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13. Geology, Hydrogeology and Land Contamination

13.1. Introduction

13.1.1. This chapter of the Environmental Statement (ES) addresses the potential effects of the construction, operation (including maintenance) and decommissioning of the Proposed Development on geology, hydrogeology and land contamination (considering effects to and from any existing contamination and also any potential to cause contamination). The assessment considers:

- the present-day and future baseline geological and hydrogeological conditions during construction and at opening;
- the likely nature and existing sources of contamination which may be present at the Site;
- the effects of construction and operation of the Proposed Development on geology, geoenvironmental ground conditions and groundwater; and
- the potential effects of the eventual decommissioning of the Proposed Development.

13.1.2. This chapter is supported by **ES Volume II Appendix 13A:** Phase 1 Desk Based Assessment Addendum, **Appendix 13B:** Land Contamination Methodology Tables and **Appendix 13C:** Potential Areas of Contamination Further Risk and Impact Assessment **(Application Document Ref. 6.3).** It should be noted that given the considerable overlap between disciplines, some of the potential impacts and effects relating to hydrogeology are also addressed within **ES Volume I Chapter 12**: Water Environment and Flood Risk (**Application Document Ref. 6.2**).

13.1.3. A preliminary scheme of ground investigation (GI) was undertaken in 2022 and has been used to verify the baseline conditions and relevant assumptions made in the desk-based assessment presented in **ES Volume II Appendix 13A** (**Application Document Ref. 6.3**) and will be used to inform the early design development.

13.2. Legislation, Planning Policy and Guidance

13.2.1. This section outlines the planning policy of relevance to geology, hydrogeology and contaminated land. An overview of all relevant

planning policy is provided in **ES Volume I Chapter 7:** Legislative Context and Planning Policy Framework (**Application Document Ref. 6.2**), which also sets out the primacy of National Policy Statements (NPS) in decision-making on nationally significant infrastructure projects (NSIP), such as the Proposed Development.

Legislation

13.2.2. The following key legislation (UK Acts/ Regulations) are of direct relevance to the assessment of effects of the Proposed Development on geoenvironmental ground conditions:

The Environmental Protection Act 1990 and Part 2A (the Contaminated Land Regime)

13.2.3. Current legislation relating to contaminated land in the UK is contained within Part 2A of The Environmental Protection Act (EPA), which was inserted by s57 of the Environment Act 1995 and by s86 of the Water Act 2003 and elaborated upon within the Contaminated Land (England) Regulations 2006). Under Part 2A, sites are identified as 'contaminated land' if they are: causing significant harm, if there is a significant possibility of significant harm, or if a site is causing, or could cause, significant pollution of controlled waters (i.e. both surface and groundwater).

The Water Act 2003

13.2.4. The Water Act 2003 introduced a revision to the wording of the EPA, which requires that if a site is causing or could cause significant pollution of controlled waters, it may be determined as contaminated land. Once a site is determined to be contaminated land then remediation may be required to render significant pollutant linkages insignificant (i.e. the source-pathway-receptor relationships that are associated with significant harm to human health and/ or significant pollution of controlled waters), subject to a test of reasonableness.

The Water Resources Act 1991

13.2.5. The Water Resources Act 1991 provides statutory protection for controlled waters (i.e. streams, rivers, canals, marine environment and groundwater) and makes it an offence to discharge to controlled waters without the permission or consent of the regulators of these areas.

The Building Act 1984 and the Building Regulations & c (Amendment) Regulations 2016

13.2.6. The Building Act 1984 and in particular the associated Building Regulations & c (Amendment) Regulations 2016 are key when

considering structural and design aspects of a development in terms of the geotechnical properties of the ground. The Building Act 1984 requires that buildings are constructed so that ground movement caused by swelling, shrinkage, freezing, landslip or subsidence of the sub-soils will not impair the stability of any part of the building. Notably, the Building Regulations & c (Amendment) Regulations 2016 also control ground gas mitigation which is a particularly pertinent consideration when considering land contamination.

Other relevant legislation

13.2.7. Other legislation of reference to this topic, and not already outlined above, includes:

- Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (as amended 2015 & 2016) ('WFD')[1];
- The Environment Act 1995;
- Environmental Permitting (England and Wales) Regulations 2016;
- Hazardous Waste (England and Wales) (Amendment) Regulations 2016;
- Contaminated Land (England) (Amendment) Regulations 2012;
- Environmental Damage (Prevention and Remediation) (England) Regulations 2015; and
- Anti-Pollution Works Regulations 1999.

Planning policy

13.2.8. The following planning policy and guidance documents are of direct relevance to the assessment of effects of the Proposed Development on geoenvironmental ground conditions.

Overarching National Policy Statements for Energy (EN-1)

13.2.9. The primary basis for deciding whether or not to grant a Development Consent Order (DCO) is the National Policy Statement (NPS) for Energy (EN-1) (DESNZ, 2024) which, at Part 5, sets out policies to guide how DCO applications will be decided and how the impacts of energy infrastructure should be considered.

[1] Following the United Kingdom's referendum vote to leave the European Union, the requirements of the WFD remain applicable until such time as new legislation is passed either revoking or amending the current 2017 WFD Regulations.

13.2.10. On 24 April 2025, DESNZ published a consultation on revisions to the NPS EN-1 which concluded on 29 May 2025. The outcome of the Consultation is still awaited; however it is not anticipated to result in changes which would materially alter the conclusions as set out in this Chapter.

Overarching National Policy Statement for Natural Gas Electricity Generating Infrastructure (EN-2)

13.2.11. NPS EN-2 (DESNZ, 2023) on Natural Gas Electricity Generating Infrastructure (EN-2) states that where a project is likely to have *'effects on water quality or resources, the applicant must undertake an assessment as required in Section 5.16 of EN-1. The assessment should particularly demonstrate that appropriate measures will be put in place to avoid or minimise adverse impacts of abstraction and discharge of cooling water'.* (paragraph 2.4.30)

13.2.12. **Table 13.1** identifies the policies in NPS EN-1 and NPS EN-2 relevant to geology, hydrogeology and contaminated land, and where in this ES chapter, information is provided to address the policies.

Table 13.1: Relevant NPS EN-1 policies for geology, hydrogeology and contaminated land assessment

Relevant NPS paragraph reference	Policy of the NPS	Where in the ES Chapter is information provided to address this policy
NPS EN-1		
Section 4.12 (Pollution control and other environmental regulatory regimes)	Details that issues relating to discharges or emissions from a proposed project which may affect land quality, the freshwater environment and the marine environment, or which include noise and vibration may be subject to separate regulation under the pollution control framework or other consenting and licensing regimes. Before	Consultation on the PEI report was undertaken with North Lincolnshire Council contaminated land officer and comments raised have been taken into account.

Relevant NPS paragraph reference	Policy of the NPS	Where in the ES Chapter is information provided to address this policy
	consenting any potentially polluting developments it should be confirmed that: • the relevant pollution control authority is satisfied that potential releases can be adequately regulated under the pollution control framework; and • the effects of existing sources of pollution in and around the site are not such that the cumulative effects of pollution when the proposed development is added would make that development unacceptable, particularly in relation to statutory environmental quality limits.	
5.4.17	Where the development is subject to Environmental Impact Assessment (EIA) the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of … geological conservation importance.	13.4 – 'Local Geological Sites/ Regionally Important Geological Sites'
5.4.19	The applicant should show how the project has taken advantage of opportunities to conserve and enhance … geological conservation interests.	13.4 – 'Local Geological Sites/ Regionally Important Geological Sites'

Relevant NPS paragraph reference	Policy of the NPS	Where in the ES Chapter is information provided to address this policy
5.11.18	For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination.	Notably 13.4 and 13.6 – 'Land contamination'
5.16.3	Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent.	Notably 13.4 and 13.6 and is assessed as a receptor to contamination. See also **ES Volume I Chapter 12**: Water Environment and Flood Risk (**Application Document Ref 6.2.12**)
5.16.7	The ES should in particular describe: • the existing quality of waters affected by the proposed project and the impacts of the proposed project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges; • existing water resources affected by the proposed project and the impacts of the proposed project on water resources, noting any relevant existing abstraction rates, proposed new abstraction rates and proposed changes to abstraction rates (including	Notably 13.4 and 13.6 and is assessed as a receptor to contamination. See also **Volume I Chapter 12:** Water Environment and Flood Risk (**Application Document Ref. 6.2.12**)

Relevant NPS paragraph reference	Policy of the NPS	Where in the ES Chapter is information provided to address this policy
	any impact on or use of mains supplies and reference to Catchment Abstraction Management Strategies); and • any impacts of the proposed project on water bodies or protected areas under the Water Framework Directive and source protection zones (SPZ) around potable groundwater abstractions.	
NPS EN-2		
2.4.30	Where the project is likely to have effects on water quality or resources, the applicant must undertake an assessment as required in Section 5.16 of EN-1. The assessment should particularly demonstrate that appropriate measures will be put in place to avoid or minimise adverse impacts of abstraction and discharge of cooling water.	See **ES Volume I Chapter 12**: Water Environment and Flood Risk (**Application Document Ref. 6.2.12**)

National Planning Policy Framework

13.2.13. The latest version of the National Planning Policy Framework (NPPF) was adopted in December 2024 (Ministry of Housing, Communities and Local Government (MHCLG), 2024). The policies contained within the NPPF are expanded upon and supported by the 'Planning Practice Guidance' (MHCLG, 2019a). Neither are applicable to NSIP where the requirements of the NPS apply however the PPG does constitute the most up to date guidance for development in general.

13.2.14. The section of the NPPF that is of particular relevance relevant to the scope of the geology, hydrogeology and contaminated land chapter is Section 15 – Conserving and enhancing the natural environment. Table

13.2 identifies the NPPF policies relevant to geology, hydrogeology and contaminated land. However, parts of other sections may also be of relevance.

Table 13.2: Relevant NPPF policies for geology, hydrogeology and contaminated land assessment

Relevant NPPF paragraph reference	Policy in the NPPF
124	Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions. Strategic policies should set out a clear strategy for accommodating objectively assessed needs, in a way that makes as much use as possible of previously developed or 'brownfield' land.
125 c)	Planning policies and decisions should give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land.
187 a)	Planning policies and decisions should contribute to and enhance the natural and local environment by: • protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan).
187 e)	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 soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water

Relevant NPPF paragraph reference	Policy in the NPPF
	quality, taking into account relevant information such as river basin management plans.
187 f)	Planning policies and decisions should contribute to and enhance the natural and local environment by: • remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.
188	Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework.
196 a)	Planning policies and decisions 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. 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).
196 b)	Planning policies and decisions should ensure that: after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990.
196 c)	Planning policies and decisions should ensure that: adequate site investigation information, prepared by a competent person, is available to inform these assessments.
197	Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.
198	Planning policies and decisions should also ensure that new development is appropriate for its location

Relevant NPPF paragraph reference	Policy in the NPPF
	taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.
201	The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.

Local planning policy

13.2.15. Other relevant policies and guidance have been considered as part of the geology, hydrogeology and land contamination chapter where these have informed the identification of receptors and resources and their sensitivity; the potential for significant environmental effects; and required mitigation. These policies include:

- North Lincolnshire Core Strategy (North Lincolnshire Council, 2011a) - adopted June 2011 (Chapter 11, Environment and Resources); and
- Saved Policies of North Lincolnshire Local Plan - adopted May 2003, saved September 2007 (LC1 - Special Protection Areas, Special Areas of Conservation and Ramsar Sites, LC2 - Sites of Special Scientific Interest and National Nature Reserves, DS7 - Contaminated Land, DS13 - Groundwater Protection and Land Drainage and DS15 - Water Resources).

13.2.16. North Lincolnshire Council is preparing a new Local Plan to 2043. Once agreed (formally adopted), it will replace the current North Lincolnshire Local Plan and the Core Strategy. North Lincolnshire Council anticipates that the new Local Plan will be submitted to the Secretary of State for examination in Spring 2026.

