Great North Road Solar and Biodiversity Park

Environmental Statement Report

Volume 2 – Chapters

Chapter 10 – Ground Conditions and Land Contamination

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Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009, APFP Regulation 5(2)(a)

Contents

10.1 INTRODUCTION

1 This chapter of the Environmental Statement (ES) presents the findings of EIA work undertaken concerning the potential effects of the Development on Ground Conditions and Land Contamination with respect to:

- Possible land and groundwater contamination;
- Geological conservation sites designated as Sites of Special Scientific Interest (SSSIs) or are being considered for notification as such by the Joint Nature Conservation Committee (JNCC) in the Geological Conservation Review (GCR); and
- Nature and extent of Mineral Safeguarding Areas.

2 This chapter references groundwater and surface water in the context of potential receptors of contamination and pathways by which contamination could impact on other receptors. Baseline studies and impact assessments for water resources are presented in Volume 2 Chapter 9 – Water Resources [EN010162/APP/6.2.9].

3 This chapter is supported by the following figures provided in Volume 3:

- Figure 5.1: Works Areas [EN010162/APP/6.3.4.1];
- Figure 10.1: Site Desk Study Zoning Plan [EN010162/APP/6.3.10.1]; and
- Figure 10.2: Ground Conditions Constraint Plan [EN010162/APP/6.3.10.2].

4 The assessment presented is informed by the following chapters of this ES provided in Volume 2:

- Chapter 2: Environmental Impact Assessment [EN010162/APP/6.2.2];
- Chapter 5: Development Description [EN010162/APP/6.2.5]; and
- Chapter 9: Water Resources [EN010162/APP/6.2.9].

5 This chapter is also supported by the following Technical Appendices (TAs) provided in Volume 4. It should be noted that the supporting assessments are based on eight Study Areas, as identified within Figure 10.1: Site Desk Study Zoning Plan, and the extents of each Study Area were based on the previous Order Limits for PEIR. The Study Area boundaries are inclusive of the current Order Limits:

- TA A10.1: Study Area 1, Desk Top Study And Preliminary Risk Assessment (DTS and PRA) [EN010162/APP/6.4.10.1];
- TA A10.2: Study Area 2, DTS and PRA [EN010162/APP/6.4.10.2];
- TA A10.3: Study Area 3, DTS and PRA [EN010162/APP/6.4.10.3];
- TA A10.4 Study Area 4, DTS and PRA [EN010162/APP/6.4.10.4];
- TA A10.5: Study Area 5, DTS and PRA [EN010162/APP/6.4.10.5];
- TA A10.6: Study Area 6, DTS and PRA [EN010162/APP/6.4.10.6];
- TA A10.7: Study Area 7, DTS and PRA [EN010162/APP/6.4.10.7];
- TA A10.8: Study Area 8, DTS and PRA [EN010162/APP/6.4.10.8];
- TA A10.9: Mineral Resource Assessment (MRA) [EN010162/APP/6.4.10.9.];
- TA A10.10: Detailed Desk Study (Stage 2) For Potential UXO Contamination [EN010162/APP/6.4.10.10]; and

- TA A10.11: Desk Study and Preliminary Risk Assessment Groundsure Data [EN010162/APP/6.4.10.11].

6 A glossary of terms is provided in ES Chapter 20 – Glossary [EN010162/APP/6.2.20].

10.1.1 Site Description

7 The Development would be located to the north-west of Newark, in the Newark and Sherwood district, Nottinghamshire, East Midlands. The Development would be within an area bound by the Order Limits. The Order Limits are to the west of the A1, north of the A617, east of Eakring, and south of Egmanton, to the north and north-west of Staythorpe. The Development essentially consists of discrete land parcels proposed to be occupied by solar PV panels, BESS and associated infrastructure and connected by cable route areas. The eastern side of the Development runs from the north of Norwell to Egmanton in the north (with additional parcels of land for mitigation/enhancement around North Muskham). The western side of the Development runs north-west from Staythorpe Power Station and then splits at Maplebeck, with spurs running to Eakring in the north-west and Kneesall to the north-north-east, then connecting with the eastern side of the Development.

8 The Order Limits are shown on Figure 1.1: Development Location [EN010162/APP/6.3.1.1]. Further detail is provided in ES Chapter 5 – Development Description [EN010162/APP/6.2.5].

9 The wider area within and surrounding the Order Limits are generally composed of agricultural land, interspersed by occasional woodlands. Surrounding villages and hamlets are connected by rural roads and public rights of way. Smaller fields and tree cover are more common close to the villages and along water courses, with larger and more open fields set further away. The total area of the Order Limits is approximately 1,765 hectares (ha), the majority of which is currently used for arable crops or is otherwise down to pasture, hedgerows, Public Rights of Way and roads.

10.2 CONSULTATION AND ENGAGEMENT

10.2.1 Scoping

10 Following consultation with the appropriate statutory bodies, the Planning Inspectorate (on behalf of the Secretary of State) provided a Scoping Opinion in December 2023[1] [EN010162-000012 and ES TA A3.2, EN010162/APP/6.4.3.2]. Key issues raised during the scoping process specific to ground conditions and land contamination are outlined within Table 10.1.

[1] The Planning Inspectorate (2023). Scoping Opinion: Proposed Great North Road Solar Park. Case Reference: EN010162. Dated 19 December 2023.

Table 10.1: Consultation Responses

Consultee	Summary of Consultation Response	Applicant Response
PINS Scoping response December 2023, para 3.3.5	Ground conditions are included in the title for Chapter 7 of the Scoping Report [EN010162/APP/6.4.3.1], however no baseline information has been provided in relation to the potential for historic and contemporary contaminated land. The ES should provide a detailed baseline description for all aspects assessed within the ES.	This chapter and TAs listed in Section 10.1 of this chapter provide a detailed baseline description for contaminated land.
PINS Scoping response December 2023, para 3.3.6	The Scoping Report also does not refer to other sensitive land uses such as mineral deposits / extraction and Unexploded Ordnance (UXO). It is also noted that paragraph 328 of the Scoping Report states that "Within the north of the Order Limits within the Ossington Airfield, there is a ruined Battle Headquarters dating back to the Second World War". This suggests that UXO may be present on the site. Accordingly, the ES should include baseline information and a subsequent assessment (including methodology) of mineral resources and UXO, or information demonstrating agreement with the relevant consultation bodies that this matter can be scoped out and the absence of LSE. With reference to UXO, this may be supported by information such as a desk-based assessment.	A Mineral Resource Assessment (MRA) has been undertaken and provided as TA A10.9 – MRA - [EN010162/APP/6.4.10.9] to this chapter. This assessment concluded that safeguarded mineral resources would not be permanently sterilised by the Development given its temporary nature and the safeguarded resource would subsequently be available for extraction at some point in the future. The regional minerals officer has concurred with the conclusions of the MRA and no further consultation has been required. A detailed desk based UXO assessment has been undertaken and included

Consultee	Summary of Consultation Response	Applicant Response
		as TA A10.10 - Detailed Desk Study (Stage 2) For Potential UXO Contamination [EN010162/APP/6.4.10.10]. The conclusions of this assessment have been referenced in TAs A10.1 to A10.8 [EN010162/APP/6.4.10.1 – EN010162/APP/6.4.10.8].
PINS Scoping response December 2023, para 3.3.10	Whilst Chapter 7.4 recognises the requirement to assess contaminated land, there is limited information provided in relation to guidance or legislation, specific receptors, contamination sources, significance criteria or other methodological or assessment matters for ground conditions. The ES should clearly explain the methodology used in the assessment and how it was developed.	The methodology used to assess contaminated land is set out in section 10.4.
PINS Scoping response December 2023, para 3.3.11	The list of guidance omits the Environment Agency Land Contamination Risk Management (LCRM) guidance. The ES should include a consideration of this within the methodological approach.	The methodology set out in section 10.4 includes a consideration of the EA's LCRM guidance at section 10.3.5.1.
PINS Scoping response December 2023, para 3.3.14	The Inspectorate also consider that receptor sensitivity, magnitude of impacts and overall significance criteria should be topic specific, as it is not clear how the criteria given in Table 7.3 (relevant to hydrology, flood risk and hydrogeology) could be applied to land contamination or other land use characteristics (such as migration of pollution to human or ecological receptors or the changing of soil compaction).	The methodology set out in section 10.4 includes detail on sensitivity, magnitude and significance in sections 10.4.7, 10.4.8 and 10.4.9 respectively.

Consultee	Summary of Consultation Response	Applicant Response
	The ES should include details on the assessment methodology used, including the assessment of the sensitivity of receptors and the significance of effects.	
PINS Scoping response December 2023, para 3.3.15	Based on the above comment requiring additional assessment beyond what is currently provided (including underground resources and UXO), the Inspectorate advises that it may be more helpful to divide the four separate topics (Hydrology, Hydrogeology, Flood Risk and Ground Conditions) into at least two chapters.	The assessments have been separated as follows: • Surface and groundwater resources is presented in ES Chapter 9 - Water Resources [EN010162/APP/6.2.9]; • Volume 2 Chapter 10 – Ground Conditions [EN010162/APP/6.2.10], including, land contamination, UXO and minerals is presented in this chapter 10; and • Soils and agricultural land is presented in Volume 2 Chapter 16 - Agricultural Land [EN010162/APP/6.2.17].
Coal Authority	The Development does not fall within the defined Development High Risk Area and is located instead within the defined Development Low Risk Area. This means that there is no requirement under the risk-based approach that has been agreed with the LPA for a Coal Mining Risk Assessment to be submitted or for The Coal Authority to be consulted	Noted. This is referred to in section 10.5.7.

10.2.2 Preliminary Environmental Information Report

11 The preliminary findings of the EIA process were published in the Preliminary Environmental Information Report[2] (PEIR) in January 2025. The PEIR was prepared to provide the basis for statutory public consultation under the Planning Act 2008. This included consultation with statutory bodies under section 42 of the Planning Act 2008.

12 A summary of the key items raised specific to this topic is presented in Table 10.2, together with how these issues have been considered in the production of this ES chapter.

[2] RPS (2025): Great North Road Solar and Biodiversity Park – Preliminary Environmental Information Report. Chapter 10 – Ground Conditions and Land Contamination.

Table 10.2: PEIR Consultation Responses

Consultee and Type of Response	Summary of Consultation Response	Applicant Response
Nottinghamshire County Council Section 42 response	Whilst there are no permitted or allocated mineral sites within the Development, there are three sand and gravel quarries to the east of the Development, with Cromwell Quarry the closest at 230 m. The northern part of the Development, labelled as Study Area 7, is also adjacent to the Egmanton Oil well sites which are permitted and monitored by the County Council as the Mineral Planning Authority. To consider the potential effects of the Development on the mineral resource and sites, the promoter, as per the County Council's request, has produced a Minerals Resource Assessment provided within Volume 4 TA A10.9 – MRA [EN010162/APP/6.4.10.9].	A Mineral Resource Assessment (MRA) has been undertaken and provided as TA A10.9 – MRA [EN010162/APP/6.4.10.9].
Nottinghamshire County Council Section 42 response	The Minerals Resource Assessment notes how Study Areas 1 – 6 and parcel 8 fall within the mineral safeguarding area for sand and gravel or brick clay.	Noted
Nottinghamshire County Council Section 42 response	As per Policy SP7 of the Nottinghamshire Minerals Local Plan, clause 2, any non-mineral development in the safeguarding areas will have to demonstrate the mineral resource will not be needlessly sterilised. The promoter has detailed that this clause is met as the Development is of temporary nature, with an estimated life span of 40 – 50 years, and will not permanently sterilise the resource which could be worked after the closure of the Development.	Noted
Environment Agency Section 42 response	The potential contamination associated with the former RAF Ossington does not mention radium. Radium coatings were often used in aeroplane dials and occasionally, planes were buried on old RAF sites - so radium is a contaminant of concern. Inadequate assessment of potential contaminants at the Order Limits could lead to risks to groundwater not being identified. Include radium as a contaminant of concern for any	Conceptual Site Model reassessed in TA A10.7 – Study Area 7 DTS and PRA [EN010162/APP/6.4.10.7]. This report has included Radium as a potential

Consultee and Type of Response	Summary of Consultation Response	Applicant Response
	Order Limits characterisation assessments of the former RAF Ossington within parcel 7.	contamination source. It has been concluded that Radium, amongst other potential contaminants, are likely to pose a low risk to groundwater given the low permeability of outcropping strata at Study Area 7 (predominantly Mercia mudstone). The low permeability of the outcropping Mercia mudstone bedrock inhibits vertical groundwater migration to deeper underlying main water bearing sandstone strata.
Environment Agency Section 42 response	The Environment Agency is not listed as being notified under the 'discovery strategy protocol', Possible risks to controlled waters could be overlooked. We request the Environment Agency is also included as part of this process, should contamination be identified.	Noted. Amended in section 10.6.2.
Environment Agency Section 42 response	We disagree with the conceptual site model presented and request further assessment, Inadequate assessment of potential source-pathway-receptors linkages could lead to risks to groundwater not being identified. Reconsider the conceptual site model for Study Area 7 and the need for additional land contamination assessment. Groundwater has been disregarded as potential receptor, despite Study Area 7 overlying a Secondary A aquifer. A source of pollution within Study Area 7 is the	The Conceptual Site Model has been reassessed in TA A10.7 – Study Area 7 DTS and PRA [EN0101.62/APP/6.4.10.7].

