



Preliminary Environmental Information Report Chapter 13: Geology, Hydrogeology and Contaminated Land

June 2021

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Report for

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Appendix 13A Wisbech Phases 1 and 2 Geoenvironmental Desk Study and Interpretative Report.

Appendix 13B Medworth Grid Connection Corridor Phase 1 Geoenvironmental Desk Study and Interpretative Report.



13. Soils, Geology, Hydrogeology and Ground Conditions

13.1 Introduction

- 13.1.1 This chapter presents the preliminary assessment of the likely significant effects of the Proposed Development with respect to soils (including agricultural soils), geology (including geodiversity), hydrogeology, and ground conditions (land contamination and geohazards). The preliminary assessment is based on information obtained to date.
- 13.1.2 The chapter should be read in conjunction with the description of the development provided in **Chapter 3: Description of the Proposed Development** and with respect to relevant parts of other chapters (**Chapter 11: Biodiversity** and **Chapter 12: Hydrology**) where common receptors have been considered and where there is an overlap or relationship between the assessment of effects. Terms and abbreviations used within this chapter are defined in **Appendix 1F: Terms and Abbreviations**.

13.2 Consultation and stakeholder engagement

- 13.2.1 MVV submitted a Scoping Report and request for a Scoping Opinion to the Secretary of State (administered by the Planning Inspectorate (PINS)) in December 2019.
- 13.2.2 The Scoping Report set out the proposed assessment methodologies for geology, hydrogeology, and contaminated land, outlined the baseline data collected, and the scope of the assessment for the then current red line boundary of the EfW CHP Facility.
- 13.2.3 Due to a large element of uncertainty at the point of submission of the Scoping Report over the Grid Connection Corridor and other elements of the Proposed Development including the CHP Connection Corridor, it was acknowledged in the Scoping Report that receptors with potential to be significantly affected by the Proposed Development elements other than the EfW CHP Facility would need to be confirmed at the next stage of the EIA. This PEIR therefore updates the assessment of potentially significant effects for all elements of the Proposed Development within the PEIR red line boundary, as presented in **Figure 3.2: Proposed Components** in **Chapter 3: Description of the Proposed Development** of the PEIR. These include: the EfW CHP Facility, the CHP Connection Corridor, Access Improvements, the Grid Connection Corridor, Substation sites and all Temporary Construction Compounds.
- 13.2.4 When the Scoping Report was submitted, only the EfW CHP Facility (leased area), which is a slightly smaller area than the PEIR boundary for the EfW CHP Facility) had been subject to geo-environmental desk study and site investigation. Phase 1 environmental desk study assessment has now been completed for all the elements of the Proposed Development within the PEIR red line boundary and that



information informs this chapter, along with the other updated baseline information (such as that for soils and agricultural land) presented in **Section 13.5**.

13.2.5 For the purposes of the updated Phase 1 geoenvironmental assessment, the various elements of the Proposed Development have been split into two distinct areas as follows:

- The first area is defined by being in a predominantly urban setting and includes the majority of the proposed built infrastructure. This includes:
 - ▶ the EfW CHP Facility,
 - ▶ CHP Connection Corridor,
 - ▶ Access Improvements,
 - ▶ Temporary Construction Compound located on land immediately east and of the EfW CHP Facility.
- The second area comprises all of the Grid Connection elements and is defined by being in a predominantly rural setting, it includes:
 - ▶ the Grid Connection Corridor including the Common Grid Connection (Options 1 and 2), the Walpole Grid Connection (Option 1), the Walsoken Grid Connection (Option 2),
 - ▶ two Grid Connection Temporary Construction Compounds immediately north of Lynn Road,
 - ▶ the Walpole Grid Connection to the Walpole Substation,
 - ▶ the Walsoken Grid Connection to the Walsoken Substation, and,
 - ▶ a Temporary Construction Compound at the Walpole Substation.

13.2.6 The first area defined above is the subject of a Combined Phases 1 and 2 Geoenvironmental Desk Study and Interpretative Report¹, the second area is the subject of a separate Geoenvironmental Phase 1 Desk Study². These reports are included as **Appendices 13A** and **13B** to this chapter.

13.2.7 The same division of the Proposed Development elements as defined in 13.2.5 has been applied in the description of the baseline description in **Section 13.5** and definition of the scope of the assessment in **Section 13.6**.

13.2.8 The assessment has also been informed by consultation responses. An overview of the approach to consultation is provided in **Chapter 4: Approach to the EIA**.

13.2.9 A summary of the relevant responses received in the EIA Scoping Opinion in relation to soil, agricultural land, geology, hydrogeology and ground conditions and confirmation of how these have been considered within the assessment to date is presented in **Table 13.1**.

¹ Wisbech Phases 1 and 2 Geoenvironmental Desk Study and Interpretative Report. Draft Report. Included as **Appendix 13A**.

² Medworth Grid Connection Corridor Phase 1 Geoenvironmental Desk Study and Interpretative Report. Draft Report. Included as **Appendix 13B**.



Table 13.1 Summary of EIA Scoping Opinion responses for soil, geology, hydrogeology, and ground conditions