Guidance/ best practice

13.2.17. The following includes a non-exhaustive list of additional guidance considered pertinent and applicable to the geology, hydrogeology and land contamination topic:

- BS 10175 (2011 +A2 2017), Investigation of Potentially Contaminated Sites - Code of Practice;
- BS 8576 (2013), Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOC);
- BS 8485 (2015 +A1 2019), Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings;
- CIRIA C665, assessing risks posed by hazardous ground gases to buildings, 2007;
- CIRIA C552 Contaminated Land Risk Assessment: A Guide to Good Practice, 2001;
- CIRIA C692 3rd Edition 'Environmental Good Practice on Site' 2010;
- Environment Agency's published online guidance for the management of land contamination 'Land contamination risk management (LCRM)'; and
- Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66, 2008.

13.3. Assessment Methodology

Consultation

13.3.1. The consultation undertaken with statutory consultees to inform this chapter, including a summary of comments, relevant to Geology, Hydrogeology and Land Contamination, raised via the formal Scoping Opinion (**ES Volume II Appendix 1B** (**Application Document Ref. 6.3**)) is summarised in **Table 13.3**.

Table 13.3: Consultation summary table

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
Planning Inspectorate	Scoping Opinion (June 2024)	6.6.1.4 Baseline information It is stated that the location of the licensed and historical waste management facilities are shown on the figure contained in Appendix A1.6 of the Report. The facilities are not named on the figure, however those depicted do not appear to reflect the licensed facilities described in para 6.6.1.4, assuming those are the features referenced in the figure Legend as a 'Permitted Waste Site/Authorised Landfill Site'. Figures accompanying the PEI Report should clearly identify relevant features and be consistent with those described in the main text, including using the same naming terminology.	Landfill sites present around and within the perimeter of the application boundary have been considered, and details are shown on **ES Volume III Figure 13.1**: Identified Historical and Current Areas of Contamination (**Application Document Ref. 6.4**) and details presented in **ES Volume II Appendix 13A:** Phase 1 Desk Based Assessment Addendum (**Application Document Ref. 6.3)**.
		6.6.1.4 Receptors – contamination The potential for land contamination to be present, owing to the Main Site's development history, is highlighted, together with the number of waste	Potential receptors have been identified within **ES Volume II Appendix 13A:** Phase 1 Desk Based Assessment Addendum (**Application Document Ref. 6.3**) and

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		management facilities on the Site or within 250m of it. The River Trent, Humber Estuary Ramsar site, SAC and SSI are identified as sensitive receptors that could be affected by groundwater providing a pathway for contamination. The Humber Estuary SPA is not mentioned although it is identified elsewhere in the report as 9.1km downstream of the Site and connected to the Proposed Development via the River Trent. Consideration should be given to the potential for contamination of the SPA through the River Trent and the PEI Report should include an assessment of significant effects where they are likely to occur.	Section 13.7 considers the likely impacts and effects. The potential impacts to the SPA are also included within **ES Volume I Chapter 11:** Biodiversity, Ecology and Nature Conservation (**Application Document Ref. 6.2**).
		6.6.2 baseline – contaminated land survey The wording of this section suggests in relation to contaminated land that should the need for an intrusive site investigation be identified by the desk-based assessment, Technical Note and conceptual site model it would be undertaken post-DCO consent. The PEI	An initial site investigation is proposed, as described in **Chapter 13:** Geology, Hydrogeology and Land Contamination (ES Volume I) and **ES Volume II Appendix 13A** (**Application Document Ref. 6.3**). Relevant literature and desk-based assessment to inform the ground investigation is cited. A Requirement in the draft DCO (**Application Document Ref:**

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		Report should contain a full description of any (post-consent) further intrusive investigation considered to be required and confirm how this will be secured. It is welcomed that the requirements for any intrusive investigation will be discussed and agreed in advance with the EA and North Lincolnshire Council.	**3.1**) secures the carrying out of a contamination scheme.
North Lincolnshire Council	Response to PINS scoping consultation – contaminated land (May 2024)	Section 3.5 of the report confirms the following: "The Proposed Development would be located within the curtilage of the Keadby Power Station site. The ground conditions vary across the Site depending on their historical use. Given the nature of the former site operations in some parts of the Site, it is known from the results of a ground investigation recently undertaken in relation to Keadby CCS Power Station that some localised subsurface contamination is present. Any additional soil or groundwater investigation required for the Proposed Development would be undertaken prior to	The recent ground investigation report is discussed within the desk study technical note provided as **ES Volume II Appendix 13A:** Phase 1 Desk Based Assessment Addendum (**Application Document Ref. 6.3**) with the full report provided as Annex 4 to this technical note.

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		commencing construction. Parts of the Main Site would need to be raised for flood protection so fill material will need to be imported for this purpose. This department has not received or reviewed the ground investigation referred to and will await submission of the PEI Report when further comments will be provided.	
		Section 6.6. of the report confirms the following: "A desk study was carried out in May 2021 and the report acknowledges that it is now three years old and also considered a slightly different site area. The report has confirmed that a Technical Note will be prepared to highlight any key differences and updates that need to be accounted for in the Keadby Next Generation geology, hydrogeology and land contamination assessment. This will include for a review of updated site sensitivity data as well as relevant site investigations undertaken	The desk study technical note is provided as **ES Volume II Appendix 13A:** Phase 1 Desk Based Assessment Addendum (**Application Document Ref. 6.3**).

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		since completion of the May 2021 desk-based assessment. A Baseline report will also be incorporated into the addendum Technical Note." This department agrees with the recommendations and will await submission of the addendum Technical Note when further comments will be provided.	
	Response to PEI Report (February 2025)	<u>Contaminated Land</u> Section 13.6.3 of the PEIR confirms the following: "Ground investigation will be undertaken before construction to inform the development of the preliminary and detailed design. The ground investigation will validate the assumptions made in the initial Conceptual Site Model and Preliminary Risk Assessment (**Appendix 13A**: Phase 1 Desk-based Assessment Addendum (PEI Report Volume II) and provide site-specific data upon which to base a land contamination risk assessment. The ground	Comment noted. Further ground investigation will be secured by Requirement in the **Draft DCO (Application Document Ref. 3.1**) to support detailed design and will be submitted in advance of construction commencing.

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		investigation will be designed to target the potentially contaminative sources identified, including the historical landfilling activities identified on the Site. Where risks are deemed to be unacceptable, further detailed quantitative risk assessment and if required, detailed remediation strategies will be developed accordingly, pursuant to the process set out by the planning authorities". This department agrees with the recommendations and will await submission of the ground investigation when further comments will be provided.	
Canal & River Trust	Response to PEI Report (February 2025)	Our previous comments on the scoping document highlighted no significant concern with the promoters' proposed approach to the Environmental Statement. The Trust have no significant issues with the approach and conclusion of no likely significant effects reached in the phase 1 report submitted alongside the PEIR. We note in Section 13.3 that a ground	Comment noted. Further ground investigation will be secured by Requirement in the **Draft DCO (Application Document Ref. 3.1**) to support detailed design and will be submitted in advance of construction commencing.

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		investigation (GI) would be undertaken before construction is started on site, and believe this may be subject to further engagement with the Trust.	
Environment Agency	Response to PEI Report (March 2025)	PEI Report Chapter 13, Section 13.1.3. 13.6.3 and 13.8.2 In 13.1.3 it states "A preliminary scheme of ground investigation (GI) was undertaken in 2022 and has been used to verify the baseline conditions and relevant assumptions made in the desk-based assessment". It is not clear where in Chapter 13, if anywhere, reference is made to the results of the 2022 GI by Fugro. The 2022 GI (PEIR Appendix 13A Phase 1 DBA Annex 4) identified contamination in soils and groundwater. It was recommended that additional groundwater monitoring and further investigation is carried out (PEIR Appendix 13A Phase 1 DBA Annex 4 part 1, sections 6.8 and 8 respectively). Findings and recommendations from this assessment	Results of the ground investigation are included in the ground conditions summary in **Table 13.6** and discussed in 13.5.37 and 13.5.8. Recommendation to undertake additional monitoring and investigation is included in Section 13.6.3 and 13.8.2.

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		have seemingly not been included in Chapter 13. In Chapter 13, Section 13.8.2 refers to a proposed future ground investigation. It states: “Depending on information gathered through this ground investigation, monitoring of groundwater and surface water may be recommended”. This fails to acknowledge that monitoring has already been completed, and further monitoring is recommended.	
		PEI Report Chapter 13, Section 13.5.6 and Table 13.6 Contradictory information regarding recent and historical site investigations. Fully review all available site investigation data and update anticipated thicknesses of Made Ground wherever stated. It may be beneficial to consider different areas of the site separately (such as the former landfill site). Supply the borehole logs.	The summary of anticipated ground conditions detailed in **Table 13.6** of this has been amended to provide a summary of ground conditions based on all available information reviewed and anticipated thickness of made Ground has been sub-divided by site area. Borehole logs from the 2022 Fugro ground investigation are provided in **ES Volume II Appendix 13A:** Phase 1 Desk Based

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
			Assessment Addendum (**Application Document Ref. 6.3**) Annex 5.
		Appendix 13A: Phase 1 Desk Based Assessment Addendum Annex 4 In 1.2 it states: "Details of the site investigations [sic] scope and the data can be found in Fugro's Factual Report submitted separately." We assume from Section 1.4 that this is report ref. F212561 - Ground Investigation Report (GIR) Factual Account. This report has not been submitted with the PEIR documents. As such, we have not been able to review the factual data. Throughout this report, there is reference to the Environment Agency's Land contamination risk management (LCRM) guidance, with dates of both 2020 and 2021 given. The version in the references (Section 8) is stated as being 2021, with an "accessed" date in 2022. The consultant	The factual ground investigation report has been included in **ES Volume II Appendix 13A:** Phase 1 Desk Based Assessment Addendum (**Application Document Ref. 6.3**) Annex 5. Comment on referencing is noted, as this relates to a historical report this has not been updated.

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		should take care to be consistent and accurate with their references.	
		Appendix 13A: Phase 1 Desk Based Assessment Addendum Annex 4 Ensure project description in all chapters of the PEIR, in Appendix 13A: Phase 1 Desk Based Addendum Annex 4, and all other documents, is correct and consistent. Make allowance for additional sampling and testing of any soils to be removed from site. Liaise with the Environment Agency about any permits or exemptions required for earthworks, and reuse or disposal of waste soils. Shallow groundwater may also be contaminated. Where this affects earthworks, it must be appropriately tested and disposed of. Material in a former landfill is, by definition, waste. This is the case even if it proven to be inert, non-hazardous waste. As such,	Introduction of **ES Volume II Appendix 13A**: Phase 1 Desk Based Assessment Addendum (**Application Document Ref. 6.3**) has been amended to clarify that the earthworks discussed in Annex 4 do not relate to the current Proposed Development. Requirements to undertake additional testing of soils and groundwater during earthworks are outlined in Section 13.6 Paragraph 13.6.17 and 13.6.18 acknowledge that a suitable permit, exemption or MMP will be required for reuse of earthworks material and that material excavated from landfill will be classed as waste. Text discussing shallow groundwater levels in **ES Volume II Appendix 13A:** Phase 1 Desk Based Assessment Addendum (**Application Document Ref. 6.3**) has

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		End of Waste status must be achieved before this is reused. We note that Appendix 13A: Phase 1 Desk Based Assessment Addendum Annex 4 appears to be an outdated report, with some updates addressed in Appendix 13A Phase 1 Desk Based Assessment Addendum. Appendix 13A Phase 1 Desk Based Assessment Addendum presents inconsistencies regarding shallow groundwater: • 13A.7.4 and 13A.9.5 state groundwater depths average 0.5 to 2.0mbgl • 13A.8.5 Conceptual Site Model receptors R6&R7 states 0.9 to 3.0mbgl As Appendix 13A Phase 1 Desk Based Assessment has now been supplied, we can assume that the discussion in Appendix 13A Annex 4 is outdated. This is not specifically stated in the Addendum, where earthworks are not discussed.	been amended. Average groundwater levels from the 2022 ground investigation were 0.5m-2m bgl with the range stated in the Conceptual Site Model Table based on other historical monitoring data discussed in **ES Volume II Appendix 13A:** Phase 1 Desk Based Assessment Addendum (**Application Document Ref. 6.3**) Annex B. The text in the Conceptual Site Model table for receptors R6 and R7 has been amended to reflect this.