Consultee and Type of Response	Summary of Consultation Response	Applicant Response
	former RAF site located within the boundary. These receptors and sources should be included in the conceptual site model.	
Environment Agency Section 42 response	Contaminated soil that is (or must be) disposed of is waste. Therefore, its handling, transport, treatment, and disposal are subject to waste management legislation, which includes:• Duty of Care Regulations 1991 • Hazardous Waste (England and Wales) Regulations 2005 • Environmental Permitting (England and Wales) Regulations 2016 • The Waste (England and Wales) Regulations 2011 Developers should ensure that all contaminated materials are adequately characterised both chemically and physically in line with British Standard BS EN 14899:2005 'Characterization of Waste - Sampling of Waste Materials - Framework for the Preparation and Application of a Sampling Plan' and that the permitting status of any proposed treatment or disposal activity is clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays. If you receive (or reject) any hazardous waste, you must send a report to the Environment Agency. These are known as 'returns'. If you dispose of hazardous waste at the premises where it's produced, you may also need to send returns. You should follow the guidance provided here: Hazardous waste: consignee returns guidance The Environmental Protection (Duty of Care) Regulations 1991 for dealing with waste materials are applicable to any off-site movements of wastes. The code of practice applies to you if you produce, carry, keep, dispose of, treat, import, or have control of waste in England or Wales. The law requires anyone dealing with waste to keep it safe and make sure it's dealt with responsibly and only given to businesses authorised to take it.	This has been secured through the DCO by a Requirement, as set out in Section 10.7.1.

Consultee and Type of Response	Summary of Consultation Response	Applicant Response
Newark & Sherwood District Council Section 42 response	In respect of Chapter 10, NSDC have focussed our review on the Desk Study and Preliminary Risk Assessment reports for Study Areas 1-8 completed by RPS on behalf of the Applicant. These provide a broad, high-level assessment of land contamination risks relating to the Order Limits and proposed solar park use. The assessment concludes that the majority of the Study Areas present low risk in terms of land contamination and require no further assessment. The exception to this is Debdale Tip in Parcel 4 which the report states require further consideration and a phase 2 intrusive investigation and ground gas assessment. Whilst we concur with the output of the assessment work at this stage, it would be helpful for the Applicant to confirm when the Phase 2 work would be undertaken, also noting that requirement no. 16 within the DCO seeks to provide for further assessment work, where the risk is higher than 'low.'	Post PEIR submission design changes have resulted in exclusion of the Debdale Tip location from the Order Limits. TA A10.4 - Study Area 4 DTS and PRA [EN010162/APP/6.4.10.4] has been revised to reflect this change.
Newark & Sherwood District Council Section 42 response	It is noted that UXO presents medium and high risks in several locations across the Order Limits (Study Area 2 Averham Park decoy bombing site, Parcel's 7 and 8 former RAF Ossington). Again, it would be useful for the Applicant to confirm when further assessment work will be undertaken to address this high-level risk, again noting draft requirement no. 16. Any controls and mitigation necessary should consider how site workers would be protected from such risk, including nearby communities during the construction stage of the Development (should permission be forthcoming).	A Detailed Stage 2 UXO Desk Study has been undertaken and provided as TA A10.10 - Detailed Desk Study (Stage 2) For Potential UXO Contamination [EN010162/APP/6.4.10.10] to this chapter. Recommended control measures to reduce the risk posed by UXO to As Low as Reasonably Practicable (ALARP) are included within

Consultee and Type of Response	Summary of Consultation Response	Applicant Response
		that assessment and would comprise the preparation of a set of Explosives Site Safety Guidelines and attendance at an Explosives Safety and Awareness Briefing. This is secured through construction health and safety legislation, such as the Health and Safety at Work Act.

10.3 LEGISLATON, POLICY AND GUIDANCE

10.3.1 National Legislation and Guidance

13 The following key national legislation is relevant to ground conditions and provides the technical framework relevant to this chapter.

10.3.1.1 The Environmental Protection Act 1990

14 The Environmental Protection Act 1990 ("the Act") has been amended by The Environment Act 1995 (Section 57) and makes provisions for a risk based framework for the identification, assessment and management of contaminated land within the UK. The provisions of the Act came into effect in April 2000.

15 Part 2A of the Environmental Protection Act is implemented by the Contaminated Land (England) Regulations (CLR) 2006 and the Contaminated Land (England) (Amendment) Regulations 2012.

16 The Part 2A regime is aimed at ensuring that actions taken with respect to contaminated land are directed by a technically well-founded assessment of risk that considers the 'contaminant-pathway-receptor' scenario (contaminant linkage). Under the section 78A(2) of the EPA[3] legislation, contaminated land is defined as:

- *"…any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:*
- *'Significant harm' is being caused or there is a significant possibility of such harm being caused; or*
- *Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused*."

17 Under the section 78A(4) of the EPA legislation, "*'Harm' means harm to the health of living organisms or other interference with the ecological systems of which they form part and, in the case of man, includes harm to his property*".

10.3.1.2 Environmental Protection Act 1990: Part 2A: Contaminated Land Statutory Guidance (2012)[4]

18 The definition of 'Significant harm' is not included in the Act but provides for statutory guidance to elaborate further. The "*statutory guidance*" for Part 2A was issued in 2000, revised in 2006 and 2012.'Significant harm' is defined in the guidance as "*death, disease, serious injury, genetic mutation, birth defects or impairment of reproductive functions*".

19 Under Part 2A, for a relevant risk to exist there needs to be one or more contaminant pathway-receptor linkages – *"contaminant linkage"* – by which a

[3] Environmental Protection Agency (1990): Environmental Protection Act 1990: Part 2A. Available at: https://www.legislation.gov.uk/ukpga/1990/43/contents (accessed on 21/05/2025).
[4] DEFRA (2012): Environmental Protection Act (1990): Part 2A. Contaminated Land Statutory Guidance. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/223705/pb/13735cont-land-guidance.pdf (accessed on 21/05/2025).

relevant receptor might be affected by the contaminants in question. The guidance provides the following definitions for these elements as follows:

- "*A "contaminant" is a substance which is in, on or under the land and which has the potential to cause significant harm to a relevant receptor, or to cause significant pollution of controlled waters*";
- "*A "receptor" is something that could be adversely affected by a contaminant, for example a person, an organism, an ecosystem, property, or controlled waters*"; and
- "*A "pathway" is a route by which a receptor is or might be affected by a contaminant*".

20 A source, pathway and receptor must all be present to complete the pollutant linkage and for a potentially significant risk to exist. As such, the presence of contamination in itself does not necessarily indicate a need for remedial action. Accordingly, a site can only be considered 'contaminated' when a risk to the environment or human health is present due to the presence of a 'source-pathway-receptor' linkage. The Act provides a means of identifying and remediating land that poses a significant risk to human health and/or the environment, where there is no alternative solution. It also works alongside the planning system to help ensure that land is made suitable for use following redevelopment.

21 If risks are presented by groups of substances that are likely to behave in a similar manner relating to the risks that they present, then the groups of contaminants and multiple linkages can be treated as a single contaminant and linkage should it be demonstrated scientifically that there is reason to do so.

22 In considering contaminant linkages, it should be considered whether there are several different pathways linking one or more contaminants to the same receptor. There may be a single significant contaminant linkage or if there is more than one significant linkage identified whether required remediation should be dealt with separately.

10.3.1.3 Hazardous Waste (England and Wales) Regulations 2005

23 The aim of the Hazardous Waste (England and Wales) Regulations 2005 ("the Regulations") is to set out a regime to control and track the movement of hazardous waste in England and Wales. Under the Regulations, a process of registration of hazardous waste producers and a system for recording the movement of waste has been developed, to ensure that certain sites where hazardous waste is produced are notified to the Environment Agency.

10.3.1.4 The Contaminated Land (England) Regulations 2006 (as amended 2012)

24 These regulations make provisions for a contaminated land regime, in accordance with Part IIA of the EPA 1990, which includes actions for the remediation of such land. These regulations (and the accompanying 2012

statutory guidance[5]) introduced a four category test which is intended to clarify when land does, and does not, need to be remediated.

10.3.1.5 Water Resources Act 1991

25 The Water Resources Act principally relates to the protection of controlled water (i.e., rivers, lakes, canals and groundwater) from pollution. It sets out the responsibilities of the Environment Agency in relation to water pollution, resource management, flood defence, fisheries and, in some areas, navigation. It also regulates discharges to controlled waters, namely rivers, estuaries, coastal waters, lakes and groundwater.

10.3.1.6 Water Supply (Water Quality) Regulations 2016 (as amended in 2018)

26 The Water Supply Regulations set out measures to protect the quality of water intended for human consumption.

10.3.1.7 Environmental Damage (Prevention and Remediation) (England) Regulations 2015 (as amended in 2017 and 2019)

27 The aim of the Environmental Damage Regulations is to prevent and remedy damage to land, water and biodiversity.

10.3.2 European Legislation

28 The following European or European-derived legislation is also relevant to the assessments undertaken in this chapter.

10.3.2.1 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

29 These regulations were prepared to implement the European Water Framework Directive in the UK. Although the Directive no longer has effect, the regulations remain in place to control groundwater pollution and contaminated land and establish a legislative framework for the protection of surface waters and groundwater.

10.3.3 National Planning Policy and Guidance

30 The Development will be located to the north-west of Newark, in the administrative area of Newark and Sherwood District Council (NSDC) Nottinghamshire, East Midlands.

10.3.3.1 National Policy Statements

31 National Policy Statements (NPS) EN-1, EN-3 and EN-5, adopted 17 January 2024, are the relevant NPSs to this chapter. Table 10.3 summarises the policies within these NPSs relevant to this chapter.

[5] DEFRA (2012). Environmental Protection Act 1990: Part 2A, Contaminated Land Statutory Guidance. Available at: https://assets.publishing.service.gov.uk/media/5a757dfa40f0b6360e47489d/pb13735cont-land-guidance.pdf [accessed on 23/12/2024].

