constraint on mineral extraction in the local vicinity by physically preventing its exploitation; and
- that the Scheme would adversely affect the local mineral supply.

12.7.3 In terms of potentially disturbing a mineral deposit to the extent it becomes unviable to exploit at some point, in this case the only identified surface mineral the Scheme affects are sand and gravel deposits. On the basis that the Scheme does not require deep excavations and foundations are limited to galvanised steel poles driven into the ground, disturbance is limited to the surface layers rather than underlying deposits and the Scheme would not affect the long-term viability of working the identified sand and gravel resource.

12.7.4 The Scheme does affect a number areas of safeguarded mineral reserves and areas identified to contribute towards future mineral supply. These have been dealt with in turn below.

12.7.5 The Cottam 1 Site includes two relatively small, isolated pockets of sand and gravel which are identified in the Lincolnshire Minerals and Waste Local Plan as safeguarded mineral reserves. These are shown on **Figure 12.2**. The Cottam 1 site includes the provision of a substation in the north west corner, close to Willingham by Stow, this lies outside but right of the edge of the safeguarded mineral reserves. Given their isolated location, limited geographic extent and existing constraints, including existing built development such as roads and residential development and in the case of the southerly safeguarded area the River Till which runs through it, working these areas is very unlikely in the foreseeable future.

12.7.6 The western part of the Cottam 2 Site also affects a safeguarded mineral reserve. The safeguarded reserve extends northwards and includes the southern part of Cottam 3b and the Cable Route Corridor linking these 2 Sites, see **Figure 12.4**. The safeguarded mineral reserve within this Site is an isolated pocket of sand and gravel. Although likely to contain a sand and gravel deposit, exploiting it would be difficult given the existing constraints including the presence of built development. Both Corringham and Aisby are built directly on top of it, and it is criss-crossed by roads. The safeguarded area with Cottam 2 is also bisected by Corringham Beck. This deposit is also identified as being partially concealed, meaning that to work the sand and gravel would probably require the removal of overburden (the Alluvium deposits BGS identify as the surface geology). The safeguarded area affected is also at the periphery of the safeguarded deposit which is likely to mean it will be the thinnest part of the deposit and potentially covered with the greatest depth of overburden. On the basis of the above, working this area is also considered to be very unlikely in the foreseeable future.The Minerals Planning Authority have not raised a mineral safeguarding concern in respect the Scheme's impact on this identified mineral reserve.

12.7.7 Less than 1.5 hectares of the Site at the most westerly end of the Cottam 3a Site lies within a sand and gravel mineral safeguarding area. The safeguarded deposit surrounds Blyton extends southwards and is within part of the allocated Area of Search for sand and gravel. Approximately 46 hectares of the Cottam 3a Site is within an identified Area of Search in the Lincolnshire Minerals and Waste Local Plan (LMWLP). The Area of Search is referred to as 'West of Lincoln and north/south of Gainsborough for the Lincoln/ Trent Valley Production Area' as shown on the Policies Map within the LMWLP. The Area of Search runs through the western third of the Site.

12.7.8 The Cable Route Corridor from the Cottam Power Station runs through a mineral safeguarding area on the west side of the Trent in Nottinghamshire. On the east side of the Trent, in Lincolnshire, the cable route also crosses a mineral safeguarding area. In addition, it crosses a more extensive allocated Area of Search for sand and gravel. This is also the 'West of Lincoln and north/south of Gainsborough for the Lincoln/ Trent Valley Production Area', the same Area of Search which lies within the Cottam 3a Site. Therefore, in addition to mineral safeguarding issues there is a requirement to consider the impact of the Scheme on the future supply of mineral.

12.7.9 Areas of Search include the most viable sand and gravel resource based on a recent assessment of resources within the County carried out by the BGS. Subject to the criteria set out in Lincolnshire Minerals Plan Policy M4, it is these areas which the Mineral Planning Authority would look to for sand and gravel extraction where resources are required to meet a proven need or a specific shortfall in the landbank. Areas of Search are therefore not just safeguarded mineral resources but are also areas where future sand and gravel is anticipated to occur to meet future aggregate requirements.

12.7.10 Neither the Cottam 3a Site nor the Cottam Power Station Cable Route Corridor Site include any existing workings and therefore a new proposal in the area would be considered as a new site rather than any extension to an existing working. New quarries will only be permitted where there is a proven need or to replace an almost completed site. According to the most recent monitoring report which assesses the performance of the Local Plan, the Lincolnshire Local Aggregate Assessment (reporting 2020 data) September 2021, with current permissions together with the remainder of sites allocated in the Site Locations document, there should be sufficient sand and gravel resources to last beyond the LMWLP period which extends to the end of 2031. At the end of 2020 the landbank for sand and gravel for Lincolnshire was 9.50 years. At a sub-county level the landbank was 9.97 years in the Lincoln/Trent Valley.