Consultee	Issue raised	Response
The Planning Inspectorate (PINS)	Taking into consideration the lack of geological designations and the brownfield nature of the EfW CHP Facility site, the Inspectorate is content this matter can be scoped out for the EfW CHP facility site. However, given the uncertainty regarding the remainder of the application site, the Inspectorate does not agree that effects on geology can be scoped out for the other project elements.	<p>Acknowledged agreement to scope out geological receptors in the assessment for the EfW CHP Facility.</p> <p>The baseline condition regarding geological receptors for all components of the Proposed Development is defined in Section 13.5.</p> <p>It is concluded in this PEIR that, given the absence of nationally or locally designated geological sites within the Proposed Development, effects on geological receptors can be scoped out for all elements of the Proposed Development. The study area for geological receptors is defined in paragraph 13.4.2. Tables 13.10 and 13.11 provide the rationale for the scoping out of receptors from the assessment.</p>
PINS	The Inspectorate agrees that hydrogeological impacts on shallow groundwater at the EfW CHP Facility site are unlikely to result in significant effects and that this matter can be scoped out of the ES. However, given the uncertainty regarding the remainder of the application site, the Inspectorate does not agree that effects on hydrogeology can be scoped out for the other project elements.	<p>Acknowledged agreement to scope out shallow groundwater receptors in the assessment for the EfW CHP Facility Site.</p> <p>The baseline hydrogeological condition for all elements of the Proposed Development is defined in Section 13.5. The study area for hydrogeological receptors is defined in paragraph 13.4.5.</p> <p>It is concluded in this PEIR that given the hydrogeological conditions are similar on all elements of the Proposed Development that effects on hydrogeological receptors can be scoped out. Tables 13.10 and 13.11 provide the rationale for the scoping out of receptors from the assessment.</p>
PINS	The Inspectorate agrees that impacts from contaminated land on construction workers can be scoped out of the assessment however, the Inspectorate would expect the ES to explain the measures that would be employed to achieve compliance relevant legislation, and how these would be secured.	<p>Acknowledged agreement to scope out impacts from contaminated land on construction workers.</p> <p>The legislation and necessary measures to protect construction workers, including how they will be employed and secured, has been included in Table 13.24 and will be included in the ES.</p>
PINS	The Inspectorate agrees that impacts on soil resources at the EfW CHP Facility site are unlikely to result in significant effects and can be scoped out, however	Acknowledged agreement to scope out impact on soil in the assessment for the main EfW CHP Facility (leased area).



Consultee	Issue raised	Response
	<p>this matter should be assessed for all other project elements, where significant effects are likely.</p>	<p>The baseline soil condition for all elements of the Proposed Development is defined in Section 13.5.</p> <p>An assessment of the effects on soil receptors on the Grid Connection study area is provided in Section 13.10. Given that the CHP Connection Corridor and Access Improvements are predominantly brownfield/previously developed land, and as the associated EfW CHP Facility (additional area) and the Temporary Construction Compound adjacent to the EfW CHP Facility are both in an area allocated for urban extension in Fenland Local Plan 13 (2014), Policy LP8, it is concluded that effects on soil receptors can be scoped out for these elements of the Proposed Development, in addition to the EfW CHP Facility (leased area). Table 13.10 provides the rationale for the scoping out of receptors from the assessment.</p>
PINS	<p>The Inspectorate agrees that impacts from contaminated land on flora, fauna, and ecological systems at the EfW CHP Facility site are unlikely to result in significant effects and can be scoped out, however, this matter should be assessed for the other project elements, the CHP routes, Temporary Construction Compounds or new access routes.</p>	<p>Acknowledged agreement to scope out impacts from contaminated land on flora, fauna and ecological systems at the EfW CHP Facility (leased area). Consideration is given in the assessment to impacts from contaminated land on flora, fauna and ecological systems for all the other elements of the Proposed Development. Baseline information for all elements is presented in Section 13.5.</p> <p>The baseline ecological conditions for all elements of the Proposed Development are defined in Chapter 11: Biodiversity. Phase 1 geo-environmental desk studies have been completed for all areas of the Proposed Development and have confirmed that there are no ecological receptors within the boundary or in the study area that are likely to be affected by land contamination on the Proposed Development site. Effects from contaminated land on flora, fauna and ecological systems are, therefore, scoped out for all elements of the Proposed Development. The relevant reports are detailed in Table 13.7 and presented in Appendices 13A and 13B.</p>
PINS	<p>The Inspectorate notes that the Scoping Report indicates that site investigation may be required. Details of any site</p>	<p>Phase 1 geo-environmental desk studies for all elements of the Proposed Development have been completed and the relevant reports are appended to the</p>



Consultee	Issue raised	Response
	investigation undertaken are to be provided in the ES.	PEIR (Appendices 13A and 13B). Information from an intrusive ground investigation of the EfW CHP Facility (leased area) is also included in the report covering the EfW CHP Facility ¹ . These reports define areas where further investigation is needed to confirm the site's suitability for the Proposed Development in relation to land contamination and to inform its design.
PINS	The Inspectorate states that if earthworks are required to construct the Proposed Development, these should be described in sufficient detail to allow for a robust assessment of the earthworks and impacts resulting from them to be undertaken and for any potential significant effects to be identified.	The earthworks for the Proposed Development are described in Chapter 3 . This chapter includes assessment of the effects of earthworks on soil receptors and considers potential effects in relation to land contamination. Embedded mitigation measures to prevent significant effects on soil, agricultural land or contaminated land receptors are discussed in Table 13.14 .
Anglian Water	Reference is made to potential contamination of soils during construction phase and a risk to consumers of drinking water. Anglian Water therefore advises that a specific risk assessment for the water mains supply network from contaminants should be undertaken by the applicant with the assistance of Anglian Water as water undertaker.	This will be addressed in the design and construction process using the ground investigation data for the EfW CHP Facility (leased area) ³ , additional further ground investigation (date and scope to be confirmed) and further consultation with Anglian Water to confirm the approach. The basis of the structural design for the Proposed Development will include mitigation of identified geo hazards. This applies to hazards including contaminants with potential to permeate water pipes.
Cambridgeshire County Council & Fenland District Council	A phase one and two contaminated land investigation should be undertaken.	Phase 1 geo-environmental desk studies for all elements of the Proposed Development, and an intrusive ground investigation of the EfW CHP Facility site, have been completed and the relevant reports are appended to the PEIR (Appendices 13A and 13B). These reports define areas where further investigation is needed to confirm the site's suitability for the Proposed Development in relation to land contamination and to inform its design.
Natural England	Natural England states that assessment will need to consider any impacts upon local wildlife and geological sites, including proposals for mitigation of any impacts and if appropriate,	As stated in the Scoping Report there are no sites with statutory designations for geological conservation on the main EfW CHP Facility site.