Table 10.3: Summary of NPS requirements relevant to this chapter

Summary of NPS requirement	How and where considered in the ES
Geological Conservation Sites	
Where the development is subject to EIA the applicant should ensure that the Environmental Statement clearly sets out the effects on internationally, nationally and locally designated sites of ecological or geological conservation importance (paragraph 5.4.17 of **NPS EN-1**[6]).	Review of Designated and Non-designated Geological Conservation Sites in Section 10.5.2 confirms that there are no geological conservation sites within the Order Limits or Study Areas as defined in Section 10.4.2.
The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests (paragraph 5.4.19 of **NPS EN-1**).	Review of Designated and Non-designated Geological Conservation Sites in Section 10.5.2 confirms that there are no geological conservation sites within the Order Limits or Study Areas.
To further minimise any adverse impacts on geodiversity, where appropriate applicants are encouraged to produce and implement a Geodiversity Management Strategy to preserve and enhance access to geological interest features, as part of relevant development proposals. (paragraph 5.4.38 of **NPS EN-1**).	Review of Designated and Non-designated Geological Conservation Sites in Section 10.5.2 confirms that there are no geological conservation sites within the Order Limits or Study Areas. As such a Geodiversity Management Strategy is not considered necessary.
Development proposals provide many opportunities for building-in beneficial biodiversity or geological features as part of good design. (paragraph 5.4.46 of **NPS EN-1**).	Review of Designated and Non-designated Geological Conservation Sites in Section 10.5.2 confirms that there are no geological conservation sites within the Order Limits or Study Areas.
There is a duty on all transmission and distribution licence holders, in formulating proposals for new electricity networks infrastructure, to "have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or	Review of Designated and Non-designated Geological Conservation Sites in Section 10.5.2 confirms that there are no geological conservation sites within the Order Limits or Study Areas.

[6] Department for Energy Security and Net Zero (2024): Overarching National Policy Statement for energy (EN-1). Available at: https://www.gov.uk/government/publications/overarching-national-planning-statement-for-energy-en-1 (accessed 21/05/2025).

Summary of NPS requirement	How and where considered in the ES
physiographical features of special interest". (paragraph 2.2.10 of **NPS EN-5**[7]).	
Development consent for underground sections of a proposed line over an overhead alternative only to be granted if it is satisfied that the benefits accruing from the former proposal clearly outweigh any extra economic, social, or environmental impacts that it presents (including on geology) and that any technical obstacles associated with it are surmountable. (paragraph 2.9.25 of **NPS EN-5**).	Review of Designated and Non-designated Geological Conservation Sites in Section 10.5.2 confirms that there are no geological conservation sites within the Order Limits or Study Area.
Land Contamination	
Where pre-existing land contamination is being considered within a development, the objective is to ensure that the site is suitable for its intended use. Risks would require consideration in accordance with the contaminated land statutory guidance as a minimum (paragraph 5.11.5 of **NPS EN-1**).	Section 10.5.10 Assessment of Preliminary Risk Assessment (PRA) Findings – summary of Conceptual Site Model (CSM) findings identifying land instability and ground contamination risks.
The sustainable reuse of soils needs to be carefully considered in line with good practice guidance where large quantities of soils are surplus to requirements or are affected by contamination. (paragraph 5.11.14 of **NPS EN-1**).	There is not expected to be a large surplus of soil, nor contaminated soils. An Outline Soil Management Plan [EN010162/APP/6.4.17.2] is submitted along with the ES. More detail on this is provided in Chapter 17 - Agricultural Land [EN010162/APP/6.2.17]. Measures to be adopted in the event of finding contaminated soils on site during construction are set out in Section 10.6.2 and are included in the Outline Construction Environmental Management Plan (CEMP) [EN010162/APP/6.4.5.3].

[7] Department for Energy Security and Net Zero (2024): Overarching National Policy Statement for electricity networks infrastructure (EN-5). Available at: https://www.gov.uk/government/publications/overarching-national-planning-statement-for-electricity-networks-infrastructure-en-5 (accessed 21/05/2025).

Summary of NPS requirement	How and where considered in the ES
Applicants should ensure that a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. (paragraph 5.11.17 of **NPS EN-1**)	Section 10.5.10 Assessment of PRA Findings – summary of CSM findings identifying land instability and ground contamination risks.
For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination, and where contamination is present, applicants should consider opportunities for remediation where possible. (paragraph 5.11.8 and 5.11.18 of **NPS EN-1**)	Section 10.5.10 Assessment of PRA Findings – summary of CSM findings identifying ground contamination risks that would potentially lead to remediation under LCRM guidance.
Applicants are encouraged to develop and implement a Soil Resources and Management Plan which could help to use and manage soils sustainably and minimise adverse impacts on soil health and potential land contamination. (paragraph 2.10.34 of **NPS EN-3**[8])	An Outline Soil Management Plan [EN010162/APP/6.4.17.2] is submitted along with the ES. More detail on this is provided in Chapter 17 - Agricultural Land [EN010162/APP/6.2.17].
Mineral Reserves	
Applicants should safeguard any mineral resources on the site as far as possible, taking into account the long-term potential of the land use after any future decommissioning has taken place. (paragraph 5.11.19 of **NPS EN-1**).	MSAs for sand and gravels and brick clay have been identified within the Order Limits. In accordance with local planning policy for non-minerals development within MSAs The Applicant 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. A Mineral Resource Assessment (MRA) has been undertaken and is presented as TA A10.9 – MRA [EN010162/APP/6.4.10.9]. This assessment concluded that safeguarded mineral resources would not be
Where a proposed development has an impact upon a Mineral Safeguarding Area (MSA), the Secretary of State should ensure that appropriate mitigation measures have been put in place to safeguard mineral resources. (paragraph 5.11.28 of **NPS EN-1**)	

[8] Department for Energy Security and Net Zero (2024): Overarching National Policy Statement for renewable energy infrastructure (EN-3). Available at: https://www.gov.uk/government/publications/overarching-national-planning-statement-for-renewable-energy-infrastructure-en-3 (accessed 21/05/2025).

Summary of NPS requirement	How and where considered in the ES
	permanently sterilised by the Development given its temporary nature and the safeguarded resource would subsequently be available for extraction at some point in the future.

10.3.3.2 The National Planning Policy Framework and Planning Practice Guidance

32 The National Planning Policy Framework (NPPF)[9] sets out the Government's planning policies for England.

33 The Planning Practice Guidance (PPG)[10] supports the NPPF and provides guidance across a range of topic areas. The PPG includes guidance on the following topics relevant to this chapter:

- Land affected by Contamination;
- Minerals; and
- Natural environment.

34 Table 10.4 sets out a summary of the NPPF policies relevant to this chapter and Table 10.5 sets out a summary of the PPG relevant to this chapter.

10.3.4 Local Planning Policy

35 The relevant local planning policies applicable to Ground Conditions and Land Contamination based on the extent of the Order Limits for this assessment are summarised in Table 10.6.

[9] Ministry of Housing, Communities and Local Government, National Planning Policy Framework (Dec 2024/ Amended Feb 2025) Available at: https://assets.publishing.service.gov.uk/media/67aafe8f3b41f783cca46251/NPPF_December_2024.pdf (accessed 21.05.25)

[10] Ministry of Housing, Communities and Local Government (Amended Feb 2024). Planning Practice Guidance. Available at: https://www.gov.uk/government/collections/planning-practice-guidance [accessed on 21/05/2025].

Table 10.4: Summary of NPPF requirements relevant to this chapter

Policy	Key Provisions	How and where considered in the ES
15. Conserving and Enhancing the Natural Environment (paras 187 (e) and 187 (f))	Planning policies and decisions should contribute to and enhance the natural and local environment by: • preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of pollution including soil and water or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality; and • remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.	Section 10.5.10, Assessment of PRA Findings, identifies land instability and ground contamination risks.
15. Ground Conditions and Pollution (paras 196 (a), (b) and (c))	Planning policies and decisions ensure that: • A site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation); • After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and • Adequate site investigation information is available to inform these assessments.	Section 10.5.10, Assessment of PRA Findings – identifies land instability and ground contamination risks and TAs A10.1 – A10.8 Study Areas 1 to 8 DTS and PRA reports [EN010162/APP/6.4.10.1 – EN010162/APP/6.4.10.8].
17. Facilitating the sustainable use of	Planning policies should: • Safeguard mineral resources by defining Mineral Safeguarding Areas and Mineral Consultation Areas; and adopt appropriate policies so that known	Following the identification of the Mineral Safeguarded Areas (MSAs) within the extents of

Policy	Key Provisions	How and where considered in the ES
minerals (paras 223 (c) and (d))	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); • Set out policies to encourage the prior extraction of minerals, where practical and environmentally feasible, if it is necessary for non-mineral development to take place.	the Order Limits, a Minerals Resource Assessment has been undertaken, and provided in TA A10.9 – MRA [EN010162/APP/6.4.10.9] to evaluate the constraint that mineral resources are likely to place on the Development given local mineral planning policy.
17. Facilitating the sustainable use of minerals (para 225)	Local planning authorities should not normally permit other development proposals in Mineral Safeguarding Areas if it might constrain potential future use for mineral working.	

Table 10.5: Summary of PPG relevant to this chapter

PPG	Key PPG Guidance
Land Affected by Contamination	**What is a contamination risk assessment and what can it contain? (Paragraph: 007 Reference ID: 33-007-20190722)** If there is a reason to believe contamination could be an issue, applicants should provide proportionate but sufficient site investigation information (a risk assessment) prepared by a competent person to determine the existence or otherwise of contamination, its nature and extent, the risks it may pose and to whom/what (the 'receptors') so that these risks can be assessed and satisfactorily reduced to an acceptable level. The National Quality Mark Scheme (NQMS) accredits competent persons with regard to assessing and reporting land contamination issues. The Department for Environment, Food and Rural Affairs has published a policy companion document considering the use of 'Category 4 Screening Levels' in providing a simple test for deciding when land is suitable for use and definitely not contaminated land. A risk assessment of land affected by contamination should inform an Environmental Impact Assessment if one is required.

PPG	Key PPG Guidance
	The risk assessment should also identify the potential sources, pathways and receptors ('pollutant/ contaminant linkages') and evaluate the risks. This information will enable the local planning authority to determine whether more detailed investigation is required, or whether any required remediation is satisfactory. At this stage, an applicant may be required to provide at least the report of a desk study and site walk-over. This may be sufficient to develop a conceptual model of the source of contamination, the pathways by which it might reach vulnerable receptors and options to show how the identified pollutant/ contaminant linkages can be broken. Unless this initial assessment clearly demonstrates that the risk from contamination can be satisfactorily reduced to an acceptable level, further site investigations and risk assessment will be needed before the application can be determined. Further guidance can be found in the LCRM. Note that remediation or site investigation activities themselves, including field trials, may require planning permission if not carried out as part of a development, and in some cases may also need environmental permits. **Using planning conditions (Paragraph: 010 Reference ID: 33-010-20190722)** The stages and the factors to consider in framing appropriate planning conditions can include: • site characterisation; • submission of the remediation scheme; • implementation of the approved remediation scheme; and • monitoring and maintenance.
Minerals	**What is the purpose of safeguarding mineral resources? (Paragraph: 002 Reference ID: 27-002-20140306)** Since minerals are a non-renewable resource, minerals safeguarding is the process of ensuring that non-minerals development does not needlessly prevent the future extraction of mineral resources, of local and national importance. What steps should mineral planning authorities take to safeguard mineral resources? (Paragraph: 003 Reference ID: 27-003-20140306) Mineral planning authorities should adopt a systematic approach for safeguarding mineral resources, which: • uses the best available information on the location of all mineral resources in the authority area. This may include use of British Geological Survey maps as well as industry sources;

PPG	Key PPG Guidance
	• consults with the minerals industry, other local authorities (especially district authorities in 2-tier areas), local communities and other relevant interests to define Minerals Safeguarding Areas; • sets out Minerals Safeguarding Areas on the policies map that accompanies the local plan and define Mineral Consultation Areas; and • adopts clear development management policies which set out how proposals for non-minerals development in Minerals Safeguarding Areas will be handled, and what action applicants for development should take to address the risk of losing the ability to extract the resource. This may include policies that encourage the prior extraction of minerals, where practicable, if it is necessary for non-mineral development to take place in Minerals Safeguarding Areas and to prevent the unnecessary sterilisation of minerals.
Natural environment (Geo-diversity)	**How can biodiversity and geodiversity be taken into account in preparing a planning application? (Paragraph: 018 Reference ID: 8-018-20240214)** Information on biodiversity and geodiversity impacts and opportunities needs to inform all stages of development (including site selection and design, pre-application consultation and the application itself). As with other supporting information, local planning authorities should require ecological surveys only where clearly justified. Assessments should be proportionate to the nature and scale of development proposed and the likely impact on biodiversity (geo-diversity). Further guidance on information requirements is set out in making an application.