12.7.11 The Cottam 3a Site and the Cottam Power Station Cable Route Corridor are partially within an extensive Area of Search for sand and gravel where there are likely but not proven reserves. Current assessments report that there is no need for new sites to come forward during the plan period up to 2031. There is therefore no need for further reserves for at least 10 years. The Area of Search takes a very broad-brush approach and covers an extensive area all along the Trent Valley including areas occupied by settlements which clearly will not be worked. The Cottam 3a Site and the Cottam Power Station Cable Route Corridor encroaches a small area of the Area of Search and therefore is not considered to have a significant impact on the potential sand and gravel supply in the County during the life of the Scheme.

12.7.12 In terms of safeguarding, the Cottam 3a Site affects a small peripheral area of the identified mineral safeguarding area. There is no built development proposed in this area, the presence of a major overhead power line and associated pylon being a constraint to both the proposed Scheme and to any possible future mineral extraction. For the reasons set out above, the mineral resource affected by the Scheme is unlikely to be required during its lifetime.

12.7.13 In terms of the Cable Route Corridor, although affecting a relatively small area of an extensive area of sand and gravel within both Lincolnshire and Nottinghamshire, it does affect a sand and gravel which has been and is currently being exploited. There is an historic working just to the south of the Cottam Power Station site and a permitted sand and gravel quarry site approximately 3 km to the north.

12.7.14 Installation of the cable may disturb a small area of sand and gravel (as per the maximum cable trench widths defined in the Concept Design Parameters **[EN010133/APP/APP/C7.15])**, and as such there will be no significant impact in terms of safeguarded sand and gravel deposits. However, the installation of a cable does have the potential to become another constraint to future mineral extraction (as there will be stand-off areas either side of the cable trench) as it will bisect known deposits. This could result in operational issues for future mineral operations and might restrict the efficient exploitation of the resource. This impact has been mitigated wherever possible by cable routes following existing infrastructure corridors or edges of significant landscape features.

12.7.15 The Scheme will be decommissioned at the end of its operational life, all above ground structures will be removed and the Sites restored. The Scheme does not require deep excavations or foundations and thus disturbance is limited to the surface layers rather than underlying deposits. The operational life of the Scheme is anticipated to be 40 years and due to it being decommissioned at the end of its operational life, any minerals would not be permanently sterilised and would be available to exploit if required at a future date (including in the event that the removal of the cable / cable ducts does not take place as part of decommissioning). Thus, there is not considered to be any conflict with the relevant mineral safeguarding policies.

12.7.16 The Scheme and immediate surroundings are not currently subject to mineral working. There is no apparent evidence to suggest there has been any mineral working in the recent past within the area covered by the Scheme. Although there has been recent mineral extraction south of the Cottam Power Station, there are no specific allocations for sand and gravel within or abutting the Scheme. The Scheme is however within an Area of Search for future sand and gravel extraction. In view of the current policies of the Mineral Planning Authority, the current sand and gravel landbank and the extensive areas covered by the Area of Search, it seems highly unlikely that the sand and gravel reserve will need to be worked within the lifetime of the Scheme.

12.7.17 In the case of Cottam 1, 2 and 3b Sites, and the Cable Route Corridor linking the Cottam 2, 3a and 3b Sites, these areas do affect identified mineral reserves which are safeguarded in the Lincolnshire Minerals and Waste Local Plan therefore the sensitivity of these areas the Site is **low**. In the case of Cottam 3a and the Cable Route Corridor linking Cottam 1 to the grid connection at the Cottam Power Station, these as well affecting a safeguarded mineral reserve also affect an Area of Search for future sand and gravel extraction therefore the sensitivity of these areas is **medium**. However, given the relatively small and/or isolated nature of these reserves, the existing constraints to future mineral working, it is unlikely these mineral reserves will be exploited in the foreseeable future, the magnitude is **low** and therefore the overall effect is **moderate/minor** as identified in **Table 12.4** above. This impact is not considered a significant environmental impact. In light of

the outcome of the assessment above, no additional mitigation is considered necessary.