³ Soil and groundwater data currently held for the site is detailed in the following report: Wood (2020) MVV, Wisbech Phases 1 and 2 Geoenvironmental Desk Study and Interpretative Report, Draft Report, July 2020.



Consultee	Issue raised	Response
	<p>compensation measures, and to contact the local wildlife trust, geoconservation group or local sites body if further information is needed.</p>	<p>The baseline condition regarding geological receptors for all components of the Proposed Development is defined in Section 13.5.</p> <p>It is concluded in this PEIR that, given the absence of nationally or locally designated geological sites within the Proposed Development, effects on geological receptors can be scoped out for all elements of the Proposed Development. The study area for geological receptors is defined in paragraph 13.4.2. Tables 13.10 and 13.11 provide the rationale for the scoping out of receptors from the assessment.</p> <p>Effects on local wildlife are considered in Chapter 11: Biodiversity.</p>
Natural England	<p>Natural England states that impacts from the development should be considered in light of the Government's policy for the protection of the best and most versatile (BMV) agricultural land as set out in the NPPF, and that soils should be considered in the context of the sustainable use of land and the ecosystem services they provide as a natural resource, as also highlighted in paragraph 170 of the NPPF.</p> <p>Note: Best and most versatile (BMV) agricultural land is defined as Grades 1, 2 and 3a in the Agricultural Land Classification (ALC) system defined by the MAFF⁴.</p>	<p>The Applicant has consulted with Natural England with regard to soils and BMV land.</p> <p>Soil resources including agricultural soils were scoped out in the Scoping Report for the EfW CHP Facility (leased area), due to this area being covered in gravel and used for industrial purposes, not in use for agricultural purposes and with no areas of soft landscaping, other than the boundary bunds, which were observed to contain made ground, with no natural topsoil at the surface.</p> <p>The Phase 1 geo-environmental desk studies for all elements of the Proposed Development confirm that the CHP Connection Corridor and Access Improvements are located on brownfield land, and although the EfW CHP Facility Site (additional area) is still within a field, it has been used for an unknown activity including some structures and an access track, since at least the 1990s. The Temporary Construction Compound adjacent to the EfW CHP Facility is located on land currently identified as Provisional ALC Grade 2. However, this area is noted to be allocated for urban extension in Fenland Local Plan 13 (2014), Policy LP8. Additionally, the compound will be temporary (for the Proposed Development construction phase) and the land will be reinstated as</p>

⁴ <http://publications.naturalengland.org.uk/publication/6257050620264448>, accessed June 2021



Consultee	Issue raised	Response
		<p>greenfield as part of the Proposed Development, however, given the above allocation, it is likely that this area will be developed, after the Proposed Development.</p> <p>The Grid Connection Corridor, the other Temporary Construction Compounds and land adjacent to the Walpole and Walsoken Substations is predominantly greenfield and in agricultural use and the baseline soil and agricultural land classifications for these areas is outlined in Section 13.5.</p> <p>Based on the Phase 1 geo-environmental desk studies and the updated baseline for all elements of the Proposed Development reported in Section 13.5, and the scoping response in relation to the EfW CHP Facility (leased area), it is concluded in this PEIR that effects on soil and agricultural land receptors can be scoped out for the EfW CHP Facility, Access Improvements, CHP Connection and the Temporary Construction Compound adjacent to the EfW CHP Facility (TCC 1). Effects on soils and agricultural land are assessed for all aspects of the Grid Connection, including the Grid Connection Corridor, three Temporary Construction Compounds, and the Walpole and Walsoken Grid Connections at the Walpole and Walsoken Substations.</p> <p>Likely effects of the Grid Connection elements of the Proposed Development on agricultural land and soil conditions are assessed in Section 13.10. Embedded mitigation measures relating to soil are set out in Table 13.14.</p>
Public Health England	<p>Health Public Health England states that any hazardous contamination present on site (including ground gas) should be identified as part of a site condition report. Public health impacts associated with ground contamination and/or the migration of material off-site should also be assessed and the potential impact on nearby receptors and control and mitigation measures should be outlined.</p>	<p>Phase 1 geo-environmental desk studies for all elements of the Proposed Development, and an intrusive ground investigation of the EfW CHP Facility (leased area), have been completed and the relevant reports are appended to the PEIR (Appendices 13A and 13B). These reports define areas where further investigation is needed to confirm the site's suitability for the Proposed Development in relation to land contamination, including ground gas, and to inform its design.</p>



Consultee	Issue raised	Response
Public England	<p>Health Emissions to and from the ground should be considered in terms of the previous history of the site and the potential of the site, once operational, to give rise to issues.</p>	<p>Phase 1 geo-environmental desk studies for all elements of the Proposed Development, and an intrusive ground investigation of the EfW CHP Facility site, have been completed and the relevant reports are appended to the PEIR (Appendices 13A and 13B). These reports define areas where further investigation is needed to confirm the site's suitability for the Proposed Development in relation to land contamination, including ground gas, and to inform its design.</p> <p>The only element of the Proposed Development likely to have the potential to impact land quality during the operational phase is the EfW CHP Facility. The operational phase will be regulated under the Environmental Permitting (England and Wales) Regulations 2016, which requires the assessment of site condition, typically including collection of soil and groundwater baseline data for comparison with ongoing monitoring data during the operational phase and then additional data collected at the point of permit surrender. This forms part an embedded mitigation measure (see Table 13.14).</p> <p>In addition, management of risks to the health and safety of workers and visitors to the EfW CHP Facility will be subject to The Health and Safety at Work Act 1974 (see Table 13.2).</p>