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		Appendix 13A: Phase 1 Desk Based Assessment Addendum Annex 4 Section 6.8 Stated in text that information is presented in Appendix XX. There is no Appendix XX for this report.	The correct Appendix reference should be Appendix F.2 Groundwater Risk Assessment Analysis. Appendix F.2 is available within the report provided in **ES Volume II Appendix 13A:** Phase 1 Desk Based Assessment Addendum (**Application Document Ref. 6.3**) Annex 4. As this is a historical report the reference in the text has not been updated.
		Appendix 13C: Potential AOC Baseline Risk Scores The term "AOC" is not clearly defined in the main report (Chapter 13), in Volume II Cover, Contents And Glossary, or in Appendix 13C. We note that the title to Table 1 in Appendix 13C is "Potential areas of contamination". We assume this is "AOC", but it is not explicitly stated. In Chapter 13, Section 13.3.9 and elsewhere the applicant has misnamed Appendix 13C as "Potential Areas of Contamination Further Risk and Impact Assessment". This supports our	Term "AOC" has been removed from **ES Volume II Appendix 13C:** Potential Areas of Contamination Further Risk and Impact Assessment (**Application Document Ref. 6.3**) and **ES Volume I Chapter 13:** Geology, hydrogeology and land contamination (**Application Document Ref. 6.2.13**) and is spelt out in full throughout to avoid confusion. **Appendix 13C:** has been renamed as "Potential Areas of Contamination Further Risk and Impact Assessment". Figure 13.2 is referenced in error and should be **Figure 13.1** which was provided

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		assumption, but it is still not explicitly stated. In Section 13C.1.2 there is reference to "Figure 13.2 (PEI Report)". This has not been uploaded to Library — Keadby Next Generation Power Station with the other consultation documents. As such, we have not been able to review it.	in the PEI Report and is included with this ES. The reference in **ES Volume II Appendix 13C:** Potential Areas of Contamination Further Risk and Impact Assessment (**Application Document Ref. 6.3**) has been corrected.
		Appendix 13C: Potential AOC Baseline Risk Scores Table 2 is an assessment of different contaminant sources, including whether they are within the site boundary. The applicant has determined some sources are 'outside' of the Proposed Development Site Boundary as they only "extend slightly to within" the boundary. We disagree with this, as anything within the boundary, even if not wholly, should be determined as being within the boundary. This includes, but may not be limited to, sources S4, S5, S6 and S10. It incorrectly states that S9 is located entirely outside the boundary. The	Assessment of sources in Table 2 of **ES Volume II Appendix 13C:** Phase 1 Desk Based Assessment Addendum (**Application Document Ref. 6.3**) has been revised and all identified source areas which fully or partially extend within the site boundary have been considered to be "within" the Proposed Development Site Boundary. Text coloured blue was a formatting error and has been corrected.

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		proposed vehicular site access crosses through S9 where it crosses the North Soak Drain. While these sources are primarily outside the site boundary, the potential for contamination to be present where they are within the site cannot be ruled out. Dependent on the nature of the sources, contaminants outside the boundary might be able to migrate unrestricted into the site. It is unclear why the text in some isolated cells in the tables of this appendix is coloured blue.	
		Appendix 13A: Phase 1 Desk Based Assessment Addendum 13A.9.7 states “identified some soil contamination but this is not anticipated that this can be managed through appropriate mitigation during construction and will not pose a significant risk to the Proposed Development.” There is possibly a typographical error in this sentence.	Typographical error in **ES Volume II Appendix 13A:** Phase 1 Desk Based Assessment Addendum (**Application Document Ref. 6.3**) has been corrected. Contamination is anticipated to be appropriately managed by mitigation outlined in the ES.

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		Clarification is required as to whether soil contamination is anticipated to be managed through appropriate mitigation.	

Assessment methods

Geology and hydrogeology

13.3.2. Geological and hydrogeological conditions at the Site are summarised in Section 13.5 and are assessed, where applicable, as potential receptors to land contamination.

13.3.3. The resource value of groundwater is addressed within **ES Volume I Chapter 12**: Water Environment and Flood Risk (**Application Document Ref. 6.2.12**).

Land contamination

13.3.4. For this ES chapter, areas of potential contamination have been identified within the study area of the Site.

13.3.5. In line with the Environment Agency's LCRM, the assessment of land contamination uses a tiered, risk-based approach, as summarised below:

- Tier 1: qualitative risk assessment based on a desk top study of available information to identify potential sources of contamination, receptors to contamination and potential pathways between them. The identified sources, pathways and receptors are presented in the form of a Conceptual Site Model (CSM) showing the potential contaminant linkages (PCL);
- Tier 2: If PCL are identified, this means there is a theoretical risk to receptors from contamination and intrusive investigation should be used to provide data to inform a generic quantitative risk assessment (GQRA). The GQRA involves comparison of site-specific, laboratory analytical data against appropriate generic assessment criteria (GAC) for human health and/ or controlled waters which represent minimal or tolerable risk; and
- Tier 3: detailed quantitative risk assessment to identify whether contamination identified above minimal or tolerable risk levels represents an unacceptable risk and therefore requires remediation.

Screening assessment (undertaken as part of Tier 1)

13.3.6. A qualitative assessment of the risks posed by land contamination within the study area has been undertaken as part of this ES chapter by first assigning a 'baseline risk score' to each identified historical or current area of potential land contamination identified in the baseline

review. The baseline risk score has been determined using the tables provided in **ES Volume II Appendix 13B:** Land Contamination Methodology Tables (**Application Document Ref. 6.3**). The baseline risk score is based partly on the relationship between the identified area of potential land contamination and its proximity to the Site (**ES Volume II Appendix 13B**, **Table 13B.1** (**Application Document Ref. 6.3**) together with the proposed cut/ fill of the Proposed Development design at its closest point (**ES Volume II Appendix 13B**, **Table 13B.3** (**Application Document Ref. 6.3**)). The baseline risk score also considers the nature of the current and/ or historical land use, as certain land uses typically result in a greater potential for contamination of the ground to have occurred (**ES Volume II Appendix 13B**, **Table 13B.2** (**Application Document Ref. 6.3**)). The lower the baseline risk score then the lower the perceived level of risk.

13.3.7. Professional judgement has been applied in reviewing the generated baseline risk scores. Generally, baseline risk scores of two or less are considered not to pose a significant risk and will not be considered for further assessment. Baseline risk scores of three or more will be considered for further risk and impact assessment.

13.3.8. The next stage of screening relates to a review of sensitive receptors and their proximity to the potential area of land contamination. A combination of this review and the baseline risk score defines whether a site advances to the detailed assessment stage for further risk and impact assessment which is described in the following sections. The review of sensitive receptors and their proximity to the potential contaminated site are presented in **ES Volume II Appendix 13C:** Potential Areas of Contamination Further Risk and Impact Assessment (**Application Document Ref. 6.3**).

13.3.9. A flow chart summarising the screening, risk and impact assessment steps that have been undertaken, and signposting to where relevant data and assessments can be found is presented in Plate 13.1.

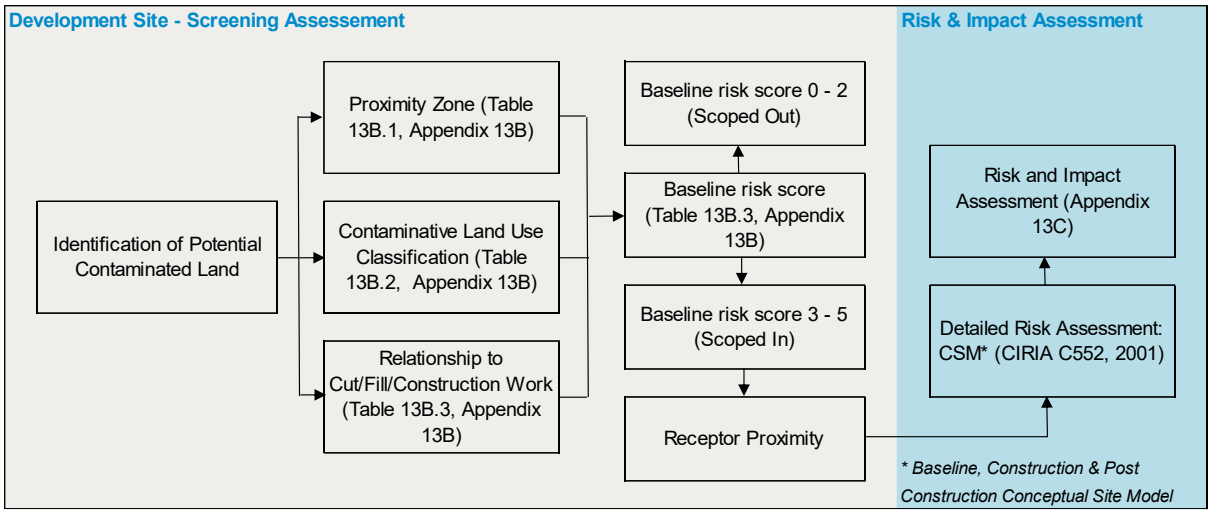

Plate 13-1 Land contamination assessment flow chart

Risk and impact assessment

13.3.10. The approach to assessing the potential impacts of the Proposed Development has been undertaken by comparing the risk levels at baseline with the CSM and the risk levels for the construction and post-construction stages respectively, to determine any change in risk at each stage.

13.3.11. Potential risks have been determined and assessed based on the likelihood (or probability) and consequence (or severity) using the principles given in the Section 6.3 of CIRIA C552, 2001. This provides guidance on development and application of the consequence and probability matrix to risk assessment and broad definitions of consequence. The risk matrix is presented in **Table 13.4**.

Table 13.4: Estimation level of risk

Probability	Consequence			
	Severe	Medium	Mild	Minor
High likelihood	Very high	High	Moderate	Moderate/low
Likely	High	Moderate	Moderate/low	Low
Low likelihood	Moderate	Moderate/low	Low	Very low

Probability	Consequence			
	Severe	Medium	Mild	Minor
Unlikely	Moderate/low	Low	Very low	Very low

13.3.12. The significance of the effects of land contamination has been assessed by comparing the difference in risk for each contaminant linkage at baseline to those at construction and at post construction stages. Where there is shown to be a decrease in contamination risk the Proposed Development is assessed as having a beneficial effect on the environment in the long term.

13.3.13. The definitions of the significance criteria used are presented in **Table 13.5** below. This provides details of how increases and decreases in the contamination risks identified are related to the significance criteria adopted. Potential effects that are determined as being moderate or major are classed as 'significant' effects. Where an effect has been anticipated to be neutral or minor, these effects are classed as 'not significant'. Predicted effects of minor or neutral/ negligible significance are acceptable and do not require further consideration. It is only predicted effects of moderate or high that require a more detailed assessment.

Table 13.5: Significance criteria

Significance Criteria	Definition
Major adverse effect	An increase in contamination risk of 4 or 5 risk levels in the risk matrix, e.g. from land that has a very low contamination risk in the baseline becomes a high or very high risk.
Moderate adverse effect	An increase in contamination risk of 2 or 3 risk levels in the risk matrix, e.g. land that has a low contamination risk in the baseline becomes a moderate or high risk.

Significance Criteria	Definition
Minor adverse effect	An increase in contamination risk of 1 risk level in the risk matrix, e.g. land that has a low contamination risk in the baseline becomes a moderate/low risk.
Neutral effect	No change in contaminated land risks.
Minor beneficial effect	A reduction in contamination risk of 1 risk level in the risk matrix, e.g. land that has a moderate/low contamination risk in the baseline becomes a low risk.
Moderate beneficial effect	A reduction in contamination risk of 2 or 3 risk levels in the risk matrix, e.g. land that has a high contamination risk in the baseline becomes a moderate/low or low risk.
Major beneficial effect	A reduction in contamination risk of 4 or 5 risk levels in the risk matrix, e.g. land that has a very high contamination risk in the baseline becomes a low or very low risk.

Study area

13.3.14. For the purposes of determining the local baseline conditions with respect to geology and land contamination, a study area that extends 250m from the boundary of the Site is adopted (see **ES Volume III Figure 3.1** (**Application Document Ref. 6.4**)). This is extended for hydrogeology to 1km from the boundary of the Site. This is appropriate to assess the local geological and hydrogeological setting and any

influence that potential land contamination might have on the Proposed Development or local receptors.

