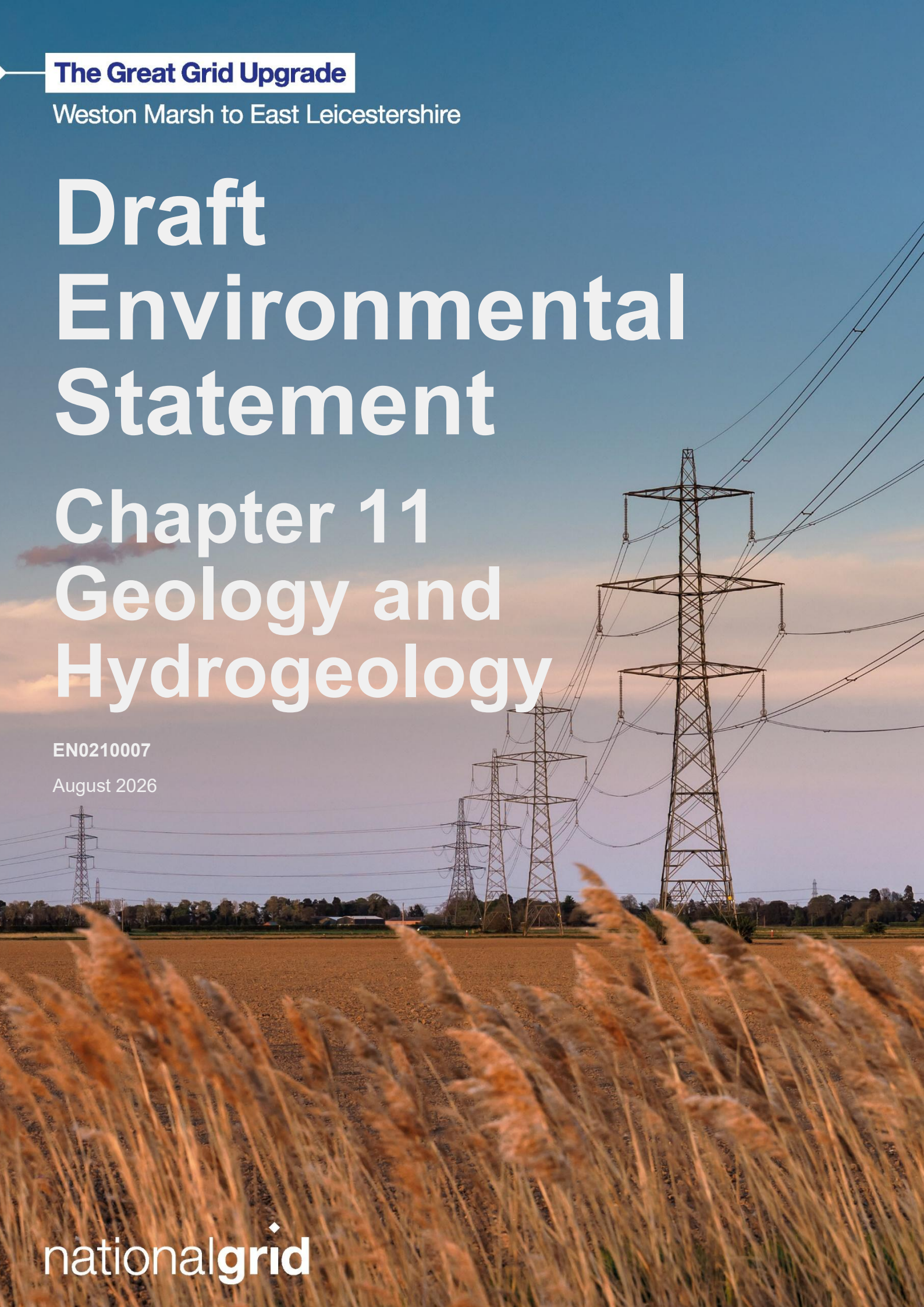




The Great Grid Upgrade

Weston Marsh to East Leicestershire

Draft Environmental Statement

Chapter 11 Geology and Hydrogeology

EN0210007

August 2026

nationalgrid

Contents

11.	Geology and Hydrogeology	11-1
11.1	Introduction	11-1
11.2	Legislation, Policy Framework and Guidance	11-2
11.3	Scope of Assessment	11-3
11.4	Stakeholder Engagement	11-3
11.5	Assessment Methodology	11-5
11.6	Baseline Conditions	11-13
11.7	Design, Standard and Additional Mitigation Measures	11-37
11.8	Preliminary Assessment of Effects	11-40
11.9	Monitoring	11-68
11.10	Further Assessment	11-68
Table 11.1	Key stakeholder engagement and National Grid's response	11-4
Table 11.2	Initial contamination screening assessment	11-8
Table 11.3	Sensitivity of receptors	11-8
Table 11.4	Magnitude of impact	11-10
Table 11.5	Determination of significance matrix (Ref 11.20)	11-12
Table 11.6	Geological maps presented in the desk studies	11-14
Table 11.7	Licensed groundwater abstractions for public water supply within the area of influence of the draft Order Limits for Section 1	11-18
Table 11.8	Permitted discharge consents located within the Study Area for Section 1	11-19
Table 11.9	Licensed groundwater abstractions within the Study Area for Section 2	11-22
Table 11.10	Licensed groundwater abstractions for public water supply within area of influence of the draft Order Limits for Section 2	11-23
Table 11.11	Unlicensed groundwater abstractions within the Study Area for Section 2	11-24
Table 11.12	Permitted discharge consents located within the Study Area for Section 2	11-25
Table 11.13	Permitted discharge consents located within the Study Area for Section 3	11-28
Table 11.14	Unlicensed groundwater abstractions within the Study Area of Section 4	11-31
Table 11.15	Permitted discharge consents located within the Study Area for Section 4	11-31
Table 11.16	Historical landfills present in Section 5.	11-33
Table 11.17	Licensed groundwater abstractions within the Study Area for Section 5	11-34
Table 11.18	Permitted discharge consents located within the Study Area for Section 5	11-35
Table 11.19	Contaminant linkages presenting a moderate and above risk for Section 1	11-42
Table 11.20	Contaminant linkages presenting a moderate and above risk for Section 2	11-44
Table 11.21	Contaminant linkages presenting a moderate and above risk for Section 3	11-47
Table 11.22	Contaminant linkages presenting a moderate and above risk for WMEL-B Substation	11-48
Table 11.23	Contaminant linkages presenting a moderate and above risk for Section 4	11-50
Table 11.24	Contaminant linkages presenting a moderate and above risk for Section 5	11-52
Table 11.25	Preliminary summary of geology and land contamination effects (note: the summary reports on worst case/highest receptor sensitivity for each section)	11-58
Table 11.26	Preliminary summary of hydrogeology effects (note: hydrogeology summary reports on worst case/highest receptor sensitivity for each section)	11-60
Table 11.27	Preliminary assessment of alternative scenarios	11-67
	References	11-70

11. Geology and Hydrogeology

11.1 Introduction

- 11.1.1 This chapter reports the preliminary assessment of the potential effects of the Weston Marsh to East Leicestershire Project (the Project) for geology and hydrogeology. This chapter includes consideration of the following matters:
- land contamination and the receptors that could be affected by contaminants;
 - geology including designated geological sites and those of local and national importance;
 - mineral resources including mineral safeguarding areas, and allocated or existing mineral sites; and
 - hydrogeology including groundwater quality, groundwater quantity, source protection zones (SPZs), groundwater abstractions, and Groundwater Dependent Terrestrial Ecosystems (GWDTEs).
- 11.1.2 This chapter should be read in conjunction with the following chapters and their figures which provide the Project context and approach to EIA:
- **Chapter 2 Regulatory and Planning Policy Context;**
 - **Chapter 3 Main Alternatives Considered;**
 - **Chapter 4 Description of the Project;** and
 - **Chapter 5 EIA Approach and Methodology.**
- 11.1.3 There are interrelationships with other disciplines. Therefore, this chapter should also be read in conjunction with the following chapters:
- **Chapter 8 Ecology and Biodiversity** covers effects that may affect ecological receptors.
 - **Chapter 9 Cultural Heritage** covers effects that may affect archaeological remains.
 - **Chapter 10 Water Environment** considers effects that may affect hydrological receptors.
 - **Chapter 12 Agriculture and Soils** covers the temporary and permanent loss of soils and soil functions.
 - **Chapter 19 Cumulative Effects** includes consideration of potential for intra-project and inter-project cumulative effects on geology and hydrogeology.
- 11.1.4 This chapter is supported by the following figures and appendices:
- **Figure 11.1 Location Plan and Study Areas;**
 - **Figure 11.2 Superficial Geology;**
 - **Figure 11.3 Bedrock Geology;**

- **Figure 11.4 Groundwater Features;**
- **Figure 11.5 Groundwater Abstractions and Discharges;**
- **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies (Weston Marsh to WMEL-A overhead line, WMEL-A Substation, WMEL-A to WMEL-B overhead line, WMEL-B Substation, and WMEL-B Substation to Grendon reconductoring);**
- **Appendix 11B Mineral Safeguarding Assessment;**
- **Appendix 11C Walkover Site Visit Records; and**
- **Appendix 11D List of Hydrogeological Receptors.**

11.2 Legislation, Policy Framework and Guidance

Legislation and National Policy

- 11.2.1 Legislation and national policy relevant to the Project and this chapter are described in **Chapter 2 Regulatory and Planning Policy Context**, and supporting appendices **Appendix 2A Key Legislation**, **Appendix 2B National and Regional Planning Policy** and **Appendix 2C Local Policy**.

Regional and Local Policy

- 11.2.2 **Chapter 2 Regulatory and Planning Policy Context**, **Appendix 2B National and Regional Planning Policy** and **Appendix 2C Local Policy** set out relevant regional and local policy. Regional and local plans or policies relevant to this assessment are as follows:
- South East Lincolnshire Local Plan 2011-2036 (Adopted March 2019) Policy 30: Pollution (Ref 11.34);
 - South Holland District Council Contaminated Land Strategy (2019) (Ref 11.35);
 - South Kesteven District Council Contaminated Land Strategy (2024) (Ref 11.36);
 - South Holland, South Kesteven and Rutland Outline Water Cycle Study Planning Summary Report (2011) (Ref 11.37);
 - The South Kesteven District Council Local Plan 2011-2036 (Adopted 2020) Policy EN3: Green Infrastructure and Policy EN4: Pollution Control (Ref 11.38);
 - Melton Local Plan 2011-2036 (Adopted October 2018) Policy EN2–Biodiversity and Geodiversity, and Policy EN10 – Energy Generation from Renewable Sources (Ref 11.39);
 - Harborough District Council Contaminated Land Strategy Framework Document (2018) (Ref 11.40);
 - Harborough Local Plan 2011-2031 (Adopted 2019) Policy GD9 Minerals Safeguarding Areas and Policy GI5 Biodiversity and Geodiversity (Ref 11.41);
 - North Northamptonshire Contaminated Land Strategy (2023) (Ref 11.42);

- North Northamptonshire Local Plan (Part 1 (2016) and Part 2, Local Plans) Policy 5: Water Environment, Resources and Flood Risk Management and Policy 6: Development on Brownfield Land and Land Affected by Contamination (Ref 11.43); and
- West Northamptonshire Joint Core Strategy Local Plan, Policy BN9 Planning for Pollution Control (Ref 11.44).

Guidance

11.2.3 Relevant guidance, specific to geology and hydrogeology, that has informed this non-statutory Draft Environmental Statement (DES) (referred to in this document as “DES” and “non-statutory DES”) and will inform the assessment within the ES, comprises:

- Environment Agency Land Contamination Risk Management (LCRM) guidance (2025). (Ref 11.1)
- Environment Agency Groundwater protection technical guidance (2017). (Ref 11.2)
- Environment Agency and Department for Environment, Food & Rural Affairs, Pollution prevention for businesses (Ref 11.3), and legacy Pollution Prevention Guidance (PPG) notes (PPG1, PPG5, PPG8 and PPG21; withdrawn).
- Construction Industry Research and Information Association (CIRIA) Contaminated land risk assessment guidance (2001). (Ref 11.4)
- Design Manual for Roads and Bridges (DMRB) Environmental assessment and monitoring LA 104 (2020). (Ref 11.5)
- DMRB Sustainability and Environment Appraisal LA 109 Geology and soils (2019). (Ref 11.6)
- DMRB Road drainage and the water environment LA 113 (2020). (Ref 11.7)
- A Guide for Developers of Potentially Contaminated Sites in Leicestershire and Rutland (2011). (Ref 11.8)

11.3 Scope of Assessment

- 11.3.1 The scope of the assessment has been informed by the Scoping Opinion provided in **Appendix 5B Scoping Opinion** (adopted by the Planning Inspectorate on behalf of the Secretary of State on 17 December 2025) and ongoing engagement with relevant technical consultees.
- 11.3.2 A summary of the key issues raised relevant to geology and hydrogeology in the Scoping Opinion and National Grid’s response is provided in **Appendix 5C Preliminary Scoping Opinion Response**. Further details of engagement undertaken to date is provided in Section 11.4.

11.4 Stakeholder Engagement

- 11.4.1 National Grid has held several meetings with stakeholders including the Environment Agency, local planning authorities and Anglian Water. A summary of discussions and how these have influenced the Project, scope and/or the approach to the assessment is provided in **Table 11.11**.

Table 11.1 Key stakeholder engagement and National Grid's response

Organisation and Date	Summary of Issue Discussed	Project Response
Environment Agency Water Environment Technical Working Group (TWG) meeting 31 March 2026	Confirmed that water supply strategy will be completed for the Environmental Statement (ES). Should that be greater than 20 m ³ /day, a water resource assessment will be undertaken. The Environment Agency welcomed this and reiterated that they would expect to see the implications of this assessed at ES stage. The Environment Agency flagged that the potential use of herbicides in construction and operation should be considered.	The ES assessment will address the hydrogeological implications, if any, of the water supply strategy for the project. Standard mitigation measures presented in Appendix 4A Draft Outline Code of Construction Practice includes the requirement for herbicides to be used in accordance with relevant Defra guidance (GH10)
Environment Agency Land Contamination, Geological and Mineral Resources TWG meeting 16 April 2026	Environment Agency Groundwater and Contaminated Land Specialist raised lack of guidance on assessment of thermal effects on groundwater of potential buried cables and offered additional discussions as the assessment progressed.	The ES will report assessment of the thermal impact on groundwater of potential buried cables.
Environment Agency Meeting 10 June 2026	Follow-up discussion on assessment of thermal effects of buried cables. Confirmed qualitative assessment is sufficient for the ES supported by a conceptual site model showing cable locations and groundwater receptors, focusing on SPZ1, abstractions, springs and GWDTEs.	The ES assessment will provide a qualitative assessment of the thermal impact of buried cables on groundwater receptors.
Parish councils: Ab Kettleby Parish Council Water Environment TWG meeting 31 March 2026	Ab Kettleby Parish Council has raised concerns over the impact of dewatering on a specific water topic receptor (a pond).	A dewatering assessment will be undertaken, as required, to assess potential groundwater effects. This will be coordinated across relevant topics to ensure a consistent approach within the ES.
Anglian Water Water Environment TWG meeting 31 March 2026	Anglian Water confirmed that the area is water-stressed and therefore cannot commit to supplying water to the Project. They advised seeking pre-application discussion to identify locations where supply may be feasible.	The ES will address the hydrogeological implications, if any, of the water supply strategy for the Project.

11.5 Assessment Methodology

- 11.5.1 This section describes the methodology used to establish the existing and future baseline together with the methodology/approach used to undertake the preliminary assessment on geology and hydrogeology. The overarching approach is also described in **Chapter 5 EIA Approach and Methodology**. This section also identifies further assessment needing to be undertaken as part of the ES.
- 11.5.2 The assessment is based on the guidance identified in Section 11.2.

Study Area

- 11.5.3 The Study Area for geology and hydrogeology comprised the area directly affected by the Project, defined as the draft Order Limits plus a 250 m buffer for geological receptors and potentially contaminative land, and a 500 m buffer for hydrogeological receptors. This approach is considered proportionate and appropriate for the assessment, reflecting the greater susceptibility of hydrogeological receptors to potential effects due to the mobile nature of groundwater and the potential for impacts to extend over greater distances. The Study Area has been established based on professional judgement, knowledge of similar projects and DMRB LA 109: Geology and Soils (Ref 11.6) and DMRB LA 113: Road drainage and the water environment (Ref 11.7). The Study Area was presented in **Appendix 5A EIA Scoping Report**. For Sections of the Project where only reconductoring is proposed, baseline data for the draft Order Limits only has been procured, although online sources have been consulted for the Study Area. This is a proportionate approach as reconductoring will not involve breaking ground, thus reducing the potential interaction of the Project with the underlying geology and hydrogeology.
- 11.5.4 In discussion of potential land contamination sites (**Table 11.8 - Table 11.23**) the term 'on-site' is used to describe those sites located either entirely or predominantly within the draft Order Limits. The term 'off-site' is used to describe those sites within the Study Area but (either entirely or predominantly) outside the draft Order Limits.
- 11.5.5 The Study Area for geology (250 m) and hydrogeology (500 m) is presented on **Figure 11.1 Location Plan and Study Areas**. Although two Study Areas have been defined, they are not distinguished separately in the assessment text; the term 'Study Area' is used throughout, with the relevant extent applied contextually depending on whether geology or hydrogeology is being assessed.

Data Collection

Desk study

- 11.5.6 The following data sources have been used to inform the DES:
- British Geological Survey (BGS) 1:625,000 scale geological mapping, available online at BGS Geoindex Viewer (Ref 11.1).
 - BGS 1:50,000 scale geological mapping, available online at BGS Geoindex Viewer (Ref 11.1).
 - Observations from site walkovers at DES stage completed 3 to 4 March 2026.
 - UK Health Security Agency (UKHSA) radon mapping (Ref 11.10).

- Groundwater abstraction details (public and private), discharge consents, historical pollution incident records, and historical and authorised landfills, as available from the Environment Agency and local authorities, respectively (Ref 11.11, Ref 11.27, and direct requests).
- Defra Multi-Agency Geographic Information for the Countryside (MAGIC) maps (Ref 11.12).
- Defra Hydrology Data Explorer (Ref 11.13).
- Environment Agency data download for GWDTE information (Ref 11.14).
- Environment Agency Catchment Data Explorer (Ref 11.15).
- Natural England designated sites, i.e. Geological Sites of Special Scientific Interest (SSSIs) or Sites of Special Scientific Interest (SSSIs), GWDTEs (Ref 11.16).
- Relevant information regarding historical ground contamination available from the local planning authorities during consultation/engagement.
- Records on geological conservation sites available from the local planning authorities. These include Local Geological Sites (LGS), Regionally Important Geological Sites (RIGS), geological conservation review sites (GCR) and County Geodiversity Sites (CGS).
- **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies:**
 - Weston Marsh to WMEL-A Overhead Line
 - WMEL-A Substation
 - WMEL-A to WMEL-B Overhead Line
 - WMEL-B Substation
 - WMEL-B Substation to Grendon Reconductoring.
- Groundsure Enviro Insight GIS data including historical mapping to identify potentially contaminative former and current land uses.

Site visit and surveys

- 11.5.7 A site drive-by and walkover survey was completed on 3 and 4 March 2026. Details of the findings are included in **Appendix 11C Walkover Site Visit Records**.

Further data to be collected to inform the ES

- 11.5.8 In addition to the data collected for this DES, the ES will be informed by the following additional third-party data, and data obtained through surveys:
- Information from local authorities regarding private water supplies which has not been received to date (information from Melton Borough Council and West Northamptonshire Council is pending).
 - Information from mineral planning authorities regarding existing mineral sites and infrastructure, mineral safeguarding areas and sites for the provision of minerals.

- Information from local authorities regarding geological conservation sites, these include geological SSSIs, LGSs, RIGSs, CGSs and GCR sites.
- Ground investigation data will be used to support the ES, where relevant and where programmes align.