Consultee	Issue raised	Response
Public England	<p>Health</p> <p>Public Health England notes the following relevant areas outlined in the Government's Good Practice Guide for EIA including:</p> <ul style="list-style-type: none"> • effects associated with ground contamination that may already exist • effects associated with the potential for polluting substances that are used (during construction / operation) to cause new ground contamination issues on a site, for example introducing / changing the source of contamination • impacts associated with re-use of soils and waste soils, for example, re-use of site-sourced materials on-site or offsite, disposal of site-sourced materials offsite, importation of materials to the site, etc. 	<p>Phase 1 geo-environmental desk studies for all elements of the Proposed Development, and an intrusive ground investigation of the EfW CHP Facility (leased area), have been completed and the relevant reports are appended to the PEIR (Appendices 13A and 13B). These reports define areas where further investigation is needed to confirm the site's suitability for the Proposed Development in relation to land contamination and to inform its design.</p> <p>Embedded mitigations for soil management, handling and storage during construction are also described in Table 13.14.</p> <p>The only element of the Proposed Development likely to have the potential to impact land quality during the operational phase is the EfW CHP Facility. The operational phase will be regulated under the Environmental Permitting (England and Wales) Regulations 2016, which requires the assessment of site condition, typically including collection of soil and groundwater baseline data for comparison with ongoing monitoring data during the operational phase and then additional data collected at the point of permit surrender. This forms part an embedded mitigation measure (see Table 13.14).</p>

13.3 Relevant legislation, planning policy, technical guidance

Legislative context

- 13.3.1 Key legislation relevant to the assessment of the effects on geology, hydrogeology, and ground conditions (land contamination) is provided in **Table 13.2** below:
- 13.3.2 There is no legislation relevant to the assessment of the effects on soils and agriculture receptors.



Table 133.2 Legislative context for Geology, Soils and Agricultural Land, Hydrogeology and Land Contamination

Legislation	Implications
<p>European Union Groundwater Directive (2006/118/EC), 2006</p> <p>European Union Water Framework Directive (2000/60/EC), 2000</p> <p>The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017</p>	<p>The aim of the Groundwater Directive (also known as the ‘daughter directive’ to the Water Framework Directive⁶) is to protect groundwater against pollution caused by dangerous substances. The potential for the elements of the Proposed Development to have an effect on groundwater bodies through the introduction of dangerous substances during the construction and operation phases requires assessment. The objectives of the Water Framework Directive and the Groundwater Directive are implemented in England through The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, and elements of the Environmental Permitting (England and Wales) Regulations 2016, these regulations are also the current means by which the EfW CHP Facility will be regulated during its operational phase.</p> <p>On 31 December 2020 the UK exited the European Union following the expiry of the “transition period”, as provided for by the European Union (Withdrawal) Act 2018 (Withdrawal Act 2018). Sections 2-3 of the Withdrawal Act 2018, as amended, provide that direct EU legislation, and EU-derived domestic legislation, continue to have effect in UK domestic law after that date. In summary, the interpretation of any retained EU law is to be the same as it was before that date, insofar as the retained EU law remains unmodified in UK law and regulations have not been made providing otherwise (s. 6(3) of the Withdrawal Act 2018).</p> <p>Embedded environmental measures detailed in Table 13.14 of this chapter will help ensure the protection of groundwater during the construction and operational phases.</p>
<p>Water Resources Act 1991 as amended by the Water Act 2003</p>	<p>The Water Resources Act 1991 states that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters. The 1991 Act was revised by the Water Act 2003, which provides the definition of and regulatory controls for the protection of water resources, including the quality standards expected for controlled waters. The 2003 Act sets out the definition of controlled waters which has been used to define the scope of receptors for the assessment in Section 13.6.</p> <p>Embedded environmental measures are detailed in Section 13.7 of this chapter that will help ensure the protection of controlled water during the construction and operational phases.</p>
<p>The Environmental Protection Act 1990</p>	<p>Part 2 of the Act makes provision for the improved control of pollution arising from certain industrial and other processes. Part 2A of the Act provides the regulatory basis for the identification, designation, and remediation of Contaminated Land. The potential for the development, including the EfW CHP Facility, Access Improvements, Temporary Construction Compounds, CHP Connection and the Grid Connection to be built on land potentially affected by historical contamination requires assessment to ensure the land is suitable for the proposed land-use and that, where necessary, remediation is carried out to ensure the land cannot be determined as Contaminated Land under the Act.</p> <p>The approach to incorporating the requirements on the Act is outlined in Section 13.7.</p>

⁶ Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.



Legislation	Implications
<p>European Union Directive on environmental liability with regard to the prevention and remedying of environmental damage (2004/35/CE), 2004</p>	<p>Regulations implementing the EU directive on environmental liability setting out the principles for prevention and remedy of environmental damage. Construction and operational activities for all elements of the Proposed Development have the potential to cause pollution and the regulations place emphasis on businesses to proactively implement pollution prevention measures so that damage to the environment does not arise.</p>
<p>Environmental Damage (Prevention and Remediation) (England) Regulations 2015</p>	<p>On 31 December 2020 the UK exited the European Union following the expiry of the “transition period”, as provided for by the European Union (Withdrawal) Act 2018 (Withdrawal Act 2018). Sections 2-3 of the Withdrawal Act 2018, as amended, provide that direct EU legislation, and EU-derived domestic legislation, continue to have effect in UK domestic law after that date. In summary, the interpretation of any retained EU law is to be the same as it was before that date, insofar as the retained EU law remains unmodified in UK law and regulations have not been made providing otherwise (s. 6(3) of the Withdrawal Act 2018).</p> <p>Embedded environmental measures are detailed in Section 13.7 of this chapter that will help ensure the prevention of pollution during the construction and operational phases.</p>
<p>The Environmental Permitting (England and Wales) Regulations 2016, as amended</p>	<p>The EfW CHP Facility will require an operating permit from the Environment Agency under the Environmental Permitting (England and Wales) Regulations (EPR) 2016, as amended, as a Schedule 1 Part A installation. The EPR regime in England implements the Industrial Emissions Directive (IED) and requires the assessment of site condition, typically including collection of soil and groundwater baseline data for comparison with ongoing monitoring data during the operational phase and then additional data collected at the point of permit surrender. The EPR regime requires operators to use best available techniques (BAT), and to demonstrate the measures they have taken to protect the land, both in terms of physical pollution prevention measures such as hardstanding and bunds and the management systems and procedures in place to prevent accidental releases of pollutants to land. This lowers the risk of emissions to soil or groundwater occurring during permitted operations and operators cannot surrender their permit until they have demonstrated to the regulator that the land is in a ‘satisfactory state’ which typically means in no worse a condition than at the beginning of the operations.</p>
<p>The Industrial Emissions Directive (2010/75/EU)</p>	<p>On 31 December 2020 the UK exited the European Union following the expiry of the “transition period”, as provided for by the European Union (Withdrawal) Act 2018 (Withdrawal Act 2018). Sections 2-3 of the Withdrawal Act 2018, as amended, provide that direct EU legislation, and EU-derived domestic legislation, continue to have effect in UK domestic law after that date. In summary, the interpretation of any retained EU law is to be the same as it was before that date, insofar as the retained EU law remains unmodified in UK law and regulations have not been made providing otherwise (s. 6(3) of the Withdrawal Act 2018).</p> <p>Compliance with EPR 2016 forms part an embedded mitigation measure (see Table 13.14).</p>
<p>The Construction Design and Management Regulations 2015</p>	<p>The Construction (Design and Management) Regulations 2015 (CDM 2015) place specific duties on clients, designers, and contractors, so that health and safety is considered throughout the life of a construction project from its inception to its subsequent final demolition and removal. They include the requirement to appoint a Principal Designer and Principal Contractor to co-ordinate health and safety aspects during construction. Under CDM 2015, designers must avoid foreseeable risks so far as reasonably practicable by: eliminating hazards from the construction, cleaning, maintenance, and proposed use and demolition of a structure; reducing risks from</p>