Data sources

13.3.15. This ES chapter draws on information from a combination of the following sources:

- historical mapping and environmental data provided as part of a professional Groundsure Insights Report provided by Groundsure (July 2024) (see **Appendix 13A**: Desk Based Assessment Addendum (Annex 3) (ES Volume II))
- British Geological Survey (BGS) Geological Mapping and Memoirs;
- Environment Agency website;
- BGS website;
- Cranfield Soil and AgriFood Institute (CSAI) Soilscapes website;
- stakeholder consultation
- Department for Environment Food and Rural Affairs (DEFRA) Multi Agency Geographic Information for the Countryside (MAGIC) website;
- National Library of Scotland website (for additional historical mapping); and
- current and recent-historical aerial imagery from Google Earth Pro (for additional historical information).

13.4. Use of Rochdale Envelope

13.4.1. A focused use of the Rochdale Envelope approach has been adopted to present a worst-case assessment of potential environmental effects of the different parameters of the Proposed Development that cannot yet be fixed. The parameters included within the Rochdale Envelope are described in **ES Volume I Chapter 4:** Proposed Development (**Application Document Ref. 6.2.4**). Whilst it is recognised that there are areas of variability in the design that could affect the assessment, the building dimensions included within the assessment are the maximum dimensions under consideration, and the limits of deviation (as set out in the **Works Plans** (**Application Document Ref. 2.3**)) are the maximum extents that would be considered. This variability would not change the assessment outcome, as all the worst-case assumptions have been applied to the assessment.

13.5. Baseline Conditions

13.5.1. This section presents the baseline conditions for geology, soils and hydrogeology. It also considers potential receptors that could be impacted upon by any existing or resulting ground contamination. There is therefore reference made to surface water, groundwater and ecological features in this section which are discussed in more detail in **ES Volume I Chapter 11:** Biodiversity and Nature Conservation and **Chapter 12**: Water Environment and Flood Risk (**Application Document Ref. 6.2**).

Soils classification

13.5.2. Information obtained from CSAI, (2020) describes the soils on the Site to be loamy and clayey soils of coastal flats with naturally high groundwater (Soilscape identification description number 21). Land within this soil type is described as generally draining to local groundwater and mostly drained. Shallow groundwater and marginal ditches to most fields mean that the water resource is vulnerable to pollution from nutrients, pesticides and wastes that may be applied to the land.

13.5.3. According to the Groundsure Insights report, Natural England reports the Agricultural Land Classification (ALC) to be Grade 2 for the majority of the Site. This is classed as soil of '*very good quality*'. This land is further described as having only minor limitations which affect crop yield, cultivations or harvesting. It can support a wide range of agricultural and horticultural crops but there can be some reduced flexibility on land within the grade, which causes difficulty in the production of more demanding crops.

13.5.4. The ALC within and around the proposed access road from the A18 and the potential laydown options in adjacent agricultural fields is Grade 1. This is classed as soil of '*excellent quality*'. This land is further described as having no or very minor limitations. A very wide range of agricultural and horticultural crops can be grown.

Geology

13.5.5. The BGS GeoIndex website and published 1:50,000 scale geological maps of the area (Sheet 88, Doncaster and Sheet 79, Goole) have been reviewed, alongside selected historical BGS borehole records available from the Proposed Development Site, historical and recent ground investigations (summarised in **ES Volume II Appendix 13A** (**Application Document Ref. 6.3**)). These records indicate that the

Site is underlain by the geological succession summarised in **Table 13.6**.

Table 13.6: Geological succession from published mapping and on-site borehole records (including results from 2022 GI)

Geological stratum	Location	Anticipated thickness	Description
Made Ground	Main Site Area	0.3-3.65m (1m average)	Typically clayey sand deposits with occasional fragments of brick, concrete and clinker
	Access Road in south of Proposed Development Site	0.45-2.5m (0.8m average)	Typically clayey gravelly sand deposits with occasional fragments of brick, concrete and clinker
	Ash tip to the west of the Proposed Development Site	6m-19m (raised above natural ground surface)	Sandy clay, sand and silty sand with ash sands and fragments of clinker and wood
Warp (artificially induced Alluvium)	Across the majority of the Site and the study area.	13 – 14m	Clay and silt.
Cohesive Alluvium	Eastern extent of the Site and study area.		Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel.

Geological stratum	Location	Anticipated thickness	Description
Granular Alluvium	Beneath the Cohesive Alluvium.		Sands, silts and clays, with occasional peat layers (peat layers recorded between 0.45m and 1.6m thickness). Sands sometimes described as '*blown sands*'[1].
Mercia Mudstone Group (bedrock)	Across the Site and study area, beneath the superficial deposits.	Up to 200m	Dominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite-bearing units in some basinal areas. Thin beds of gypsum/ anhydrite widespread; sandstones are also present.

[1] *Blown sand; defined by BGS as sand that has been transported by wind, or sand consisting predominantly of wind-borne particles*

Soil chemistry

13.5.6. The BGS Soil Chemistry datasets detail the topsoil concentrations of five potentially harmful elements (PHE): arsenic (As), cadmium (Cd), copper (Cu), nickel (Ni) and lead (Pb). Elevated concentrations of these PHE can exist because of natural geological conditions or possible anthropogenic sources. The estimated soil chemistry levels attributed to the Site and study area are set out in **Table 13.7**.

Table 13.7: Estimated soil chemistry

Potentially Harmful Element	Estimated geometric mean concentration range within the Site boundary (mg/kg)
Arsenic	South-western area (around the northern area of the proposed A18 access road and laydown area) 18.9 – 25.8 Remainder of the Site and study area 14.1 – 18.9
Cadmium	South-central area of the Site 0.49 – 0.85 Remainder of the Site and study area <0.33
Copper	Whole of the Site and study area 15.4 – 35.0
Lead	South-western area (around the northern area of the proposed A18 access road and laydown area) 99.5 – 242 Remainder of the Site and study area 47.1 – 99.5
Nickel	South-western area (around the northern area of the proposed A18 access road and laydown area) 31.9 – 40.1 Remainder of the Site and study area 23.5 – 31.9

Hydrogeology

Aquifer classification

13.5.7. The Environment Agency's Groundwater Protection Policy (Environment Agency, 2018) adopts aquifer designations that are consistent with the WFD regime.

13.5.8. The superficial geology (Alluvium/ Warp) is classified as a Secondary A aquifer. These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. Based on the WFD this groundwater body currently is at "Good Overall Status" (quality). Further details are provided in **ES Volume II Appendix 12B**: Water Framework Directive Assessment (Annex 1, Table A2) (**Application Document Ref. 6.3**).

13.5.9. The bedrock geology (Mercia Mudstone Formation) is classified as a Secondary B aquifer. These are predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers. Based on the Water Framework Directive this groundwater body currently is at "Good Overall Status" (quality). Further details are provided in **ES Volume II Appendix 12B** (**Application Document Ref. 6.3**).

Groundwater vulnerability

13.5.10. The Environment Agency's simplified Groundwater Vulnerability Map (Environment Agency, 2017) shows that the Site is located in an area where the groundwater vulnerability to pollution is classified as medium-high. These are high priority groundwater resources that have limited natural protection. These areas are likely to be characterised by generally high leaching soils. This results in a medium-high overall pollution risk to groundwater from surface activities. Activities in these areas may require additional measures over and above good practice to ensure they do not cause groundwater pollution.

Groundwater Source Protection Zones

13.5.11. The Site does not lie within a SPZ. There are no SPZ within 1km of the Site.

Groundwater abstractions

13.5.12. According to the Groundsure Report (see **ES Volume II Appendix 13A** (**Application Document Ref. 6.3**), there are no active licenced groundwater abstractions recorded within the Site and none within the extended 1km study area for groundwater abstractions.

13.5.13. A historical licensed abstraction was present within the footprint of the existing Keadby Power Station (National Grid Reference 482619, 411656). It had multiple variations to the licence, with the most recent licensed to '*Siemens Energy Ltd* (Md/028/0083/040) in 2022. The

abstraction is listed as being for '*dewatering*' and was related to the, now completed, construction of Keadby 2 Power Station.

13.5.14. Based on local authority consultation carried out, there are no records of private water abstractions within a 1km radius of the Site.

Groundwater levels

13.5.15. Groundwater levels within the historical borehole records indicate generally shallow groundwater levels within the superficial geology of between 0.9m - 3.0m below ground level (bgl). Occasionally, deeper groundwater strikes were recorded between 5.4m - 6.9m bgl.

13.5.16. During the 2022 Fugro ground investigations the average groundwater levels in the superficial deposits beneath the Proposed Development Site were on average 0.5m to 2mbgl.

13.5.17. The Environment Agency do not hold any groundwater level monitoring data within a 1km radius from the Site boundary.

Hydrology

Surface watercourses and drainage

13.5.18. There are numerous surface water features located within the Site and wider study area. These are detailed, along with river quality information (where available) in **Table 13.8**.

Table 13.8: Surface water features

Surface water feature name	Location	River Quality Information
Various unnamed drains	Located on-site and within the study area; various directions.	Not available.
River Trent (tidal river) (Humber Upper)	Overlaps slightly onto the eastern spurs of the Site; north-south direction.	Water body ID: GB5300402609203 Chemical rating: Fail Ecological rating: Moderate Overall rating: Moderate Year: 2019

Surface water feature name	Location	River Quality Information
Paupers Drain (includes Warping Drain and Eastoft Moors Drain)[2] / Eastoft Moors (Warping) Drain (inland river)[3]	Overlaps slightly onto the north-eastern spur of the Site; west-east direction.	Water body ID: GB104028064300 Chemical rating: Fail Ecological rating: Moderate Overall rating: Moderate Year: 2019
Sewer Drain (drain)	Overlaps slightly onto the north-eastern spur of the Site; west-east direction.	Not available. Tributary of River Trent (Humber Upper) Water Body (GB5300402609203)
North Soak Drain (inland river)	Overlaps slightly onto the southern boundary of the Site and crosses the northern section of the A18 access road; west-east direction.	Water body ID: GB104028064350 Chemical rating: Fail Ecological rating: moderate Overall rating: Moderate Year: 2019
Sheffield and South Yorkshire Navigation/ Stainforth and Keadby Canal (canal)	Overlaps slightly onto the southern boundary of the Site and crosses the northern section of the A18 access road; west-east direction.	Water body ID: GB70410281 Chemical rating: Fail Ecological rating: Good Overall rating: Moderate Year: 2019

[2] Source, Water Framework Directive (WFD)
[3] Source, Envirocheck data

Surface water feature name	Location	River Quality Information
South Soak Drain (inland river)	Crossed by the Construction and Operational Access Route and crosses the northern section of the A18 access road at its closest point; west-east direction.	Not available. Artificial drain within North Soak Drain Water Body (GB104028064350)
Torne/Three Rivers (includes South Engine Drain and Folly Drain)[4] / Three Rivers (inland river)[5]	100m south of the Waterborne Transport Off-loading Area at its closest point; south-west to north-east direction	Water body ID: GB104028064340 Chemical rating: Fail Ecological rating: moderate Overall rating: Moderate Year: 2019
Hatfield Waste Drain	Adjacent to the A18 junction and crossed by Mabey Bridge, to be replaced	Water body ID: GB104028064330 Chemical rating: Fail Ecological rating: Poor Overall rating: Poor Year: 2019
North Level Engine Drain	5m south of the A18 junction	Not available. Within Hatfield Waste Drain Water body (GB104028064330)
River Torne	20m south of the A18 junction	Not available. Within Torne/Three Rivers

[4] Source, WFD
[5] Source, Envirocheck data

Surface water feature name	Location	River Quality Information
		Water Body (GB104028064340)
South Level Engine Drain	100m south of the A18 junction	Not available. Within Torne/Three Rivers Water Body (GB104028064340)

13.5.19. Further information on the quality and status of relevant watercourses can be found in **ES Volume I Chapter 12** (**Application Document Ref. 6.2**) and **ES Volume II Appendix 12B** (**Application Document Ref. 6.3**) including surface water quality data in Annex 3 for relevant watercourses, where available.

Surface water abstractions

13.5.20. Nine surface water abstractions have been identified within 250m of the Site. These are listed in **Table 13.9**.