Table 10.6: Summary of local planning policy relevant to this chapter

Policy	Key Provisions	How and where considered in the ES
Nottinghamshire County Council Minerals Local Plan (adopted March 2021)[11]		

[11] Nottinghamshire County Council (2021). Nottinghamshire Minerals Local Plan Adopted 2021. Available at: https://www.nottinghamshire.gov.uk/planning-and-environment/minerals-local-plan/adopted-minerals-local-plan (accessed on 21.05.2025).

Policy	Key Provisions	How and where considered in the ES
Policy SP7: Minerals Safeguarding, Consultation Areas and Associated Minerals Infrastructure	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. 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. 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.	TA A10.9 – MRA [EN010162/APP/6.4.10.9]. This assessment concluded that safeguarded mineral resources would not be permanently sterilised by the Development given its temporary nature and the safeguarded resource would subsequently be available for extraction at some point in the future.
Newark and Sherwood District Council Amended Core Strategy (adopted March 2019)[12]		
Core Policy 12: Biodiversity and Green Infrastructure	Planning proposals to take into account the need for continued protection of the District's ecological, biological and geological assets. Council to secure development that maximises the opportunities to conserve, enhance and restore biodiversity and geological diversity. Provide for suitable alternative natural green space to reduce visitor pressure on the District's ecological, biological and geological assets.	Section 10.5.2 Identification of Designated Sites – confirms that there are no geological conservation sites within the Order Limits or Study Areas.

[12] Newark and Sherwood District Council (2019). Amended Core Strategy Adopted March 2019. Available at: https://www.newark-sherwooddc.gov.uk/media/nsdc-redesign/documents-and-images/your-council/planning-policy/local-development-framework/amended-core-strategy-dpd/amended-core-strategy-DPD.pdf (accessed on 21.05.2025).

Policy	Key Provisions	How and where considered in the ES
Newark & Sherwood Allocations & Development Management Development Plan (adopted July 2013)[13]		
Policy DM10: Pollution and Hazardous Materials	Development proposals involving hazardous materials or the potential for pollution should take account of and address their potential impacts in terms of health, the natural environment and general amenity on: • Neighbouring land Uses; • Wider Population; • Groundwater/Surface Water; • Air Quality; and • Biodiversity. A conceptual site model should be prepared with an investigation report for the Order Limits. A site investigation to confirm the conceptual site model should then be undertaken and dependent upon findings of such a remediation/mitigation plan with subsequent validation should then be agreed with the planning authority. Where a site is known, or highly likely to have been contaminated by a previous use, investigation of this and proposals for any necessary mitigation should form part of the proposal for re-development. Where contamination comes to light as part of the development process, the proposal will be determined in light of this.	Section 10.5.10 Assessment of PRA Findings – summary of CSM findings identifying ground contamination risks.

[13] Newark and Sherwood District Council (2013). Allocations and Development Management Development Plan Document Adopted July 2013. Available at: https://www.newark-sherwooddc.gov.uk/media/nsdc-redesign/documents-and-images/your-council/planning-policy/supplmentary-planning-information/allocations-and-development-management-dpd/Allocation-and-Development-Management-Development=Plan-Document.pdf (accessed on 21.05.2025).

10.3.5 Other Guidance

36 The following guidance documents that are relevant to ground conditions and land contamination provides the basis of assessment relevant to this chapter.

10.3.5.1 Contaminated Land

37 *Environment Agency (2023) Land Contamination: Risk Management (LCRM 2023)*

38 Environment Agency guidance on managing the risks from land contamination through a staged risk based approach. There are 3 stages and each stage is broken down into tiers or steps:

- Stage 1 – Risk Assessment;
- Stage 2 – Options Appraisal; and
- Stage 3 – Remediation and Verification.

39 *DEFRA Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance (2012)*

40 Guidance detailing the responsibilities of the local planning authority in prioritising the inspection of sites under Part 2A of the Environmental Protection Act and sets out a revised framework for assessing risk associated with land contamination. Guidance on remediation is also presented and the document introduces the necessity for cost-benefit analysis when assessing appropriate remedial techniques.

41 *British Standard requirements for the 'Investigation of potentially contaminated sites - Code of practice'. BS10175:2011+A2:2017*

42 This British Standard gives recommendations and guidance on the investigation of land that could potentially be affected by contamination. This includes land with naturally raised concentrations of harmful substances, to determine or manage any risks to human health or the environment.

43 *British Standard requirement for 'Soil quality - conceptual site models for potentially contaminated sites'. BS EN ISO 21365:2020*

44 Good practice to be followed in compilation of the Conceptual Site Model (CSM) that underpins the 3 stages of LCRM (2023).

45 *CIRIA Document C552 – Contaminated Land Risk Assessment: A Guide to Good Practice (2001)*

46 Guidance on the process of risk assessment of contaminated land and the key elements of risk assessment practices and procedures.

47 *CIRIA Document C665 – Assessing risks posed by hazardous ground gases to buildings (2007)*

48 Guidance for the assessment of the risk of hazardous ground gas to buildings.

10.3.5.2 Mineral Reserves

49 *Bureau of Land Management (BLM) Manual 3031 (1985) – Energy and Mineral Resource Assessment*

50 This Manual Section sets standards for gathering and analysing information on mineral resources.

10.4 METHODOLOGY

10.4.1 Scope of the Assessment

51 Table 10.7 summarises the issues considered as part of this assessment.

Table 10.7: Issues considered within this assessment

Activity	Potential effects scoped into the assessment
Construction Phase	
Construction Activities	Contamination risk to off-site users (members of the public) via airborne migration of dusts and subsequent inhalation, dermal contact or ingestion of contaminated groundwaters, or ground gas/vapours via migration during trench excavation.
Operation Phase	
Operation and Maintenance Activities	Potential temporary sterilisation of mineral reserves.
Decommissioning Phase	
Removal of Infrastructure	Contamination risk to off-site users, e.g. airborne migration of dusts and subsequent inhalation, dermal contact or ingestion of contaminated groundwaters or ground gas/vapours migration during trench excavation.

52 Issues regarding Controlled Waters have been adressed in Chapter 9, Water Resources [EN010162/APP/6.2.9].

53 Effects which are not considered likely to be significant have been scoped out of the assessment (noting that there was no agreement to scope in or out any particular elements in the Scoping Opinion – see Table 10.1). A summary of the effects scoped out is presented in Table 10.8.

Table 10.8: Issues scoped out of the assessment

Issue	Justification
Construction Workers	
Exposure of construction workers to potential soil, groundwater or ground gas contaminants	The preliminary risk assessments undertaken, provided in TAs A10.1 to A10.8 – Study Areas 1 to 8 DTS and PRA reports [EN010162/APP/6.4.10.1 – EN010162/APP/6.4.10.8] do not consider pollutant

	linkages for construction workers. It is expected that any relevant linkages will be managed by appropriate health and safety measures. As construction workers are protected under existing health and safety legislation via the Health and Safety at Work Act, any potential effects will be avoided, prevented and reduced through the implementation of standard mitigation measures (including personal protective equipment, training and toolbox talks). Work will be carried out in accordance with relevant Construction Design Management (CDM) Regulations 2015.
Operative and Maintenance Workers	
Exposure of operative and maintenance works to potential contamination through accidental spillages / contaminant release	Operative and maintenance workers are protected under existing health and safety legislation via the Health and Safety at Work Act, any potential effects will be avoided, prevented and reduced through the implementation of standard mitigation measures (including personal protective equipment, training and toolbox talks) as included within an Outline Construction Environmental Management Plan (CEMP), as presented within TA A5.3 – Outline Construction Environmental Management Plan (CEMP) [EN010162/APP/6.4.5.3].

10.4.2 Study Areas

54 The Study Areas for this topic comprises the eight Study Areas of the Order Limits and data search buffer of up to 250 m for each Study Area, where relevant and stated. This distance has been selected based upon professional judgement. This enables the identification of both on-site and off-site sources of potential contamination and other factors which may influence ground conditions and also allows for any minor design scheme changes. The inclusion or otherwise of relevant sensitive sources and receptors gives due consideration to the following:

- The nature of the Development which would not typically include occupied buildings, therefore the risk from ground gases (including radon) is considered low. Potential ground gas sources are therefore restricted to features located within or adjacent to the Order Limits that could impact on sensitive off-site receptors if ground gases are mobilised during construction;
- Sensitivity of off-site land uses primarily residential land use or environmentally sensitive land uses such as SSSIs;
- Pollution incidents classified as having a ‘major’ impact on land or controlled waters; and
- Active groundwater/surface water abstractions and Source Protection Zones.

55 The extent of the data search buffer used in the assessment is represented on the mapping included in the Groundsure Insights Reports which are

included in TA A10.11 - Desk Study and Preliminary Risk Assessment Groundsure Data [EN010162/APP/6.4.10.11].

56 In order to provide a sufficient level of detail for assessment, the Order Limits was subdivided into eight study areas, as shown on Figure 10.1: Site Desk Study Zoning Plan.

10.4.3 Methodology for Baseline Studies

10.4.3.1 Desk Studies

57 The EA's guidance on the Management of Land Contamination indicates that the first step in evaluating land contamination risks is preparation of a Preliminary Risk Assessment (PRA). The objective of the PRA is to identify and evaluate potential land quality risks and development constraints associated with the Development and to construct an initial conceptual site model that can be used to inform future decision making and the design of any future ground investigation.

58 A series of desk based Preliminary Risk Assessments provide the prime sources of data that informs this chapter. These are provided in TAs A10.1 to A10.8 – Study Areas 1 to 8 DTS and PRA reports [EN010162/APP/6.4.10.1 to EN010162/APP/6.4.10.8], a Minerals Resource Assessment in TA A10.9 – MRA [EN010162/APP/6.4.10.9] and a Detailed UXO Desk Study in Volume 4 TA A10.10 - Detailed Desk Study (Stage 2) For Potential UXO Contamination [EN010162/APP/6.4.10.10]. The PRA consists of an appraisal of the source-pathway-receptor 'contaminant linkages', which is central to the approach used to determine the existence of 'Contaminated Land' as defined in Part 2A of the Environmental Protection Act 1990. For a risk to exist (under Part 2A), all three of the following components must be present to facilitate a potential 'contaminant linkage':

- Source of contamination (e.g. primary sources – leaking above ground storage tanks; secondary sources – free phase product (typically hydrocarbon contamination present as a discrete product rather than mixed with soil or water) within the ground or soil/groundwater migration);
- Receptor (living organisms, ecological systems or property which may be harmed, e.g. end users of site, groundwater, surface water and fauna and flora); and
- Pathway (a route or means by which a receptor can be exposed to or affected by a source of contamination) i.e. target mechanism between the source and receptor (e.g. dermal contact or inhalation).

59 The mere presence of a contaminant source does not mean that there will necessarily be attendant risks requiring remedial action or that the site will be designated as 'Contaminated Land'.

60 The location of designated geological conservation sites listed by the Joint Nature Conservation Committee (JNCC) in the Geological Conservation Review (GCR), have been reviewed through an inspection of the on-line GCR database maintained by the JNCC and Sites of Special Scientific Interest (SSSIs) listed in the Groundsure reports obtained for the Desk Studies. The GCR is a database to identify those sites of national and

international importance for sediments, rocks, fossils, and features of the landscape. These sites are typically notified as Sites of Special Scientific Interest (SSSIs) or are being considered for notification as such.