Legislation	Implications
	<p>any remaining hazard; and giving collective safety measures priority over individual measures.</p> <p>Construction of the Proposed Development, will fall under the requirements of CDM 2015, requiring consideration of health and safety to be incorporated into the design and at the construction stage.</p> <p>Phase 1 geo-environmental desk studies for all areas of the Proposed Development, and an intrusive ground investigation of the EfW CHP Facility (leased area), have been completed and the relevant reports will be appended to the ES. These reports define areas where further investigation is needed to confirm the site's suitability for the Proposed Development in relation to land contamination, including ground gas, and to inform its design in relation to geo-hazards including ground instability. Compliance with the requirements of CDM 2015 forms an embedded mitigation measure (see Table 13.24).</p>
<p>The Health and Safety at Work Act 1974</p>	<p>The Health and Safety at Work Act and regulations made under the Act (notably The Management of Health and Safety at Work Regulations 1999) place responsibilities upon employers to carry out a risk assessment for every work activity and to document it. Besides carrying out a risk assessment, employers also need to: make arrangements for implementing the health and safety measures identified as necessary by the risk assessment; appoint competent people to help them implement the arrangements; set up emergency procedures; provide clear information and training to employees; and work together with other employers sharing the same workplace.</p> <p>Land contamination poses a hazard to groundworkers and potentially others in proximity to the construction work. Appropriate risk assessments must be carried out and arrangements made to protect the health and safety of workers directly involved in groundworks for the Proposed Development, and other human receptors who could be affected.</p> <p>Compliance with the requirements of the Act in relation to ground conditions during the construction phase is an embedded mitigation measure (see Table 13.24).</p>
<p>The Control of Asbestos Regulations 2012</p>	<p>The Control of Asbestos Regulations 2012 (CAR 2012) requires employers to prevent the exposure to asbestos of any employee so far as is reasonably practicable. Where it is not reasonably practicable to prevent exposure, the employer must take the measures necessary to reduce exposure of any such employee to the lowest level reasonably practicable, using measures other than the use of respiratory protective equipment.</p> <p>To comply with CAR 2012, in respect of asbestos-contaminated soil and construction and demolition materials, employers must consider people other than their own employees in the risk assessment required by Regulation 6, and in the action taken to prevent or control exposure required by Regulation 11. The other key regulation relevant to the Proposed Development is the requirement under Regulation 16 to prevent or reduce the spread of asbestos. Every employer must prevent or, where this is not reasonably practicable, reduce to the lowest level reasonably practicable, the spread of asbestos from any place where work under the employer's control is carried out.</p> <p>During construction works for the Proposed Development there is the potential for localised asbestos containing materials or soils to be encountered in the ground. Asbestos can be found on agricultural land because of historical ad hoc waste disposal to land or releases of fibres from Asbestos Containing Materials ('ACM') structures in poor condition, and subsequent spread by farm vehicles.</p>



Legislation	Implications
	Application of CAR 2012 during the construction works in relation to ground disturbance is an embedded mitigation measure (see Table 13.24).
The Building Regulations 2010 (SI 2010/2214)	<p>Regarding contaminated land, the Building Regulations 2010 set out requirements for buildings to be resistant to contaminants and moisture, including dangerous substances such as ground gas (including carbon dioxide and methane) and for water supply pipes to be suitably constructed to prevent contamination of the water supply occurring (including from the surrounding soil or groundwater).</p> <p>Application of the Building Regulations during the construction phase will be addressed through compliance with CDM 2015 and it is not assessed further in the EIA.</p> <p>Compliance with the requirements of CDM 2015 forms an embedded mitigation measure (see Table 13.24).</p>

Planning policy context

- 13.3.3 The Planning Act 2008 requires that when deciding an application, the decisionmaker must have regard to the relevant National Policy Statement (NPS) (in addition to the local impact report and other matters). NPS provide the primary policy basis for the consideration of Nationally Significant Infrastructure Projects (NSIPs). National Policy Statement EN-1 is the overarching national policy statement for energy whilst National Policy Statement EN-3 Renewable Energy and National Policy Statement EN-5 Electricity Networks Infrastructure are also applicable to the Proposed Development.
- 13.3.4 The principal policies and their relevance to soils (including agricultural soils), geology, hydrogeology and ground conditions are listed in **Table 13.3**. This section should be read in conjunction with **Chapter 5: Legislation and Policy**.