Table 13.9: Environment Agency licensed surface water abstractions

National Grid Reference	Approximate distance	Licence number and operator*	Use
482790, 411490	On the Site, located on the south of the southeastern spur	03/28/83/0171 Canal and River Trust	Boiler Feed
482655, 411480	On the Site, located on the south of the southeastern spur	MD/028/0083/014 Canal and River Trust	Boiler Feed Make-up or top-up water General use relating to secondary category (medium loss) Evaporative cooling

National Grid Reference	Approximate distance	Licence number and operator*	Use
482790, 411478	On the Site, located on the south of the southeastern spur	MD/028/0083/014 Canal and River Trust	Boiler Feed Make-up or top-up water General use relating to secondary category (medium loss) Evaporative cooling
482260, 412480	On the Site, located on the northeastern spur	MD/028/0084/002/R01 ER Woodhouse	Spray irrigation - direct
483171, 412204	61m east	MD/028/0084/005 RJ & AE Godfrey	Spray irrigation - direct
480950, 411350	67m west	03/28/83/0257/1 Waterton Hall Farms	Spray irrigation - direct
478799, 410349	125m southwest	MD/028/0083/005 Maw	Spray irrigation - direct
478190, 409770	148m southwest	03/28/83/0193 JJ & DS Stubley Ltd	Spray irrigation - drain
480900, 409800	178m southeast	03/28/83/0088 GR Bletcher and Son Ltd	Spray irrigation - direct

**Permit end dates for these abstractions are specified as 'not supplied', and therefore all are assumed to be active abstractions.*

Nitrate vulnerable zones

13.5.21. The Site and the study area are located within a nitrate vulnerable zone – surface water. Designations of nitrate vulnerable zones occur where land drains contribute to nitrate concentrations found in polluted water. Polluted waters include:

- surface waters that contain at least 50 mg/l of nitrate;
- surface waters that are likely to contain at least 50 mg/l of nitrate if no action is taken; and
- waters which are eutrophic, or are likely to become eutrophic, if no action is taken.

Drinking Water Protected Areas

13.5.22. The Site and the study area are not located within a Drinking Water Protected Area (surface water).

Mining and mineral resources

13.5.23. The adopted 2003 Local North Lincolnshire Plan does not refer to any Mineral Safeguarding Area (MSA) or Mineral Consultation Areas (MCA) in the study area. The 2003 Local North Lincolnshire Plan is due to be replaced by the North Lincolnshire Local Plan which will run to 2037. In May 2025 NLC carried out an initial engagement and call for sites consultation and published an addendum document at the same time. The consultation concluded in July 2025. The Consultation confirmed that there is no MSA or MCA at, or in the study area of the Site. Therefore, these features are scoped out of the assessment.

13.5.24. Based on available data and local authority consultation carried out there are no records of aggregate/ mineral quarrying or mining, non-coal mining or coal mining at or in the study area of the Site. Therefore, these features are scoped out of the assessment.

Local Geological Sites/ Regionally Important Geological Sites

13.5.25. Based on available data and consultation carried out with the local authority, Greater Lincolnshire Nature Partnership and Natural England, there are no records of LGS or RIGS at or in the study area of the Site. Therefore, these features are scoped out of the assessment.

Land contamination

Regulated processes and pollution incidents

13.5.26. Information on regulated processes and pollution incidents has been collated from Environment Agency and Local Authority datasets within the Groundsure Report presented in **ES Volume II Appendix 13A**: (Annex 3) (**Application Document Ref. 6.3**). Recorded pollution incidents can indicate a potential for land contamination, whilst regulated processes provide a good indicator as to the nature of the processes undertaken at a site, which whilst regulated may nonetheless have, over time, resulted in the potential for some residual land contamination. Key information is summarised as follows:

- Integrated Pollution Controls – None located within the Site, 12 no. located within the study area. All named under 'Keadby Generation Limited' and concern combustion processes within the Fuel & Power Industry;
- Planning Hazardous Substances Consents – None located within the Site, 1 no. located within the study area. This is located 42m east of the Site and it concerns ammonium nitrate-based fertilisers which conforms to the Fertilisers Regulations 1991(a) and composite fertilisers containing phosphate and/or potash. However, its status is indicated to have been withdrawn;
- there are no Registered Radioactive Substances or records of COMAH (Control of Major Accidents Hazards) sites or licenses listed on the Site or in the study area;
- there are no recorded pollution incidents to controlled waters listed for the Site;
- there are five Category 3 pollution incidents to controlled waters within the study area. The closest of these are two incidents 20m east of the Site and concerned crude sewage and mixed/waste oils pollutants to an unknown receiving water in 2003 and 2001 respectively; and
- in response to the submitted data request, the Environment Agency have stated that there have been no Category 3 or above pollution incidents in the area of interest within the last 5 years.

Site and surrounding area history

13.5.27. Historical mapping has been reviewed to evaluate the potential for past activities, both on and adjacent to the Site, to have impacted upon the site's environmental and land quality. A detailed appraisal is presented

in **ES Volume II Appendix 13A** (Annex 2) (**Application Document Ref. 6.3**) and an overall summary provided here.

13.5.28. Earliest available mapping (circa 1885 – 1886) indicates that at this time the Site was largely undeveloped comprising predominantly open fields, with Keadby Common at the centre with properties limited to the eastern-most spur of the Site. A railway passed just over the southern boundary near to Keadby Junction. By 1967 – 1969 a power station was developed in the central/ eastern area with railway sidings in the south-west which led to, and terminated, at the power station. An area of marshland is also shown in the south-west along with a small refuse heap. By 1978 – 1982, approximately seven mixed circular and rectangular tanks are shown to occupy the land directly south of the main power station building. Keadby Common Farm was also indicated as present.

13.5.29. Mapping indicates that the power station was disused by 1991 – 1994 and by this time Keadby Common Farm was also no longer shown.

13.5.30. From 1995 onwards, the disused power station became an electric generation station and a change in site layout had occurred. A set of small tanks and a single tank were indicated on mapping located to the west; with five tanks parallel to the south, and an additional set of tanks located east of the electric generation station. Further west from the electric generation station, towards the centre of the Site, a further three large tanks were shown. The refuse heap and area of marshland to the south-west of the Site were by this time indicated to be absent.

13.5.31. Within the wider study area historical features of note include a railway line parallel and adjacent to the south of the Proposed Main Site, areas of marshland to the south extending up to 50m away from the boundary, and also to the south a gasometer that was approximately 60m away.

13.5.32. Around 1966 – 1969, 220m west of the Site, a large slag heap with two sludge beds and a pond were indicated. A drain was also present adjacent to the slag heap and pond, which appears to be connected to one of the sludge beds and the Site, passing through the centre. An additional drain is also present north of the slag heap that passes past the northern boundary of the Site, with a drain adjacent to the south of the slag heap which runs onto the Site.

13.5.33. To the east, adjacent to the Site, a coal wharf was present on mapping (1966 – 1969) on the banks of the River Trent, with a loading bay on train tracks further inland approximately 30m from the Site. Further

south and to the east is a depot approximately 120m south, along with a set of tanks present approximately 220m from the Site. A pond is also present which by 1994 appears to have been infilled.

13.5.34. Historical maps from 1995 show the slag heap to the west of the Site as a disused spoil heap. The two sludge beds, pond and drains associated with this area are no longer apparent and are assumed to have been infilled.

13.5.35. Historical maps from 1885 - 1948 indicate that the location of the proposed access road from the A18 and the laydown areas in adjacent agricultural fields were agricultural fields during this time period. Recent aerial images viewed on Google Earth Pro indicate that this area has been agricultural land and a track since 2002. On these maps, North Pilfrey Farm and Pilfrey Farm have been present since 1885 and are located approximately 100m north of the northern extent of the proposed A18 access road, and approximately 200m east of the southern extent of the proposed A18 access road, respectively.

Potential land contamination sources

13.5.36. Data obtained from the Environment Agency and the local authorities that is contained in the Groundsure Report, Envirocheck data, along with historical Ordnance Survey mapping (see **ES Volume II Appendix 13A:** (**Application Document Ref. 6.3**)), aerial mapping and site walkover records, have been reviewed to identify current and historical potential contaminative land uses. A summary of the areas of potential land contamination identified within the study area is presented in **Table 13.10**. The sites are mapped and have been allocated a unique reference number as shown on **ES Volume III Figure 13.1:** Identified Historical and Current Areas of Potential Contamination (**Application Document Ref. 6.4**).

Table 13.10: Summary of potential sources of contamination within the study area

Site title and site identification[1]	Location
Industrial sites including:	
Keadby Power Station (formerly coal fired, current gas fired). Keadby Power Landfill (deposited waste included inert	Located partly within the central/ eastern area of the Site (land required for utility connections including Electrical Connection

Site title and site identification[1]	Location
and industrial waste) also within S1 area, along with numerous tanks, including three decommissioned heavy fuel oil tanks, and former railway (southern-most boundary) and former farms (west and north) – (S1)	Option), and partly in the study area[2].
Current PD Ports Marina and wharf, including current warehouse, former railway and gasometer and infilled pond – (S12)	Located within the study area 55m to the east of the Site (Waterborne Transport Offloading Area).
Former tanks – (S19)	Located within the eastern extent of the Site
Potential current tanks – (S22)	Located in the study area, 220m south of the proposed Waterborne Transport Off-Loading Area.
Historical landfill sites including:	
Historic Landfill and BGS Recorded Landfill Site - Keadby Power Station. Deposited waste included inert and industrial waste – (S2)	Located in the northern area of the Site (Main Site) and extends beyond the Site boundary to the west.
Historic Landfill and Licensed Waste Management Facility - John Brown Engineering Landfill. Deposited waste included inert and industrial waste, and liquid sludge – (S3)	Located 14m west of the Site (existing access road) at its closest point.

Site title and site identification[1]	Location
Historic Landfill and Licensed Waste Management Facility - Keadby Power Station. Deposited waste included inert, commercial and household waste – (S4)	Located adjacent to and slightly overlaps into the south-western boundary of the Site (existing access road).
Historic Landfill - Keadby Central Electricity Generating Board. Deposited waste included inert, industrial, commercial and household waste, ash (from Keadby Power Station after lagoon settlement), construction, colliery tailings, refractories (from Keadby Power Station), asbestos – (S5)	Located adjacent to and slightly overlaps into the south-western boundary of the Site (existing access road).
Historic Landfill - Former Keadby Power Station and Registered Landfill - Transtore Industries. Deposited waste included inert, industrial, commercial, household and special waste – (S6)	Located adjacent to and slightly overlaps into the south-western boundary of the Site (existing access road).
Historic Landfill Site - Pulverised Fuel Ash (PFA) Settlement Lagoon – (S7)	Located to the east of the Keadby Power Station landfill and 30m west of the Site (Main Site) at its closest point.
Historic Landfill Site - Keadby Power Station – (S8)	Located to the west of the PFA Settlement Lagoon and 80m west of the Site (Main Site) at its closest point.

Site title and site identification[1]	Location
Railway sites including:	
Former railway sidings and conveyor system – (S11)	Located partly within the western area of the Site, and partly in the study area, extending west.
Current railway – (S9)	Located in the study area, 15m south of the Site at its closest point.
Former railway – (S10)	Slightly overlaps into the southern boundary of the Site.
Light industrial sites including:	
Current pumping station – (S14)	Located within the eastern extent of the Site.
Current pumping stations – (S15), (S16, (S17) and (S18)	Located in the study area, various distances from the Site.
Depot – (S13)	Located in the study area, 120m from the proposed Waterborne Transport Off-Loading Area.
Former S L Cleaning Services; commercial cleaning services – (S21)	Located in the study area, 200m north and south-east of the proposed Water Connection Corridors.
Agricultural sites including;	
Current and former agricultural land and buildings, including North Pilfrey Farm (S23), Pilfrey Farm (S24) and Roe Farm (S20)	Located in the study area, various distances from the Site.

Site title and site identification[1]	Location
Peat;	
Peat deposits could be present anywhere within the superficial deposits layer (historically proven up to 1.6m thickness in isolated areas).	Located in the Site and in the study area.

*[1] Each potentially contaminated site is allocated a unique reference number (e.g.S1) as shown on **Figure 13.1** (ES Volume III) and also indicated in brackets above.*

[2] Study area is between 0 – 250m from the Site boundary.