Petroleum Exploration and Development

12.7.18 The whole of the Scheme is within a Petroleum Exploration and Development License (PEDL) area where oil and gas extraction is licensed under the Petroleum Act 1998 by the Oil and Gas Authority. A PEDL allows the pursuit a range of oil and gas exploration activities, subject to necessary drilling/development consents and planning permission.

12.7.19 Lincolnshire has a long history associated with the production of conventional oil and gas and there are a number well extracting oil extending north from Lincoln and around Gainsborough. The Glentworth Oil wells lies approximately 1 km north east of Cottam 1. Wells associated with the Corringham Oil and Gas Field are located within 700 metres of Cottam 2. The mineral safeguarding area associated with these wells overlaps with the Study area although Scheme boundary is outside it. . The Scampton oil field lies approximately 6 km to the east of Cottam 1. The Scheme would have no implications in terms of the continued exploitation of this resource.

12.7.20 The BGS identified a shale gas resource associated with the 'Bowland Shale' in central Britain. The BGS study area includes the northern half of Lincolnshire and extends into Nottinghamshire. It identifies an area referred to as the 'Gainsborough Trough' as being prospective for shale gas. Whilst interest has been shown in the above area, shale gas development does not currently take place in Lincolnshire or Nottinghamshire, and until any exploratory wells are sought and drilled, the location and extent of any resource and prospect for economic recovery is unknown.

12.7.21 There have been a number of exploratory wells sunk in the north west of Lincolnshire in the vicinity of the Scheme. Owing to commercial confidentiality there is limited information publicly available about the results.

12.7.22 The method of extracting shale gas involves constructing a well to drill into the ground vertically and horizontally to reach the shale rock layer. A mixture of water, sand and chemicals is then pumped under high pressure into the bore hole to fracture the shale rock to enable the gas to flow out. This process is known as hydraulic fracturing or 'fracking'. The need for surface development is relatively limited and the ability to drill horizontally and well as vertically to extract the gas means that even if a commercially exploitable deposit of shale gas were to be found under the Scheme it could still be exploited by wells located beyond the boundary of the Scheme

12.7.23 In addition to planning permission, consent to hydraulic fracture is required from the Secretary of State under the Infrastructure Act 2015. The current Government position is there is a presumption against issuing any further Hydraulic Fracturing Consents. This position is an effective moratorium and will, it is understood at the time of writing, be maintained until new evidence is provided which addresses the concerns around the prediction and management of induced seismicity.

12.7.24 Thus, at the current time, whilst the Site may contain an economic deposit of shale gas, there is an effective national moratorium on hydraulic fracturing for shale gas and until there is change in policy the deposits will not be exploited.

12.7.25 Oil and gas deposits are found at much greater depths than other minerals and therefore surface development has less potential impact in terms of exploiting the resource. Neither Lincolnshire nor Nottinghamshire have identified mineral safeguarding areas for hydrocarbons as prospects can only be identified after extensive exploration activity. Existing oil fields are identified and safeguarded with mineral consultation zone around each. The Scheme does not affect an existing oil field or come within a mineral consultation zone.

12.7.26 It is not considered that the proposed Scheme would have any implications for existing or proposed exploration and eventual exploitation of oil and gas resources. Solar arrays and associated development are not considered to be sensitive adjoining land uses to an oil well. Whilst together the solar array Sites occupy a large area, they are not a single block of land and are dispersed across a large area thus there is still scope for exploratory drilling across the PEDL. The method of petrochemical extraction involves limited surface development that could be located outside the solar array Sites and still allow extraction of the mineral beneath those Sites.

12.8 Mitigation Measures

12.8.1 Following the assessment of the impact of the development on identified mineral resources, an assessment of the mitigation options, to the extent that they are necessary, is considered.

12.8.2 To mitigate the impact on the Safeguarded Mineral Resource in the Trent Valley the Cable Route Corridor has been designed so that wherever possible cable routes follow existing infrastructure corridors or alternatively follow the edge of significant landscape features rather than directly crossing open fields. Such an approach avoids creating a further obstruction to the future exploitation of the mineral resource.

12.9 In-Combination Effects

12.9.1 The Scheme's impact on any mineral resource in any one area within the Scheme is limited to the development taking place in that area. For example the development of Cottam 1 would not have any impact on the mineral resource contained in Cottam 2. There are not considered to be any in combination effects in terms of mineral resources.

12.10 Cumulative Effects

12.10.1 The process of environmental impact assessment also requires consideration of the cumulative impact of the Scheme in conjunction with other plans and proposals. Notable substantial projects in close proximity to the Scheme that have the potential to impact on mineral resources are :

- West Burton Solar Project;
- Gate Burton Energy Park;
- Tillbridge Solar.