10.4.3.2 Site-specific Surveys

61 No site walkovers have been required for the establishment of baseline conditions for this assessment, given the absence of any onsite permitted current activities or potential ground level contaminant sources identified from environmental data searches. Should development be proposed in areas where potential contaminants are present (as detailed below), ground investigation and potential remediation may be required as detailed in section 10.6.2.

10.4.4 Impact Assessment Methodology

10.4.5 Overview

62 The overall assessment has been carried out in accordance with guidance and standards typically used for infrastructure schemes in the UK: Design Manual for Roads and Bridges (DMRB) Sustainability and Environment Appraisal, LA109[14]: Geology and Soils (National Highways (formerly Highways England) *et. al.,* 2019) and DMRB Sustainability and Environment Appraisal, LA113[15]: Road drainage and the water environment (National Highways (formerly Highways England) *et. al.,* 2020) for sensitivity, whilst the detailed assessment of the magnitude of impacts and significance criteria for effects has been undertaken using the methodology outlined in DMRB Sustainability and Environment Appraisal, LA104[16]: Environmental assessment and monitoring (National Highways (formerly Highways England) *et. al.,* 2020).

63 The terms used to define magnitude and sensitivity are based on and have been adapted from those used in the Design Manual for Roads and Bridges (DMRB) LA104 methodology (National Highways (formerly Highways England) *et al.,* 2020).

[14] National Highways (2019). Design Manual for Roads and Bridges: LA109 – Geology and Soils (2019). Available at: https://www.standardsforhighways.co.uk/tses/attachments/adca4c7d-4037-4907-b633-76eaed30b9c0?inline=true (accessed on 21.05.2025).
[15] National Highways (2020). Design Manual for Roads and Bridges: LA113 – Road drainage and the water environment (2020). Available at: https://www.standardsforhighways.co.uk/tses/attachments/d6388f5f-2694-4986-ac46-b17b62c21727?inline=true (accessed on 21.05.2025).
[16] National Highways (2020). Design Manual for Roads and Bridges: LA104 – Environmental assessment and monitoring. Available at: https://www.standardsforhighways.co.uk/tses/attachments/0f6e0b6a-d08e-4673-8691-cab564d4a60a?inline=true (accessed on 21.05.2025).

10.4.6 Receptor Sensitivity/Value

64 The criteria for defining sensitivity in this chapter in accordance with DMRB LA109[17] (2019) are outlined in Table 10.9.

Table 10.9: Sensitivity criteria

Sensitivity	Definition
Very High	Very high importance and rarity, international scale and very limited potential for substitution. Geology UNESCO World Heritage Sites, UNESCO Global Geoparks and GCR where citations indicate features of international importance. Geology meeting international designation citation criteria which is not designated as such. Contamination: Hydrogeology Principal aquifer providing a nationally important water resource and/or supporting a groundwater dependant site protected under international/EC legislation. Groundwater within an inner source protection zone (SPZ1). Contamination: Human health Very high sensitivity land use such as residential or allotments.
High	High importance and rarity, national scale and limited potential for substitution. Geology Geological site of national importance (e.g., GCR or SSSI or NNR). Geology meeting national designation citation criteria which is not designated as such. Contamination: Hydrogeology Principal aquifer providing locally important water resource and/or supporting a groundwater dependent site of national importance or a river ecosystem. Groundwater supports a Groundwater Dependent Terrestrial Ecosystem defined for the WFD. Groundwater within an outer source protection zone (SPZ2). Contamination: Human health High sensitivity land use such as public open space.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution. Geology Geological site of regional importance (e.g., LGS, LNR). Geology meeting regional designation citation criteria which is not designated as such.

[17] National Highways (2019). Design Manual for Roads and Bridges: LA109 – Geology and Soils (2019). Available at: https://www.standardsforhighways.co.uk/tses/attachments/adca4c7d-4037-4907-b633-76eaed30b9c0?inline=true (accessed on 21.05.2025).

Sensitivity	Definition
	Contamination: Hydrogeology Secondary aquifer unit providing a locally important water resource and/or groundwater dependent features or sites of local importance. Groundwater within the total catchment source protection zone (SPZ3). Contamination: Human health Medium sensitivity land use such as commercial or industrial.
Low	Low or medium importance and rarity, local scale. Geology Non-designated geological features of local interest (e.g., non-designated geological exposure, former quarries/mining sites, cuttings etc). Contamination: Hydrogeology Secondary aquifer unit of providing water resource of limited local importance with little connection to surface water. Contamination: Human health Low sensitivity land use such as highways and rail.
Negligible	Very low importance and rarity, local scale; Geology No geological exposures, little/no local interest. Contamination: Hydrogeology Unproductive strata. Contamination: Human health Undeveloped surplus land/no sensitive land use proposed.

10.4.7 Magnitude of Change

65 The criteria for defining magnitude in this chapter are outlined in Table 10.10.

Table 10.10: Change Magnitude Criteria

Magnitude of Change		Definition
High	Adverse	Geology: loss of geological feature / designation and/or quality and integrity, severe damage to key characteristics, features or elements, large scale landslides or ground destabilisation across a wide area. Contamination: 1) human health: significant contamination identified. Contamination levels significantly exceed background levels and relevant screening criteria (e.g. category 4

Magnitude of Change		Definition
		screening levels) SP1010[18] with potential for significant harm to human health. Contamination heavily restricts future use of land; 2) surface water: Loss or extensive change to a fishery. Loss of regionally important public water supply. Loss or extensive change to a designated nature conservation site. Reduction in water body WFD classification; and 3) groundwater: Loss of, or extensive change to, an aquifer. Loss of regionally important water supply. Potential high risk of pollution to groundwater from routine runoff. Loss of, or extensive change to GWDTE or baseflow contribution to protected surface water bodies. Reduction in water body WFD classification. Loss or significant damage to major structures through subsidence or similar effects.
	Beneficial	Highly beneficial to the geology/hydrogeology environment resources of the area. e.g. exposure of new geological formations that may become designated sites of significant regional and or national interest or removal of existing polluting discharge or removing the likelihood of polluting discharges occurring to an aquifer/ watercourse. Improvement in water body WFD classification. Recharge of an aquifer.
Medium	Adverse	Geology: partial loss of geological feature / designation, potentially adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements, Moderate scale landslides or ground destabilisation within a localised area. Contamination: 1) human health: contaminant concentrations exceed background levels and are in line with limits of relevant screening criteria (e.g. category 4 screening levels) SP1010. Significant contamination can be present. Control / remediation measures are required to reduce risks to human health / make land suitable for intended use; 2) surface water: Partial loss in productivity of a fishery. Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies. Contribution to reduction in water body WFD classification; and 3) groundwater: Partial loss or change to an aquifer. Degradation of regionally important public water supply

[18] DEFRA (2014). SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document (2014). Available at: https://claire.co.uk/projects-and-initiatives/category-4-screening-levels (accessed on 21.05.25).

Magnitude of Change		Definition
		or loss of significant commercial/ industrial/ agricultural supplies. Potential medium risk of pollution to groundwater from routine runoff. Partial loss of the integrity of GWDTE. Contribution to reduction in water body WFD classification.
	Beneficial	Moderate benefit to the hydrogeological environment/soils resource of the area e.g. the Development results in a brownfield contaminated site that is or is likely to be determined as contaminated land being remediated, contribution to improvement in water body WFD classification or reduction of groundwater hazards to existing structures.
Low	Adverse	Geology: minor measurable change in geological feature / designation attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements, ~~Small~~small scale localised landslides/ground destabilisation. Contamination: 1) human health: contaminant concentrations are below relevant screening criteria (e.g. category 4 screening levels) SP1010. Significant contamination is unlikely with a low risk to human health. Best practice measures can be required to minimise risks to human health; 2) surface water: Minor effects on water supplies; and 3) groundwater: Potential low risk of pollution to groundwater from routine runoff. Minor effects on an aquifer, GWDTEs, abstractions and structures.
	Beneficial	Minor benefit to the hydrogeological environment/mineral resources. E.g., the Development may result in the exposure of geological formations that may become of significant local interest. Reduction of groundwater hazards to existing structures.
Negligible	Adverse	Geology: very minor loss or detrimental alteration to one or more characteristics, features or elements of geological feature / designation. Overall integrity of resource not affected. Very limited or no landslides. Contamination: 1) human health: contaminant concentrations substantially below levels outlined in relevant screening criteria (e.g. category 4 screening levels) SP1010. No requirement for control measures to reduce risks to human health / make land suitable for intended use; 2) surface water; No effects on water supplies; and

Magnitude of Change		Definition
		3) groundwater: No measurable impact upon an aquifer and/or groundwater receptors and risk of pollution from spillages <0.5 %.
	Beneficial	None.
No Change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

66 The criteria for defining duration of impact magnitude in this chapter are as follows:

- Short term: a period of months, up to one year;
- Medium term: a period of more than one year, up to five years; or
- Long term: a period of greater than five years.

10.4.8 Significance of Effect

67 The significance of the effect has been determined by taking into account the sensitivity of the receptor and the magnitude of the change from baseline conditions. The method employed for this assessment is presented in Table 10.11. The grey shaded boxes within the table highlight where the significance of likely effect may be moderate or above.

Table 10.11: Matrix for determining the significance of likely effects

Sensitivity of receptor	Magnitude of change			
	High	**Medium**	**Low**	**Negligible**
Very High	Major	Major	Moderate or Major	Minor
High	Major	Moderate or Major	Minor or Moderate	Minor
Medium	Moderate or Major	Moderate	Minor	Negligible or Minor
Low	Minor or Moderate	Minor	Negligible or Minor	Negligible or Minor
Negligible	Minor	Negligible or Minor	Negligible or Minor	Negligible

68 Where the magnitude of impact is 'no change', no effect would arise.

69 The definitions for significance of effect levels are described as follows:

- Negligible – No loss or alteration of characteristics, features or elements; no observable impact either positively or negatively;
- Minor – These beneficial or adverse effects are generally, but not exclusively, raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project;

- Moderate – These beneficial or adverse effects have the potential to be important and may influence the key decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor; and
- Major – These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category. Effects upon human receptors may also be attributed this level of significance.

70 Generally, effects assessed as being Moderate or Major, as shaded in Table 10.11, will be significant in terms of the EIA Regulations, although professional judgement is also applied, and where the assessment concludes differently from the above, this is explained.

10.4.9 Assumptions and Limitations of the Assessment

71 The information used to determine the significance of potential impacts is based primarily upon a review of the desk-based information detailed within the DTS and PRA reports presented in TAs A10.1 to A10.8 – Study Areas 1 to 8 DTS and PRA reports [EN010162/APP/6.4.10.1 to EN010162/APP/6.4.10.8], the Minerals Resource Assessment as presented in TA A10.9 – MRA [EN010162/APP/6.4.10.9] and the Detailed UXO Desk Study presented in TA A10.10 - Detailed Desk Study (Stage 2) For Potential UXO Contamination [EN010162/APP/6.4.10.1]. Given the absence of potentially significant contaminative land uses / sources, as identified from environmental data searches for the Study Areas, targeted site inspections of each Study Area has not been required. The limitations of the DTS and PRA are set out below and also presented within Annex 2 in each PRA report, presented in TAs A10.1 to A10.8 – Study Areas 1 to 8 DTS and PRA reports [EN010162/APP/6.4.10.1 to EN010162/APP/6.4.10.8]:

- A “desk study” means that no site visits have been carried out as part of an assessment, unless otherwise specified;
- The DTS and PRA reports provide available factural data for the Study Areas obtained only from the sources described in the reports and related to each Study and a 250 m radius, where relevant, on the basis of the location information provided by the Applicant;
- The desk study information is not necessarily exhaustive and further information relevant to the Study Areas may be available from other sources;
- The accuracy of maps cannot be guaranteed, and it should be recognised that different conditions within the Study Areas may have existed between and subsequent to the various map surveys;
- No sampling or analysis has been undertaken in relation to this desk study;
- Any borehole data from British Geological Survey sources is included on the basis that: "The British Geological Survey accept no responsibility for

omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation";

- Where any data supplied by the Applicant or from other sources, including that from previous site investigations, have been used it has been assumed that the information is correct. No responsibility can be accepted by RPS for inaccuracies in the data supplied by any other party; and
- The reports have been prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a re-interpretation of the report in whole or in part after its original submission.