Table 133.3 National Policy Statement context for soils, geology, hydrogeology, and ground conditions

Policy reference	Implications	Section addressed
Overarching National Policy Statement for Energy (EN-1)	5.3.3 states that the applicant should ensure that the ES " <i>clearly sets out any effects on internationally, nationally and locally designated sites of ... geological conservation importance</i> ".	The baseline conditions with regard to sites of geological importance is presented in Section 13.5 .
	5.10.8 states that Applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as and in grades 1, 2 and 3a of the Agricultural Land Classification) and preferably use land in areas	The baseline conditions with regard to controlled waters (hydrogeology) is presented in Section 13.5 (potential effects on surface water receptors are assessed in Chapter 12: Hydrology).
		Potential effects on geological receptors and water environment receptors scoped out of the assessment are detailed in Section 13.6 .
		Embedded environmental measures in relation to soil and agricultural land protection are detailed in Section



Policy reference	Implications	Section addressed
	<p>of poorer quality (grades 3b, 4 and 5) except where this would be inconsistent with other sustainability considerations. Applicants should also identify any effects and seek to minimise impacts on soil quality considering any mitigation measures proposed. For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination.</p> <p>5.15.2 states that <i>“where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent”</i>.</p>	<p>13.7. The assessment of potential effects on these receptors is presented in Section 13.9.</p>
<p>National Policy Statement for Electricity Networks Infrastructure (EN-5)</p>	<p>EN-5 notes the general duty at Schedule 9 to the Electricity Act 1989 that proposals for new electricity infrastructure should <i>“have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest...”</i>.</p> <p>2.8.9 relates to overhead and underground cable options and notes that the Government has not laid down any general rule about when an overhead line should be considered unacceptable. <i>“The IPC should, however, only refuse consent for overhead line proposals in favour of an underground line if it is satisfied that the benefits from the non-overhead line alternative will clearly outweigh any extra economic, social and environmental impacts and the technical difficulties are surmountable.”</i> In this context considerations should include</p>	<p>The baseline conditions with regard to sites of geological importance is presented in Section 13.5.</p> <p>Potential effects on geological receptors scoped out of the assessment are detailed in Section 13.6.</p> <p>Embedded environmental measures in relation to soil receptors are detailed in Section 13.7.</p>



Policy reference	Implications	Section addressed
	<i>“the environmental and archaeological consequences (undergrounding a 400kV line may mean disturbing a swathe of ground up to 40 metres across, which can disturb sensitive habitats, have an impact on soils and geology, and damage heritage assets, in many cases more than an overhead line would)”.</i>	

13.3.5 Other national and local policies which may provide additional guidance which can be considered material to the consideration of a NSIP are detailed in **Table 13.4**, below.

Table 133.4 Planning policy context for soils, geology, hydrogeology, and ground conditions

Policy reference	Implications	Section addressed
National Planning policy		
National Planning Policy Framework, (NPPF), Ministry of Housing, Communities and Local Government, 2019	<p>The NPPF sets out the Government’s planning policies for England and how these should be applied. It provides a framework within which locally prepared plans for housing and other development can be produced.</p> <p>Regarding paragraphs 117, 178, 179 and 180, the ES will need to demonstrate, with regard to land affected or potentially affected by contamination that:</p> <ul style="list-style-type: none"> • The Proposed Development makes effective use of land, including the use of suitable brownfield land, and provides an opportunity to remediate land affected by contamination. • The Proposed Development site is suitable for the proposed use taking account of ground conditions arising from contamination. • If remediation is required, then, as a minimum, after remediation, the land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990. • Adequate site investigation information, prepared by a competent person, is provided. • The developer and landowner have met the requirement to secure a safe development with respect to land contamination. • The Proposed Development is appropriate for its location, considering the likely effects (including cumulative effects) of pollution on health, living 	Section 13.7 and 13.10



Policy reference	Implications	Section addressed
	<p>conditions and the natural environment, as well as the sensitivity of the site and wider area to impacts that could arise from the Proposed Development.</p> <ul style="list-style-type: none"> With respect to land, the Proposed Development will need to demonstrate that the potential for migration of contaminants to affect sensitive receptors has been considered and there will be no significant effects. <p>Regarding agricultural soils, paragraph 170 refers to:</p> <ul style="list-style-type: none"> The benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile (BMV) agricultural land, comprising agricultural land (grades 1-3a). <p>Regarding other soils, paragraph 170 states that policies and decisions should:</p> <ul style="list-style-type: none"> Contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan). 	

Local Policy

<p>Cambridge and Peterborough Minerals and Waste Adopted Core Strategy (2011)</p>	<p>Reference is made to geodiversity in the context of its protection along with biodiversity. Indirect reference is also made to the need to prevent pollution and protect surrounding uses.</p> <p>Core strategy CS38 sustainable use of soils: section 11.54 to 11.56 outlines the Council's policy regarding sustainable use of soils, noting that agricultural land is an important resource and that together Cambridgeshire and Peterborough have a larger proportion of high-quality agricultural land than any other areas in England. It states that proposals will be expected to address the impact of development on the extent and quality of agricultural grades 1, 2 and 3a (BMV land). Any proposal which affects BMV land will have to demonstrate that it incorporates satisfactory proposals for the sustainable use of soils, potentially including:</p> <ul style="list-style-type: none"> Using poorer quality land in preference to high quality Ensuring land can be put back into beneficial agricultural use Relating restoration proposals to the soils resource Considering the wider benefits of the soil resource Securing appropriate long-term management of the restored land and associated soils <p>Using surplus soils to improve areas of poor soils in the area</p>	<p>The baseline conditions with regard to sites of geological importance is presented in Section 13.5.</p> <p>Potential effects on geological receptors scoped out of the assessment are detailed in Section 13.6.</p> <p>Embedded environmental measures in relation to protection of soil resources and agricultural land are detailed in Section 13.7.</p>
<p>Cambridgeshire and Peterborough Minerals and Waste</p>	<p>The Cambridge and Peterborough Minerals and Waste Local Plan: Proposed Submission (Publication) Draft (Nov 2019) was submitted (March 2020) to the government for examination and The Councils have now received the</p>	<p>The baseline conditions with regard to sites of geological</p>