13.5.37. Preliminary ground investigation undertaken by Fugro in 2022 (see **ES Volume II Appendix 13A** (**Application Document Ref. 6.3**)) included chemical analysis of made ground soils and groundwater and gas monitoring within the Site. Soil test results recorded a small number of samples of made ground with elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) and total petroleum hydrocarbons (TPH). Asbestos fibres were also recorded in two soil samples.

13.5.38. Elevated concentrations of metals, phenols and PAHs have been recorded in some groundwater samples obtained in 2022. Concentrations of these contaminants decreased with each sampling round and further groundwater monitoring is recommended to confirm the results.

Potential pathways

13.5.39. The following potential pathways have been identified which outline the mechanism through which any potential land contamination could impact upon a receptor:

- direct contact/ ingestion of contaminants within Made Ground/ soils, together with soil derived dust and groundwater;
- inhalation of organic vapours from Made Ground/ soils, soil derived dust, and groundwater;
- leaching of soluble contaminants and migration of mobile contaminants into shallow groundwater;
- vertical groundwater flow through Made Ground and superficial deposits to underlying bedrock aquifer;

- lateral groundwater flow and direct run-off to surface waters;
- vertical migration of ground gases to indoor and outdoor air and migration of ground gases into enclosed spaces (inhalation/ asphyxiation/ explosion);
- inhalation of asbestos fibres;
- direct contact of buried concrete with contaminated soils (i.e. hydrocarbons) and aggressive ground conditions (pH and sulphate)/ direct contact of services and supply pipes with contaminated soils; and
- indirect pathway: migration of hazardous gases/ vapours via permeable strata into enclosed spaces and service/ utility trenches.

Identified receptors

13.5.40. Potential receptors associated with the Site are as follows:

- current on-site human health users including;
  - commercial users (workers at Keadby 1 and Keadby 2 Power Station);
  - residential users (on the eastern-most spur only);
- future on-site human health users including;
  - commercial users (workers at the Proposed Development);
- current and future off-site human health users including;
  - commercial and public open space users (surrounding);
  - residential users (Keadby village, adjacent to the east);
- groundwater including;
  - superficial geology (Alluvium/ Warp) which is classified as a Secondary A aquifer;
  - bedrock geology (Mercia Mudstone Formation) which is classified as a Secondary B aquifer;
- surface water located on-site and off-site including;
  - watercourses: various unnamed drains, River Trent (Humber Upper), Paupers Drain (includes Warping Drain and Eastoft Moors Drain)/ Eastoft Moors (Warping) Drain, Sewer Drain, North Soak Drain, Sheffield and South Yorkshire Navigation/ Stainforth and Keadby Canal, South Soak Drain, Three Rivers, Hatfield

Waste Drain, North Level Engine Drain, South Level Engine Drain and River Torne;
  - surface water abstractions located on-site and off-site (not potable);
- building and infrastructure located on-site and off-site: infrastructure at risk from ignition of gas in confined space, below ground infrastructure at risk from aggressive ground conditions;
- ecological sites including;
  - Ramsar Site, SSSI and SAC – Humber Estuary; and
  - Non-statutory designated ecological sites: Local Wildlife Sites (LWS) – Keadby Warping Drain, Stainforth and Keadby Canal Corridor, Keadby Boundary Drain, Keadby Wetland, South Soak Drain, Keadby, Keadby Wet Grassland, Three Rivers, Hatfield Waste Drain, North Engine Drain, Belton, River Torne, South Engine Drain, Belton.

13.6. Development Design and Impact Avoidance

13.6.1. Measures that have been integrated into the Proposed Development in order to avoid or reduce adverse environmental effects are described in the following section. The assessment of impacts and effects takes account of these measures already being in place.

13.6.2. As part of the Proposed Development, any on-site contamination that poses a potential unacceptable risk to any of the receptors will need to be further investigated, and where necessary, mitigated or remediated such that potential risks to identified receptors are minimised to a standard suitable for the proposed end use of the site. In implementing any such measures, it will be necessary to prevent potential pollution of the environment occurring, either through disturbance of land contamination or through the introduction of potential contaminative materials during construction.

Ground Investigation

13.6.3. Ground investigation will be undertaken before construction to inform the development of the detailed design. The ground investigation will validate the assumptions made in the initial Conceptual Site Model and Preliminary Risk Assessment (**ES Volume II Appendix 13A** (**Application Document Ref. 6.3**)), taking into consideration results of previous ground investigations, and provide site-specific data upon which to base a land contamination risk assessment. The ground

investigation will be designed to target the potentially contaminative sources identified, including the historical landfilling activities identified on the Site. Based on the findings of the 2022 Fugro ground investigation (**ES Volume II Appendix 13A** (**Application Document Ref. 6.3**)) further investigation and risk assessment of groundwater quality and ground gas will be undertaken. Where risks are deemed to be unacceptable, further detailed quantitative risk assessment and if required, detailed remediation strategies will be developed accordingly, pursuant to the process set out by the planning authorities.

Construction

Legislation and Regulation

13.6.4. A final Construction Environmental Management Plan (CEMP) will be developed that will contain measures to ensure compliance with relevant standards and legislation. The CEMP will set out the environmental mitigation requirements and also the project level expectations on how the Proposed Development will be constructed. Measures contained within the CEMP would be designed to limit the potential for dispersal and accidental releases of potential contaminants, soil derived dusts and uncontrolled run-off to occur during construction. For example, the CEMP will set out how material is to be excavated, segregated and stockpiled to minimise the potential for run-off, soil quality degradation and wind dispersal of dusts. The CEMP will also establish procedures for dealing with unexpected soil or groundwater contamination that may be encountered.

13.6.5. An Outline CEMP has been prepared and accompanies the Application (**Application Document Ref 7.4**). The submission, approval and implementation of the final CEMP will be developed in accordance with the Outline CEMP and will be secured by a requirement in Schedule 2 of the draft DCO (**Application Document Ref. 3.1**).

Soil and groundwater pollution control mitigation

13.6.6. It is assumed that the majority of structures at the Main Site will require piling. It will be necessary to avoid creating flow paths between potentially contaminated soils and/ or groundwater in the underlying superficial deposits which are classified as Secondary A aquifers and the bedrock which is classified as a Secondary B aquifer.

13.6.7. Piling design and construction works would be completed following preparation of a piling and penetrative foundation design method statement, informed by a risk assessment, completed in accordance with the Environment Agency's 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance

on Pollution Prevention' (Environment Agency 2001). The method statement would be submitted to, and after consultation with the Environment Agency, approval sought from NLC prior to relevant works commencing, secured by a Requirement of the draft DCO (**Application Document Ref. 3.1**).

13.6.8. Potential impacts specific to construction workers during site preparation and construction would be mitigated by the following measures and through working in accordance with CIRIA C692, 2010:

- measures to minimise dust generation;
- provision of PPE, such as gloves, barrier cream, overalls etc. to minimise direct contact with soils;
- provision of adequate hygiene facilities and clean welfare facilities for all construction site workers;
- monitoring of confined spaces for potential ground gas accumulations, restricting access to confined spaces, i.e. to suitably trained personnel only, and use of specialist Personal Protective Equipment (PPE), where necessary; and
- preparation and adoption of a site and task specific health and safety plan as is required under Health and Safety legislation.

13.6.9. A Pollution Response Plan will be in place prior to the commencement of construction works. The plan will outline key pollution mitigation measures to be adopted including a Control of Substances Hazardous to Health (COSHH)/ fuel inventory and key contacts to be notified in the event of a significant pollution incident, which may subsequently lead to the contamination of controlled waters or soils. All bulk fuel and COSHH items will be stored in accordance with the relevant Environment Agency Guidance for Pollution Prevention (GPP) or where GPP are yet to be published, Pollution Prevention Guidance (PPG) notes (withdrawn but widely considered good practice) and storage regulations – refer to Section 5, **ES Volume I Chapter 12** (**Application Document Ref. 6.2**). Tanks and dispensing pumps will be locked when not in use to prevent unauthorised access.

13.6.10. Any hazardous materials will be stored in designated locations with specific measures to prevent leakage and the release of their contents. This will include a requirement to position storage areas at least 10m away from surface water features/ drains (and take into consideration the positions of any groundwater abstraction wells), on an impermeable base with an impermeable bund that has no outflow and is of adequate capacity to contain at least 110% of the contents. Valves and trigger guns will be protected from vandalism and kept locked when not in use.

13.6.11. Only well-maintained plant will be used during construction to minimise the potential for accidental pollution from leaking machinery or damaged equipment. Static machinery and plant are expected to be stored in hardstanding areas when not in use and, where necessary, to make use of drip trays beneath oil tanks/ engines/ gearboxes/ hydraulics. Spill response kits containing equipment that is appropriate to the types and quantities of materials being used and stored during construction will be maintained on Project Area for the duration of the works.

13.6.12. The **Outline CEMP** (**Application Document Ref. 7.4**) sets out procedures for dealing with unexpected soil or groundwater contamination that may be encountered. These procedures will be further developed in the final CEMP to be secured by Requirement of the **Draft DCO** (**Application Document Ref. 3.1**). This would typically require affected works to stop to enable appropriate people to be notified, and further characterisation and risk assessment to be undertaken before remediation or mitigation proposals are agreed with all required stakeholders.

13.6.13. Specific mitigation measures may be required in the form of treating/ remediating any contamination encountered during construction (e.g. any contamination that may be associated with any potentially contaminative sites identified as part of the assessment, notably the landfills and areas of potentially infilled land, or contamination identified following demolition of existing structures such as the decommissioned heavy oil fuel tanks). This will be confirmed based on information gathered through ground investigation to inform the scheme to deal with land contamination that is secured by a Requirement of the draft DCO (**Application Document Ref. 3.1**).

13.6.14. Any remediation works, or the removal of contaminated soils or waters associated with the construction of the Proposed Development, should this be required, would be expected to result in the enhancement of the local environment.

Excavated materials management

13.6.15. Prior to construction, a strategy will be prepared as part of the design development, which will set out how the earthworks stage of the construction phase will be undertaken. Where necessary the strategy will consider what excavated materials can be reused or are required for the various components of the Proposed Development as part of the Materials Management Plan, and what materials are surplus and require either disposal or onward management to ensure appropriate re-use, this will include requirements for additional soil testing to

confirm re-use/disposal classification. The strategy will also set out requirements for dealing with any shallow contaminated groundwater encountered during earthworks and appropriate testing where this needs to be disposed of.

13.6.16. To minimise the effects on soil resources during any earthworks, including materials management following foundation construction in relation to the Proposed Development, high standards of soil handling and management will be employed with a view to minimising where possible the double handling of soils and the extent to which exposed soils will be left vulnerable to erosional processes.

13.6.17. The re-use of excavated materials during construction will be governed by either a Materials Management Plan developed in accordance with the CL:AIRE Definition of Waste: Development Industry Code of Practice (2011), an environmental permit or a relevant exemption. The CL:AIRE Code of Practice is a voluntary framework for excavated materials management and re-use. Following this framework results in a level of information being generated that is sufficient to demonstrate to any regulator that excavated material has been re-used appropriately and is suitable for its intended use. It demonstrates that waste material has not been used in the development. The Materials Management Plan details the procedures and measures that will be taken to classify, track, store, reuse and dispose of all excavated materials that will be encountered during the development works.

13.6.18. Any material excavated from the former landfill sites will be classed as waste and will not be re-used unless End of Waste status can be achieved.

13.6.19. The disposal of soil waste, contaminated or otherwise, to landfill sites would be best mitigated by minimisation of the overall quantities of waste generated during construction, and by ensuring that excavated material consigned to landfill cannot, as an alternative, be put to use either on the Proposed Development or on other sites.

13.6.20. Where there is a requirement to dispose of surplus excavated materials off site as waste, the material will be characterised to determine firstly whether it is Hazardous or Non-Hazardous waste in accordance with the Environment Agency's Technical Guidance WM3 and then once this is established, the appropriate disposal facility will be determined through Waste Acceptance Criteria (WAC) analysis, as required.

Operation

13.6.21. Operational materials, including chemicals, waste solvent, waste acid (if applicable), fuels and oils (acetylene, lubricating oils, distillate fuels, or other fuels), will be provided with secondary containment appropriate to the level of risk to ensure that in the event of any spillage, the materials are safely contained. Secondary containment will be included in the installed design.