Impact Assessment Methodology

- 11.5.9 The data collection outlined above enabled the baseline conditions in the Study Area to be defined. For land contamination, the reports in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies** identified potential source-pathway-receptor linkages to inform a risk-based assessment. This approach followed published guidance e.g., LCRM (Ref 11.1) and CIRIA C552 Contaminated Land Risk Assessment (Ref 11.4).
- 11.5.10 In the ES, an initial contamination screening assessment will be completed for each identified contamination source to determine the risk and potential for contamination as shown in **Table 11.2**. The potential contamination sources classed as moderate or greater will be subject to further assessment in the ES as described below.
- 11.5.11 For each potential effect, the receptor sensitivity (**Table 11.3**) and magnitude of impact (**Table 11.4**) will be assigned then combined to determine a level of significance (**Table 11.5**).
- 11.5.12 The output of the assessment will be the level of effect determined from **Table 11.5**. This classifies each potential effect as either negligible, minor, moderate or major. Effects may be adverse or beneficial. An example of a beneficial effect could be remediation of existing ground contamination that happens as a direct result of the Project.
- 11.5.13 It should be noted that when considering effects relating to contamination, the output of the assessment will be a risk classification for example 'low', 'low to moderate', 'moderate', 'high', rather than a predicted effect. For example, minor 'effects' in relation to health risks from exposure to soil contamination would reflect an assessment that there is a low/very low risk of significant effects occurring, rather than indicating that there is a predicted adverse effect that would be of a minor nature.
- 11.5.14 This approach integrates the topic-specific requirement for effects to be assessed via a risk-based approach in the EIA methodology and is an application of the methodology provided within CIRIA C552: Contaminated Land Risk Assessment (Ref 11.4), which recommends considering potential effects as a function of 'consequence' and the probability of the effect occurring. Screening-out sources with low contamination potential in this way is useful for linear projects of this type which cover several kilometres.
- 11.5.15 The following table describes how the potential land contamination sources identified will be pre-screened in the ES.

Table 11.2 Initial contamination screening assessment

Risk Classification	Potential for Contamination
Very low	Potential for contamination that could be of note in the context of the Project is very unlikely – e.g. residential, retail or offices, agriculture.
Low	Some potential for contamination, but previous and current uses are of low risk and unlikely to be of note in the context of an electricity infrastructure construction project, e.g. low risk commercial uses such as depots or warehouses.
Moderate	Some potential for contamination, with previous and current processes that are considered a risk of generating widespread slightly elevated contamination levels and/or more localised areas of more severe contamination – e.g. railways, railway yards, collieries, scrapyards, inert landfills.
High	Previous and current uses that are commonly associated with widespread elevated contamination potential – e.g. major industry, ‘non-hazardous’ landfills.
Very high	Previous and current uses that are associated with the highest risk of elevated contamination – e.g. hazardous landfills, gas works, chemical works.

11.5.16 For the DES assessment, each potential effect of moderate or greater risk of contamination identified in the Preliminary Risk Assessment (PRA) section of **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies** has been carried forward for assessment using **Table 11.3** and **Table 11.4**, to give an assessment of the effect in **Table 11.5**.

Sensitivity

11.5.17 The value or sensitivity of receptors will be reported in accordance with the criteria presented in **Table 11.3**.

Table 11.3 Sensitivity of receptors

Value/ Sensitivity	Land Contamination, Geological Conservation	Hydrogeology
Very high	Human health risk, in areas of high sensitivity land use (e.g. residential, allotments) where receptor characteristics promote exposure and/or vulnerability to soil contamination or ground gas. Geological conservation: very rare and of either international or national importance with no potential for replacement, e.g. United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Sites, UNESCO Global Geoparks, GCR sites where citations indicate	Principal aquifer providing a regionally important resource and/or supporting a site protected under European Commission legislation (e.g. designated GWDTEs such as SAC, SPA or SSSI). Groundwater locally supports designated GWDTE. SPZ1 (inner zone)

Value/ Sensitivity	Land Contamination, Geological Conservation	Hydrogeology
	features of international importance, geological SSSIs, ASSIs). Geology meeting international or national designation criteria, but which is not designated as such.	associated with a public water supply (PWS). Licensed abstraction for PWS.
High	Human health risk in areas of high sensitivity, e.g. public open spaces, schools, where receptor characteristics promote exposure and/or vulnerability to soil contamination or ground gas and vapour. Geological conservation: rare and of either international or national importance with limited potential for replacement (e.g. Geological SSSI, ASSI). Geology meeting international or national designation criteria, but which is not designated as such.	Principal aquifer providing locally important resource or supporting a river ecosystem. Groundwater supports a GWDTE (non-designated). Licensed groundwater abstraction. SPZ1 associated with a private water abstraction, SPZ2 (outer zone) associated with a PWS.
Medium	Human health risk, medium sensitivity land use such as commercial or industrial where receptor characteristics limit exposure and/or vulnerability to soil contamination, ground gas and vapour. Soil/land: crops, livestock, or plants in managed planting/landscaping schemes (parks/verges) etc. Agricultural assets whose quality may be affected by exposure to contamination. Geological conservation: geology of regional importance with limited potential for replacement (e.g. RIGS, LGS). Geology meeting regional designation criteria, but which is not designated as such.	Aquifer providing water for agricultural or industrial use with limited connection to surface water. Secondary aquifers, unlicensed groundwater abstractions, SPZ3 (total catchment).
Low	Human health risk, low sensitivity land use such as highways and rail, where receptor characteristics significantly minimise exposure and/or vulnerability to soil contamination and ground gas. Geology of local importance/interest with potential for replacement e.g. non-designated geological exposures, former quarries, mining sites.	Unproductive strata.
Negligible	Human health: undeveloped land, no sensitive land uses proposed. Land/soil: phytotoxic effects on non-agricultural plants that are not part of managed planting or landscaping schemes. Geological conservation: no designated sites or geology of known recorded local interest.	n/a

Magnitude

11.5.18 Magnitude of impact will be reported in accordance with the criteria listed in Table 11.4.

Table 11.4 Magnitude of impact

Magnitude	Land Contamination, Geological Conservation	Hydrogeology ¹
Major	Risk assessments indicate that contaminant levels exceed relevant screening criteria (e.g. Category 4 screening levels) and may present unacceptable acute or substantial chronic human health risks. Geological conservation: loss of geological features/designation and/or quality and integrity, severe damage to key characteristics, features or elements.	Release of Priority Hazardous Substances (PHSs) or substances regulated under The Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015 (Ref 11.18) of The Water Supply (Water Quality) Regulations 2016 (Ref 11.19) introduced by the Project at concentrations that may present a direct/imminent risk to abstractions. These regulations were transposed into domestic law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 ('WER') (Ref 11.20). Physical or chemical effects on an aquifer (i.e. changes in groundwater levels, flows, yield, or quality) that substantively restrict its viability as an abstractable resource and/or its WER status.
Moderate	Risk assessment indicates that pre-existing contaminant concentrations may be slightly or moderately above precautionary screening criteria, potentially resulting in a chronic health risk that although likely to be low or moderate, may require remediation and/or control measures. Death or major health effects on livestock or significant direct damage to crops or plants in a managed planting/landscaping scheme that is directly attributable to soil contamination. Geological conservation: partial loss of geological feature/designation, potentially adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.	Release of contamination introduced by the Project at concentrations that may lead to substantial localised degradation in groundwater quality but not present a direct/imminent risk to abstractions. Physical or chemical effects on an aquifer (i.e. changes in groundwater levels, flows, yield or quality) that limit its effectiveness as a resource and may affect its status.

¹The hydrogeological criteria do not include the magnitude of effect that may be caused to GWDTE or surface water receptors as a result of changes to groundwater that feeds these receptors. This is because effects on these receptors are considered in Chapter 8 Ecology and Biodiversity and Chapter 10 Water Environment, respectively.

Magnitude	Land Contamination, Geological Conservation	Hydrogeology ¹
Minor	Pre-existing contaminant concentrations are below relevant screening levels and there is no requirement for control/remediation measures. Minor damage to crops or plants in a managed planting /landscaping scheme that is directly attributable to soil contamination. Geological conservation: minor measurable change in geological feature/designation attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features, or elements.	Minor localised changes introduced by the Project to groundwater quality, flow, levels or yields. Changes are localised with little effect on the use or status of the groundwater resource and present no significant risk to abstractions.
Negligible	Pre-existing contaminant concentrations are at background and risk assessments indicate that there is no significant potential for adverse human health effects from soil contamination. No damage to crops, livestock or plants. Geology: negligible loss or detrimental alteration to one or more characteristics, features or elements of geological feature/designation. Overall integrity of resource unaffected.	Minimal measurable effect introduced by the Project on groundwater levels, quantities, flows, or chemical quality, or on the use or status of a groundwater resource.
No change	Pre-existing contaminant concentrations are at or below background and risk assessments indicate that there is no significant potential for adverse human health effects from soil contamination. No damage to crops, livestock or plants. Geology: no loss or detrimental alteration to one or more characteristics, features or elements of geological feature/designation. Overall integrity of resource unaffected.	No measurable effect introduced by the Project on groundwater levels, quantities, flows, or chemical quality, or on the use or status of a groundwater resource.

Significance of effects

- 11.5.19 The general approach adopted for evaluating the significance of effects considering the sensitivity of the receptor and the magnitude of impacts is outlined in **Table 11.5**.

Table 11.5 Determination of significance matrix (Ref 11.20)

Magnitude of Impact						
Sensitivity of Receptor		Major	Moderate	Minor	Negligible	No change
	Very high	Very large	Large or very large	Moderate or large	Slight	Neutral
	High	Large or very large	Moderate or large	Slight or moderate	Slight	Neutral
	Medium	Moderate or large	Moderate	Slight	Neutral or slight	Neutral
	Low	Slight or moderate	Slight	Neutral or slight	Neutral or slight	Neutral
	Negligible	Slight	Neutral or slight	Neutral or slight	Neutral	Neutral

- 11.5.20 A very large, large or moderate effect is considered significant; a resultant effect of slight or neutral is considered not significant. This matrix approach provides a guide, however, professional judgement will be used in concluding the significance of an effect.

Assessment Assumptions and Limitations

- 11.5.21 The key parameters and assumptions considered within this preliminary assessment include the following:
- A ground investigation is currently in progress across the draft Order Limits and planned to collect site data for design purposes. These data will be used to support the ES, where relevant and where programmes align. Further information from the geotechnical and geo-environmental investigation will be provided in the ES.
 - The assessment undertaken in this chapter is based on desk study information provided in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies**. 'Reasonable worst case' assumptions regarding the likely ground conditions will be made when assessing effects in the ES, determined from the desk study information. The current and proposed site inspections and ground investigations are designed to support the engineering design and not specifically the ES, unless specific high-risk circumstances are identified at DES from desk study information which would warrant this.
 - This assessment is based on the current draft Order Limits and the Project description provided in Chapter 4 Description of the Project. It is anticipated that these details of the development will be subject to refinement as the Project progresses. Subsequent reports to inform the ES will be based on more detailed design information. The approach to data gathering and assessment provided within this chapter is intended to be flexible and is expected to remain applicable as the design develops.

- A defined construction water supply strategy is not available at this stage of the Project. Whilst the abstraction of groundwater for construction purposes cannot be entirely ruled out at this stage, there is no information available regarding potential abstraction locations, rates, durations or mechanisms. In the absence of this information, a quantitative assessment of groundwater abstraction effects cannot be meaningfully undertaken at DES stage. Any future proposal to abstract groundwater would be subject to the relevant regulatory consenting regime, would be designed to avoid adverse effects on groundwater receptors and would consider the constraints on water availability in the region. The need for, and potential effects of, any groundwater abstraction will be confirmed and, where required, assessed at ES stage once further design detail is available.
- Discharges from dewatering of excavations to remove rainwater and minor groundwater seepages would be made to ground where practicable. At deeper excavations or where significant management of groundwater is required, it is assumed that discharges would be subject to treatment to settle sediments, prior to discharge to ground. Where this is not practicable in localised areas, any discharge to surface water would be made in compliance with relevant consents. Where this is the case, it is envisaged that the assessment of the potential effects will be considered in the ES.

11.5.22 The key parameters and assumptions will be reviewed based on the final Project description and design and, where required, updated or refined for the ES. The ES will present the final key parameters and assumptions used within that assessment, drawing attention to any areas that may have changed from those presented in this preliminary assessment.

11.6 Baseline Conditions

Existing Baseline

11.6.1 This section outlines the geology and hydrogeology baseline identified throughout the relevant Study Area as defined in Section 11.5 of this DES. The baseline is reported by key matter (geology then hydrogeology), and by receptor type (e.g. geology, aquifers) initially to provide an overview, and then the receptors identified in each Section of the Project. The Project has been divided into five Sections as described in **Chapter 4 Description of the Project** and shown in **Figure 1.2 Draft Order Limits**. The Sections are defined by the geographical alignment of the draft Order Limits and the administrative boundaries of the local authorities.

Geology

Superficial deposits and bedrock geology

11.6.2 The superficial deposits and bedrock geology shown on the 1:625,000 scale BGS map (Ref 11.1) that are anticipated to be present within the Study Area for the Project are presented on **Figure 11.2 Superficial Geology** and **Figure 11.3 Bedrock Geology** respectively and described below for each section.

11.6.3 The superficial deposits and bedrock geology shown at a higher resolution on the 1:50,000 scale BGS map (Ref 11.1) is also described for each section. Further detailed information on the superficial and bedrock geology anticipated within the Study Area is provided in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies** with the 1:50,000 scale geology shown in the drawings listed in **Table 11.6**.

Table 11.6 Geological maps presented in the desk studies

Desk study report title	Drawing number and title	Section
Weston Marsh to WMEL-A Overhead Line	WMEL-AAJ-ZZZZ-XXXXXX-DRW-GE-000015 (Sheets 1 to 9) Published Superficial Geology and Artificial Ground	1 and 2
	WMEL-AAJ-ZZZZ-XXXXXX-DRW-GE-000016 (Sheets 1 to 9) Published Bedrock Geology	
WMEL-A to WMEL-B Overhead Line	WMEL-AAJ-ZZZZ-XXXXXX-DRW-GE-000025 (Sheets 1 to 7) Published Superficial Geology and Artificial Ground	2 and 3
	WMEL-AAJ-ZZZZ-XXXXXX-DRW-GE-000026 (Sheets 1 to 7) Published Bedrock Geology and Artificial Ground	
WMEL-A Substation	WMEL-AAJ-ZZZZ-XXXXXX-DRW-GE-000003 Superficial, Artificial and Mass Movement Deposits	2
	WMEL-AAJ-ZZZZ-XXXXXX-DRW-GE-000004 Bedrock Geology and Linear Features	
WMEL-B Substation	WMEL-AAJ-ZZZZ-XXXXXX-DRW-GE-000009 Superficial, Artificial and Mass Movement Deposits	3
	WMEL-AAJ-ZZZZ-XXXXXX-DRW-GE-000010 Bedrock Geology and Linear Features	
WMEL-B Substation to Grendon Reconductoring	WMEL-AAJ-ZZZZ-XXXXXX-DRW-GE-000035 (Sheets 1 to 14) Published Superficial Geology and Artificial Ground	3, 4 and 5
	WMEL-AAJ-ZZZZ-XXXXXX-DRW-GE-000036 (Sheets 1 to 14) Published Bedrock Geology and Artificial Ground	

Hydrogeology

Aquifer designation

- 11.6.4 All superficial and bedrock geological units are grouped into one of the following aquifer types:
- Principal aquifers: provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands.
 - Secondary A aquifers: comprise permeable layers that can support local water supplies and may form an important source of base flow to rivers.
 - Secondary B aquifers: mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers.
 - Secondary undifferentiated: where it is not possible to apply either a secondary A or B definition because of the variable characteristics of the rock type.
 - Unproductive aquifers: largely unable to provide usable water supplies are unlikely to have surface water and wetland ecosystems dependent on them.

- 11.6.5 The aquifer type descriptions are provided by the Environment Agency (Ref 11.28). Defra's Magic Map (Ref 11.12) has been used to identify each geological unit's designation.

WER groundwater bodies

- 11.6.6 The WFD was transposed into UK law by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (the 'WER'). These provide a structure for the protection and enhancement of surface fresh water, estuaries, coastal waters and groundwater.
- 11.6.7 This DES is supported by a standalone WER compliance assessment (**Appendix 10C Preliminary Water Environment Regulations Assessment**) in relation to hydrological receptors. Assessment of WER compliance for groundwater bodies is therefore reported within **Chapter 10 Water Environment** of this DES, and cross-referred to in this chapter (**Chapter 11 Geology and Hydrogeology**).
- 11.6.8 The locations of WER groundwater bodies are shown in **Figure 11.4 Groundwater Features**.

Groundwater source protection zones

- 11.6.9 SPZs are defined by the Environment Agency around large and public potable groundwater abstraction sites (Ref 11.24). The purpose of SPZs is to provide additional protection to safeguard drinking water quality through constraining the proximity of an activity that may impact upon a drinking water abstraction. The following subdivisions are defined within SPZs:
- Zone 1 (SPZ1) – Inner Protection Zone: This zone is defined by a travel time of 50 days or less from any point within the zone at, or below, the water table. Additionally, the zone has as a minimum a 50 m radius.
 - Zone 2 (SPZ2) – Outer Protection Zone: This zone is defined by the 400-day travel time from a point below the water table. Additionally, this zone has a minimum radius of 250 or 500 m, depending on the size of the abstraction.
 - Zone 3 (SPZ3) – Total Catchment: This zone is defined as the total area needed to support the abstraction or discharge from the protected groundwater source.
- 11.6.10 Additional divisions of SPZs are made for areas of confined aquifers. The requirement for these areas is for a minimum of 10 m of protective cover from a geological unit of low permeability. The extents of the SPZs on the surface are worked out as if they were not confined. These SPZs need only to be considered if a pathway develops through the confining layer, such as through drilling. These protective cover zones are written as SPZ1c, SPZ2c and SPZ3c.
- 11.6.11 Groundwater abstractions which are not PWS abstractions are considered to have a nominal area of SPZ when assessing. This is considered to be a 50 m radius of SPZ1 only.
- 11.6.12 Areas of SPZs are shown in **Figure 11.5 Groundwater Abstractions and Discharges**.

Drinking Water Safeguard Zones

- 11.6.13 The Environment Agency defines areas of Drinking Water Safeguard Zones (SgZs) around PWSs where additional pollution control measures are needed (Ref 11.25). The geometry of these is often based upon SPZs but they are only established in locations which require additional protection of the groundwater source to avoid deterioration in their quality as part of the WER.
- 11.6.14 There are no SgZs within the Study Area; therefore, they are not considered further in the baseline.

Groundwater abstractions and discharge consents

- 11.6.15 Groundwater abstractions capable of exceeding 20 m³/day must be licensed under current regulations (Ref 11.26), while smaller abstractions do not require a licence. Records of licensed abstractions held by the Environment Agency were used to identify all abstractions within the Study Area and wider area. The dataset does not include information on the aquifer unit associated with each abstraction. Groundwater abstractions operated by a water company for the purposes of PWS are considered where any part of their SPZ falls within the Study Area, regardless of the abstraction's location relative to the Study Area boundary. This is also discussed in the baseline conditions. Abstractions that fall into this category are considered to be within the area of influence of the draft Order Limits.
- 11.6.16 Information on unlicensed abstractions held by relevant local authorities has been gathered and assessed for all, other than Melton Borough Council and West Northamptonshire Council, for which information has been requested but not yet received. Information will be considered at ES stage.
- 11.6.17 Records of permitted discharge consents maintained by the Environment Agency (Ref 11.27) have been obtained for use in this assessment. The dataset does not differentiate between discharges to surface water or groundwater; therefore, all live discharges within the Study Area are included.
- 11.6.18 Groundwater abstractions and discharge consents are shown in **Figure 11.5 Groundwater Abstractions and Discharges**.