12.10.2 In terms of the direct impact on the mineral reserves affected by the Scheme, there are no other plans or proposals for other developments that directly affect these deposits .

12.10.3 The Cable Route Corridors linking the solar array Sites to the former Cottam Power Station site do overlap with proposed cable corridors for Gate Burton Energy Park, and for a short distance, also with the cable corridor for the proposed West Burton Solar Project. Much of the overlap is within an area of safeguarded sand and gravel reserves associated within the Trent Valley. The Applicant has worked with West Burton Solar Project and with Gate Burton Energy Park to establish a Shared Cable Route Corridor to minimise the overall impact. Without this mitigation multiple cable routes across this safeguarded reserve would further bisect it adding further constraints to any future mineral working and whilst not actually physically sterilising any mineral deposit might make areas uneconomic to work.

12.10.4 Any other proposals for development that sterilise safeguarded mineral resources, particularly those also identified as Area of Search for sand and gravel in the Lincolnshire Minerals and Waste Local Plan, could have an impact on the supply of sand and gravel within Lincolnshire.

12.10.5 The West Burton Solar Project consists of a number of parcels of land, one of which lies to the west of the Sheffield to Lincoln Railway Line, south east of Marton and east of Brampton. This part of the West Burton Scheme does lie within the Area of Search for sand and gravel.

12.10.6 The Gate Burton Energy Park scheme extends west from Willingham by Stow to Gate Burton and Knaith in the west. The proposed extent of this development does mean that it also covers the same Area of Search for sand and gravel.

12.10.7 The potential cumulative impact is considered small as these proposals only affect a relatively small area of an extensive area of search for the lifetime of each of these proposals. The cumulative impact of this Scheme, in combination with the West Burton Solar Project and Gate Burton Energy Park is not considered to have a significant adverse impact on the supply of sand and gravel within Lincolnshire. It is considered that the cumulative assessment is within the same significance of effect range as the Scheme on it's own i.e. moderate/ minor, as stated above.

12.10.8 The Tillbridge Solar scheme does not appear to affect any safeguarded mineral deposits. The site does appear to fall within the mineral consultation zone for 2 oil wells near Glentworth, these are site specific considerations and there are no cumulative impacts arising from this development.

12.11 Residual Effects

12.11.1 There is not considered to be any significant residual impact for mineral resources if the Scheme, including decommissioning, is completed in full. By that stage all surface development associated with the scheme would have been removed and the underlying mineral resource would be available to be extracted if required. Any remaining below ground infrastructure, such as cabling ducts would be removed as part of any mineral excavation. This would be no different to removing other redundant subterranean infrastructure such as agricultural land drains.

12.12 Conclusion

12.12.1 Minerals are of fundamental importance to the economy. There are no permitted or proposed mineral extraction sites within close proximity of any of the Sites that might be affected by the Scheme. In the case of Cottam 1 and 2, the Mineral Planning Authority have identified a mineral resource that requires safeguarding. In the case of Cottam 3a the Mineral Planning Authority have identified sand and gravel mineral resources within an Area of Search and an area that requires safeguarding. Current assessments report that there is no need for new sites to come forward during the plan period up to 2031. Furthermore, on the basis that the Scheme will be decommissioned at the end of its operational life, any minerals would not be permanently sterilised and would be available to exploit if required at a future date. Thus, there is not considered to be any conflict with the relevant mineral safeguarding policies.

12.12.2 The proposed cabling connecting the individual Sites to each other and the grid are unlikely to sterilise any significant volume of safeguarded mineral. The proposed Cable Route Corridor particularly those in the Trent Valley, however, do have the potential to result in operational issues for future mineral operations and might restrict the efficient exploitation of the resource. This impact has been mitigated wherever possible by cable routes following existing infrastructure corridors or edges of significant landscape features.

12.13 References

Ref 1 Overarching National Policy Statement for Energy (EN-1) Department of Energy and Climate Change July 2011

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Ref 4 Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) Department for Business, Energy and Industrial Strategy, September 2021

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Ref 6 National Planning Practice Guidance Minerals Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government 17 October 2014

Ref 7 Lincolnshire Minerals and Waste Local Plan Core Strategy and Development Management Policies (June 2016)

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Ref 9 Nottinghamshire Minerals Local Plan (March 2021).

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Ref 13 British Geological Survey: A Guide to Mineral Safeguarding in England (2007). British Geological Survey.

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