Policy reference	Implications	Section addressed
<p>Development Plan, Core Strategy, Development Plan Document, Adopted 19th July 2011</p> <p>Cambridge and Peterborough Minerals and Waste Local Plan: Proposed Submission (Publication) Draft (Nov 2019)</p>	<p>Inspectors Report. Once the Councils have considered the contents of the Report, they will take it to their respective committees for consideration.</p> <p>Objective 5 of the 2019 draft plan is to safeguard productive land by avoiding the loss of the best and most versatile agricultural land for waste development and prioritising the location of waste development on previously developed sites over greenfield land, minimising soil contamination and safeguarding soil quality and quantity.</p> <p>Objective 9 is to protect and encourage biodiversity and geodiversity by protecting and enhancing habitats of international, national or local importance, and utilising opportunities to enhance biodiversity and geodiversity and achieve net gains.</p> <p>Policy 24 Sustainable Use of Soils seeks the protection of best most versatile agricultural land and peat.</p> <p>Policy 20 Biodiversity and Geodiversity sets out the policy response to international, national, and locally designated sites which could include for sites designated for their geological importance.</p> <p>These objectives accord with the adopted plan (2011) which has a policy on the sustainable use of soils which notes that (11.55) where there are proposals to develop agricultural land, poorer quality land will usually be developed in preference to that of a higher quality. However, considerations including for example the importance of biodiversity, the quality and character of the landscape, its amenity value or heritage interest, accessibility to infrastructure, and the protection of natural resources, may also justify the development of best and most versatile agricultural land.</p> <p>It also states (11.56) that proposals will be expected to address the impact of development on the extent and quality of agricultural land grades 1, 2, and 3a.</p> <p>With regard to geodiversity, the adopted plan (CS35) states that waste management development will only be permitted where it has been demonstrated that there will be no likely significant adverse impact on sites of local nature conservation or geological interest, such as County Wildlife Sites or Regionally Important Geological .</p>	<p>importance is presented in Section 13.5.</p> <p>Potential effects on geological receptors scoped out of the assessment are detailed in Section 13.6.</p> <p>Embedded environmental measures in relation to soil and agricultural land protection are detailed in Section 13.7.</p>
<p>Fenland Local Plan (Adopted) (2014)</p>	<p>Objective 5.1 and 5.2 of the Local Plan relate to reducing emissions and risk of pollution from contaminated land.</p> <p>Paragraph 6.2.5 requires risks from landfill gas or suspected land contamination to be brought to the Council's and other relevant stakeholders' attention for discussion and risk assessment in accordance with the 'Model procedures for land</p>	<p>The embedded environmental measures in relation to potential land contamination</p>



Policy reference	Implications	Section addressed
	<p>contamination (CLR11)', which has now been superseded by the UK Government's Land contamination risk management (LCRM) guidance⁷.</p> <p>In relation to agricultural land, Paragraph 2.4.2, Objective 1.1 relates to minimising the irreversible loss of undeveloped land.</p> <p>The local plan notes that The Fens has half of England's Grade 1 and 2 agricultural land. The Council wishes to promote access to healthy and local food, which also has the additional benefit of being low carbon food due to the low mileage such foods have travelled. All development, whenever possible, should contribute to meeting this aim.</p> <p>Council policy LP7 for urban extensions is to make use of the best quality soils for allotments, where the development of the urban extension has to take place on agricultural land of the best and most versatile quality.</p> <p>Policy LP19 relates to conservation of the natural environment including its geological interest. This includes protecting and enhancing sites which have been designated for their international, national or local importance to an extent that is commensurate with their status, in accordance with national policy in the National Planning Policy Framework.</p>	<p>are detailed in Section 13.7.</p> <p>The embedded environmental measures with regard to soils and agricultural land protection are outlined in Section 13.7.</p> <p>The baseline conditions with regard to sites of geological importance is presented in Section 13.5.</p> <p>Potential effects on geological receptors scoped out of the assessment are detailed in Section 13.6.</p>
<p>King's Lynn and West Norfolk Development Framework Strategy (2011)</p>	<p>Local CS01 notes that significant emphasis is placed on brownfield redevelopment within the towns and villages.</p> <p>Core CS06 'Development in Rural Areas' states that the development of greenfield sites will be resisted unless essential for agricultural or forestry needs.</p> <p>CS12, 7.5.5 states that the Council will work to the provisions of the Planning Policy Statements (PPS) (now replaced by the National Planning Policy Framework) to ensure that geodiversity is protected, and that opportunities for enhancement sensitive to the area and feature are grasped.</p> <p>There is no specific policy coverage in respect of geology, soils and agricultural land, hydrogeology, and land contamination.</p>	<p>The embedded environmental measures in relation to potential land contamination/d evelopment on brownfield land are detailed in Section 13.7.</p> <p>The embedded environmental measures with regard to agricultural land protection are outlined in Section 13.7.</p>
<p>King's Lynn and West Norfolk Development</p>	<p>Local C.16.6 requires that land contamination be assessed in relation to relevant standards and national guidance.</p>	<p>The embedded environmental measures in</p>

⁷ <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>, accessed June 2021



Policy reference	Implications	Section addressed
Framework Allocations and development Management Policies (2016)	Site and Policy DM 15 – Environment, Design and Amenity and Policy DM 20 Renewable Energy state that applications will be assessed to determine whether the benefits are outweighed by the impacts with reference to contaminated land and the protection of best most versatile agricultural land and avoidance of significant loss of agricultural land.	<p>relation to potential land contamination are detailed in Section 13.7. The assessment of potential effects of the proposed development on land contamination receptors is presented in Section 13.9.</p> <p>The embedded environmental measures with regard to agricultural land protection are outlined in Section 13.7. The assessment of potential effects of the proposed development on agricultural land is presented in Section 13.10.</p>

Technical guidance

13.3.6 Technical guidance used to inform the assessment is listed in **Table 13.5** below.

Table 13.5 Technical guidance for soil, geology, hydrogeology, and ground conditions assessment

Technical guidance	Implications
Land Contamination	
UK Government, The Environmental Protection Act 1990: Part 2A Contaminated	The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance sets out how local authorities should implement the Part 2A regime, including how they should go about deciding whether land is contaminated land as referred to in the Environmental Protection Act 1990. It also elaborates on the remediation provisions of Part 2A, such as the goals of remediation, and how regulators should ensure that remediation requirements are reasonable.