72 The main limitations to the MRA is the absence of existing site-specific ground investigation information for the Development, however there is sufficient available published mapping and historical borehole logs held by the British Geological Survey (BGS) to provide sufficient baseline data for the assessment.

73 Limitations to the Detailed Desk Study (Stage 2) For Potential UXO Contamination are listed below and also set out in TA A10.10 [EN010162/APP/6.4.10.1] Section A10.10.1.3:

- It must be emphasised that the detailed UXO Desktop Study can only indicate the potential for UXO-related items to be present onsite. Dependent on the information identified throughout the desk-based process which does not include site visits, or any non-intrusive survey or intrusive site investigation works at this stage, further UXO mitigation may be advised / recommended prior to and in support of any future redevelopment and / or works onsite. Any such recommendations are stipulated later in the document;
- It should be recognised that any recommendations made may require alteration, or further mitigation may be advised, if information outside of that already documented within the Desk Study subsequently comes to light;
- Records of air raids, bomb damage, casualties, and the locations of Unexploded Bombs (UXB) were rarely released into public domain in the interest of national security and morale; this is particularly pertinent with military establishments. Furthermore, details pertinent to these records are often difficult to locate. The records compiled were only as detailed and accurate as the availability of time, personnel, and the ease of access to information would allow. Densely populated areas, such as those associated with major cities, tended to have a greater number of records than those produced for the more provincial, or rural areas. Official records were often supplemented by press reports and local information. This source of information was sometimes discredited as being inadvertently inaccurate, or purposely made inaccurate, to confuse enemy intelligence. Even the accuracy of classified official records is somewhat dubious. This stance has been established based on the quantities of unrecorded German UXO and part-exploded ordnance discovered since 1945; and

- The study consists of a desk-based collation and review of accessible official records, relating to the possibility of UXO being present within the Study Area. Certain information acquired for the purpose of this study may be either classified or restricted material; therefore, summaries of such information have been provided.

74 No further assumptions or limitations have been identified in the preparation of this chapter with regard to ground conditions or land contamination that would prevent a preliminary assessment of the potential effects being made for EIA purposes.

10.5 BASELINE ENVIRONMENT

10.5.1 Desk Study

75 Information on Ground Conditions and Land Contamination within the Study Areas was collected through a detailed desk-based review of existing studies and datasets. These are summarised in Table 10.12.

Table 10.12: Summary of Desk Study Sources Used

Title	Source	Year	Author
Groundsure Enviro+Geo+Map Insights Reports Refs GSIP-2024-16448-21123 and GSIP-2024-16448-21124	Groundsure	2024	Produced by Groundsure based on dataset sets relevant to the Environment and Ground Conditions
BGS Onshore Geoindex and Lexicon of Named Rock Units	British Geological Survey Map Viewers	2024	BGS
Ground investigation exploratory hole data local to the Project	British Geological Survey Map Viewers	2024	N/A
Published 1:63,360 scale geological map Sheet No 113 Ollerton, Solid and Drift	British Geological Survey Map Viewers	1966	BGS
Interactive Map Viewer	Gov.uk	-	Mining Remediation Authority
Mineral Safeguarding Areas	Nottinghamshire Minerals Local Plan	2021	Nottinghamshire County Council
Mineral Consultation Areas	Nottinghamshire Minerals Local Plan	2021	Nottinghamshire County Council

Title	Source	Year	Author
Aquifer designation – Bedrock & Superficial Deposits; Groundwater vulnerability; Groundwater safeguard zones Source Protection Zones.	Magic Maps	-	DEFRA
Unexploded Ordnance	Detailed UXO Desk Based Risk Assessment	2024	Tetra Tech RPS Energy TA A10.10 [EN010162/APP/6.4.10.10]

10.5.2 Identification of Designated Sites

76 There are no designated geological conservation sites within the Study Areas that could be affected by the construction, and operation and maintenance phases of the Development. Loss of geological sites has therefore been excluded from further assessment in this ES chapter.

10.5.3 Site History

77 The land forming the Study Areas has had a predominantly agricultural historical usage, as identified from the earliest available mapping. There is little evidence of potentially contaminative historical industrial land use within the Study Areas other than the following former potentially contaminative land uses listed in Table 10.13. Other localised historical land uses such as smithies or agricultural land usage have been discounted from being significant potential sources of contamination in the PRAs included in TAs A10.1 to A10.8 – Study Areas 1 to 8 [EN010162/APP/6.4.10.1 to EN010162/APP/6.4.10.8].

Table 10.13: Historical Potentially Contaminative Land Uses

Land Use	Potential Contaminants (including but not limited to)	Location
Infilled former gravel pit	Potentially unlicensed waste materials including asbestos-containing materials (ACMs), and sources of metals, hydrocarbons. Potential ground gas generating organic materials.	Study Area 8
Former RAF Ossington Airfield including demolition materials	Hydrocarbons, fuels, oils, metals, ACMs, solvents, metals, phosphoric and mineral acids, toluene,	Study Area 7

Land Use	Potential Contaminants (including but not limited to)	Location
	hexamine, Radium 226 and Polychlorinated Biphenyls (PCBs).	
Egmanton Oil Pumping Wells (disused) and oil depot	Hydrocarbons and fuels.	Study Area 7

10.5.4 Hydrology

78 There are multiple watercourses located within the Study Areas which are classified within a River Basin Management Plan published by the Environment Agency (EA) under the European Water Framework Directive (2000). These include the River Trent and tributaries such as The Beck, Pingley Dyke, Rundell Dyke and Moorhouse Beck. Further detail on these is provided in Chapter 9 - Water Resources [EN010162/APP/6.2.9].

10.5.5 Geology

79 The geology of the Study Areas is dominated by a thick sequence of Triassic bedrock comprising the Mercia Mudstone Group (MMG) which includes the Sidmouth Mudstone Formation (present beneath Staythorpe Power Station) and the Taporley Siltstone Formation present around Eakring. The regional geological bedrock sequence is summarised in Table 10.14.

10.5.5.1 Superficial Deposits

80 The main surface superficial deposits cover across the Study Areas are associated with the flood plain of the River Trent comprising Alluvium (generally unconsolidated clay, silt, sand and gravel) of varying thickness and river terrace deposits identified as the Holme Pierrepont Sand and Gravel Member (predominantly sands and gravels). The latter is a safeguarded mineral resource and is further assessed in the Mineral Resource Assessment compiled for the Study Areas as presented in TA A10.9 – MRA [EN010162/APP/6.4.10.9].

81 Other superficial deposits within the Study Areas are limited to further Alluvium in association with watercourses forming tributaries to the River Trent and in the north-west to the north of Kersall are localised exposures of Glaciofluvial Deposits comprising predominantly sands and gravels and Glacial Till (mid-Pleistocene), an unsorted heterogenous mixture of clay, sand, gravel, and boulders.

10.5.5.2 Bedrock Geology

82 The general stratigraphic sequence of bedrock beneath the Study Area is provided in Table 10.14.

Table 10.14: Description of Geological Strata

Strata	Description	Approximate Thickness (metres (m))
Mercia Mudstone Group (MMG) – Mudstone.	Dominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite-bearing units in some basinal areas.	110 m
Mercia Mudstone Group – Dolomitic Siltstone.	Bands of more dolomitic siltstone within the MMG.	110 m
Gunthorpe Member of the Sidmouth Mudstone Formation (also the MMG). Located in south of the Development	Mudstone, red-brown, with subordinate dolomitic siltstone and fine-grained sandstone, greenish grey, common gypsum veins and nodules	70-90 m
Tarporley Siltstone Formation - Siltstone, Mudstone And Sandstone (basal unit of the MMG).	Very fine to fine grained micaceous siltstones interlaminated with mudstones or sandstones.	20 – 60 m

83 The bedrock of the MMG are also considered to constitute a safeguarded 'Brick Clay' mineral resource present within the Study Areas.

10.5.6 Hydrogeology

84 EA data including Groundwater Vulnerability mapping (1:100,000 scale) indicates the following Superficial aquifer classification for the Study Areas as follows in Table 10.15.

Table 10.15: Superficial Aquifer Classification

Aquifer Classification	Description
Secondary A – Alluvium Deposits, Holme Pierrepont Sand and Gravel Member and Glaciofluvial Deposits.	These formations are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers.
Secondary Undifferentiated – Glacial Till.	Assigned where it is not possible to attribute either category A or B to a rock type. These layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

85 The underlying Triassic MMG bedrock is designated a Secondary B or Secondary Undifferentiated Aquifer. These formations are generally formed of lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.

86 According to EA data, the north-western part of Study Area 1 is located in a groundwater Zone 3 (Total Catchment) SPZ associated with the Severn Trent abstraction at Ompton Pumping Station, which draws water from the Triassic Sandstone underlying the confining MMG strata. A second SPZ (merged zones 1-2c) also associated with abstraction from the Triassic sandstone is present to the west of Caunton and falling within the Study Area for the cable route north of Study Area 2.

87 Information provided by the EA indicates that there are records of active licensed groundwater abstractions within the Study Areas. None of these are for potable supply and most are for spray irrigation or general farming and domestic usage. The majority of these are within the eastern part of the Development and assumed to be sourced from the superficial deposits.

~~87~~88 Information on Private Water Supplies (PWS) is detailed in Chapter 9: Water Resources [EN010162/APP/6.2.9]. One PWS is identified within the Study Area located at Caunton Lodge Farm, close to the east of Study Area 8. This is anticipated to abstract from a depth of 128 m BGL associated with groundwater from the Triassic Sherwood Sandstone Group strata underlying the outcropping MMG strata.

10.5.7 Quarrying and Mining

10.5.7.1 Coal Mining

~~88~~89 The Map Viewer on the Mining Remediation Authority (formerly The Coal Authority) website indicates parts of the Study Areas fall within designated Coal Mining Reporting Areas, however not within a Development High Risk Area. The Mining Remediation Authority's response to Scoping (see Table 10.1), noting that the Study Areas 'do not fall within the defined Development High Risk Area' and is located instead within the defined Development Low Risk Area. This means that there is no requirement under the risk-based approach that has been agreed with the Local Planning Authority (LPA) for a Coal Mining Risk Assessment to be submitted or for The Mining Remediation Authority to be consulted further.

10.5.7.2 Non-Coal Mining

~~89~~90 It should be noted that there is no evidence on historical maps of former underground non-coal mining activity across the Study Areas. It is apparent that there has been historical oil and gas extraction from Egmanton Oil boreholes and wells located within the Development. Egmanton Oil and Gas Field is indicated to have been operating and active in the extraction and production of oil and gas from the Carboniferous Coal Measures and Millstone Grit bedrock since 1955, and the oil field is understood to have last produced in May 2023.

~~90~~91 The British Geological Survey holds multiple British Pit records relating to surface mineral workings of sandstone, sand and gravel and clay and shale. All identified workings are defined by the BGS as 'ceased'.

10.5.8 Environmental Data

10.5.8.1 Landfill and Waste Sites

~~9192~~Information provided by a number of sources and referenced in the Groundsure Insight reports, as presented within TA A10.11: Desk Study and Preliminary Risk Assessment Groundsure Data [EN010162/APP/6.4.10.11], shows that there are no recorded licensed or known historical landfill sites within the Study Areas, however there are two locations within the wider area. These are detailed within Table 10.16.