Groundwater Dependent Terrestrial Ecosystems

- 11.6.19 GWDTEs identified within the Study Area are from the dataset produced and maintained by the Environment Agency, last updated in July 2025 (Ref 11.14). This considers all SSSIs from Natural England, filtered to include only those sites with wetland vegetation. This dataset is not exhaustive and there may be additional GWDTEs. Integration with any additional GWDTEs identified in **Chapter 8 Ecology and Biodiversity** after surveys have been completed will be included at ES stage.
- 11.6.20 GWDTEs identified to date are shown in **Figure 11.4 Groundwater Features**.

Section 1

Superficial deposits and bedrock geology

- 11.6.21 Made Ground deposits are recorded on the 1:50,000 scale geological map (see **Figure 11.2 Superficial Geology** (Sheet 1 of 5)) within the draft Order Limits south east of Surfleet.

- 11.6.22 The 1:625,000 scale superficial geological map presented in **Figure 11.2 Superficial Geology** (Sheet 1 of 5) records Alluvium beneath the Study Area.
- 11.6.23 More detailed 1:50,000 scale geological maps record the superficial deposits as comprising Tidal Flat Deposits (clay and silt) and a small area of Abbey Sand and Gravel Member (sand and gravel) to the east of Rippingale.
- 11.6.24 The 1:625,000 scale geological map presented in **Figure 11.3 Bedrock Geology** (Sheet 1 of 5) records bedrock beneath the Study Area as Kellaways Formation and Oxford Clay Formation (Undifferentiated). This is shown on the more detailed 1:50,000 geological maps to comprise mudstone of the Oxford Clay Formation.

Potentially contaminative land

- 11.6.25 Section 1 is predominantly within agricultural fields. Potentially contaminative land uses located off-site in Section 1 include a sewage pumping station, electricity substation and a distribution and haulage centre and a vehicle components company in Surfleet. A historical landfill is located on-site south of the village of Gosberton Cheal, associated with sewage settling beds. A further historical landfill associated with Fernleigh Farm is recorded 60 m off-site, south west of Surfleet.. Other potential sources located on-site and off-site include tanks, Made Ground, railway land and animal production sites.
- 11.6.26 Further details regarding potentially contaminative sites are presented in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies (Weston Marsh to WMEL-A Overhead Line)**.

Radon

- 11.6.27 Data from UK Health Security Agency (UKHSA) radon maps (Ref 11.10) and Groundsure have been used to determine the radon potential for Section 1.
- 11.6.28 Radon levels in Section 1 are low with a maximum radon potential of less than 1%. This means that less than 1% of homes are at or above the Action Level of 200 Bq m⁻³ in Section 1.

Geological conservation sites

- 11.6.29 Information about geological sites has been requested from the local planning authority but not as yet, received. Once available, these data will be included in the ES.

Aquifer designations

- 11.6.30 Both the superficial deposits and the bedrock are designated as unproductive strata apart from the Abbey Sand and Gravel Member which is designated as a secondary A aquifer.

WER groundwater bodies

- 11.6.31 There are no WER groundwater bodies located within the Study Area for Section 1.

Groundwater source protection zones

- 11.6.32 The western end of the Study Area for Section 1 is located on two areas of SPZ1, surrounded by SPZ2 and SPZ3 which share the same boundaries and are located

within the draft Order Limits. These areas cover the westernmost 2 km of the Study Area for Section 1, from near Northgate and to the west. The draft Order Limits crosses the southern SPZ1 for approximately 1.1 ha.

- 11.6.33 These areas of SPZ1, 2 and 3 are related to groundwater PWS abstractions outside the Study Area, with abstractions contributing to the SPZs located in both South Holland and South Kesteven. These abstractions are discussed in Section 11.6.35.

Groundwater abstractions and discharge consents

- 11.6.34 All of the licensed groundwater abstractions within the Study Area for Section 1 are for PWS.
- 11.6.35 Two groundwater abstractions for PWS are located just within the Study Area for Section 1, and their associated SPZs are within the draft Order Limits. These abstraction boreholes are located at the same site. The SPZ1 associated with the abstractions crosses into the draft Order Limits for 1.1 ha. The large area of SPZ2, which the draft Order Limits passes through and across at the western end of Section 1, is associated with this abstraction and a further five abstractions which are discussed in Section 2. The details for the PWS abstractions located within the area of influence of the draft Order Limits of Section 1 are recorded below in **Table 11.7**.
- 11.6.36 Note that the PWS abstractions which are located in Section 2, but with an associated SPZ1 located 70 m west of the draft Order Limits in Section 1, are presented in Section 2.

Table 11.7 Licensed groundwater abstractions for public water supply within the area of influence of the draft Order Limits for Section 1

Permit Number	Primary Description	Use Description	Maximum Annual Quantity (m ³)	Maximum Daily Quantity (m ³)	Location Relative to Draft Order Limits	Closest Area of SPZ1
4/30/12/*G/0034 (two boreholes at same location)	Water Supply	Potable Water Supply - Direct	2,834,000	9,092	430 m S	1.1 ha of SPZ1 within draft Order Limits

- 11.6.37 There are not believed to be any unlicensed groundwater abstractions within the Study Area for Section 1. South Holland District Council provided generalised 1 km grid squares around named locations. None of these 1 km² areas are within the Study Area, but this cannot be verified without more precise information.
- 11.6.38 There are six permitted discharge consents within the Study Area for Section 1. It is unknown whether these are to surface water or to groundwater. These are listed in **Table 11.8** below.

Table 11.8 Permitted discharge consents located within the Study Area for Section 1

Permit Number	Site Type	Effluent Type	Start Date
AN/PRNNF12 463/001	Farms (not house)/Crop and Animal Rearing/Plant Nursery	Sewage - not water company	15/08/2000
AN/AW5NF56 0/002	Wastewater Treatment Works (WwTW)/Sewage Treatment Works (water company)	Sewage - water company	06/03/2019
AN/PR5LF544 5/002	Domestic property (single) (including farmhouse)	Sewage - not water company	14/12/2011
AN/EPRFB32 99DV/001	Church/Monastery/Abbey/Religious Retreat/Association Head Quarters (HQ)	Sewage - not water company	06/12/2016
AN/PRNNF09 901/001	WwTW (not water company) (not Sewage Treatment Plant (STP) at a private premises)	Sewage - not water company	19/12/1995
AN/PRNNF12 481/001	Making of Food Products/Dairy	Trade	25/02/2002

Groundwater Dependent Terrestrial Ecosystems

11.6.39 There are no GWDTEs within the Study Area for Section 1.

Section 2

Superficial deposits and bedrock geology

- 11.6.40 Made Ground deposits are recorded on the 1:50,000 scale geological maps south east of Sewstern within the wider Study Area (see **Figure 11.2 Superficial Geology** (Sheet 2 of 5)).
- 11.6.41 The 1:625,000 scale superficial geological map presented in **Figure 11.2 Superficial Geology** (Sheet 2 of 5) records Alluvium, Peat, River Terrace Deposits and Till beneath the Study Area. There are also areas where superficial deposits are absent across much of the central part of the Study Area. Till directly underlies the north west corner of the WMEL-A Substation site.
- 11.6.42 More detailed 1:50,000 scale geological maps record the superficial deposits to comprise Tidal Flat Deposits (clay and silt) and River Terrace Deposits (sand and gravel) east of Haconby. There is a small area of Peat located south east of Dunsby within the draft Order Limits and wider Study Area and a small area of Abbey Sand and Gravel Member east of Rippingale in the wider Study Area. The remainder of Section 2 comprises Glaciofluvial Deposits, Alluvium (clay, silt, sand and gravel) underlying traces of rivers, and Till (mid Pleistocene). West of Birkholme, Section 2 comprises largely Till.
- 11.6.43 The 1:625,000 scale geological map presented in **Figure 11.3 Bedrock Geology** (Sheet 2 of 5) records bedrock beneath the Study Area as Kellaways Formation and Oxford Clay Formation, Great Oolite Group, Inferior Oolite Group and Lias Group.

- 11.6.44 Bedrock recorded on the more detailed 1:50,000 scale geological maps comprises Kellaways Formation and Oxford Clay Formation in the eastern extent with Great Oolite Group consisting of Cornbrash Formation (limestone) the Blisworth Clay Formation and Rutland Formation. The western extent largely comprises Great and Inferior Oolite Group consisting of Lincolnshire Limestone Formation (Upper and Lower), Grantham Formation and the Northampton Sand Formation. West of Lobthorpe the geology largely comprises the Lias Group consisting of the Whitby Mudstone Formation. The WMEL-A Substation site is underlain by Upper and Lower Lincolnshire Limestone with the north eastern corner comprising Rutland Formation (argillaceous) and Blisworth Limestone Formation.
- 11.6.45 Limestone formations within the Great Oolite Group and Inferior Oolite Group are considered to have karstic characteristics. Karst refers to the dissolution of soluble rocks, resulting in the development of features such as enlarged fractures, solutionally widened bedding planes and, in some cases, conduits, cavities, and surface depressions. The presence and extent of such features can vary spatially and may not be laterally continuous. Where present, karstic features can influence groundwater flow behaviour by creating preferential pathways. This may locally increase groundwater flow velocities and, in some circumstances, facilitate more rapid transport of dissolved contaminants compared to non-karstic conditions.

Potentially contaminative land

- 11.6.46 Section 2 is largely situated within agricultural land. Potentially contaminative land uses located on-site include sludge storage sites, tanks and a water pumping station. A disused airfield (RAF North Witham) located north east of North Witham, present-day railway land, gas pipelines and existing underground fuel line is located on-site and off-site. Potentially contaminative land uses located off-site in Section 2 include a pump house, blacksmith, gas valve compound and sludge storage. Honey Pot Lane industrial site is located off-site to the south of the disused airfield. Ironstone mining is understood to have occurred to the north west of Section 2 on-site and off-site. Former ironstone workings have the potential to cause an explosive atmosphere if it accumulates in a confined space and contribute to the acidity of groundwater and soils. The presence of unrecorded workings cannot be discounted.
- 11.6.47 The WMEL-A Substation site is situated within Section 2. Potentially contaminative land uses present on-site include an historical limekiln and agricultural land. Made Ground and infilled land are present on-site associated with gravel pits, ponds and a railway embankment. A historical mine (Easton Mine) was located 4 km north east of the site, however, mine working may extend on-site. Off-site potentially contaminative land uses include railway land, former sidings located near the former Corby Station and a former sawmill. Further detail regarding potentially contaminative sites is presented in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies (WMEL-A Substation)**.
- 11.6.48 Made Ground, infilled ground and agricultural land are anticipated on-site and off-site due to the presence of various roads, railways, structures, infilled ponds, pits and quarries. The nature of the infill material is currently unknown.
- 11.6.49 Further detail regarding potentially contaminative sites is presented in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies (Weston Marsh to WMEL-A Overhead Line, WMEL-A to WMEL-B Overhead Line)**.

Radon

- 11.6.50 Data from UKHSA radon maps (Ref 11.10) and Groundsure have been used to determine the radon potential for Section 2.
- 11.6.51 Radon levels in Section 2 are generally low (less than 1% of homes at or above the Action Level of 200 Bq m⁻³) with areas of elevated radon where outcrops of the Lias Group occur. Higher radon levels are present west of Corby Glen along Section 2. The maximum radon potential ranges from less than 1% to 10-30% in Section 2.
- 11.6.52 The radon potential varies across the WMEL-A Substation site. A small area of elevated radon potential, where *'more than 10-30% of homes are at or above the radon Action Level of 200 Bq m⁻³'* underlies the substation site in the south eastern extent. Radon potential is lower in the south west at 3-5%, with the lowest levels in the north east at less than 1% above the Action Level.

Geological conservation sites

- 11.6.53 Information about geological sites has been requested from the local planning authority but not yet received. Once available, these data will be included in the ES.

Aquifer designation

- 11.6.54 Most of the superficial deposits present across the Study Area for Section 2 are designated as secondary A aquifers. These are the Glaciofluvial Deposits, Alluvium, River Terrace Deposits and the Abbey Sand and Gravel Member. Till and the River Terrace Deposits located near the West Glen River are described as secondary undifferentiated aquifers. Tidal Flat Deposits and Peat are described as unproductive strata. There are also areas where superficial deposits are absent across much of the central part of the Study Area for Section 2.
- 11.6.55 The Limestone of the Lower Lincolnshire Limestone Member and Upper Lincolnshire Limestone Member, and Blisworth Limestone Formation underlying the Study Area for Section 2 are described as principal aquifers. The Northampton Sand Formation, Cornbrash Formation, and Kellaways Sand Member, underlying the Study Area are all described as secondary A aquifers. The Rutland Formation – Sandstone and Limestone is described as a secondary B aquifer. The Grantham Formation is described as a secondary undifferentiated aquifer. The Whitby Mudstone Formation, Mudstone of the Kellaways Clay Member and Oxford Clay Formation are described as unproductive strata.

WER groundwater bodies

- 11.6.56 The Study Area for Section 2 crosses four WER groundwater bodies:
- Welland Limestone Unit A has an Overall Water Body status of Poor, due to a Poor Chemical status, despite a Good Quantitative status.
 - Welland Limestone Unit B has an Overall Water Body status of Poor, due to a Poor Quantitative Status, despite a Good Chemical Status.
 - Welland Mid Jurassic has an Overall Water Body status of Good, with Good Quantitative and Chemical statuses.
 - Witham Lias has an Overall Water Body status of Good, with Good Quantitative and Chemical statuses.

- Witham Limestone Unit A has an Overall Water Body status of Poor, due to Poor Quantitative and Chemical statuses.

Groundwater source protection zones

- 11.6.57 Most of the Study Area for Section 2 is located on SPZ3 except for a small area extending 5 km west of Lobthorpe to the western boundary. SPZ2 – Outer Protection Zone covers all of the Study Area for Section 2 east of and including Corby Glen, which accounts for approximately 60% of the Study Area for Section 2. There is also a small section of SPZ1 and SPZ2 within the Study Area north west of Corby Glen. Some of the easternmost 4 km of the Study Area for Section 2 is covered by SPZ1 – Inner Protection Zone, including some small areas, no larger than 2.0 ha, of draft Order Limits associated with access to the cable corridor which are within SPZ1. This is in the area west of Haconby and the SPZ1 is largely located north and south of the draft Order Limits, with only small areas where it crosses into the draft Order Limits. These areas of SPZ1 are not continuous; there are areas of the lower classification of SPZ2 between those of SPZ1.
- 11.6.58 These areas of SPZ1, 2 and 3 are related to groundwater PWS abstractions outside the Study Area, with abstractions contributing to the SPZs located in both South Kesteven and South Holland. These abstractions are discussed in paragraph 11.6.61.
- 11.6.59 A further area of SPZ2c crosses into the Study Area for 5.44 ha, 500 m east of Burton-le-Coggles, an area with only SPZ3 coverage otherwise. The abstraction associated with this abstraction is unknown.

Groundwater abstractions and discharge consents

- 11.6.60 There are six groundwater abstraction licences located within the Study Area for Section 2 which are located in four locations. One of these locations is a licensed groundwater abstraction for PWS, and is listed in both **Table 11.9** and **Table 11.10**. Three of the licences are recorded under the same permit number for different usages at the same location. The closest abstraction is located 10 m west of the draft Order Limits, with an adjacent licensed abstraction located 35 m west of the draft Order Limits. The closest PWS abstraction is located 230 m north of the draft Order Limits. The licensed groundwater abstractions located within the Study Area for Section 2 are listed in **Table 11.9**.

Table 11.9 Licensed groundwater abstractions within the Study Area for Section 2

Permit Number	Primary Description	Use Description	Maximum Annual Quantity (m ³)	Maximum Daily Quantity (m ³)
4/30/12/*G/0040A	Agriculture	General farming & domestic	6,959	38
4/30/12/*G/0040B	Agriculture	Spray irrigation - direct	154,567	4,552
4/30/12/*G/0040B	Agriculture	Transfer between sources (pre-Water Act 2003)	154,567	4,552

Permit Number	Primary Description	Use Description	Maximum Annual Quantity (m ³)	Maximum Daily Quantity (m ³)
4/30/12/*G/0040B	Agriculture	Trickle irrigation - direct	154,567	4,552
4/30/12/*G/0020	Agriculture	General farming & domestic	8,778	32.29

- 11.6.61 Further to the single groundwater abstraction for PWS located within the Study Area for Section 2, are four additional groundwater abstractions for PWS located outside the Study Area for Section 2, but with their associated SPZs within the Study Area. One of these PWSs is within the Study Area for Section 1. This makes a total of five PWS considered for Section 2.
- 11.6.62 One of these has associated areas of SPZ1c and SPZ2c within the Study Area, meaning it is would only be connected to the Study Area if a pathway developed through the >10 m thick superficial deposits located within the SPZ. The superficial deposit thickness is based upon the definition of SPZ1c and SPZ2c, rather than through confirmation from borehole logs.
- 11.6.63 The other four PWS boreholes are located across four separate locations which cross the Study Area (other than the area associated with northernmost two abstractions), with small areas crossing into the draft Order Limits. There are just three permit numbers (with extensive areas of SPZ1) associated with these boreholes. The wider area of SPZ2 which the draft Order Limits pass through and which includes two-thirds of Section 2, is associated with these abstractions. The details for the PWS abstractions located within the area of influence of the draft Order Limits of Section 2 are recorded in **Table 11.10**.
- 11.6.64 Note that the two PWS abstractions which are located in Section 1, but with an associated SPZ1 located across 1.9 ha of the draft Order Limits in Section 2, are presented in Section 1.

Table 11.10 Licensed groundwater abstractions for public water supply within area of influence of the draft Order Limits for Section 2

Permit Number	Primary Description	Use Description	Maximum Annual Quantity (m ³)	Maximum Daily Quantity (m ³)	Location Relative to Draft Order Limits	Closest Area of SPZ1
4/30/12/*G/0302/R03	Water Supply	Potable Water Supply - Direct	2,500,000	10,000	650 m S	370 m S (SPZ1c)
4/30/12/*G/0301/R03	Water Supply	Potable Water Supply - Direct	807,000	6,000	230 m N	Access tracks in draft Order Limits within SPZ1 in

Permit Number	Primary Description	Use Description	Maximum Annual Quantity (m ³)	Maximum Daily Quantity (m ³)	Location Relative to Draft Order Limits	Closest Area of SPZ1
						three locations
4/30/12/*G/0218	Water Supply	Potable Water Supply - Direct	5,635,000	26,000	980 m N	Access tracks in draft Order Limits within SPZ1 in three locations
4/30/12/*G/0218	Water Supply	Potable Water Supply - Direct	5,635,000	26,000	3,130 m N	2,300 m N
4/30/12/*G/0218	Water Supply	Potable Water Supply - Direct	5,635,000	26,000	3,280 m N	2,300 m N

11.6.65 There are five unlicensed abstractions, all for domestic usage, within the Study Area for Section 2. No details are known beyond what is listed in **Table 11.11**.

Table 11.11 Unlicensed groundwater abstractions within the Study Area for Section 2

Supply Reference	Type	Water Used for Temporary Events, Food Production, Holiday Accommodation or for a Public Building or Activity	Activity	Location Relative to Draft Order Limits
P4756	Borehole	No	Domestic	400 m SE
P4757	Borehole	No	Domestic	490 m SW
P60742	Borehole	No	Domestic	270 m S
P89963	Borehole	No	Domestic	10 m W (adjacent to existing access track which is part of the draft Order Limits)
P60873	Borehole	No	Domestic	400 m S

11.6.66 There are nine permitted discharge consents within the Study Area for Section 2, listed in **Table 11.12**. It is unknown whether these are to surface water or to groundwater.