13.6.22. The design of the Proposed Development includes measures that would contain and control any releases of contaminants to ground and surface and foul drainage network. Drainage control for the Proposed Development is considered further in the Outline Drainage Strategy provided in Annex C of **ES Volume II Appendix 12A**: Flood Risk Assessment (**Application Document Ref. 6.3**). The final drainage design will be secured through a Requirement of the **Draft DCO** (**Application Document Ref. 3.1**), in consultation with the Lead Local Flood Authority (LLFA).

13.6.23. Good housekeeping and management practices will be adopted and adhered to through the operational lifetime, in compliance with the Environmental Permit to minimise impacts to soil and groundwater.

Decommissioning

13.6.24. The Proposed Development is expected to operate for at least 25 years. At the end of its operating life, the most likely scenario is that the Proposed Development would be shut down and all above ground structures removed. The Site would then be suitably remediated as required to facilitate re-use.

13.6.25. A Decommissioning Plan (including Decommissioning Environmental Management Plan (DEMP)) would be produced and agreed with the Environment Agency as part of the Environmental Permitting and site surrender process and also secured as a Requirement in Schedule 2 of the draft DCO (**Application Document Ref. 3.1**). The DEMP would consider in detail all potential environmental risks on the Site and contain guidance on how risks can be removed or mitigated.

13.7. Likely Impacts and Effects

Construction

Land contamination

13.7.1. **ES Volume III Figure 13.1** (**Application Document Ref. 6.4**) illustrates the identified historical and current areas of potential contamination within the Site boundary and 250m study area. In accordance with the screening methodology presented in Section 13.3, a baseline risk score has been assigned to each of these areas and this is presented in Table 1 of **ES Volume II Appendix 13C** (**Application Document Ref. 6.4**), and is also visually represented on **ES Volume III Figure 13.1** (**Application Document Ref. 6.4**). For the purposes of this ES, it has been assumed at this stage that excavation (cut) may occur anywhere within the Site boundary. Those areas with a baseline risk score of three and above have been considered for further risk and impact assessment in this ES (see Section 13.7.3 for further details). Those with a baseline risk score of two or below are not considered to pose an unacceptable risk within the context of the Proposed Development construction or operation and have therefore been scoped out.

13.7.2. **Table 13.11** presents a summary of the potential areas of contamination with baseline risk scores of 3 to 5.

Table 13.11: Potential areas of contamination (baseline risk scores 3 to 5)

Site ID	Site name	Proximity zone[1]	Land use class[2]	Relationship to cut/ fill/ construction work	Baseline risk score[3]
S1	Keadby Power Station (formerly coal fired, current gas fired). Keadby Power Landfill (deposited waste included inert and industrial waste) also within S1 area, along with numerous tanks, including three decommissioned heavy fuel oil tanks, and former railway (southern-most boundary) and former farms (west and north)	Zone 1	Class 3	Cut	5

Site ID	Site name	Proximity zone[1]	Land use class[2]	Relationship to cut/ fill/ construction work	Baseline risk score[3]
S2	Historic Landfill and BGS Recorded Landfill Site - Keadby Power Station. Deposited waste included inert and industrial waste	Zone 1	Class 3	Cut	5
S3	Historic Landfill and Licensed Waste Management Facility - John Brown Engineering Landfill. Deposited waste included inert and industrial waste, and liquid sludge	Zone 2	Class 3	Cut	4
S4	Historic Landfill and Licensed Waste Management Facility - Keadby Power Station. Deposited waste included inert, commercial and household waste	Zone 1	Class 3	Cut	5
S5	Historic Landfill - Keadby Central Electricity Generating Board. Deposited waste included inert, industrial, commercial and household waste, ash (from Keadby Power Station after lagoon settlement), construction, colliery tailings, refractories (from Keadby Power Station), asbestos	Zone 1	Class 3	Cut	5
S6	Historic Landfill - Former Keadby Power Station and Registered Landfill - Transtore Industries. Deposited waste included	Zone 1	Class 3	Cut	5

Site ID	Site name	Proximity zone[1]	Land use class[2]	Relationship to cut/ fill/ construction work	Baseline risk score[3]
	industrial, commercial, household and special waste				
S7	Historic Landfill Site - PFA Settlement Lagoon	Zone 2	Class 3	Cut	4
S8	Historic Landfill Site - Keadby Power Station	Zone 3	Class 3	Cut	3
S9	Current railway	Zone 1	Class 2	Cut	4
S10	Former railway	Zone 1	Class 2	Cut	4
S11	Former railway sidings and conveyor system	Zone 1	Class 2	Cut	4
S12	Current PD Ports Marina and wharf including current warehouse, former railway and gasometer and infilled pond	Zone 1	Class 2	Cut	4
S14	Current pumping station	Zone 1	Class 1	Cut	3
S18	Current pumping station	Zone 1	Class 1	Cut	3
S19	Former tanks	Zone 1	Class 3	Cut	5
S22	Potential current tanks	Zone 3	Class 3	Cut	3

[1] *Proximity zone definition is included within* ***Table 13B.1, Appendix 13B***

[2] *Land use class types are defined within* ***Table 13B.2, Appendix 13B***

[3] *Baseline risk scoring method is defined within* ***Table 13B.3, Appendix 13B***

13.7.3. For the sites identified for further assessment (listed in **Table 13.12**), site-specific CSM have been produced and are presented in **ES**

Volume II Appendix 13C (**Application Document Ref. 6.3**). These include a CSM for each of the following:

- baseline conditions;
- construction phase; and
- post-construction (operational) phase.

13.7.4. All sites with a baseline risk score of 5 have been assessed on their own, with the exception of S4, S5 and S6. These have been grouped as they are all landfills and all located within the same area (to the west of the Site). There is considered to be the same risk outcome from these sites for all the receptors assessed.

13.7.5. The remaining sites that have a baseline risk score of 3 and 4 have been grouped based on their land use type which is either; landfills, industrial sites, railway land or light industrial sites.

13.7.6. Peat deposits are known to be present but could not be identified as a site, or defined area, as the Peat deposits are not mapped. They could therefore be present anywhere within the superficial deposits layer (which has been proven to be up to 1.6m in thickness). Therefore, for Peat and the potential for ground gas, a more generalised risk and impact assessment has been undertaken.

13.7.7. **Table 13.12** presents a summary of the groups of sites/individual sites, together with justification as to why the site has been considered in the assessment to be within or outside of the Site boundary, recognising that some sites fall within both. The table also includes a summary of the corresponding baseline CSM.

13.7.8. It should be noted that the potential impacts and baseline risks presented in **Table 13.12** are those before any mitigation (including embedded mitigation outlined in Section 13.6) is applied. The detailed baseline CSM are presented in **ES Volume II Appendix 13C** (**Application Document Ref. 6.3**).

Table 13.12: Summary of baseline CSM for sites which may pose a contaminative risk in relation to the Site

Group/ individual site	Site title (site ID) and land use class (Figure 13.1)	Consideration of whether 'within or outside of the Site boundary (Figure 13.1)	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
Potential areas of contamination located within the Site boundary							
Baseline risk score 5 industrial site – current Keadby 1 and 2 Power Station	Keadby Power Station (formerly coal fired, current gas fired). Keadby Power Landfill (deposited waste included inert and industrial waste) also within S1 area, along with numerous tanks, including three decommissioned heavy fuel oil tanks, and former railway (southern-most boundary) and	S1 is located partly within and partly outside of the Site boundary. As at least half of S1 is located where multiple services, access routes and laydown areas are proposed, it has been assessed as being 'within' the Site boundary.	Low risk	Moderate/ low risk	Low to moderate/ low risk	Low risk	Low risk

Group/ individual site	Site title (site ID) and land use class (Figure 13.1)	Consideration of whether 'within or outside of the Site boundary (Figure 13.1)	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
	former farms (west and north) – (S1) Class 3.						
Baseline risk score 5 landfill site – historic landfill	Historic Landfill and BGS Recorded Landfill Site - Keadby Power Station. Deposited waste included inert and industrial waste – (S2) Class 3.	S2 is located partly within and partly outside of the Site boundary. As a significant proportion of S2 crosses the northern area of the main site of the Proposed Development, it has been assessed as being 'within' the Site boundary.	Very low to moderate/ low risk	Moderate/ low risk	Moderate/ low risk	Low risk	Low to moderate/ low risk
Baseline risk score 5 landfill sites	Historic Landfill and Licensed Waste Management Facility - Keadby Power Station.	S4, S5 and S6 extend slightly to within the Site boundary within an area proposed for vehicular site	Very low to	Moderate/ low risk	Low to moderate/ low risk	Low risk	N/A

Group/ individual site	Site title (site ID) and land use class (Figure 13.1)	Consideration of whether 'within or outside of the Site boundary (Figure 13.1)	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
– historic landfills	Deposited waste included inert, commercial and household waste – (S4) Class 3.	access with a track already present. Therefore, it has been assumed that cut operations are likely to be limited in this area. These sites have been assessed as being 'within' the Site boundary.	moderate/ low risk				
	Historic Landfill - Keadby Central Electricity Generating Board. Deposited waste included inert, industrial, commercial and household waste, ash (from Keadby Power Station after lagoon settlement), construction, colliery tailings, refractories (from Keadby Power						

Group/ individual site	Site title (site ID) and land use class (Figure 13.1)	Consideration of whether 'within or outside of the Site boundary (Figure 13.1)	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
	Station), asbestos – (S5) Class 3.						
	Historic Landfill - Former Keadby Power Station and Registered Landfill - Transtore Industries. Deposited waste included inert, industrial, commercial, household and special waste – (S6) Class 3.						
Baseline risk score 5 industrial site –	Former tanks – (S19) Class 3.	S19 is located entirely within the Site boundary.	Very low to low risk	Moderate/ low risk	Low risk	Low risk	Very low risk

Group/ individual site	Site title (site ID) and land use class (Figure 13.1)	Consideration of whether 'within or outside of the Site boundary (Figure 13.1)	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
former tanks							
Railway site – former railway	Former railway sidings and conveyor system – (S11) Class 2.	S11 is located partly within and partly outside the Site boundary. As a significant proportion of S11 crosses the southern area of the main site of the Proposed Development, it has been considered as 'within' the Site boundary.	Very low to low risk	Moderate/ low risk	Low risk	Very low risk	N/A
Railway sites – current and former railways	Former railway – (S10) Class 2. Current railway – (S9) Class 2.	S9 and S10 extends to slightly within the Site boundary which is an area proposed for canal water supply connection works and access roads. It is assumed that cut operations are likely to be limited in this area. The	Very low to low risk	Low risk	Moderate/ low risk	Low risk	Very low risk

Group/ individual site	Site title (site ID) and land use class (Figure 13.1)	Consideration of whether 'within or outside of the Site boundary (Figure 13.1)	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
		site has been conservatively assessed as being 'within' the Site boundary.					
Industrial site – current marina and wharf including current warehouse, former railway and gasometer and infilled pond	Current PD Ports Marina and wharf including current warehouse, former railway and gasometer and infilled pond – (S12) Class 2.	S12 is located partly within and partly outside of the Site boundary. Approximately a third of S12 is located within the Site boundary which has been proposed for a haulage route and transport offloading. As this area does not currently have any access road, it has been assumed that cut operations are likely in this area. Therefore, S12 has been conservatively considered as being 'within' the Site boundary.	Very low to low risk	Low risk	Low to moderate/ low risk	Low to moderate/ low risk	Very low to low risk

Group/ individual site	Site title (site ID) and land use class (Figure 13.1)	Consideration of whether 'within or outside of the Site boundary (Figure 13.1)	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
Light industrial site – current pumping station	Current pumping station – (S14) Class 1.	S14 is located entirely within the Site boundary.	Very low risk	Very low risk	Low risk	Low risk	Very low risk
Potential areas of contamination located outside of the Site boundary							
Landfill sites – historic landfills	Historic Landfill and Licensed Waste Management Facility - John Brown Engineering Landfill. Deposited waste included inert and industrial waste, and liquid sludge – (S3) Class 3.	S3, S7 and S8 are located entirely outside of the Site boundary.	Very low to moderate/ low risk	Moderate/ low risk	Low to moderate/ low risk	N/A	N/A

Group/ individual site	Site title (site ID) and land use class (Figure 13.1)	Consideration of whether 'within or outside of the Site boundary (Figure 13.1)	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
	Historic Landfill Site - Pulverised Fuel Ash (PFA) Settlement Lagoon – (S7) Class 3.						
	Historic Landfill Site - Keadby Power Station – (S8) Class 3.						
Industrial site – potential current tanks	Potential current tanks – (S22) Class 3.	S22 is located entirely outside of the Site boundary.	Very low to low risk	Moderate/ low risk	Moderate/ low risk	Low risk	Very low to low risk
Light industrial site – current	Current pumping station – (S18) Class 1.	S18 is located entirely outside of the Site boundary.	N/A	Very low risk	N/A	N/A	N/A

Group/ individual site	Site title (site ID) and land use class (Figure 13.1)	Consideration of whether 'within or outside of the Site boundary (Figure 13.1)	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
pumping station							
Peat deposits	N/A	Within and outside of the Site boundary.	Very low to low risk	N/A	N/A	N/A	Very low risk

Construction impacts and temporary effects

13.7.9. In the locations of the identified potentially contaminative land uses and in the event of ground disturbance occurring, there is the potential for construction to affect human, controlled waters, building and infrastructure, and ecological receptors, and for the ground conditions to impact upon the design of the Proposed Development.