Table 10.16: Landfill/Waste Sites

Licence Holder	Location	Waste Types
Biffa Waste Services.	Newark Quarry - 44 m east of Study Area 4.	Inert, Industrial, Special, Liquid sludge.
-	Scrap Metal Yard – immediately north of Study Area 7.	-

10.5.8.2 Permitted Activities

~~9293~~EA and Local Authority data indicates that there are no sites with processes regulated by an Environmental Permit (under the Environmental Permitting Regulations 2016) within the 250 m buffer around the Study Areas

10.5.8.3 Recorded Pollution Incidents

~~9394~~There have been recorded major or significant pollution incidents within the Study Areas including:

- 2011 diesel spill on the A1 north of Study Area 7;
- 2004 release of contaminated water in Study Area 2; and
- 2016 release of specific waste material at Park Leys, also in Study Area 2.

~~9495~~None of these fall within the Order Limits and given the age and location of the incidents either on outcropping MMG strata with low migration potential or on the A1 where there is a watercourse flowing to the north-east, away from the Development, have been discounted as significant risks to the Development. It is also considered that where the Development were to create new pathways via construction, the underlying geology would restrict mobilisation of contaminants to controlled waters.

10.5.9 Unexploded Ordnance

~~9596~~CIRIA Report C681 (Stone *et al.,* (2009)) outlines recommendations for dealing with the potential risk associated with the legacy of Unexploded Ordnance (UXO) Risk, largely relating to World War II bombing and military sites.

~~9697~~Reference to the Zetica Unexploded Bomb Risk[19] mapping indicates that the Study Areas are in an area of low potential risk from Unexploded Ordnance

[19] Zetica (2025). Risk Maps. Available at: https://zeticauxo.com/guidance/risk-maps/ (accessed on 21.05.25).

however the presence of the former Ossington Airfield within Study Area 7 would indicate the potential cannot be discounted entirely. A detailed desk study for potential UXO contamination assessing the risk posed to the Development has been undertaken and is presented in TA A10.10 – Detailed Desk Study (Stage 2) for Potential UXO Contamination [EN010162/APP/6.4.10.10]. The assessment has established that there is a low potential UXO risk for the Development from either wartime bombing or munitions associated with RAF Ossington airfield. Recommended measures to be considered by the contractor to reduce the risk level to as low as reasonably practicable for the pre-construction phase are inclusion of UXO in the Contractor's Risk Assessments and Emergency Response Plans and during construction, UXO tool box talks and response actions. Post construction the report states that although a rare occurrence, there may be a residual risk of UXO even in the event of non-discovery. These are secured by legal requirements under the Health and Safety at Work Act.

10.5.10 Assessment of PRA Findings

~~97~~98 A preliminary assessment of ground conditions and land contamination across the Study Areas has been presented in TAs A10.1 to A10.8 – Study Areas 1 to 8 DTS and PRA reports [EN010162/APP/6.4.10.1 to EN010162/APP/6.4.10.8]. Figure 10.2 Ground Conditions Constraint Plan summarises the identified potential contamination sources and also shows the extent of the mineral safeguarding areas within the Study Areas.

~~98~~99 The Preliminary Risk Assessments undertaken have included, in line with current best practice, assessment of potential plausible contaminant source-pathway-receptor linkages within a Conceptual Site Model. This assessment takes into consideration the sources of potential contaminants and the presence of any plausible pathways or receptors.

~~99~~100 Potential contaminative sources identified are mainly associated with historical pits, which may have been filled with (potentially unlicensed) waste materials, however, given the small scale of these features and the age of any infill material, the potential for gas generation is low. Furthermore, based on the proposed infrastructure, the potential for hazardous ground gases to accumulate within confined spaces is considered low. The key potential sources of contamination associated with historical land use are, the former RAF Ossington Airfield in Study Area 7 and former oil drilling activities also in Study Area 7. Sources within the Study Areas but outside of the Order Limits across the western half of the Order Limits have been generally discounted as significant due to the anticipated limited migration potential via shallow groundwater presented by the outcropping low permeability MMG bedrock strata.

~~100~~101 The identified receptors include:

- Secondary A Aquifers (superficial deposits) mainly recorded within the eastern half of the Order Limits;
- Secondary B/Undifferentiated Aquifers (bedrock strata) mainly recorded at outcrop within the western half of the Order Limits;

- Surface watercourses, the Order Limits are crossed by a variety of surface watercourses from minor drains, ditches, streams and ponds to larger WFD recognised waterbodies;
- Off-site residents – there are areas of residential development in close proximity to the Order Limits that could be impacted by off-site migration of leachable, liquid or gaseous contaminants; and
- Future site users – albeit a low risk due to anticipated part-time site attendance for maintenance work.

~~101~~102 Potential controlled waters pathways relate to contaminant migration through permeable superficial deposits, where present, fractures in bedrock strata, shallow groundwater (likely to be limited to the superficial deposits), or leaching of soils. Human health exposure pathways for future site users include direct contact, ingestion or inhalation.

~~102~~103 The potential risks that have been identified have mainly been assessed in the PRAs as being 'not applicable' or 'low' due to the shallow nature of proposed excavations for cable trenches and PV panel supports, which are unlikely to modify/create new pathways that could impact on groundwater reserves or surface watercourses and the absence of full-time future users during operation. Further assessment is not required to evaluate these linkages.

10.5.11 Future Baseline Conditions

~~103~~104 The assessment of likely effects on ground conditions and land contamination considers any potential changes in baseline conditions that would alter the conclusions of the assessment. The primary sources of future change with respect to the baseline are changes in land use and climate change.

~~104~~105 With regard to climate change it is anticipated that with the general trend of global warming that there is potential for more frequent and prolonged periods of extreme weather including longer and more frequent periods of rainfall. This has the potential to increase leaching potential of contaminants from soil.

~~105~~106 Increased ambient temperatures may result in the warming of soils and groundwater beneath the Development, which could have the following impacts:

- Accelerated breakdown of putrescible material in Made Ground (particularly where associated with former landfills), resulting in increased rates of carbon dioxide and methane production. Increased volumes of leachate would also be produced with the accelerated breakdown of this material.

~~106~~107 Changes in land use could influence the parameters upon which this assessment has been based by introducing new potential sources of contamination through industrial-based development, or modification of existing pathways potentially increasing risk of mobilisation of contaminants.

~~107~~108 These factors are taken into consideration, where practicable, in the assessment of effects, including the cumulative effects assessment (see section 10.8).

10.5.12 Key Receptors

~~108~~109 Table 10.17 identifies the receptors taken forward into the assessment.

Table 10.17: Key receptors taken forward to assessment

Receptor	Description	Sensitivity/Value
Human Health – Offsite land users	Members of public	**Very High** sensitivity – assumption that residential offsite land users also include residents of farms.
Controlled Waters ~~–~~ ~~Secondary A Aquifers~~and Abstractions	Superficial Deposits of Alluvium, Holme Pierrepont Sand and Gravel Member and Glaciofluvial Deposits~~.~~ (Secondary A Aquifers). Mercia Mudstone Group (Secondary B Aquifer)	**Low** – ~~only one source protection zone~~Mercia Mudstone Group strata. **Medium** – Superficial Secondary A Aquifers, Source Protection Zone (SPZ3) within the Order Limits ~~but not from~~associated with the ~~Superficial Deposits~~confined Sherwood Sandstone Aquifer and ~~no potable abstractions~~PWS considered Medium sensitivity as the individual supplies support abstraction for up to 25 people.
Controlled Waters – Surface watercourses/water bodies	Various Water Framework Directive (WFD) watercourses within a River Basin Management Plan including the Rivers Trent, The Beck, Pingley Dyke, Rundell Dyke and Moorhouse Beck.	**High** as most conservative value through presence of watercourses having a WFD classification and shown in a RBMP.

10.6 DEVELOPMENT DESIGN

10.6.1 Maximum Design Scenario

~~109~~110 The maximum design scenarios identified in Table 10.18 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the allowed parameter values (the Rochdale Envelope) provided in Chapter 5: Development Description [EN010162/APP/6.2.5].

~~110~~111 Potential impacts on Controlled Waters relating to the accidental spillage or release of pollutants during construction, operation and decommissioning are addressed in Chapter 9: Water Resources [EN010162/APP/6.2.9].

Table 10.18: Maximum design scenario considered for the assessment of potential impacts (C: construction, O: operation and D: Decommissioning)

Potential Impact				Maximum Design Scenario	Justification
	C	O	D		
The impact of existing contamination to off-site human receptors.	Y	Y	Y	Construction Phase Potential cable excavation trenches (maximum width of 12 m with an additional 9 m working area either side totalling 30 m) in Work no.s 1, 2, 4, 5a, 5b, 6 and 7 and piling to nominally 2.50 m below ground level (BGL) for PV panel supports in Work no. 1 could mobilise any residual contamination present in shallow soils or groundwater through creation of new pathways. Operation phase No change anticipated. Pathway if created will still be present and potentially active. Decommissioning Phase Pathway if created will still be potentially active post decommissioning.	Reasonable maximum design scenario for works areas with ground disturbance and depth of excavations, affecting potential to encounter localised unrecorded ground contamination
The impact of existing contamination on future site users.	N	Y	N	Construction Phase Not Applicable. Operation phase No change anticipated. Pathway if created will still be present and potentially active. Decommissioning Phase Not Applicable.	Exposure pathways to residual contamination may exist to maintenance workers during the period of operation although likely to be on a short-term basis.
The impact of existing areas of	Y	Y	Y	Construction Phase	Proposed ground disturbance and depth

Potential Impact				Maximum Design Scenario	Justification
	C	O	D		
contamination causing a deterioration of groundwater quality in underlying aquifer units ~~and~~, connected surface water quality, SPZs and private water supplies.				Potential cable excavation trenches in Work no.s 1, 2, 4, 5a, 5b, 6 and 7 and piling for PV panel supports in Work no. 1 (assumed 2.50 m BGL) or BESS (potentially to be piled) (Work no. 5a could release any leachable contaminants into shallow groundwater. Operation phase No change anticipated. Pathway if created will still be present and potentially active. Decommissioning Phase Pathway if created will still be potentially active post decommissioning.	of excavations, with potential to encounter ground contamination or mobilise contaminants through creation of new pathway via shallow groundwater.

10.6.2 Measures Adopted as Part of the Development (Commitments)

~~111~~112 A Construction Environmental Management Plan (CEMP) will be secured via a DCO requirement, which will describe the construction related mitigation measures outlined below. An outline CEMP is included in TA A5.3 - Outline Construction Environmental Management Plan (CEMP) [EN010162/APP/6.4.5.3]. The plan will clearly set out best practice measures to ensure any environmental impacts during construction and in terms of land contamination are minimal. These include the following;

- Site workers will be made aware of the possibility of encountering localised contamination through toolbox talks and good standards of personal hygiene, including welfare facilities on-site and the use of appropriate levels of personal protective equipment (PPE), will be enforced;
- Site workers will adhere to health, safety and environmental precautions in order to reduce the potential for any accidents and incidents;
- A 'Discovery Strategy' protocol will be drawn upon to ensure that any contamination identified during construction is assessed by a specialist in land contamination. This will include but not be limited to stopping works in the area and ensuring the identified contamination does not pose a risk until an environmental specialist undertakes an assessment and a method is agreed to deal with the identified contamination. If

required, the Local Planning Authority and Environment Agency will be notified;
- Methods will be used to reduce the amount of dust, e.g. washing down of vehicle's wheels and dampening down;
- Any potentially contaminative stockpiles of demolition materials as may be present on the former airfield site will be safely removed; and
- Any bulk fuels or chemical used onsite will be stored appropriately, within an impervious bund of 110 % of the volume of the container in order to reduce the potential for any contamination source in the event of a container failure/ leak of battery fire and associate fire waters. Also, any spillages will be promptly addressed by appropriate measures, such as spill kits.

~~112~~113 Ground Investigations – as there has been minimal previous ground investigation across the Order Limits, ground investigation and geotechnical testing, primarily for confirmation on foundation design parameters would be undertaken. In the absence of site-specific geological and geotechnical data, any ground investigation required would be undertaken at detailed design stage. This is not required as mitigation of potential environmental effects, but is noted as it may occur in any case.