Table 11.12 Permitted discharge consents located within the Study Area for Section 2

Permit Number	Site Type	Effluent Type	Start Date
AN/AW3NFF113 5/001	WTW/Water Collection/Treatment/Supply	Trade	05/01/1976
AN/ANNNF1315 5/001	WTW/Water Collection/Treatment/Supply	Trade	26/08/1994
AN/PRNNF1871 3/001	Real Estate Activities/Buying/Selling/Renting	Sewage - not water company	01/02/2007
AN/PRNNF1865 9/001	Making of Food Products/Dairy	Sewage - not water company	16/11/2006
AN/ANNNF1346 5/002	Pumping Station on Sewerage Network (water company)	Sewage - water company	20/03/2000
AN/AW5NF1811 /001	WwTW/Sewage Treatment Works (water company)	Sewage - water company	18/05/1987
AN/AW5NF301/ 001	Pumping Station on Sewerage Network (water company)	Sewage - water company	24/09/1965
AN/AW5NF300/ 010	WwTW/Sewage Treatment Works (water company)	Sewage - water company	22/12/2024
AN/AW3NF312A /001	WwTW/Sewage Treatment Works (water company)	Sewage - water company	28/11/1984

Groundwater Dependent Terrestrial Ecosystems

11.6.67 There are no GWDTE within the Study Area for Section 2.

Section 3

Superficial deposits and bedrock geology

- 11.6.68 Made Ground deposits are recorded on the 1:50,000 scale geological map (see **Figure 11.2 Superficial Geology** (Sheet 3 of 5)), south of Sewstern, west of Ab Kettleby and south west of Asfordby within the draft Order Limits and wider Study Area. Further Made Ground deposits are recorded north east of Welby, south east of Ashby Folville and north of Frisby on the Wreake within the wider Study Area.
- 11.6.69 The 1:625,000 scale superficial geological map presented in **Figure 11.2 Superficial Geology** (Sheet 3 of 5) records Alluvium and Till beneath the Study Area. There are some localised areas where superficial deposits are absent. Till directly underlies the WMEL-B Substation site.
- 11.6.70 More detailed 1:50,000 scale geological maps record the superficial deposits to predominantly comprise Till, with Alluvium and Head (clay, silt, sand and gravel) occurring along the courses of present and former rivers. From Potters Hill, superficial deposits also comprise the Oadby Member (diamicton Lias-rich). A small lens of Bytham Formation, Wanlip and Birstall Sand and Gravel Member and the

Thrussington Till Member are present west of Asfordby within the draft Order Limits. East of Frisby on the Wreake, superficial deposits comprise Bosworth Clay Member overlain by Head deposits within the draft Order Limits and a local occurrence of Glaciofluvial deposits within the Study Area. The southern extent of Section 3 also includes Colluvium deposited on hillsides, Oadby Till Member (Lias and Trias-rich) and River Terrace Deposits (sand and gravel). An area of Glaciolacustrine Deposits is located north east of Twyford within the Study Area. Superficial deposits directly underlying WMEL-B substation comprise Oadby Till Member, with Lias-rich Oadby Till Member present toward the north of the site. A central linear occurrence of Head deposits, comprising clay, silt, sand and gravel (Head) is also mapped.

- 11.6.71 The 1:625,000 scale geological map presented in **Figure 11.3 Bedrock Geology** (Sheet 3 of 5) as Lias Group with a small area of Inferior Oolite Group at the eastern extent of Section 3. Lias Group underlies the WMEL-B Substation site.
- 11.6.72 Bedrock on the more detailed 1:50,000 scale geological maps comprises the Lias Group consisting of Dyrham Formation, Charmouth Mudstone, Marlstone Rock Formation, Whitby Mudstone Formation and Scunthorpe Mudstone Formation. The southern extent from Asfordby largely comprises Mudstone of Blue Lias Formation. A small outcrop of the Inferior Oolite Group, comprising the Northampton Sand and Grantham Formations, is present south of Sewstern at the eastern extent of the Section 3 Study Area. Bedrock directly underlying the WMEL-B Substation site comprises Charmouth Mudstone Formation.

Potentially contaminative land

- 11.6.73 Section 3 is largely situated within agricultural land. Potentially contaminative land uses present on the site for the overhead line include Made Ground, infilled land, historical railway land, tanks and sludge storage sites. The north western part of Section 3 lies within a Coal Mining Reporting Area, with historical surface workings and underground coal mining present. Potentially contaminative land uses located off-site include animal management sites (Sunrise Poultry Farm), waste sites, a gas valve compound, a vehicle repair site and unspecified works and factories.
- 11.6.74 On-site potentially contaminative land uses located along the reconductoring of Section 3 includes Made Ground, historical railway land, waste exemptions, a sewage pumping station and ground workings/ quarries.
- 11.6.75 Further detail regarding potentially contaminative sites is presented in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies (WMEL-A to WMEL-B Overhead Line and WMEL-B Substation to Grendon Reconductoring)**.
- 11.6.76 WMEL-B Substation site is within Section 3. Potentially contaminative land uses located on-site include a sewage pumping station and a former stockpile of unknown material. Those present both on-site and off-site include agricultural land, Made Ground, infilled ground and historical railway land (tramway).
- 11.6.77 Further detail regarding potentially contaminative sites is presented in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies (WMEL-B Substation)**.

Radon

- 11.6.78 Data from UKHSA radon maps (Ref 11.10) and Groundsure have been used to determine the radon potential for Section 3.

- 11.6.79 Radon levels are generally low in Section 3, where less than 1% of homes are at or above the Action Level of 200 Bq m⁻³. Elevated levels of radon are present north of the WMEL-B Substation site on the border of the Study Area where the maximum radon potential is greater than 30%.
- 11.6.80 WMEL- B Substation is situated in an area where the maximum radon potential is less than 1%.

Geological conservation sites

- 11.6.81 Information about geological sites has been requested from the local planning authority but as yet not received. Once available, these data will be included in the ES.

Aquifer designation

- 11.6.82 Most of the Study Area for Section 3 is located on superficial deposits described as secondary undifferentiated. These units comprise Head, Till, Oadby Member Glacial Till and the Thrussington Member. Predominantly located along rivers within the Study Area for Section 3 are the remaining superficial aquifers: Alluvium, River Terrace Deposits, Bytham Sand and Gravel Formation, Glaciofluvial Deposits, and Birstall Member are all described as secondary A, whilst Colluvium is described as secondary B and Glaciolacustrine deposits and Bosworth Clay Member are described as unproductive strata. There are also areas where superficial deposits are absent, the largest of which is north of Wartnaby in the northern corner of the Study Area for Section 3.
- 11.6.83 All of the Study Area for Section 3 is located on bedrock units described as secondary or unproductive. The Dyrham Formation where it is a Sandstone, Marlstone Rock Formation and Northampton Sand Formation are described as secondary A aquifers. The Charmouth Mudstone Formation and Blue Lias Formation which underly most of the Study Area for Section 3 are described as secondary undifferentiated aquifers, along with the Grantham Formation and the Dyrham Formation where it is interbedded Siltstone and Mudstone. The Whitby Formation, Jericho Gryphaea Bed and Scunthorpe Mudstone Formations are described as unproductive strata.

WER groundwater bodies

- 11.6.84 The Study Area for Section 3 crosses three WER groundwater bodies:
- Witham Lias;
 - Soar – Secondary Combined; and
 - Lower Trent and Erewash – Secondary Combined.
- 11.6.85 All have an Overall Water Body status of Good, with Good Quantitative and Chemical statuses.

Groundwater source protection zones

- 11.6.86 There are no SPZs within the Study Area for Section 3.

Groundwater abstractions and discharge consents

- 11.6.87 There are no licensed groundwater abstractions within the Study Area for Section 3.
- 11.6.88 Information regarding the location of unlicensed water abstractions within the Study Area for Section 3 has been requested from Melton Borough Council but has not yet been received.
- 11.6.89 There are 13 permitted discharge consents within the Study Area for Section 3, listed in **Table 11.13**. It is unknown whether these are to surface water or to groundwater.

Table 11.13 Permitted discharge consents located within the Study Area for Section 3

Permit Number	Site Type	Effluent Type	Start Date
MI/T/54/45330/S/001	Domestic property (single) (including farm house)	Sewage - not water company	30/09/1999
MI/T/54/45703/R/001	WwTW/Sewage Treatment Works (water company)	Sewage - water company	31/03/2003
MI/T/55/02317/O/001	Pumping Station on Sewerage Network (water company)	Sewage - water company	20/02/1973
MI/EPRCB3897VE/001	WwTW/Sewage Treatment Works (water company)	Sewage - water company	12/08/2015
MI/EPRYB3094EJ/001	Pumping Station on Sewerage Network (water company)	Sewage - water company	12/12/2023
MI/T/54/40013/S/001	Domestic property (single) (including farm house)	Sewage - not water company	24/08/1994
MI/EPRAP3427GF/001	Domestic property (single) (including farm house)	Sewage - not water company	11/08/2010
MI/T/55/20905/S/001	WwTW (not water co) (not STP at private premises)	Sewage - not water company	11/01/1992
MI/3/28/55/2585/001	Domestic property (single) (including farm house)	Sewage - not water company	14/05/1974
MI/T/55/20577/S/001	Undefined or Other	Sewage - not water company	05/11/1990
MI/EPRDP3524XL/001	Offices Admin + Support	Sewage - not water company	10/08/2010
MI/T/55/10305/S/001	Mining of Coal + Lignite	Sewage - not water company	13/03/1986
MI/EPRYB3094AA/001	Pumping Station on Sewerage Network (water company)	Sewage - water company	12/12/2023

Groundwater Dependent Terrestrial Ecosystems

- 11.6.90 The only GWDTE within Section 3 is Twenty Acre Piece (SSSI), located to the west in the separated part of Section 3, which is identified as potential location for highway junction improvement works.

Section 4

Superficial deposits and bedrock geology

- 11.6.91 No Made Ground deposits are recorded on the 1:50,000 scale geological maps within the draft Order Limits or in the Study Area.
- 11.6.92 On the 1:625,000 scale superficial geological map presented in **Figure 11.2 Superficial Geology** (Sheet 4 of 5) the majority of Section 4 is mapped as Glacial Sand and Gravel and Till, while the southern extent comprises Alluvium and River Terrace Deposits.
- 11.6.93 More detailed 1:50,000 scale geological maps record the superficial deposits comprising the Oadby Till Member (diamicton), Glaciofluvial Deposits, Alluvium along the traces of rivers, Head and Colluvium. A localised area of River Terrace Deposits is present in the southern extent of Section 4 north west and south west of Welham outside the draft Order Limits in the Study Area. Isolated patches of Till are present south east of Stonton Wyville within the Study Area.
- 11.6.94 This is shown on the 1:625,000 scale **Figure 11.3 Bedrock Geology** (Sheet 4 of 5) as Lias Group across the whole of Section 4.
- 11.6.95 Bedrock on the more detailed 1:50,000 scale geological map is recorded as comprising the Lias Group consisting of Charmouth Mudstone Formation, Dyrham Formation, Marlstone Rock Formation and Whitby Mudstone Formation. The southern extent is largely underlain by Charmouth Mudstone.

Potentially contaminative land

- 11.6.96 Section 4 is primarily situated within agricultural land. Potentially contaminative land located on-site includes Made Ground, historical railway land, unspecified disused works and waste exemptions associated with sewage and sludge storage sites. An historical inert landfill named Warren Lodge is also situated on-site, located south west of Dingley.
- 11.6.97 Further detail regarding potentially contaminative sites is presented in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies (WMEL-B to Grendon Reconductoring)**.

Radon

- 11.6.98 Data from UKHSA radon maps (Ref 11.10) and Groundsure have been used to determine the radon potential for Section 4.
- 11.6.99 Radon levels in Section 4 are generally low, with most of the area having a radon potential where less than 1% of homes are at or above the Action Level of 200 Bq m⁻³, and the remainder having a maximum radon potential of 1–3%. Elevated areas of radon are present north east of Skeffington with a maximum radon potential of 10-30%.

Geological conservation sites

- 11.6.100 Information about geological sites has been requested from the local planning authority but as yet, not received. Once available, these data will be included in the ES.

Aquifer designation

- 11.6.101 Most of the superficial deposit coverage in the Study Area for Section 4 is from units described as secondary (undifferentiated) aquifers. These are Till, Oadby Member, Glaciofluvial Deposits and Head. There are also large areas within the Study Area for Section 4 where superficial deposits are absent. River Terrace Deposits and Alluvium are present within the Study Area for Section 4 and are described as secondary A aquifers. Colluvium is described as a secondary B aquifer.
- 11.6.102 Most of the Study Area for Section 4 is underlain by bedrock units described as secondary undifferentiated, these are the Charmouth Mudstone Formation and the Dyrham Formation. The remaining parts of the Study Area for Section 4 is underlain by Limestone of the Marlstone Rock Formation is described as a secondary A aquifer, and the Whitby Mudstone Formation is described as unproductive strata.

WER groundwater bodies

- 11.6.103 The Study Area for Section 4 crosses three WER Groundwater bodies:
- Soar – Secondary Combined;
 - Welland Lower Jurassic Unit; and
 - Warwickshire Avon – Secondary Mudrocks.
- 11.6.104 All three have an Overall Water Body status of Good, with Good Quantitative and Chemical statuses.

Groundwater source protection zones

- 11.6.105 There are no SPZs within the Study Area for Section 4.

Groundwater abstractions and discharge consents

- 11.6.106 There are no licensed groundwater abstractions within the Study Area for Section 4.
- 11.6.107 There are two unlicensed groundwater abstractions within the Study Area for Section 4 and are listed in **Table 11.14**. Each of these relate to springs and their current usage status as water sources is unknown. The information received from Harborough District Council was in the form of address, rather than grid reference, so the exact locations are unknown.

Table 11.14 Unlicensed groundwater abstractions within the Study Area of Section 4

Supply Reference	Type	Water Used for Temporary Events, Food Production, Holiday Accommodation or for a Public Building or Activity	Activity	Location Relative to Draft Order Limits (Approximate)
12/0001/ spring	Historic (spring assumed)	Unknown	Unknown	300 m W (spring location unknown)
12/00004/ spring	Historic (spring assumed)	Unknown	Unknown	0 m (suspected spring location, spring collection location unknown)

11.6.108 There are eight permitted discharge consents within the Study Area for Section 4, listed in **Table 11.15** below. It is unknown whether these are to surface water or to groundwater.

Table 11.15 Permitted discharge consents located within the Study Area for Section 4

Permit Number	Site Type	Effluent Type	Start Date
AN/EPRCB3551 TE/001	Domestic property (single) (including farm house)	Sewage - not water company	09/05/2024
AN/AW5NF538B /001	WwTW/Sewage Treatment Works (water company)	Sewage - water company	21/10/1985
AN/PRNNF1248 9/001	WwTW (not water company) (not STP at private premises)	Sewage - not water company	19/09/2000
AN/AW5NF425/0 03	WwTW/Sewage Treatment Works (water company)	Sewage - water company	29/09/2020
AN/AWNNF1048 6/002	WwTW/Sewage Treatment Works (water company)	Sewage - water company	19/07/1995
AN/PRNNF03991 /003	Domestic property (multiple) (including farm houses)	Sewage - not water company	24/01/1995
AN/EPRFB3993 WZ/001	Church/Monastery/Abbey/Religious Retreat/Association HQ	Sewage - not water company	08/05/2017
AN/AW5NF762/0 08	WwTW/Sewage Treatment Works (water company)	Sewage - water company	04/03/2015

Groundwater Dependent Terrestrial Ecosystems

11.6.109 There are no GWDTE within the Study Area for Section 4.

Section 5

Superficial deposits and bedrock geology

- 11.6.110 Made Ground deposits are recorded within the draft Order Limits, as indicated on the 1:50,000 scale geological maps (see **Figure 11.2 Superficial Geology** (Sheet 5 of 5)), located south west of Thorpe Underwood, Orton and west of Loddington associated with historical landfills and former pits. A large area of Made Ground is present in the southern extent of the Study Area associated with Upper Nene Gravel Pits (Ramsar, SPA and SSSI).
- 11.6.111 On the 1:625,000 scale **Figure 11.2 Superficial Geology** (Sheet 5 of 5) the majority of Section 4 is mapped as Till. Alluvium and River Terrace Deposits are mapped at the northern and eastern extent of Section 5.
- 11.6.112 More detailed 1:50,000 scale geological maps record the superficial deposits as comprising Till, Alluvium along traces of rivers and River Terrace Deposits. Isolated patches of Glaciofluvial Deposits occur within the Study Area. The centre of Section 5 from Mawsley Village largely comprises Oadby Till Member (diamicton) with isolated occurrences of Bozeat Till Member. The southern extent of the Study Area largely comprises River Terrace Deposits and Alluvium around the River Nene. A pocket of Glaciofluvial Deposits occurs in the wider Study Area north west of Grendon.
- 11.6.113 Bedrock is mapped as Great Oolite Group, Inferior Oolite Group and Lias Group on the 1:625,000 scale **Figure 11.3 Bedrock Geology** (Sheet 5 of 5).
- 11.6.114 The bedrock on the more detailed 1:50,000 scale geological map comprises the Lias Group, which forms the underlying strata in both the northern and southern extents comprising the Dyrham Formation (siltstone and mudstone), Whitby and Charmouth Mudstone Formation. The Great (Blisworth Limestone Member, Rutland Formation and Wellingborough Limestone Member) and Inferior (Grantham Formation, Northampton Sand Formation and Stamford Member) Oolite Groups are mapped in the remaining areas. An outcrop of the Lower Lincolnshire Limestone Member lies within the southern extent of the Study Area for Section 5 east of Harrington.
- 11.6.115 Limestone formations within the Great Oolite Group and Inferior Oolite Group are considered to have karstic characteristics. Karst refers to the dissolution of soluble rocks, resulting in the development of features such as enlarged fractures, solutionally widened bedding planes and, in some cases, conduits, cavities, and surface depressions. The presence and extent of such features can vary spatially and may not be laterally continuous. Where present, karstic features can influence groundwater flow behaviour by creating preferential pathways. This may locally increase groundwater flow velocities and, in some circumstances, facilitate more rapid transport of dissolved contaminants compared to non-karstic conditions.

Potentially contaminative land

- 11.6.116 Section 5 is largely situated within agricultural land. Potentially contaminative land present on-site includes Made Ground and historical railway land. A current chemical works is located near Dingley (tower ZA211) associated with cosmetics and toiletries manufacturing. Further potentially contaminative land uses include electrical substations, tanks, a historical water pumping station and sludge storage sites. Dockyards and docklands are situated in Earls Barton which may be a potential source of contamination. Historical quarries, pits and ground workings are also present across Section 5, consisting of sand and gravel workings and disused ironstone quarries. Industrial land use across Section 5 includes a current crane hire service and historical unspecified heaps.

11.6.117 Three historical inert landfills are located within Section 5; further details are presented in **Table 11.16**.

Table 11.16 Historical landfills present in Section 5.

Landfill Name	Date of Licence Issue	Date of Licence Surrender
Earls Barton Quarry	1979	1989
Ashby Road	1984	1986
Warren Lodge	1991	No surrender date listed, last input 1993

11.6.118 Further detail regarding potentially contaminative sites is presented in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies (WMEL-B Substation to Grendon Reconductoring)**.

Radon

11.6.119 The radon potential (Ref 11.10) varies across Section 5 from less than 1% of homes (at or above the Action Level of 200 Bq m⁻³) to greater than 30%. Elevated levels of radon are present west of Loddington and Wilby.

Geological conservation sites

11.6.120 Information about geological sites has been requested from the local planning authority but as yet, not received. Once available, these data will be included in the ES.

Aquifer designation

11.6.121 Most of the superficial deposit coverage in the Study Area for Section 5 is from units described as secondary (undifferentiated) aquifers, these are Till, Oadby Member and Bozeat Till. Note that there are large areas within the Study Area where superficial deposits are absent. Glaciofluvial Deposits, River Terrace Deposits, Alluvium, Alluvial Fan Deposits and the Ecton Member are present and are described as secondary A aquifers.

11.6.122 There are two bedrock units which underly part of the Study Area for Section 5 that are described as principal aquifers: the Blisworth Limestone Formation and the Lower Lincolnshire Limestone Member. The Stamford Member, the Northampton Sand Formation and the Wellingborough Limestone Member are described as secondary A aquifers. The Rutland Formation is described as a secondary B aquifer. The Grantham Formation, Charmouth Mudstone and the Dyrham Formation are described as secondary (undifferentiated) aquifers. The Whitby Mudstone Formation is described as unproductive strata.