13.7.10. Potential impacts include but are not limited to:

- mobilising existing contamination in soil and groundwater as a result of ground disturbance and potential de-watering during construction;
- increasing the potential for contaminants in unsaturated soils to leach to groundwater in open excavations during construction;
- increasing the potential for contaminated surface run-off to migrate to surface water and groundwater receptors as a result of leaching from uncovered stockpiles;
- introducing new sources of contamination, such as fuels and oils used in construction plant;
- creating preferential pathways for the migration of soil contamination and gases, for example, along new below ground service routes, service ducts and as a result of potential de-watering; and
- introducing new human health receptors such as site staff during and post construction.

13.7.11. Construction activities can also result in physical damage to soil, including soil compaction as a result of heavy construction vehicle movements or the exacerbation of soil erosion through handling and storage of soils.

13.7.12. To determine whether there are any potential temporary effects on human, controlled waters, building and infrastructure, and ecological receptors during the construction phase, the baseline condition risk and construction risk levels (see **Table 13.6**), as defined in their respective CSM have been compared in **ES Volume II Appendix 13C** (**Application Document Ref. 6.3**).

13.7.13. Where there is no predicted change between the main baseline risk and the main construction risk, the construction effect significance is assessed as a neutral effect, even if the risk from the land contamination site is deemed to be high.

13.7.14. An increase in risk at the construction stage compared to baseline would result in an adverse effect and conversely, any improvement resulting from construction, for example where remediation is undertaken or a contaminant linkage is broken or removed, would result in a beneficial effect.

13.7.15. Whilst adoption of the measures included as part of the Outline CEMP (**Application Document Ref. 7.4**) would make it unlikely that there would be significant adverse effects during construction, there may still be some temporary minor adverse effects during construction from ground disturbance or groundwater controls which may inadvertently mobilise contamination or create preferential pathways; in particular for groundwater and ground gas migration, which may cause a temporary adverse impact on groundwater quality or increased ground gas risk compared to the baseline risk.

13.7.16. A summary of the assessment of construction temporary effects is provided in **Table 13.13**. Further detail on these comparisons is presented in **ES Volume II Appendix 13C** (**Application Document Ref. 6.3**).

Table 13.13: Summary of temporary effects (during construction)

Risk and impact assessment CSM – group/ individual CSM	Site ID(s)	Classification of effect	Concerning groundwater and/or ground gas migration (which may cause a temporary worsening in groundwater quality or increased ground gas risk compared to baseline)
Potential areas of contamination located within the Site boundary			
Baseline risk score 5 industrial site – current Keadby 1 and 2 Power Station	S1	Neutral to minor adverse (**not significant**)	Groundwater and ground gas
Baseline risk score 5 landfill site – historic landfill	S2	Neutral to minor adverse (**not significant**)	Groundwater and ground gas
Baseline risk score 5 landfill sites – historic landfills	S4, S5, S6	Neutral to minor adverse (**not significant**)	Groundwater

Risk and impact assessment CSM – group/ individual CSM	Site ID(s)	Classification of effect	Concerning groundwater and/or ground gas migration (which may cause a temporary worsening in groundwater quality or increased ground gas risk compared to baseline)
Baseline risk score 5 industrial site – former tanks	S19	Neutral to minor adverse (**not significant**)	Groundwater
Railway site – former railway	S11	Neutral to minor adverse (**not significant**)	Groundwater
Railway sites – current and former railways	S9, S10	Neutral to minor adverse (**not significant**)	Groundwater
Industrial site – current marina and wharf including current warehouse, former railway and gasometer and infilled pond	S12	Neutral to minor adverse (**not significant**)	Groundwater
Light industrial site – current pumping station	S14	Neutral to minor adverse (**not significant**)	Groundwater
Potential areas of contamination located outside of the Site boundary (in the study area)			
Landfill sites – historic landfills	S3, S7, S8	Neutral to minor adverse (**not significant**)	Groundwater
Industrial site – potential current tanks	S22	Neutral	-
Light industrial site – current pumping station	S18	Neutral	-
Peat deposits	-	Neutral	-

Permanent effects

13.7.17. To determine whether there are any potential permanent effects, the baseline risks posed to receptors and post-construction risks to receptors based on the CSM have been compared (**ES Volume II Appendix 13C** (**Application Document Ref. 6.3**)). Where there is no change between the main baseline risk and the post-construction risk, the permanent effect significance is deemed to be neutral even if the risk is assessed to remain as high, post construction. This will be the case where the construction of the Site will have no impact on the risks from a potentially contaminated site. These are sites that are within the study area, i.e. outside the Site boundary. The assessment indicates there will be no adverse permanent effects on the sites outside the study area post construction.

13.7.18. It is anticipated that if any remediation is carried out on potentially contaminated sites identified within the Site boundary, there will, in most instances, be overall beneficial effects. However, the risk and impact assessment has not considered these to be significant beneficial effects to ensure that a precautionary approach is adopted. If required, (subject to ground investigation at the Site), site-specific permanent remediation measures, which will focus on source removal, pathway breakage or receptor protection, will be developed during the detailed design stage. If required, such measures will reduce risks to human health, controlled waters and/ or property from contamination, gas and vapours in the ground (the principal risks in this area), to an acceptable level.

13.7.19. A summary of the assessment is provided in **Table 13.14** and the details of these comparisons are presented in **ES Volume II Appendix 13C** (**Application Document Ref. 6.3**).

Table 13.14: Summary of permanent effects (post-construction)

Risk and impact assessment CSM – group/ individual CSM	Site ID(s)	Post-construction classification of effect
Potential areas of contamination located within the Site boundary;		
Baseline risk score 5 industrial site – current Keadby 1 Power Station	S1	Neutral to minor beneficial **(not significant)**
Baseline risk score 5 landfill site – historic landfill	S2	Neutral to minor beneficial **(not significant)**

Risk and impact assessment CSM – group/ individual CSM	Site ID(s)	Post-construction classification of effect
Baseline risk score 5 landfill sites – historic landfills	S4, S5, S6	Neutral
Baseline risk score 5 industrial site – former tanks	S19	Neutral to minor beneficial **(not significant)**
Railway site – former railway	S11	Neutral to minor beneficial **(not significant)**
Railway sites – current and former railways	S9, S10	Neutral
Industrial site – current marina and wharf including current warehouse, former railway and gasometer and infilled pond	S12	Neutral
Light industrial site – current pumping station	S14	Neutral
Potential areas of contamination located outside the Site boundary (in the study area);		
Landfill sites – historic landfills	S3, S7, S8	Neutral
Industrial site – potential current tanks	S22	Neutral
Light industrial site – current pumping station	S18	Neutral
Peat deposits	-	Neutral

Operation impacts

13.7.20. During the operational stage of the Proposed Development, conditions may have altered from the baseline as a result of, but not limited to:

- introducing commercial users (workers at the Proposed Development), and development infrastructure as new receptors;
- contamination which has been encountered having been removed, remediated or mitigated, if required;
- additional drainage and discharge routes and the potential for polluted surface water run-off and drainage to be directed towards groundwater and surface water receptors with the new drainage system acting as a more efficient pollutant pathway;
- the potential for impacts arising from leaks/ spills of pollutants to pass directly into the underlying ground/ aquifers, bypassing the drainage system; and
- reduction in soil erosion through additional hardstanding, improved drainage design and improvement in surface water runoff quality from on-site surface water attenuation features required which would be incorporated into the layout of the Proposed Development.

13.7.21. It is anticipated that there will be **no significant effects** during the operation of the Proposed Development as maintenance and operation of the Proposed Development will be in accordance with the Environmental Permit Site Condition Report and relevant site protection and monitoring programme (SPMP) arrangements therein.

Decommissioning

13.7.22. During the decommissioning of the Proposed Development, conditions may alter from the baseline as a result of, but not limited to:

- mobilising existing contamination in soil and groundwater as a result of ground disturbance during decommissioning;
- increasing the potential for contaminants in unsaturated soils to leach to groundwater in open excavations during decommissioning;
- increasing the potential for contaminated surface run-off to migrate to surface water and groundwater receptors as a result of leaching from uncovered stockpiles; and
- introducing new sources of contamination, such as fuels and oils used in decommissioning plant.

13.7.23. It is anticipated that there may be some temporary minor adverse effects during the decommissioning period from ground disturbance. The DEMP , secured by a Requirement of the **Draft DCO** (**Application Document Ref. 3.1**), will mitigate the potential for any risks that could otherwise result in significant adverse effects during decommissioning. Therefore, any

temporary minor adverse effects would be no worse than those effects at the construction stage i.e**. not significant.**

13.8. Mitigation, Monitoring and Enhancement Measures

13.8.1. As no significant effects have been identified, no additional mitigation, compensation and enhancement measures are considered to be required during the construction, operation or decommissioning phase in order to further reduce the potential impacts and effects from the ground conditions on the Proposed Development.

13.8.2. As detailed in Section 13.6, ground investigation, which will include further groundwater and gas monitoring, will be undertaken before construction to inform the development of the detailed design. Depending on information gathered through this ground investigation, monitoring of groundwater and surface water may be recommended before construction commences, during construction works and post-construction.

13.8.3. The **Draft DCO** (**Application Document Ref. 3.1**) contains a Requirement outlining measures to be taken to address any contamination of land, including groundwater at the Site and secure the provision of:

- a scheme to deal with the contamination of land, including groundwater, likely to cause significant harm, including a risk assessment, supported by site investigation data, to identify the extent of any contamination and the remedial measures to be taken, which sets out long-term measures with respect to any contaminants remaining on the site. The authorised development, including any remediation, must be carried out in accordance with the approved scheme unless otherwise agreed with the relevant planning authority;
- a final CEMP, which will be prepared prior to the commencement of construction activities. The CEMP will set out the expectations with regards to how works will be delivered, and specific requirements associated with control of soils, sediment and monitoring; and
- a DEMP which would be prepared in advance of any decommissioning works to ensure measures to address any significant environmental effects are implemented throughout the decommissioning phase.

13.9. Limitations or Difficulties

13.9.1. The current assessment has been based on the collation and evaluation of readily available documentation provided by the Environment Agency, BGS, Groundsure historical mapping, Groundsure site sensitivity data,

Envirocheck historical mapping, Envirocheck site sensitivity data, and other data sources made available.

13.9.2. The assessed baseline risks presented in **Table 13.13** are based on the information provided at the time of the assessment. Where limited information is available, the assessment is based on precautionary, worst-case assumptions and may, therefore, report a higher risk than that which actually exists.

13.9.3. Any borehole data from BGS sources are 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'.

13.9.4. This chapter should be read in light of the legislation, statutory requirements and/ or industry good practice applicable at the time of the works being undertaken. Any subsequent changes in this legislation, guidance or design may necessitate the findings to be reassessed in the light of these circumstances.

13.10. Summary of Likely Significant Residual Effects

13.10.1. Assuming that the design and impact avoidance measures detailed in Section 13.6 would be employed, the effects related to potential geological and land contamination related impacts associated with the Proposed Development during the construction, operation and decommissioning periods are likely to be negligible or minor adverse (**not significant**).

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