~~113~~114 Remediation Strategy – should ground investigation or the discovery strategy determine that remediation is required to ensure that the Order Limits is suitable for its proposed use, a remediation strategy would be prepared and submitted to Newark and Sherwood District Council for approval prior to its implementation. The DCO includes a Requirement for a Remediation Strategy.

~~114~~115 The Outline Decommissioning and Restoration Plan (DRP) (TA A5.6; [EN010162/APP/6.4.5.6]) includes measures to mitigate against potential pollution incidents during decommissioning.

10.7 LIKELY EFFECTS

10.7.1 Construction Effects

~~115~~116 The potential impacts arising from the construction phase of the Development are listed in Table 10.18, along with the maximum design scenario against which each impact has been assessed. The decommissioning phase is covered in this section where effects are commensurate with the construction phase.

~~116~~117 When determining the significance of likely effects for each potential impact below, the rationale for the category of significance is set out and judgement, where a range of significance of likely effects is presented in Table 10.11, has been based on professional opinion.

10.7.1.1 The Impact of Existing Contamination on Off-site Human Receptors

~~117~~118 Off-site land users include nearby residents or workers. The area within the Order Limits mainly of low residential density and with limited contamination source potential there is not considered to be a viable risk over the majority of the Study Areas.

~~118~~119 The sensitivity of the receptor is considered to be **Very High**.

~~119~~120 Significant contamination is unlikely, with a negligible risk to human health within the Study Areas.

~~120~~121 The magnitude of impact, after the committed measures outlined above, will be **Negligible or No Change**.

~~121~~122 As the sensitivity of the receptor is **very high,** the effect will be **negligible adverse, or no change,** and **not significant.** This will also apply to the decommissioning phase.

10.7.1.2 The Impact of Existing Areas of Contamination Causing a Deterioration of Groundwater Quality ~~in Underlying Aquifer Units~~, connected surface water quality, on SPZs and ~~Connected Surface~~Private Water ~~Quality~~Supplies

~~122~~123 Recent or historical land uses have the potential to result in localised areas of soil or groundwater contamination. That contamination is subject to potential mobilisation if disturbed. The mobilisation of contamination may result in an adverse impact on underlying aquifers, in terms of their WFD status. These effects can be direct or may arise from the creation of new pathways, *e.g.,* through piling or trench excavation.

~~123~~124 There is the potential for the presence of localised Made Ground that contains elevated concentrations of contaminants, particularly around any areas of reprofiled/infilled historical mineral workings and the former airfield.

~~124~~125 The shallow, Secondary A aquifer associated with the fluvial superficial deposits is a locally important groundwater resource that is currently of good quantitative status and used for non-potable abstractions. The sensitivity of this receptor is **Medium**. Part of the Development is also with a Zone 3 SPZ~~.~~ ~~The sensitivity of this receptor is **medium**. The Secondary B Aquifer of~~ , albeit the ~~MMG present~~protected source is the confined Sherwood Sandstone Group strata with abstractions at ~~outcrop across much of the Development is of **Low**~~approximately 60m BGL, this is also a receptor of **Medium** sensitivity.

126 The PWS identified within the Study Area is also related to abstraction from the confined Sherwood Sandstone Group strata. The PWS is also considered to be of **Medium** sensitivity. The PWS is anticipated to abstract from a depth of 128 m BGL associated with groundwater from the Sherwood Sandstone Group, boreholes in the immediate area of Caunton Lodge Farm show low permeability mudstones to a depth of 81 m BGL. The shallow installation of PV panels and associated infrastructure will not result in a viable pollution pathway, therefore there will be no direct interaction on the groundwater resource being utilised for the supply.

127 The Secondary B Aquifer of the MMG present at outcrop across much of the Development and overlying the confined Sherwood Sandstone Group aquifer is of **Low** sensitivity.

~~125~~128 The presence or severity of any contamination is not known although the risk is qualitatively assessed as low based on the findings of the Desk Top Studies undertaken, as presented within TAs A10.1 to A10.8 – Study Areas 1 to 8 DTS and PRA reports [EN010162/APP/6.4.10.1 to EN010162/APP/6.4.10.8].

~~126~~129 The magnitude of impact will be **Negligible or No Change**.

~~127~~130 Overall, the magnitude of the impact on the Secondary A aquifers, SPZs and PWS is negligible and the sensitivity of the receptor is medium. The effect will, therefore, be of **minor, negligible** adverse or no change, and **not significant**, through application of the mitigation measures and development commitments described in Section 10.6.2.

10.7.2 Operational Effects

~~128~~131 The potential impacts arising from the operation and maintenance phase of the Development are listed in Table 10.18, along with the maximum design scenario against which each impact has been assessed. The decommissioning phase is covered in this section where effects are commensurate with the operational phase.

10.7.2.1 The Impact of Existing Areas of Contamination Causing a Deterioration of Groundwater Quality in Underlying Aquifer Units, connected surface water quality, on SPZs and ~~Connected Surface~~Private Water ~~Quality~~Supplies

~~129~~132 The sensitivity of the ~~receptor~~receptors will remain unchanged from that assessed for construction. The sensitivity of the superficial aquifer ~~receptor is **medium**.~~, PWS and SPZ receptors are **Medium**. The Secondary B Aquifer of the MMG present at outcrop across much of the Development is of **Low** sensitivity.

~~130~~133 Once constructed, no activities are likely during operation that have the potential to result in additional mobilisation of any existing contamination.

~~131~~134 The magnitude of impact during the operation and maintenance phase and the decommissioning phase will therefore be ~~negligible~~**Negligible** for all areas.

~~132~~135 Overall, the magnitude of the impact is negligible and the sensitivity of the receptor medium. The effect will be **negligible**, which is **not significant** in EIA terms.

10.7.3 Decommissioning Effects

10.7.3.1 The Impact of Existing Areas of Contamination Causing a Deterioration of Groundwater Quality in Underlying Aquifer Units, connected surface water quality, on SPZs and ~~Connected Surface~~Private Water ~~Quality~~Supplies.

~~*10.7.3.1*~~136

~~133~~137 The sensitivity remains unchanged from the construction phase. The sensitivity of the superficial aquifer ~~receptor is~~, PWS and SPZ receptors are **Medium**. The Secondary B Aquifer of the MMG present at outcrop across much of the Development is of **Low** sensitivity.

~~134~~138 The magnitude of impact during the decommissioning phase will be less than that reported for the construction phase, so the magnitude of impact is anticipated to be **Negligible.**

~~135~~139 The effect will be **negligible or minor adverse** significance, which is **not significant** in EIA terms.

10.8 CUMULATIVE EFFECTS ASSESSMENT

10.8.1 Zone of Influence

~~136~~140 The Zone of Influence (ZOI) for ground conditions and land contamination has been identified based on the spatial extent of likely effects. For this topic the ZOI equates to the Study Areas for the assessment of effects on these resources as described in Section 10.4.2, namely the Study Areas and a data search buffer of up to 250 m around each Study Area.

10.8.2 Screening of Other Developments

~~137~~141 The Cumulative Effects Assessment (CEA) takes into account the impact associated with the Development together with other projects and plans. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise (see TA A2.1 – Cumulative Assessment Stages 1 and 2 [EN010162/APP/6.4.2.1]) identifying potential developments/planning applications within the identified Zone of Influence (ZOI). Each discipline has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

~~138~~142 The Ground Conditions and Land Contamination CEA methodology has followed the methodology set out in Chapter 2 - EIA [EN010162/APP/6.2.2] and methodology of the ES. As part of the assessment, all projects and plans considered alongside the Development have been allocated into ‘tiers’ reflecting their current stage within the planning and development process. Appropriate weight is therefore given to each Tier in the decision-making process when considering the potential cumulative impact associated with the Development. Each Tier has been defined within Chapter 2 - EIA [EN010162/APP/6.2.2].

~~139~~143 This tiered approach is adopted to provide a clear assessment of the Development alongside other projects, plans and activities.

~~140~~144 The specific projects, plans and activities scoped into the CEA, based on the screened Short List of development projects are outlined in Table 10.19**.** The locations of such projects, plans and activities are presented in Figure A2.1.1 provided within TA A2.1 [EN010162/APP/6.4.2.1].

Table 10.19: List of cumulative developments considered within the CEA

Application Reference	Status	Distance from Project (km)	Description	Dates of Construction (if available)	Dates of Operation (if available)	Overlap in temporal scope
Tier 1						
22/01840/FULM	Refused – Appeal allowed	0.00	Staythorpe BESS - Construction of Battery Energy Storage System and associated infrastructure.	Unknown	Unknown	Yes
24/01261/FULM	Approved	0.00	Staythorpe BESS connection - Infrastructure associated with the connection of battery energy storage system to National Grid Staythorpe Electricity Substation and associated works.	Unknown	Unknown	Yes
23/00317/FULM	Pending	0.00	SSE BESS - Construction and operation of Battery Energy Storage System (BESS), transformer/sub-station and associated infrastructure.	Unknown	Unknown	Yes
23/00810/FULM	Approved	0.00	SSE BESS cable route - Laying of an underground	Unknown	Unknown	Yes

Application Reference	Status	Distance from Project (km)	Description	Dates of Construction (if available)	Dates of Operation (if available)	Overlap in temporal scope
			cable run linking Battery Energy Storage System to Grid Connection Point at Staythorpe Substation.			
22/00976/FULM	Refused – Appeal allowed	0.00	Knapthorpe Solar - Construction of a solar farm, access and all associated works, equipment and necessary infrastructure.	Unknown	Unknown	Yes
22/00975/FULM	Refused – Appeal allowed	0.00	Knapthorpe Solar - Construction of a solar farm, access and all associated works, equipment and necessary infrastructure.	Unknown	Unknown	Yes
23/01837/FULM	Refused (within appeal period)	0.00	Kelham Solar - Proposed ground mounted photo voltaic solar farm and battery energy storage system with associated equipment, infrastructure, grid connection and ancillary work.	Unknown	Unknown	Yes

Application Reference	Status	Distance from Project (km)	Description	Dates of Construction (if available)	Dates of Operation (if available)	Overlap in temporal scope
22/01983/FULM	Application submitted	0.02	Foxholes Solar - Construction of Solar farm with associated works, equipment and necessary infrastructure.	Unknown	Unknown	Yes

~~141~~145 In the assessment of effects scenario set out in above, Ground Conditions cumulative effects are not considered to be significant. As on the basis of the information available, only negligible to minor adverse effects have been identified in relation to ground conditions and contamination associated with the Development. The Development is therefore not considered to represent a significant risk in terms of contaminated soil and/or groundwater. Therefore, it is not considered that the Development would contribute to any significant adverse cumulative effects in relation to ground conditions and contamination and no mitigation measures are required for managing cumulative effects.

~~142~~146 With respect to mineral safeguarding, the Development is of a temporary nature and therefore does not present permanent sterilisation of the mineral resources beneath the Study Areas. The current Minerals Local Plan identifies sufficient allocated reserve through to 2036. Beyond the adopted Plan period, a replacement Minerals Local Plan will address the potential requirement to secure additional reserves where a shortfall in reserve landbanks are identified. Mineral safeguarding areas may be redefined in the replacement plan to seek to protect areas as appropriate from non-mineral development. It is therefore considered that the Development does not represent a significant adverse cumulative effects in relation to mineral sterilisation.

10.9 MITIGATION AND RESIDUAL EFFECTS

~~143~~147 No significant effects have been identified, and no further mitigation measures are considered necessary. Residual effects would therefore be as assessed in section 10.7.

10.10 STATEMENT OF SIGNIFICANCE

~~144~~148 Potential effects arising in relation to ground conditions and land contamination have been assessed. With the embedded mitigation measures proposed, all effects would be minor adverse, or less, and not significant in terms of the EIA Regulations.