WER groundwater bodies

- 11.6.123 The Study Area for Section 5 crosses three WER groundwater bodies:
- Welland Lower Jurassic Unit;
 - Warwickshire Avon – Secondary Mudrocks; and
 - Nene Mid Lower Jurassic Unit.
- 11.6.124 All three have an Overall Water Body status of Good, with Good Quantitative and Chemical statuses.

Groundwater source protection zones

- 11.6.125 There are no SPZs within the Study Area for Section 5.

Groundwater abstractions and discharge consents

- 11.6.126 There are six groundwater abstraction licences located within the Study Area for Section 5 which are located in three locations. Three licences are recorded under the same permit number for different usages at the same location. Two other licences are recorded under the same permit number for different usages at a second location, and the final licence is located on its own. The closest abstractions are 20-30 m from one of the access tracks making up the draft Order Limits, with the other abstractions 270 m east of the draft Order Limits. The licensed groundwater abstractions located within the Study Area for Section 5 are listed in **Table 11.17** below.

Table 11.17 Licensed groundwater abstractions within the Study Area for Section 5

Permit Number	Primary Description	Use Description	Maximum Annual Quantity (m ³)	Maximum Daily Quantity (m ³)
5/32/05/*G/0015	Agriculture	General Farming & Domestic	9,550	274
5/32/05/*G/0015	Agriculture	Spray Irrigation - Direct	9,550	274
5/32/05/*G/0010	Industrial, Commercial and Public Services	Dust Suppression	3,500,000	14,064
5/32/05/*G/0010	Industrial, Commercial and Public Services	General Washing/Process Washing	3,500,000	14,064
5/32/05/*G/0010	Industrial, Commercial and Public Services	Mineral Washing	3,500,000	14,064
AN/032/0005/016	Industrial, Commercial and Public Services	Dewatering	Unknown	

- 11.6.127 There are no unlicensed groundwater abstractions within the Study Area in North Northamptonshire Council, as confirmed by direct correspondence. Information regarding the location of unlicensed water abstractions has been requested from West Northamptonshire Council but has not yet been received and so will be included in the ES.
- 11.6.128 There are 16 permitted discharge consents within the Study Area for Section 5, listed in **Table 11.18**. It is unknown whether these are to surface water or to groundwater.

Table 11.18 Permitted discharge consents located within the Study Area for Section 5

Permit Number	Site Type	Effluent Type	Start Date
AN/AW5NF174/002	WwTW/Sewage Treatment Works (water company)	Sewage - water company	11/08/1984
AN/AW5NF1788/002	Pumping Station on Sewerage Network (water company)	Sewage - water company	04/03/2022
AN/PR5NF291/001	Sub-station/Electricity/Gas/Air Conditioning Supply	Sewage - not water company	24/06/1965
AN/EPRPB3854GL/001	Breweries/Making of Beverages/Soft Drinks	Trade	11/04/2025
AN/AW5NF757/006	WwTW/Sewage Treatment Works (water company)	Sewage - water company	09/10/2015
AN/AW5NF739A/010	WwTW/Sewage Treatment Works (water company)	Sewage - water company	22/12/2024
AN/PR5LF3384/002	WwTW (not water co) (not STP at private premises)	Miscellaneous	06/12/1996
AN/AW5NF712/001	WwTW/Sewage Treatment Works (water company)	Sewage - water company	08/08/1984
AN/AW5NF699/001	WwTW/Sewage Treatment Works (water company)	Sewage - water company	15/07/1985
AN/EPRSB3696AM/001	Storm Tank/Combined Sewer Overflow on Sewerage Network (water company)	Sewage - water company	18/08/2020
AN/EPRFB3940KN/001	Domestic property (single) (including farm house)	Sewage - not water company	02/01/2025
AN/NPSWQD006026/002	Mineral/Gravel Extraction/Quarrying	Trade	05/04/2011
AN/PR5LF3931/002	Domestic property (single) (including farm house)	Sewage - not water company	14/12/2011
AN/AWCNF2266/004	Pumping Station on Sewerage Network (water company)	Sewage - water company	31/03/2019
AN/AW5NF2031/001	WwTW/Sewage Treatment Works (water company)	Sewage - water company	06/06/1963
AN/EPRDB3199EZ/001	Sport, Amusement & Recreation/Golf Club/Gym/Theme Park/Spa	Sewage - not water company	07/10/2015

Groundwater Dependent Terrestrial Ecosystems

- 11.6.129 There are two GWDTEs within the Study Area for Section 5. Birch Spinney & Mawsley Marsh SSSI is located on the north side of Mawsley Village, crossing the draft Order Limits and extending to the western edge of the Study Area. The Upper Nene Valley Gravel Pits (Ramsar, SPA and SSSI) extends across the south of Section 5, crossing both the draft Order Limits and the Study Area in their entirety.

Future Baseline

- 11.6.130 The future baseline relates to known or anticipated changes to the current baseline in the future, in the absence of the Project. Relevant factors in defining the future baseline and considered in this DES are described here or will be considered in the ES. **Chapter 18 Climate Change** assesses the potential effects on the climate from the Project overall.
- 11.6.131 To assess the potential effects of the Project, it is required to predict how the baseline conditions recorded within this chapter may change from the time of baseline data collection to the commencement of development and during the construction, operation and maintenance phases. It is currently anticipated that, subject to gaining development consent in 2029, construction works would begin in 2030 and be completed by 2035 including any reinstatement required.
- 11.6.132 Climate change may have an effect on soil erosion and the potential for mobilisation of contamination. Despite this, it is not expected that ground conditions, with respect to land contamination and geology, would change significantly in response to climate change. This assumes that any future activities undertaken within the Study Area would be permitted or controlled in accordance with current land contamination legislation and planning policy, to prevent or limit adverse effects from contamination, to ground conditions or controlled waters.
- 11.6.133 Hydrogeological conditions are more susceptible to change and therefore may be affected by the following factors:
- Climate change – changes in rainfall can affect aquifer recharge, groundwater levels and flow gradients.
 - Future developments, including housing – increases in housing within the areas surrounding the Study Area have the potential to affect recharge to the underlying aquifers. Increased demand for drinking water associated with these can also affect future water resources and groundwater levels in aquifers, including the SPZs present within Sections 1 and 2.
- 11.6.134 Regarding climate change impacts on hydrogeology, the UK Climate Projections 2018 (UKCIP18) predicts the following changes up to 2099 (Ref 11.31):
- Temperatures will continue to increase, with larger temperature increases estimated in summer.
 - The average summer rainfall rate is estimated to decrease, whereas the average winter rainfall is estimated to increase.
 - An overall increase in extreme weather events.

- 11.6.135 The UK Groundwater Forum concluded the following, as the potential impacts of climate change on groundwater (Ref 11.32):
- long-term decline in groundwater storage;
 - increased frequency and severity of groundwater droughts; and
 - increased frequency and severity of groundwater-related floods.
- 11.6.136 This will lead to greater variability in groundwater levels, with prolonged periods of high and low groundwater levels relating to the variability of rainfall and recharge.
- 11.6.137 The UK Centre for Ecology and Hydrology (UKCEH) has run predictive models to simulate these impacts of climate change, across England, Scotland and Wales, using predictions from UKCP09 (Ref 11.33). This report also predicts the impact on groundwater stations, the closest of which is New Red Lion, at Aslackby, approximately 4.5 km to the north of the draft Order Limits in Section 2. This groundwater station is on the Lincolnshire Limestone. At this location, groundwater level is predicted to change between -2.0 and +2.0 m in elevation to 2070, with approximately 2 m seasonal variation.
- 11.6.138 It is not considered likely at this stage that any change in baseline conditions would be likely to significantly influence the assessment of effects. However, this will be reviewed during the EIA and consideration given to any instances where the future baseline requires more detailed specific consideration, on a case-by-case basis. This will include consideration of changes in baseline conditions that could result from any nearby allocated/proposed future development sites, which will be considered in the geology and hydrogeology assessment of the ES and/or cumulative effects assessment as appropriate.

11.7 Design, Standard and Additional Mitigation Measures

- 11.7.1 Mitigation measures to avoid, reduce, manage, or control potential impacts and resulting effects of the Project are typically described and considered in assessments in three groups or types as defined in **Chapter 5 EIA Approach and Methodology** of this DES. Each measure considered in this preliminary assessment is described in the relevant section below.

Design Measures

- 11.7.2 The Project and draft Order Limits have been designed to avoid sensitive receptors as far as practicable. This is in accordance with the 'Holford Rules' (Ref 11.29) applicable to routing of new overhead lines and the 'Horlock Rules' (Ref 11.30) which apply to the design and siting of substations.
- 11.7.3 Higher risk design elements, such as construction compounds and laydown areas, and temporary access tracks/haul roads should be sited outside designated sites and sensitive features. Where this is not possible, additional mitigation will be required.
- 11.7.4 Where practicable, a 50 m stand-off will be applied from all groundwater abstractions, both licensed and private water supplies and springs.
- 11.7.5 A Drainage Strategy will be implemented to ensure that surface water runoff is appropriately attenuated and treated to protect the receiving water environment from pollution. Electrical equipment, including supercharged transformers containing oil,

will be self-bunded, with surface water runoff from relevant areas captured and routed through an oil separator. Reinforced concrete bunds forming the perimeter of the substations will provide secondary spill containment. The detailed design of the substations and associated drainage systems will also incorporate measures for firewater containment and disposal, preventing contaminated fire-fighting water from reaching groundwater receptors.

- 11.7.6 In addition, thermal effects from buried cables will be managed through design, including placement of internal cabling within engineered structures or beneath impermeable hardstanding, appropriate burial depths, and separation from groundwater receptors. Cable design and operational controls further limit heat generation during operation.
- 11.7.7 During operation, where possible, the inspection of overhead line would be by foot patrol rather than small van, or by air using drone/helicopter to check for visible faults or signs of wear, thereby reducing on-site vehicle movements.

Standard Mitigation Measures

- 11.7.8 Standard measures are those that would be implemented on a project of this scale and nature regardless of being subject to statutory assessment. As such, it can be assumed that these measures will be applied in the assessment.
- 11.7.9 A range of standard measures for the Project will be adopted throughout the construction phase. Measures relevant to the control and management of impacts that could affect geology and hydrogeology, are as follows (refer to **Appendix 4A Draft Outline Code of Construction Practice (CoCP)** for the full description of each measure):
- GH01 – on ground investigations and assessment.
 - GH02 – on good construction methods including piling techniques in line with guidance to minimise risk to groundwater through new pathways (Ref 11.21).
 - GH03 – on the use of appropriate occupational health and safety measures and statutory and safety compliance, including compliance with The Confined Spaces Regulations 1997 in relation to ground gas (including radon).
 - GH04 and GH05 – on the use, handling and storage of chemicals in accordance with relevant regulations and guidance.
 - GH06 – on the control of earthworks or materials movement under appropriate Environmental Permits, exemptions or Contaminated Land: Applications in Real Environments (CL:AIRE) (Ref 11.22).
 - GH07 – on temporary dewatering activities during construction being undertaken with the relevant guidance.
 - GH08 – on dealing with unexpected contamination.
 - GH09 – on contamination avoidance and waste management procedures.
 - GH10 – If required, herbicides to be used in accordance with relevant Defra guidance.
 - GH11 – on the application of salt grit in accordance with C648 guidance (Ref 11.23), with appropriate runoff controls in Source Protection Zones.

- GH12 – on water discharges and pre-treatment.
- GH13 – on minimising the area of hardstanding required during construction.
- W05 – on complying with relevant consent conditions regarding dewatering and other discharge activities.
- W08 and GG28 – on identification of active private water supplies, and escalation should a private water supply be affected.
- W09 – on the assessment of potential groundwater contamination in the event of a significant spill during construction.
- W11 – on appropriate control of runoff from working areas.
- GG04 – on appointment of Environmental Managers and Environmental Clerks of Works to monitor implementation of requirements and ensure good practice is employed.
- GG05 – on environmental training of construction workers.
- GG07 and GG08 – on formation and conformance to the Construction Environmental Management Plan (CEMP) and other Environmental Compliance Plans (ECPs).
- GG10 – on retention and protection of sensitive features such as Ancient Woodland and protected habitats.
- GG14 – on correct maintenance of vehicles used for construction.
- GG16 on responsible storage of fuel, oil and chemicals, refuelling guidance and plans to reduce occurrence and impact from any spillage.
- GG17 – on no intentional discharge of site runoff to ditches, watercourses, drains or sewers without treatment.
- GG18 – on washdown of vehicles and equipment to prevent pathway of untreated water to watercourses and groundwater.
- GG24 – on implementing an emergency action plan for the construction phase.
- GG25 – on use of temporary works pads in areas where heavy equipment is to be used, to reduce disturbance to the ground.

11.7.10 Operation and maintenance plans will follow similar principles to those outlined above, specifically relating to pollution prevention and appropriate storage and handling of fuels, oils and chemicals (GH04, GH05, GG16 and GG17), and procedures for responding to unexpected contamination or pollution incidents (GH08, W09 and GG24).

Additional Mitigation Measures

- 11.7.11 Additional mitigation measures are those identified through assessment to reduce likely significant adverse environmental effects, which may still occur despite the inclusion of the embedded design and standard measures described above.
- 11.7.12 As part of the ES, a groundwater risk assessment will be undertaken for those parts of Section 1 and Section 2 that fall within SPZ1 and SPZ2 within the Study Area. SPZ1 and SPZ2 are associated with PWSs and therefore confer (respectively) a very

high and high sensitivity on the underlying aquifer. Although no principal aquifer is present within Section 1, the area of SPZ2 extending into this section is hydraulically associated with the principal aquifer in Section 2 and will therefore be included in the assessment. This approach allows the identification and assessment of potential risks to ensure that the Project does not give rise to a risk of minor or greater magnitude, which would constitute a significant adverse effect. Examples of potential additional mitigation that may be required include monitoring of sensitive receptors during certain construction activities and use of additional ground protection where higher risk activities, such as construction compounds, are sited close to very high or high value receptors.

- 11.7.13 Within areas underlain by limestone in Section 2 and Section 5, there is potential for the presence of karstic features which may locally influence groundwater flow behaviour. Where present, such features could create preferential pathways and in some circumstances, facilitate more rapid transport of contaminants. Accordingly, the need for additional mitigation measures will be considered in the ES for these areas to reduce potential risks to groundwater. An example of such measures is the use of additional ground protection at construction compounds.
- 11.7.14 Where works are required within or adjacent to GWDTEs, including those identified in Section 5, additional mitigation and management measures will be developed and secured primarily through the CEMP and relevant method statements, and where relevant to later project phases, through the Operational Environmental Management Plan (OEMP) and Decommissioning Environmental Management Plan (DEMP). These will include maintaining a register of GWDTEs potentially affected by construction works and applying receptor-specific siting constraints to minimise interaction with GWDTEs. Where access within designated sites is required (e.g. Upper Nene Valley Gravel Pits (Ramsar, SPA and SSSI) for reconductoring works), existing roads and tracks will be used to minimise disturbance as already incorporated into the draft Order Limits. Site-specific risk assessments will be undertaken where works could affect groundwater contributions to a GWDTE, with proportionate ecological and/or groundwater monitoring implemented where a plausible impact pathway is identified. Monitoring requirements will include defined trigger levels and contingency actions, secured within the relevant management plan, where required.

11.8 Preliminary Assessment of Effects

- 11.8.1 A summary of potential impacts and mitigation measures identified in this preliminary assessment, and likely significance of the resulting effect with mitigation in place, is provided in **Table 11.25** and **Table 11.26**. The likely significant effects are reported below for each of the five Sections, describing the potential impacts on human health and groundwater receptors. **Table 11.25** and **Table 11.26** summarise the likely significance of effects across the Project by receptor type.
- 11.8.2 Where appropriate for likely significant or notable effects, further explanation is provided in the following sections on construction, and operation and maintenance effects.
- 11.8.3 This assessment is preliminary and based on reasonable worst-case assumptions. Further refinement will be undertaken at ES stage following completion of ground investigations and detailed design, as available. This information will be used to validate the assumptions applied in the DES assessment and to update the

assessment where necessary; however, it is not anticipated that this will alter the overall magnitude or significance of effect identified.

Construction

- 11.8.4 Preliminary Risk Assessments (PRA) have been completed as part of the geotechnical and geoenvironmental desk studies, in accordance with Land Contamination Risk Management (LCRM) (Ref 11.17) and are provided as **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies**. Moderate or above risks to sensitive receptors identified in the PRAs and summarised in Section 11.6 herein, have been identified as having potential to result in significant effects. Where further assessment of these sites identifies the risk of ground disturbance during construction, the policy requirements of measure GH01 within **Appendix 4A Draft Outline Code of Construction Practice** would apply, requiring the sites to be individually investigated and assessed in accordance with LCRM to determine additional mitigation measures or remediation requirements.
- 11.8.5 For the DES assessment of construction effects on hydrogeology, where the magnitude of impact to multiple receptors is assessed to be the same, the assessment focuses on the receptor with the highest sensitivity, thereby presenting a reasonable worst-case assessment of effect significance. The overall assessment therefore reports only the worst-case outcome for each effect. A complete list of all receptors considered, together with their assigned sensitivities, is provided in **Appendix 11D List of Hydrogeological Receptors**. A full assessment for all receptors for the construction phase will be undertaken for ES. A summary of preliminary hydrogeology effects is presented in **Table 11.26**.
- 11.8.6 At this preliminary stage, the assessment of construction-phase effects on groundwater resources has been undertaken using a reasonable worst-case interpretation of the assessment assumptions and limitations set out in Paragraph 11.5.21. This approach reflects the level of design definition available at DES stage and ensures that the assessment remains proportionate and precautionary in the absence of detailed construction information.
- 11.8.7 A defined construction water supply strategy is not available at this stage of the Project, and no commitment is made to either abstract groundwater or not. As such, there is no defined groundwater abstraction scenario to assess. In the absence of information on abstraction rates, locations or durations, and noting that any abstraction would be subject to regulatory control and designed to avoid adverse effects, no likely significant effects on groundwater resources are identified at DES stage. This matter will be reviewed and where relevant, assessed further at ES stage once the construction water supply strategy has been confirmed.
- 11.8.8 At DES stage, the requirement for dewatering is unknown and will depend on depth of excavations and groundwater levels. These parameters will be refined through ground investigation and detailed design and reassessed at ES stage.

Section 1

Geology – geological conservation sites

- 11.8.9 Information requests have been sent out to local authorities to confirm the absence of geological conservation sites, but as yet, a response has not been received. If any sites are identified these will be assessed in the ES.

Potential land contamination

- 11.8.10 Readily available information has been gathered, and historical mapping has been reviewed. An initial assessment has been undertaken and is presented in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies (Weston Marsh to WMEL-A Overhead Line)** which provides the potential contamination sources, receptors and the pathways between them.
- 11.8.11 The contaminant linkages (source-receptor-pathway) identified as a moderate and above risk for Section 1 are provided in **Table 11.19**.

Table 11.19 Contaminant linkages presenting a moderate and above risk for Section 1

Section 1			
Location On-site/ Off-site ²	Potentially Contaminative Source	Receptor	Pathway
On-site	Sludge storage sites, historical landfill associated with sewage settling beds	Human health	Inhalation of vapours Ground gas inhalation and explosion
Off-site	Historical landfill (associated with Fernleigh Farm for household waste), Sewage pumping station, Sludge storage sites	Human health	Ground gas inhalation and explosion
	Sewage pumping station		
	Sludge storage sites		

- 11.8.12 The design and standard mitigation measures presented in **Appendix 4A Draft Outline Code of Construction Practice** would apply. These include piling techniques in line with pollution control guidance (GH02), appropriate occupational health and safety measures (GH03), handling and storage of chemicals (GH04 and GH05), managing material resources (GH06) and a protocol for dealing with unexpected contamination (GH08) as provided in Section 11.7.
- 11.8.13 Based on the preliminary assessment, impacts on human health receptors of very high, high and medium sensitivity are assessed as being negligible magnitude and result in an overall slight adverse effect, which is not significant. A preliminary summary of effects for the receptors is provided in **Table 11.25**.

Hydrogeology

- 11.8.14 The following construction effects are relevant for Section 1:
- Tower foundations and associated temporary construction drainage – short-term localised effect on groundwater quality and quantity.

² In discussion of potential land contamination sites the term 'on-site' is used to describe those sites located either entirely or predominantly within the draft Order Limits. The term 'off-site' is used to describe those sites within the Study Area but (either entirely or predominantly) outside the draft Order Limits.

- Construction compounds, construction laydown areas and temporary access tracks/haul roads – short-term localised effect on groundwater quality and quantity.
 - Third-party utility diversions and any associated underground cabling – short-term localised effect on groundwater quality.
 - Temporary construction drainage for access roads, haul roads and third-party cable diversions – short-term localised effect on groundwater quantity.
- 11.8.15 A potential effect can occur only where a plausible pathway links construction activities to a groundwater receptor. Potential effects would be limited to the construction phase, and the scale of any impact would be controlled by:
- proximity and connectivity to groundwater receptors;
 - local ground and groundwater conditions; and
 - design/construction factors such as:
 - duration of works;
 - depth and extent of works/ground disturbance;
 - foundation type;
 - cable installation method;
 - requirement for groundwater control measures;
 - volume of temporary drainage managed; and
 - traffic intensity.
- 11.8.16 Standard mitigation measures for the Project are set out in **Appendix 4A Draft Outline CoCP**, with those relevant to this chapter summarised in Section 11.7 alongside additional mitigation measures for groundwater.
- 11.8.17 Tower foundations, construction compounds, laydown areas, temporary access tracks/ haul roads and third-party utility diversions will be sited away from designated sites (GWDTEs).
- 11.8.18 In addition, a groundwater risk assessment will be undertaken at ES stage for any tower foundations, construction compounds, laydown areas, third-party utility diversions or temporary construction drainage located within SPZ2 and SPZ3 in Sections 1 and 2, which are associated with principal aquifers and PWSs. This will enable potential risks to be identified and assessed to ensure that the Project does not give rise to a risk of minor or greater magnitude, which would constitute a significant adverse effect.
- 11.8.19 With these measures in place, the impacts listed under 11.8.14 are expected to be negligible in magnitude and temporary in nature.
- 11.8.20 The highest sensitivity groundwater receptors within the Study Area of Section 1 are the SPZ1 area and associated licensed groundwater abstractions for PWS underlying this part of the area, which have a very high receptor sensitivity, as detailed in Section 11.6.32 to Section 11.6.35. When combined with the negligible magnitude of impact associated with the construction activities, this results in a slight adverse effect, which is not significant.

- 11.8.21 Other groundwater receptors of lower sensitivity within the Study Area may also have plausible pathways to the works; however, these receptors are subject to the same negligible magnitude of impact and, due to their lower sensitivity, experience a correspondingly lower effect, which would be not significant. No groundwater receptors within the Study Area are subject to a higher level of risk.

Section 2

Geology – geological conservation sites

- 11.8.22 Information requests have been sent out to local authorities to confirm the absence of geological conservation sites, but as yet, a response has not been received. If any sites are identified these will be assessed in the ES.

Potentially contaminative land

- 11.8.23 Readily available information has been gathered, and historical mapping has been reviewed. An initial assessment has been undertaken and is presented in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies (Weston Marsh to WMEL-A Overhead Line, WMEL-A to WMEL-B Overhead Line and WMEL-A Substation)** which provides the potential contamination sources, receptors and the pathways between them.
- 11.8.24 No contaminant linkages presenting a moderate or above risk have been identified for WMEL-A Substation.
- 11.8.25 The contaminant linkages (source-receptor-pathway) identified as a moderate and above risk for Section 2 are provided in **Table 11.20**.

Table 11.20 Contaminant linkages presenting a moderate and above risk for Section 2

Section 2			
Location On-site/ Off-site	Potentially Contaminative Source	Receptor	Pathway
On-site	Pumping station, Railway, Disused RAF North Witham airfield	Groundwater – Secondary A and principal aquifers	Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers Lateral and vertical migration of groundwater
	Sludge storage sites, unrecorded ironstone mining	Human health	Ground gas inhalation and ingress
Off-site	Current railway, Blacksmith, Historical railway sidings, Tanks, Electricity substations, Water Pumping Station and Honey Pot	Groundwater – Secondary A and principal aquifers	Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers

Section 2

Location On-site/ Off-site	Potentially Contaminative Source	Receptor	Pathway
	Lane Industrial Estate, unrecorded ironstone workings		Lateral and vertical migration of groundwater
	Sludge storage sites, unrecorded ironstone workings	Human health	Ground gas inhalation and explosion

11.8.26 The design and standard mitigation measures presented in **Appendix 4A Draft Outline Code of Construction Practice** would apply. These include piling techniques in line with guidance (GH02), appropriate occupational health and safety measures (GH03), handling and storage of chemicals (GH04 and GH05), managing material resources (GH06) and a protocol for dealing with unexpected contamination (GH08) as provided in Section 11.7.

11.8.27 Based on the preliminary assessment, impacts on human health and groundwater receptors of very high, high and medium sensitivity are assessed as being negligible magnitude and result in an overall slight adverse effect, which is not significant. A preliminary summary of effects for the receptors is provided in **Table 11.25**.

Hydrogeology

11.8.28 The following construction effects are relevant for Section 2:

- Substation (WMEL-A) foundations and platforms with associated temporary construction drainage and internal cabling – short-term localised effect on groundwater quality and quantity.
- Tower foundations and associated temporary construction drainage – short-term localised effect on groundwater quality and quantity.
- Construction compounds, construction laydown areas and temporary access tracks/haul roads – short-term localised effect on groundwater quality and quantity.
- Third-party utility diversions and any associated underground cabling – short-term localised effect on groundwater quality.
- Temporary construction drainage for access roads, haul roads and third-party cable diversions – short-term localised effect on groundwater quantity.
- Improvement works to existing highway junctions (junction of the A1 and A151 to the east of Colsterworth, 1.7 km north west of the overhead line route) – short-term localised effects on groundwater quality.

11.8.29 A potential effect can occur only where a plausible pathway links construction activities to a groundwater receptor. Potential effects would be limited to the construction phase, and the scale of any impact would be controlled:

- by proximity and connectivity to groundwater receptors;
- local ground and groundwater conditions; and

- design/construction factors such as:
 - duration of works;
 - depth and extent of works/ground disturbance;
 - foundation type;
 - cable installation method;
 - requirement for groundwater control measures;
 - volume of temporary drainage managed; and
 - traffic intensity and nature of junction improvement works.
- 11.8.30 Standard mitigation measures for the Project are set out in **Appendix 4A Draft Outline CoCP**, with those relevant to this chapter summarised in Section 11.7 alongside additional mitigation measures for groundwater.
- 11.8.31 Tower foundations, construction compounds, laydown areas, temporary access tracks/haul roads and third-party utility diversions will be sited away from designated sites (GWDTEs).
- 11.8.32 In addition, a groundwater risk assessment will be undertaken at ES stage for any tower foundations, construction compounds, laydown areas, third-party utility diversions or temporary construction drainage located within SPZ2 and SPZ3 in Sections 1 and 2, which are associated with principal aquifers and PWSs. This will enable potential risks to be identified and assessed to ensure that the Project does not give rise to a risk of minor or greater magnitude, which would constitute a significant adverse effect.
- 11.8.33 With these measures in place, the impacts listed under 11.8.28 are expected to be negligible in magnitude and temporary in nature.
- 11.8.34 The highest sensitivity groundwater receptor within the Study Area of WMEL-A Substation and for the junction works in Section 2 is the bedrock aquifer which has a very high receptor sensitivity as it is a principal aquifer supporting PWS abstraction. For the Study Area of the overhead line in Section 2, the highest sensitivity groundwater receptors are the SPZ1 area associated with PWSs and the principal aquifer, each of which have a very high receptor sensitivity. A very high receptor sensitivity combined with the negligible magnitude of impact associated with the construction activities, results in a slight adverse effect, which is **not significant**.
- 11.8.35 Other groundwater receptors of lower sensitivity within the Study Area may also have plausible pathways to the works; however, these receptors are subject to the same negligible magnitude of impact and, due to their lower sensitivity, experience a correspondingly lower effect, which would be not significant. No groundwater receptors within the Study Area are subject to a higher level of risk.

Section 3

Geology – geological conservation sites

- 11.8.36 Information requests have been sent out to local authorities to confirm the absence of geological conservation sites, but as yet, a response has not been received. If any sites are identified these will be assessed in the ES.

Potentially contaminated land

- 11.8.37 Readily available information has been gathered, and historical mapping has been reviewed. An initial assessment has been undertaken and is presented in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies (WMEL-A to WMEL-B Overhead Line, WMEL-B Substation and WMEL-B Substation to Grendon Reconductoring)** which provides the potential contamination sources, receptors and the pathways between them.
- 11.8.38 The contaminant linkages (source-receptor-pathway) identified as a moderate and above risk for Section 3 are provided in **Table 11.21** and **Table 11.22**.

Table 11.21 Contaminant linkages presenting a moderate and above risk for Section 3

Section 3			
Location On-site/ Off-site	Potentially Contaminative Source	Receptor	Pathway
On-site	Historical railway land, Tank	Groundwater – Secondary A aquifers	Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers Lateral and vertical migration of groundwater
	Unspecified pit and railway cuttings (ZA108 and ZA109)	Groundwater – Secondary undifferentiated aquifers	Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers Lateral and vertical migration of groundwater
	Sewage pumping station (ZA115)		
Off-site	Sludge storage sites	Human health	Ground gas inhalation and explosion
	Tanks, Sludge storage sites	Groundwater – Secondary A aquifers	Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers Lateral and vertical migration of groundwater

Table 11.22 Contaminant linkages presenting a moderate and above risk for WMEL-B Substation

WMEL-B Substation			
Location On-site/ Off-site	Potentially Contaminative s Source	Receptor	Pathway
On-site	Made Ground, infilled land, agricultural land, sewage pumping station, two stockpiles and natural radon. Mine gas associated with abandoned mines	Human health	Ground gas inhalation and explosion
		Human health	Inhalation of dust
		Structures ³	Gas intrusion - explosion
Off-site	Made Ground, infilled land, agricultural land, natural radon, historical railway land and industrial land use	Human health	Gas migration through ground and/or via faults to surface and ingress – explosive atmosphere and inhalation
		Structures ³	Ground gas intrusion – accumulation

³Effects on structures have been scoped out of the assessment and will be addressed as an ‘embedded engineering measure’.

11.8.39 The design and standard mitigation measures presented in **Appendix 4A Draft Outline Code of Construction Practice** would apply. These include piling techniques in line with guidance (GH02), appropriate occupational health and safety measures (GH03), handling and storage of chemicals (GH04 and GH05), managing material resources (GH06) and a protocol for dealing with unexpected contamination (GH08) as provided in Section 11.7.

11.8.40 Based on the preliminary assessment, impacts on human health and groundwater receptors of very high, high and medium sensitivity would be negligible magnitude and result in an overall slight adverse effect, which is **not significant**.

Hydrogeology

11.8.41 The following construction effects are relevant for Section 3:

- Substation (WMEL-B) foundations and platforms with associated temporary construction drainage and internal cabling – short-term localised effect on groundwater quality and quantity.
- Tower foundations and associated temporary construction drainage – short-term localised effect on groundwater quality and quantity.
- Construction compounds, construction laydown areas and temporary access tracks/haul roads – short-term localised effect on groundwater quality and quantity.

- Third-party utility diversions and any associated underground cabling – short-term localised effect on groundwater quality.
- Temporary construction drainage for access roads, haul roads and third-party cable diversions – short-term localised effect on groundwater quantity.
- Improvement works to existing highways junctions (junction of the A46 and B676 at Six Hills, 5.6 km to the west of the overhead line route) – short-term localised effect on groundwater quality.

11.8.42 A potential effect can occur only where a plausible pathway links construction activities to a groundwater receptor. Potential effects would be limited to the construction phase, and the scale of any impact would be controlled by:

- proximity and connectivity to groundwater receptors;
- local ground and groundwater conditions; and
- design/construction factors such as:
 - duration of works;
 - depth and extent of works/ground disturbance;
 - foundation type;
 - cable installation method;
 - requirement for groundwater control measures;
 - volume of temporary drainage managed; and
 - traffic intensity and nature of junction improvement works.

11.8.43 Standard mitigation measures for the Project are set out in **Appendix 4A Draft Outline CoCP**, with those relevant to this chapter summarised in Section 11.7 alongside additional mitigation measures for groundwater.

11.8.44 Tower foundations, construction compounds, laydown areas, temporary access tracks/haul roads and third-party utility diversions will be sited away from designated sites (GWDTEs).

11.8.45 With these measures in place, the impacts listed under 11.8.41 are expected to be negligible in magnitude and temporary in nature.

11.8.46 The highest sensitivity groundwater receptors within the Study Area of the WMEL-B Substation site and the overhead line in Section 3 are the bedrock and superficial aquifers underlying the area which have a secondary aquifer designation, each of which have a medium sensitivity. For the junction works in Section 3 the highest sensitivity groundwater receptor is Twenty Acre Piece SSSI, a GWDTE, which is immediately adjacent to the draft Order Limits, and has a very high receptor sensitivity. Both very high and medium receptor sensitivities combined with the negligible magnitude of impact associated with the construction activities, result in a slight adverse effect, which is **not significant**.

11.8.47 Other groundwater receptors of lower sensitivity within the Study Area may also have plausible pathways to the works; however, these receptors are subject to the same negligible magnitude of impact and, due to their lower sensitivity, experience a correspondingly lower significance of effect. No groundwater receptors within the Study Area are subject to a higher level of risk.

Section 4

Geology – geological conservation sites

- 11.8.48 Information requests have been sent out to local authorities to confirm the absence of geological conservation sites, but as yet, a response has not been received. If any sites are identified these will be assessed in the ES.

Potentially contaminated land

- 11.8.49 Readily available information has been gathered, and historical mapping has been reviewed. An initial assessment has been undertaken and is presented in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies (WMEL-B Substation to Grendon Reconductoring)** which provides the potential contamination sources, receptors and the pathways between them.
- 11.8.50 The contaminant linkages (source-receptor-pathway) identified as a moderate and above risk for Section 4 are presented in **Table 11.23**.

Table 11.23 Contaminant linkages presenting a moderate and above risk for Section 4

Section 4			
Location On-site/ Off-site	Potentially Contaminative Source	Receptor	Pathway
On-site	Historical railway (ZA199), waste exemption for the storage of sludge (ZA164), Warren Lodge historical landfill (ZA213), unspecified works/factory (ZA185)	Controlled waters - secondary A aquifers Secondary undifferentiated aquifers	Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers Lateral and vertical migration of groundwater
	Warren Lodge historical landfill (ZA213)	Human health	Gas ingress - inhalation

- 11.8.51 The design and standard mitigation measures presented in **Appendix 4A Draft Outline Code of Construction Practice** would apply. These include appropriate occupational health and safety measures (GH03), handling and storage of chemicals (GH04 and GH05), managing material resources (GH06) and a protocol for dealing with unexpected contamination (GH08) as provided in Section 11.7.
- 11.8.52 Based on the preliminary assessment, impacts on human health and groundwater receptors of very high, high and medium sensitivity would be negligible magnitude and result in an overall slight adverse effect, which is not significant. A preliminary summary of effects for the receptors is provided in **Table 11.25**.

Hydrogeology

- 11.8.53 The following construction effects are relevant for Section 4:

- Construction compounds, construction laydown areas and temporary access tracks – short-term localised effect on groundwater quality and quantity.
- Temporary construction drainage for access roads – short-term localised effect on groundwater quantity.

11.8.54 A potential effect can occur only where a plausible pathway links construction activities to a groundwater receptor. Potential effects would be limited to the construction phase, and the scale of any impact would be controlled by:

- proximity and connectivity to groundwater receptors;
- local ground and groundwater conditions; and
- design/construction factors such as:
 - duration of works;
 - depth and extent of works/ground disturbance;
 - cable installation method;
 - requirement for groundwater control measures;
 - volume of temporary drainage managed; and
 - traffic intensity.

11.8.55 Standard mitigation measures for the Project are set out in **Appendix 4A Draft Outline CoCP**, with those relevant to this chapter summarised in Section 11.7 alongside additional mitigation measures for groundwater.

11.8.56 Construction compounds, laydown areas, and temporary access tracks will be sited away from designated sites (GWDTEs).

11.8.57 With these measures in place, the impacts listed under 11.8.53 are expected to be negligible in magnitude and temporary in nature.

11.8.58 The highest sensitivity groundwater receptors within the Study Area of Section 4 are the bedrock and superficial aquifers with a secondary aquifer designation underlying the area, each of which have a medium receptor sensitivity. When combined with the negligible magnitude of impact associated with the construction activities, this results in a slight adverse effect, which is **not significant**.

11.8.59 Other groundwater receptors of lower sensitivity within the Study Area may also have plausible pathways to the works; however, these receptors are subject to the same negligible magnitude of impact and, due to their lower sensitivity, experience a correspondingly lower significance of effect, which would be not significant. No groundwater receptors within the Study Area are subject to a higher level of risk.

Section 5

Geology – geological conservation sites

11.8.60 Information requests have been sent out to local authorities to confirm the absence of geological conservation sites, but as yet, a response has not been received. If any sites are identified these will be assessed in the ES.

Potentially contaminative land

- 11.8.61 Readily available information has been gathered, and historical mapping has been reviewed. An initial assessment has been undertaken and is presented in **Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies (WMEL-B Substation to Grendon Reconductoring)** which provides the potential contamination sources, receptors and the pathways between them.
- 11.8.62 The contaminant linkages (source-receptor-pathway) identified as a moderate and above risk for Section 5 are presented in **Table 11.24**.

Table 11.24 Contaminant linkages presenting a moderate and above risk for Section 5

Section 5			
Location On-site/ Off-site	Potentially contaminative source	Receptor	Pathway
On-site	Historical railway (ZA246, ZA247), electrical substation (ZA278), unspecified tank (ZA220), waste exemption for sludge storage (ZA241), historical landfill Ashby Road (ZA284), sewage farm (between ZA203 and ZA204), sewage works (ZA205), crane hire service (ZA278), unspecified works/factories (ZA220)	Controlled waters - undifferentiated aquifers	Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers Lateral and vertical migration of groundwater
	Unspecified heap, electrical substation (ZA300C, ZA300D), unspecified works/factories (ZA220)	Controlled waters - principal and secondary A aquifers	
	Warren Lodge historical landfill (ZA214)	Human health	Gas ingress - inhalation

- 11.8.63 The design and standard mitigation measures presented in **Appendix 4A Draft Outline Code of Construction Practice** would apply. These include appropriate occupational health and safety measures (GH03), handling and storage of chemicals (GH04 and GH05), managing material resources (GH06) and a protocol for dealing with unexpected contamination (GH08) as provided in Section 11.7.
- 11.8.64 Based on the preliminary assessment, impacts on human health receptors of very high, high and medium sensitivity would be negligible magnitude and result in an overall Slight effect, which is not significant. Effects on groundwater receptors (aquifers) of high, medium and low sensitivity would result in an overall slight adverse effect and are therefore **not significant**.
- 11.8.65 Effects of negligible magnitude on GWDTEs (groundwater receptors) of very high sensitivity, including Birch Spinney & Mawsley Marsh SSSI and The Upper Nene Valley Gravel Pits (Ramsar, SPA and SSSI), would result in an overall Slight adverse

effect and are therefore not significant. A preliminary summary of effects for the receptors is provided in **Table 11.25**.

Hydrogeology

- 11.8.66 The following construction effects are relevant for Section 5:
- Construction compounds, construction laydown areas and temporary access tracks – short-term localised effect on groundwater quality and quantity.
 - Temporary construction drainage for access roads – short-term localised effect on groundwater quantity.
- 11.8.67 A potential effect can occur only where a plausible pathway links construction activities to a groundwater receptor. Potential effects would be limited to the construction phase, and the scale of any impact would be controlled by:
- proximity and connectivity to groundwater receptors;
 - local ground and groundwater conditions; and
 - design/construction factors such as:
 - duration of works;
 - depth and extent of works/ground disturbance;
 - cable installation method;
 - requirement for groundwater control measures;
 - volume of temporary drainage managed; and
 - traffic intensity.
- 11.8.68 Standard mitigation measures for the Project are set out in **Appendix 4A Draft Outline CoCP**, with those relevant to this chapter summarised in Section 11.7 alongside additional mitigation measures for groundwater.
- 11.8.69 Construction compounds, laydown areas and temporary access tracks will be sited away from designated sites (GWDTEs). Where access for the reconductoring works is required at Upper Nene Valley Gravel Pits (Ramsar, SPA and SSSI), existing roads and tracks will be used.
- 11.8.70 With these measures in place, the impacts listed under 11.8.66 are expected to be negligible in magnitude and temporary in nature.
- 11.8.71 The highest sensitivity groundwater receptors within the Study Area of Section 5 are the GWDTEs which the draft Order Limits cross, which have a very high receptor sensitivity. When combined with the negligible magnitude of impact associated with the construction activities, this results in a slight adverse effect, which is **not significant**.
- 11.8.72 Other groundwater receptors of lower sensitivity within the Study Area may also have plausible pathways to the works; however, these receptors are subject to the same negligible magnitude of impact and, due to their lower sensitivity, experience a correspondingly lower significance of effect, which would be not significant. No groundwater receptors within the Study Area are subject to a higher level of risk.

Mineral resources

Existing mineral sites and mineral safeguarding areas

- 11.8.73 A preliminary Mineral Safeguarding Assessment has been undertaken and is provided as **Appendix 11B Mineral Safeguarding Assessment** to this DES. This assessment concluded that there would be no likely significant effects on mineral safeguarding areas identified across the Project. Therefore, in EIA terms no likely significant effects are expected.
- 11.8.74 The draft Order Limits do not cross any allocated or existing mineral sites (with a very high sensitivity) as described in **Appendix 11B Mineral Safeguarding Assessment**. Therefore, it is considered that significant effects would be unlikely.

Operation and Maintenance

Geology – geological conservation sites for all Project sections

- 11.8.75 Information requests have been sent out to local authorities to confirm the absence of geological conservation sites. If any sites are identified these will be assessed in the ES.

Potentially contaminative land for all Project sections

- 11.8.76 Potential effects in relation to existing contamination are not anticipated during operation and maintenance as it is anticipated that most contamination risks would be dealt with during the construction phase as part of standard mitigation measures and good practice. The design and standard mitigation measures presented in **Appendix 4A Draft Outline Code of Construction Practice** would apply. These include compliance with appropriate occupational health and safety measures (GH03), handling and storage of chemicals (GH04 and GH05), managing material resources (GH06), a protocol for dealing with unexpected contamination (GH08) and contamination avoidance and waste management procedures (GH09) as provided in Section 11.7.
- 11.8.77 Potential effects during operation and maintenance could occur by accidental release and spillages during routine maintenance activities. However, National Grid's standard operational and maintenance procedures will be implemented.
- 11.8.78 Impacts on human health, land quality and groundwater receptors of high and medium sensitivity would be negligible magnitude during operation and maintenance, resulting in an overall Slight adverse effect, which is **not significant**.
- 11.8.79 There are potential long-term and permanent beneficial effects at operation associated with remediation of contamination. If contamination is identified during construction, a remediation strategy would be designed and implemented. At this stage of the assessment, contamination inferences are from desk-based sources, and the requirement for remediation is not yet known. Beneficial effects in relation to remediation of contamination cannot be effectively assessed at this stage but remain possible and will be described in the ES, if identified.

Mineral resources

- 11.8.80 A preliminary Mineral Safeguarding Assessment has been undertaken and is provided as **Appendix 11B Mineral Safeguarding Assessment** to this DES. Haul roads and construction compounds would have a temporary sterilisation effect on mineral safeguarding areas although no likely significant effects are expected as access would be restored once the infrastructure is decommissioned after the construction phase of the Project.

Hydrogeology

- 11.8.81 Where the magnitude of potential impacts on multiple hydrogeology receptors would be the same, the assessment focuses on the receptor with the highest sensitivity, thereby presenting a reasonable worst-case assessment of effect. A complete list of all receptors considered, together with their assigned sensitivities, is provided in **Appendix 11D List of Hydrogeological Receptors**. A full assessment for all receptors for operation and maintenance will be undertaken for the ES. A summary of preliminary hydrogeology effects is presented in **Table 11.26**.
- 11.8.82 Groundwater quantity effects are scoped out of assessment for the operation and maintenance phase, as no permanent dewatering is anticipated and the design of the Project would ensure that underground structures and impermeable surfaces do not result in long-term changes to groundwater flow pathways or aquifer behaviour. Equally, a defined construction water supply strategy is not available at this stage of the Project, with no commitment made to abstract groundwater. As such, no operational groundwater abstraction or long-term modification of groundwater flow conditions is anticipated.
- 11.8.83 Any maintenance activities undertaken during the operational phase that are comparable in nature and scale to activities assessed during construction are assumed to give rise to the same effects and are not assessed further in this section. Such activities may include, but are not limited to:
- foundation repairs or upgrades with associated temporary drainage;
 - tower repairs, maintenance or replacement;
 - construction of temporary access tracks; and
 - the establishment of temporary construction compounds.

Section 1

- 11.8.84 The following operation and maintenance effects are relevant for Section 1:
- Vehicle movements for routine inspection and maintenance – effect on groundwater quality.
- 11.8.85 Standard and design mitigation measures relating to vehicle movements during operation are summarised in Section 11.7. With these measures in place, the impact associated with this effect is expected to be negligible in magnitude and temporary in nature.
- 11.8.86 The highest sensitivity groundwater receptor within the Study Area of Section 1 is the SPZ1 area associated with PWSs underlying the part of the area, which has a very high receptor sensitivity. When combined with the negligible magnitude of impact

associated with the operation and maintenance effect, this results in a slight adverse effect, which is **not significant**.

- 11.8.87 Other groundwater receptors of lower sensitivity within the Study Area may also have plausible pathways to the works; however, these receptors are subject to the same negligible magnitude of impact and, due to their lower sensitivity, experience a correspondingly lower effect, which would be not significant. No groundwater receptors within the Study Area are subject to a higher level of risk.

Section 2

- 11.8.88 The following operation and maintenance effects are relevant for Section 2:
- Vehicle movements for routine inspection and maintenance – effect on groundwater quality.
 - Fire-related contaminant runoff at substations – effect on groundwater quality.
 - Thermal influence of substation internal cabling – effect on groundwater quality.
- 11.8.89 Standard and design mitigation measures relating to these effects during operation are summarised in Section 11.7. With these measures in place, the impacts listed above are expected to be negligible in magnitude and temporary in nature.
- 11.8.90 The highest sensitivity groundwater receptor within the Study Area of WMEL-A Substation in Section 2 is the bedrock aquifer which has a very high receptor sensitivity, being a principal aquifer supporting PWS abstraction. For the Study Area of the overhead line in Section 2, the highest sensitivity groundwater receptors are the SPZ1 area associated with PWSs and the principal aquifer, each of which have a very high receptor sensitivity. A very high receptor sensitivity combined with the negligible magnitude of impact, results in a slight adverse effect, which is **not significant**.
- 11.8.91 Other groundwater receptors of lower sensitivity within the Study Area may also have plausible pathways to the works; however, these receptors are subject to the same negligible magnitude of impact and, due to their lower sensitivity, experience a correspondingly lower effect, which would be not significant. No groundwater receptors within the Study Area are subject to a higher level of risk.

Section 3

- 11.8.92 The following operation and maintenance effects are relevant for Section 3:
- Vehicle movements for routine inspection and maintenance – effect on groundwater quality.
 - Fire-related contaminant runoff at substations – effect on groundwater quality.
 - Thermal influence of substation internal cabling – effect on groundwater quality.
- 11.8.93 Standard and design mitigation measures relating to these impacts during operation are summarised in Section 11.7. With these measures in place, the impacts listed above are expected to be negligible in magnitude and temporary in nature.
- 11.8.94 The highest sensitivity groundwater receptors within the Study Area around the WMEL-B Substation site and the overhead power line in Section 3 are the bedrock and superficial aquifers underlying the area which have a secondary aquifer designation, each of which have a medium receptor sensitivity. A medium receptor

sensitivity combined with the negligible magnitude of impact, results in a slight adverse effect, which is **not significant**.

- 11.8.95 Other groundwater receptors of lower sensitivity within the Study Area may also have plausible pathways to the works; however, these receptors are subject to the same negligible magnitude of impact and, due to their lower sensitivity, experience a correspondingly lower effect, which would be not significant. No groundwater receptors within the Study Area are subject to a higher level of risk.

Section 4

- 11.8.96 The following operation and maintenance impacts are relevant for Section 4:

- Vehicle movements for routine inspection and maintenance – effect on groundwater quality.

- 11.8.97 Standard and design mitigation measures relating to vehicle movements during operation are summarised in Section 11.7. With these measures in place, the impact above is expected to be negligible in magnitude and temporary in nature.

- 11.8.98 The highest sensitivity groundwater receptors within the Study Area of Section 4 are the bedrock and superficial aquifers with a secondary aquifer designation underlying the area, each of which have a medium receptor sensitivity. When combined with the negligible magnitude of impact associated with the operation and maintenance, this results in a slight adverse effect, which is **not significant**.

- 11.8.99 Other groundwater receptors of lower sensitivity within the Study Area may also have plausible pathways to the works; however, these receptors are subject to the same negligible magnitude of impact and, due to their lower sensitivity, experience a correspondingly lower effect, which would be not significant. No groundwater receptors within the Study Area are subject to a higher level of risk.

Section 5

- 11.8.100 The following operation and maintenance impacts are relevant for Section 5:

- Vehicle movements for routine inspection and maintenance – effect on groundwater quality.

- 11.8.101 Standard and design mitigation measures relating to vehicle movements during operation are summarised in Section 11.7. With these measures in place, the impact is expected to be negligible in magnitude and temporary in nature.

- 11.8.102 The highest sensitivity groundwater receptors within the Study Area of Section 5 are the GWDTEs which the draft Order Limits cross, which have a very high receptor sensitivity. When combined with the negligible magnitude of impact associated with the operation and maintenance, this results in a slight adverse effect, which is **not significant**.

- 11.8.103 Other groundwater receptors of lower sensitivity within the Study Area may also have plausible pathways to the works; however, these receptors are subject to the same negligible magnitude of impact and, due to their lower sensitivity, experience a correspondingly lower effect, which would be not significant. No groundwater receptors within the Study Area are subject to a higher level of risk.

Table 11.25 Preliminary summary of geology and land contamination effects (note: the summary reports on worst case/highest receptor sensitivity for each section)

Receptor(s)	Key Design, Standard and Additional Mitigation	Impact	Magnitude of Change	Sensitivity/ Value	Likely Significance of Effect
Construction					
Geology – sites of geological importance	The Project is routed to avoid designated sites and sensitive features as far as reasonably practicable.	Sites of geological importance have not been identified to date.	No change	High	Neutral – not significant
Adjacent land users (human health)	Standard mitigation measures are presented in Section 11.7 and Appendix 4A Draft Outline Code of Construction Practice	Harm to human health through exposure to contamination, dust and vapours through ground disturbance during construction that is affected by pre-existing contamination.	Negligible	Very high	Slight adverse – not significant
Construction workers (human health)			Negligible	Medium	Neutral – not significant
Principal aquifers (Sections 2 and 5)			Negligible	Very high	Slight adverse – not significant
Secondary A and undifferentiated aquifers (Sections 2, 3 and 4)	Standard mitigation measures are presented in Section 11.7 and Appendix 4A Draft Outline Code of Construction Practice	Deterioration in chemical quality of the land and aquifers through ground disturbance during construction that is affected by pre-existing contamination.	Negligible	Medium	Neutral – not significant
GWDTEs (Sections 5)			Negligible	Very high	Slight adverse – not significant
Land quality			Negligible	High	Slight adverse – not significant

Receptor(s)	Key Design, Standard and Additional Mitigation	Impact	Magnitude of Change	Sensitivity/ Value	Likely Significance of Effect
Adjacent land users (Human health)	Standard mitigation measures are presented in Section 11.7 and Appendix 4A Draft Outline Code of Construction Practice	Explosion or asphyxiation as a result of ingress and accumulation of ground gas within structures and accumulation within buildings or other confined spaces.	Negligible	Very high	Slight adverse – not significant
Construction workers (Human health)			Negligible	Medium	Neutral – not significant
Adjacent land users (Human health)	Standard mitigation measures are presented in Section 11.7 and Appendix 4A Draft Outline Code of Construction Practice	Harm to human health from disturbance of historical mining leading to potential mobilisation of mine gases and mine water.	Negligible	High	Slight adverse – not significant
Construction workers (Human health)			Negligible	Medium	Neutral – not significant
Principal aquifers (Section 2 and 5)			Negligible	Very high	Slight adverse – not significant
Secondary A and undifferentiated aquifers (Section 2, 3 and 4)			Negligible	Medium	Neutral – not significant
Operation and maintenance					
Workers (i.e. manual access to carry out operational activities)	Standard mitigation measures are presented in Section 11.7 and Appendix 4A Draft Outline Code of Construction Practice	Explosion or asphyxiation as a result of ingress and accumulation of ground gas within substation buildings.	Negligible	Medium	Neutral – not significant
Land quality	Standard mitigation measures are presented in Section 11.7 and Appendix 4A Draft Outline Code of Construction Practice	Deterioration in chemical quality of the land and aquifers via maintenance purposes through release of	Negligible	High	Slight adverse – not significant
Principal aquifers (Sections 2 and 5)			Negligible	Very high	Slight adverse – not significant

Receptor(s)	Key Design, Standard and Additional Mitigation	Impact	Magnitude of Change	Sensitivity/ Value	Likely Significance of Effect
Secondary A and undifferentiated aquifers (Sections 2, 3 and 4)		contamination by disturbance of ground that is affected by pre-existing contamination.	Negligible	Medium	Neutral – not significant
GWDTEs (Section 5)			Negligible	Very high	Slight adverse – not significant

Table 11.26 Preliminary summary of hydrogeology effects (note: hydrogeology summary reports on worst case/highest receptor sensitivity for each section)

Receptor	Key Design, Standard and Additional Mitigation	Impact	Magnitude of Change	Sensitivity/V alue	Likely Significance of Effect
Construction					
11.8.104 Principal Bedrock Aquifer (highest sensitivity for WMEL-A Substation)	11.8.105 Standard mitigation measures as set out in Appendix 4A Draft Outline Code of Construction Practice . Mitigation measures applicable to this effect would be GH01, GH02, GH04, GH05, GH06, GH07, GH08, W05, W09, W11, W12, GG16, GG17, GG18, and GG24.	Substation foundations and platforms with associated temporary construction drainage and cabling – effect on groundwater quality and quantity. WMEL-A in Section 2 and WMEL-B in Section 3.	Negligible	Very high (worst case)	Slight adverse, not significant
Secondary Bedrock and Superficial Aquifers (highest sensitivity for WMEL-B Substation)				Medium (worst case)	Slight adverse, not significant

Receptor	Key Design, Standard and Additional Mitigation	Impact	Magnitude of Change	Sensitivity/V alue	Likely Significance of Effect
SPZ1 associated with PWS (highest sensitivity for Section 1)	Standard mitigation measures as set out in the Appendix 4A Draft Outline Code of Construction Practice. Mitigation measures applicable to this effect would be GH01, GH02, GH04, GH05, GH06, GH07, GH08, W05, W09, W11, GG16, GG17, GG18, and GG24. In addition, a groundwater risk assessment will be undertaken at the ES stage for any towers located within SPZ2 and SPZ3 in Sections 1 and 2, which are associated with principal aquifers and PWSs. This will enable potential risks to be identified and assessed to ensure that the Project does not give rise to a significant adverse effect.	Tower foundations and associated temporary construction drainage – effect on groundwater quality and quantity. Sections 1, 2 and 3.	Negligible	Very high (worst case)	Slight adverse, not significant
SPZ1 associated with sPWS and Principal Bedrock Aquifer (highest sensitivity for Section 2)				Very high (worst case)	Slight adverse, not significant
Secondary Bedrock and Superficial Aquifers (highest sensitivity for Section 3)				Medium (worst case)	Slight adverse, not significant
SPZ1 associated with PWS (highest sensitivity for Section 1)	Standard mitigation measures as set out in the Appendix 4A Draft Outline Code of Construction Practice. Mitigation measures applicable to this effect would be GH01, GH02, GH04, GH05, GH06, GH08, GH12, GH13, W09, W11, GG16, GG17, GG18, and GG24.	Construction compounds, construction laydown areas and temporary access tracks/haul roads – effect on groundwater quality. Sections 1 to 5.	Negligible	Very high (worst case)	Slight adverse, not significant
SPZ1 associated with PWS and Principal Bedrock Aquifer (highest sensitivity for Section 2)				Very high (worst case)	Slight adverse, not significant
Secondary Bedrock and Superficial Aquifers				Medium (worst case)	Slight adverse, not significant

Receptor	Key Design, Standard and Additional Mitigation	Impact	Magnitude of Change	Sensitivity/Value	Likely Significance of Effect
(highest sensitivity for Section 3)	Construction compounds and laydown areas and temporary access tracks to be sited away from designated sites. In addition, a groundwater risk assessment will be undertaken at ES stage for any construction compounds or laydown areas located within SPZ2 and SPZ3 in Sections 1 and 2, which are associated with principal aquifers and PWSs. This will enable potential risks to be identified and assessed to ensure that the Project does not give rise to a significant adverse effect.				
Secondary Bedrock and Superficial Aquifers (highest sensitivity for Section 4)				Medium (worst case)	Slight adverse, not significant
GWDTEs (highest sensitivity for Section 5)				Very high (worst case)	Slight adverse, not significant
SPZ1 associated with PWS (highest sensitivity for Section 1)	Standard mitigation measures as set out in the Appendix 4A Draft Outline Code of Construction Practice. Mitigation measures applicable to this effect would be GH01, GH02, GH04, GH05, GH06, GH07, GH08, GH12, W09, W11, GG16, GG17, GG18, and GG24. Third-party utility diversions or laydown areas will be sited away from designated sites.	Third-party utility diversions – effect on groundwater quality. Sections 1 to 5.	Negligible	Very high (worst case)	Slight adverse, not significant
SPZ1 associated with PWS and Principal Bedrock Aquifer (highest sensitivity for Section 2)				Very high (worst case)	Slight adverse, not significant
Secondary Bedrock and Superficial Aquifers (highest sensitivity for Section 3)				Medium (worst case)	Slight adverse, not significant

Receptor	Key Design, Standard and Additional Mitigation	Impact	Magnitude of Change	Sensitivity/V alue	Likely Significance of Effect
Secondary Bedrock and Superficial Aquifers (highest sensitivity for Section 4)	In addition, a groundwater risk assessment will be undertaken at ES stage for any third-party utility diversions or laydown areas located within SPZ2 and SPZ3 in Sections 1 and 2, which are associated with principal aquifers and PWSs. This will enable potential risks to be identified and assessed to ensure that the Project does not give rise to a significant adverse effect.			Medium (worst case)	Slight adverse, not significant
GWDTEs (highest sensitivity for Section 5)				Very high (worst case)	Slight adverse, not significant
SPZ1 associated with PWS (highest sensitivity for Section 1)	Standard mitigation measures as set out in the Appendix 4A Draft Outline Code of Construction Practice . Mitigation measures applicable to this effect would be GH01, GH02, GH07, GH08, GH12, W05, W09, W11, GG18, and GG24.	Temporary construction drainage for access roads and third-party cable diversions – effect on groundwater quantity. Sections 1 to 5.	Negligible	Very high (worst case)	Slight adverse, not significant
SPZ1 associated with PWS and Principal Bedrock Aquifer (highest sensitivity for Section 2)				Very high (worst case)	Slight adverse, not significant
Secondary Bedrock and Superficial Aquifers (highest sensitivity for Section 3)				Medium (worst case)	Slight adverse, not significant
Secondary Bedrock and Superficial Aquifers (highest sensitivity for Section 4)				Medium (worst case)	Slight adverse, not significant
GWDTEs (highest sensitivity for Section 5)				Very high (worst case)	Slight adverse, not significant

Receptor	Key Design, Standard and Additional Mitigation	Impact	Magnitude of Change	Sensitivity/Value	Likely Significance of Effect
	potential risks to be identified and assessed to ensure that the Project does not give rise to a significant adverse effect.				
Principal Bedrock Aquifer (highest sensitivity for junction works in Section 2)	Standard mitigation measures as set out in the Appendix 4A Draft Outline Code of Construction Practice . Mitigation measures applicable to this effect would be GH01, GH02, GH04, GH05, GH06, GH08, GH12, GH13, W09, W11, GG16, GG17, GG18, and GG24.	Improvement works to existing highways junctions – effect on groundwater quality. Sections 2 and 3.	Negligible	Very high (worst case)	Slight adverse, not significant
GWDTE (highest sensitivity for junction works in Section 3)	In addition, a groundwater risk assessment will be undertaken at ES stage for any construction compounds or laydown areas located within SPZ2 and SPZ3 in Sections 1 and 2, which are associated with principal aquifers and PWSs. This will enable potential risks to be identified and assessed to ensure that the Project does not give rise to a significant adverse effect.			Very high (worst case)	Slight adverse, not significant
Operation					
Principal Bedrock Aquifer (highest sensitivity for WMEL-A Substation)	The detailed design of the substations and associated drainage systems will take into	Fire-related contaminant runoff at substations – effect on groundwater quality. WMEL-A	Negligible	Very high (worst case)	Slight adverse, not significant

Receptor		Key Design, Standard and Additional Mitigation	Impact	Magnitude of Change	Sensitivity/Value	Likely Significance of Effect
Secondary Bedrock and Superficial Aquifers (highest sensitivity for WMEL-B Substation)		account the requirement for firewater containment and disposal, thereby preventing contaminated fire-fighting water from reaching groundwater receptors. This will be incorporated into the Drainage Strategy.	in Section 2 and WMEL-B in Section 3.		Medium (worst case)	Slight adverse, not significant
11.8.106	Principal Bedrock Aquifer (highest sensitivity for WMEL-A Substation)	Design measures incorporated into the substation layout provide inherent control of this potential effect and are summarised in Section 11.7. These include the placement of internal cabling within engineered structures or beneath impermeable	Thermal influence of substation internal cabling on groundwater quality. WMEL-A in Section 2 and WMEL-B in Section 3.	Negligible	Very high (worst case)	Slight adverse, not significant
	Secondary Bedrock and Superficial Aquifers (highest sensitivity for WMEL-B Substation)	hardstanding, appropriate burial depths, and separation from groundwater receptors. Cable design and operational controls further limit heat generation during operation, reducing the potential for any measurable thermal influence on groundwater.			Medium (worst case)	Slight adverse, not significant
SPZ1 associated with PWS (highest sensitivity for Section 1)		Where possible the inspection of overhead line would be by foot patrol, rather than small van, or by air using drone/helicopter to check for visible faults or signs of wear,	Vehicle movements for routine inspection and maintenance – effect on groundwater quality. Sections 1 to 5.	Negligible	Very high (worst case)	Slight adverse, not significant
SPZ1 associated with PWS and Principal					Very high (worst case)	Slight adverse, not significant

Receptor	Key Design, Standard and Additional Mitigation	Impact	Magnitude of Change	Sensitivity/Value	Likely Significance of Effect
Bedrock Aquifer (highest sensitivity for Section 2)	thereby reducing the on-site vehicle movements.				
Secondary Bedrock and Superficial Aquifers (highest sensitivity for Section 3)	At the substations, the Drainage Strategy will describe how surface water runoff will be adequately attenuated and treated to protect the receiving water environment, including groundwater, from pollution. Electrical equipment such as supercharged transformers contain oil and although self-bunded, surface water runoff from certain areas will be captured and passed through an oil separator. Reinforced concrete bunds forming the perimeter to the substations also act as a secondary spillage containment.			Medium (worst case)	Slight adverse, not significant
Secondary Bedrock and Superficial Aquifers (highest sensitivity for Section 4)				Medium (worst case)	Slight adverse, not significant
GWDTEs (highest sensitivity for Section 5)	Operation and maintenance plans will follow similar principles to those in construction, summarised in Section 11.7: GH04, GH05, GH08, W09, GG16, GG17, and GG24.			Very high (worst case)	Slight adverse, not significant

Alternative Scenarios

- 11.8.107 As described in Section 4.4 of **Chapter 4 Description of the Project**, there are elements of the Project which have not been fixed at this stage. Therefore, flexibility needs to be considered in this DES. Two alternative scenarios are outlined in **Table 4.3** and are assessed in **Table 11.27** below.
- 11.8.108 This assessment considers each scenario, together with the assumptions and mitigation measures described in this chapter. It provides a qualitative appraisal of the potential changes to the preliminary conclusions reported in this section, should these scenarios occur.
- 11.8.109 **Table 11.27** presents the conclusions of this appraisal, supported by appropriate qualitative justification, to ensure that any potentially significant effects are identified in this DES. If these alternative scenarios remain under consideration in the application for development consent, they will be appropriately assessed in the ES.

Table 11.27 Preliminary assessment of alternative scenarios

Scenario	Potential change in impacts	Potential change in effects
1. No or reduced haul roads	Geology and land contamination: This scenario could reduce the number of receptors impacted by potential contaminative land. Hydrogeology: This scenario could reduce the number of hydrogeological receptors affected by impacts relating to haul roads.	Geology and land contamination: This scenario is not anticipated to result in new or different significant effects if it were included as part of the Project, due to the potential reduction in receptors and pathways. Hydrogeology This scenario is not expected to give rise to any new or different significant effects if incorporated into the Project, due to the likely reduction in hydrogeological receptors and pathways.
2. Off-site construction compound near Melton Mowbray	Geology and land contamination: This scenario could introduce new receptors (human health and groundwater) and pathways relating to construction activities associated with the compound. The construction compound is approximately 100 m north of two mine entries located within the grounds of the present day Asfordby Business Park. Hydrogeology: This scenario is unlikely to introduce new hydrogeological receptors, as all receptors that could be affected by the construction compound are already considered within the assessment for the existing draft Order Limits.	Geology and land contamination: This scenario is not anticipated to result in new or different significant effects if it were included as part of the Project. Whilst new receptors and pathways may be introduced due to the proximity to historical mining activities, they would be managed through standard mitigation measures. Hydrogeology: This scenario is unlikely to introduce new hydrogeological receptors, as all receptors that could be affected by the construction compound are already assessed within the existing draft Order Limits. Accordingly, it is unlikely that the scenario would give rise to any new or different significant effects.

11.9 Monitoring

- 11.9.1 Monitoring requirements have not been identified, as no likely significant effects for geology and land contamination have been reported in this preliminary assessment. The ground investigation currently being undertaken will identify proposed monitoring requirements for potential land contamination. This will be detailed further within the ES.
- 11.9.2 In view of the very high sensitivity hydrogeological receptors identified (within Sections 1, 2 and 5), the presence of groundwater abstractions, and the current uncertainty regarding the requirement for groundwater control measures during construction and/or the need for abstraction during construction and operation, monitoring may be required during the construction phase as a precautionary measure to confirm the effectiveness of any controls implemented. The proposed monitoring requirements will be defined and reported within the ES.

11.10 Further Assessment

Geology

- 11.10.1 Information is required from local authorities to confirm the presence and assessment of geological conservation areas of international, national, regional or local importance. This issue was raised during stakeholder engagement and information requests sent out to the relevant authorities. Any information received prior to preparation of the ES will be reviewed and, where relevant, incorporated into the baseline and assessment.

Potentially Contaminative Land

- 11.10.2 This DES presents a preliminary assessment of risks due to land contamination sites within the Study Area. Sites/areas that are classified as having a very low or low potential for generating contamination will be scoped out of further assessment on the basis that there will be no significant contamination source likely to result in significant risks and/or impacts.
- 11.10.3 Sites/areas that are identified as having a moderate or above potential for generating contamination will be taken forward for further assessment. This approach will be undertaken as it is proportionate for the scale of the Project. The ES will present a further analysis of these potential risks, together with provisional results of the geoenvironmental ground investigation (where available) used to support the ES, where relevant.

Mineral Resources

- 11.10.4 Information is required from Local Planning authorities to confirm mineral resources in each administrative area. This issue was raised at the TWG meeting and information requests were sent out to the relevant authorities. Any information received prior to preparation of the ES will be reviewed and, where relevant, incorporated into the baseline and assessment.

Hydrogeology

- 11.10.5 The impact on groundwater receptors will be reviewed against the latest design developed for the application for development consent. In addition, a full assessment for all receptors will be undertaken for the ES, with this DES assessment having focused on the receptor with the highest sensitivity in each Section, thereby presenting a reasonable worst-case assessment of effect significance.
- 11.10.6 Further refinement will be undertaken at ES stage following completion of ground investigations and design development, including confirmation of foundation design, excavation extents and any temporary construction drainage or groundwater management requirements. Other key elements to consider from a hydrogeological perspective are locations of construction compounds and laydown areas and any groundwater abstraction for construction or operation following further consideration of the water resource requirements and the supply strategy. All of this information will be used to validate the assumptions applied in this DES and to update the assessment where necessary.
- 11.10.7 In addition, a qualitative assessment of the thermal impacts of buried cables on groundwater receptors will be undertaken for the ES. This will be supported by a conceptual site model showing cable locations and groundwater receptors, focusing on SPZ1, abstractions, springs and GWDTEs.

References

- Ref 11.1 Environment Agency (2025) *Land contamination risk management (LCRM)* [online] Available at: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm> [Accessed 28 April 2026]
- Ref 11.2 Environment Agency (2017) *Groundwater protection technical guidance* [online] Available at: <https://www.gov.uk/government/publications/groundwater-protection-technical-guidance/groundwater-protection-technical-guidance> [Accessed 28 April 2026]
- Ref 11.3 Department for Environment Food and Rural Affairs (2026) *Pollution prevention for businesses* [online] Available at: <https://www.gov.uk/guidance/pollution-prevention-for-businesses> [Accessed 28 April 2026]
- Ref 11.4 Construction Industry Research and Information Association (CIRIA) (2001) *Contaminated land risk assessment C552. A guide to good practice* [Online] Available at: https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C552&Category=BOOK
- Ref 11.5 Highways England (2020) *Design Manual for Roads and Bridges LA 104 Environmental assessment and monitoring* [online] Available at: <https://www.standardsforhighways.co.uk/search/0f6e0b6a-d08e-4673-8691-cab564d4a60a> [Accessed 28 April 2026]
- Ref 11.6 Highways England (2019) *Design Manual for Roads and Bridges LA 109 Geology and soils* [online] Available at: <https://www.standardsforhighways.co.uk/search/adca4c7d-4037-4907-b633-76eae30b9c0> [Accessed 28 April 2026]
- Ref 11.7 Highways England (2020) *Design Manual for Roads and Bridges LA 113 Road drainage and the water environment* [online] Available at: <https://www.standardsforhighways.co.uk/tses/attachments/d6388f5f-2694-4986-ac46-b17b62c21727> [Accessed 28 April 2026]
- Ref 11.8 Leicestershire & Rutland Pollution Sub Committee on Land Contamination (2011) *A Guide for Developers of Potentially Contaminated Sites in Leicestershire and Rutland* [online] Available at: https://www.charnwood.gov.uk/files/documents/a_guide_for_developers_of_potentially_contaminated_sites_in_leicestershire_and_rutland/A%20Guide%20for%20developers%20of%20Potentially%20Contaminated%20Sites%20in%20Leicestershire%20%26%20Rutland.pdf [Accessed 28 April 2026]
- Ref 11.9 British Geological Survey (2026) *GeoIndex Onshore*. [online] Available at: <https://mapapps2.bgs.ac.uk/geoindex/home.html> [Accessed 26 January 2026]
- Ref 11.10 UK Health Security Agency (UKHSA) (2022) *UK maps of radon* [online]. Available at: <https://www.ukradon.org/information/ukmaps> [Accessed 14 January 2026].
- Ref 11.11 Environment Agency, (2025). *Historical Landfill Sites*. Available at: <https://www.data.gov.uk/dataset/17edf94f-6de3-4034-b66b-004ebd0dd010/historiclandfill-sites1> [Accessed 13 January 2026].

- Ref 11.12 Department for Environment Food and Rural Affairs (2026) *Multi-Agency Geographic Information for the Countryside*. [online] Available at: <https://magic.defra.gov.uk/MagicMap.html> [Accessed 13 January 2026].
- Ref 11.13 Department for Environment Food and Rural Affairs (2025) *Hydrology Data Explorer*. [online] Available at: <https://environment.data.gov.uk/hydrology/explore> [Accessed 14 January 2026].
- Ref 11.14 Environment Agency (2025) *Groundwater Dependent Terrestrial Ecosystems*. [online] Available at: <https://www.data.gov.uk/dataset/72a149a2-1be7-441f-bc37-94a77f261e27/groundwater-dependent-terrestrial-ecosystems-england-only> [Accessed 15 January 2026].
- Ref 11.15 Department for Environment Food & Rural Affairs (2026) Environment Agency, *Catchment Data Explorer*. [online] Available at: <https://environment.data.gov.uk/catchment-planning/> [Accessed 15 January 2026]
- Ref 11.16 Natural England, (2026). *Designated Sites View* [online] Available at: <https://designatedsites.naturalengland.org.uk/>. [Accessed 20 January 2026].
- Ref 11.17 Environment Agency (2023) *Land Contamination Risk Management (LCRM) guidance*.
- Ref 11.18 The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015
- Ref 11.19 The Water Supply (Water Quality) Regulations 2016
- Ref 11.20 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 [online]. Available at: <https://www.legislation.gov.uk/ukxi/2017/407/contents/made> [Accessed 01 December 2025].
- Ref 11.21 CL:AIRE (2025) *Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention*.
- Ref 11.22 CL:AIRE (2011) *The definition of Waste: The development industry Code of Practice*.
- Ref 11.23 CIRIA (2006). *648 Control of water pollution from linear construction projects*.
- Ref 11.24 Environment Agency (2024) *Groundwater source protection zones (SPZs)* [online] Available at: <https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs>. [Accessed 12 December 2025]
- Ref 11.25 Environment Agency (2025) *Drinking Water Safeguard Zones (Groundwater)* [online] Available at: <https://www.data.gov.uk/dataset/7fe90245-d6e8-4d7c-a13a-65a87455f429/drinking-water-safeguard-zones-groundwater> [Accessed 12 December 2025]
- Ref 11.26 Environment Agency (2025) *Check if you need a licence to abstract water* [online] Available at: <https://www.gov.uk/guidance/check-if-you-need-a-licence-to-abstract-water> [Accessed 03 February 2026]
- Ref 11.27 Environment Agency (2025) *Environmental Permitting Regulations – Discharges to Water and Groundwater* [online] Available at: <https://environment.data.gov.uk/public-register/view/search-water-discharge-consents> [Accessed 12 December 2025]

- Ref 11.28 Environment Agency (2025) *Protect groundwater and prevent groundwater pollution* [online] Available at: <https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution/protect-groundwater-and-prevent-groundwater-pollution> [Accessed 12 December 2025]
- Ref 11.29 National Grid. *The Holford Rules*. Guidelines on Overhead Line Routing [online]. Available at: <https://www.nationalgrid.com/sites/default/files/documents/13795-The%20Holford%20Rules.pdf> [Accessed 02 December 2025].
- Ref 11.30 National Grid. *NGC Substations and the Environment: Guidelines on Siting and Design* [online] Available at: <https://www.nationalgrid.com/sites/default/files/documents/13796-The%20Horlock%20Rules.pdf> [Accessed 02 December 2025].
- Ref 11.31 Met Office Hadley Centre and Environment Agency (2019). *UKCP18 Science Overview Report*.
- Ref 11.32 UK Groundwater Forum (2011). *Groundwater Resources and Climate Change*.
- Ref 11.33 Prudhomme, C., et al. (2014). *Future Flows: a dataset of climate, river flow and groundwater levels for climate change impact studies in Great Britain in Hydrology in a changing world: environmental and human dimensions* (IAHS Publication, 363). Wallingford, International Association of Hydrological Sciences, 2014, pp. 330-335.
- Ref 11.34 South East Lincolnshire Joint Strategic Planning Committee (2019) South East Lincolnshire Local Plan 2011-2036 (Adopted March 2019). [online] Available at: <https://southeastlincslocalplan.org/article/20102/Adopted-Plan> [Accessed 9 December 2025].
- Ref 11.35 South Holland District Council (2019) Contaminated Land Strategy. [online] Available at: https://www.sholland.gov.uk/media/5219/Contaminated-Land-Strategy/pdf/contaminated_land_strategy_2014.pdf [Accessed 9 December 2025]
- Ref 11.36 South Kesteven District Council (2024) Contaminated Land Strategy. [online] Available at: <https://www.southkesteven.gov.uk/sites/default/files/2024-07/SKDC%20Draft%20Contaminated%20Land%20Strategy.pdf> [Accessed 9 December 2025]
- Ref 11.37 Scott Wilson (2011) South Holland, South Kesteven and Rutland Outline Water Cycle Study, Planning Summary Report (Final). [online] Available at: <https://www.rutland.gov.uk/sites/default/files/2022-10/ENV11a%20-%20Water%20Cycle%20Study%20Planning%20Summary%20%28January%202011%29.pdf> [Accessed 9 December 2025]
- Ref 11.38 South Kesteven District Council (2020) South Kesteven District Council Local Plan 2011-2036 (Adopted January 2020). [online] Available at: <https://www.southkesteven.gov.uk/planning-building-control/planning-policy-local-plans/south-kesteven-local-plan> [Accessed 7 August 2025].
- Ref 11.39 Melton Borough Council (2018) Melton Local Plan 2011-2036 (Adopted October 2018). [online] Available at: <https://www.meltonplan.co.uk/adoptedplan> [Accessed 9 December 2025].
- Ref 11.40 Harborough District Council (2018) Contaminated Land Strategy Framework Document. Available at: https://www.harborough.gov.uk/downloads/file/4331/contaminated_land_strategy_2018 [Accessed 9 December 2025]

- Ref 11.41 Harborough District Council (2019) Harborough Local Plan 2011-2031 (Adopted April 2019). [online] Available at: https://www.harborough.gov.uk/info/20004/planning_strategy/220/harborough_local_plan_2011-2031 [Accessed 9 December 2025]
- Ref 11.42 North Northamptonshire Council (2019) Contaminated Land Strategy [online] Available at: <https://www.northnorthants.gov.uk/environment/contaminated-land/contaminated-land-strategy> [Accessed 9 December 2025]
- Ref 11.43 North Northamptonshire Joint Planning Unit (2016 & 2021) North Northamptonshire Joint Core Strategies 2011-2031 (Adopted July 2016) and Part 2 Local Plans. [online] Available at: <https://www.northnorthants.gov.uk/planning-strategies-and-plans/north-northamptonshire-local-plan> [Accessed 9 December 2025].
- Ref 11.44 West Northamptonshire Joint Planning Unit (2014) West Northamptonshire Joint Core Strategy Local Plan (Adopted December 2014). [online] Available at: <https://www.westnorthants.gov.uk/west-northamptonshire-joint-core-strategy/west-northamptonshire-joint-core-strategy-local-plan-part> [Accessed 9 December 2025].

National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

Registered in England and Wales
No. 4031152
nationalgrid.com