Technical guidance	Implications
Land Statutory Guidance, 2012	
UK Government, Land Contamination Risk Management (LCRM), 2020	Land Contamination Risk Management (LCRM) provides the technical framework for applying a risk management process when dealing with land affected by contamination.
BS10175: 2011 + A2: 2017 Investigation of Potentially Contaminated Sites – Code of Practice⁸	Provides guidance and recommendations for the investigation of potentially contaminated sites.
NHBC, Guidance for the Safe Development of Housing on Land Affected by Contamination (2008)⁹	The guidance, whilst written to be relevant to housing development, is also generally applicable to other forms of development, to existing developments and to undeveloped land, where such sites are on land affected by contamination. It was designed to accord with the Model Procedures in Contaminated Land Report 11 (now replaced by the LCRM, however the approach is broadly unchanged) and describes the processes and activities involved in hazard identification and assessment, risk estimation and evaluation and remediation (design, implementation, and verification).
CL:AIRE, Framework for Assessing the Sustainability of Soil and Groundwater Remediation, 2010	A Framework for Assessing the Sustainability of Soil and Groundwater Remediation provides a framework for assessing the sustainability of remediation and informing the decision-making process where remediation measures are required.
CAR-SOIL: Control of Asbestos Regulations 2012, Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials (2016)¹⁰	<p>CAR-SOIL: Control of Asbestos Regulations 2012, Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials provides interpretation and guidance to all involved in the management of asbestos in both soils and construction and demolition arisings in accordance with the Control of Asbestos Regulations 2012.</p> <p>This guidance applies to any work that involves asbestos including construction works where asbestos containing materials or asbestos fibres are present in soil. Key requirements regarding the assessment include preventing the spread of asbestos.</p>
Environmental Permitting Regulations H5 Site Condition	This sets out the requirement for site condition reporting during the lifespan of a permit issued under EPR 2016.

⁸ British Standards Institute *BS10175: 2011 + A2: 2017 Investigation of Potentially Contaminated Sites – Code of Practice* (2011)

⁹ NHBC, Environment Agency, Chartered Institute of Environmental Health *Guidance for the Safe Development of Housing on Land Affected by Contamination* (2008)

¹⁰ CL:AIRE *CAR-SOIL: Control of Asbestos Regulations 2012, Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials* (2016)



Technical guidance	Implications
Report guidance (2013)¹¹	
Definition of Waste Code of Practice (DoW CoP) (2008)¹²	The Code of Practice (CoP) sets out good practice for developers to use when: assessing on a site-specific basis whether excavated materials are classified as waste or not; and, determining on a site-specific basis when treated excavated waste can cease to be waste for a particular use.
Site Preparation and Resistance to Contaminants and Moisture (2004)¹³	This deals with the following requirement of the Building Regulations 2010; 'Reasonable precautions shall be taken to avoid danger to health and safety caused by contaminants on or in the ground covered, or to be covered by the building and any land associated with the building.'
Environmental Permitting Regulations H5 Site Condition Report guidance (2013)¹⁴	This sets out the requirement for site condition reporting during the lifespan of a permit issued under EPR 2016. This is relevant to the construction and operational phase of the EfW CHP Facility.
Soils	
CIRIA Report C692: Environmental Good Practice on Site (2010)¹⁵	Provides practical advice about managing construction on site to minimise environmental impacts.
Defra: Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009)¹⁶	Outlines current guidance concerning the use of soil in construction projects, before offering stage by stage guidance on the use, management, and movement of soil on site, and the completion of appropriate soil resource surveys to inform the site working strategy (e.g., Site Waste Management Plan or Material Management Plan) and for the construction phase preparation of a Soil Resource Plan.
BS6031: 2009 Code of practice for earthworks¹⁷	Provides recommendations and guidance for unreinforced earthworks forming part of general civil engineering construction, except for dams. This standard also gives recommendations and guidance for temporary excavations such as trenches and pits.
BS3882: 2015 Specification for Topsoil	Specifies requirements for the classification and composition of natural and manufactured topsoils that are moved or traded for creating soil profiles intended to support plant growth. The standard is not applicable to subsoil, or to topsoil that is to remain in situ, however, it is not intended to preclude the use of topsoil that is already on site and suitable for its intended purpose. States that if natural topsoil is to be used without stockpiling, the topsoil shall be sampled before stripping, to the full depth that

¹¹ Environment Agency *Environmental Permitting Regulations H5 Site Condition Report guidance* (2013)

¹² CL:AIRE *Definition of Waste Code of Practice* (2008)

¹³ HM Government *Site Preparation and Resistance to Contaminants and Moisture: Approved Document C* (2004)

¹⁴ Environment Agency *Environmental Permitting Regulations H5 Site Condition Report guidance* (2013)

¹⁵ CIRIA *Report C692: Environmental Good Practice on Site* (2010)

¹⁶ DEFRA *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites* (2009)

¹⁷ British Standards Institute *BS6031: 2009 Code of practice for earthworks* (2009)



Technical guidance	Implications
The Government's Guide to Assessing Development Proposals on Agricultural Land (2021)¹⁸	<p>is intended to be stripped. Before sampling, a soil resource survey shall be carried out in accordance with the Defra Code of Practice 2009.</p> <p>Provides recommendations for topsoil stripping, handling, storage and preparation.</p> <p>States that planning decisions should be supported by use of the agricultural land classification system (ALC), taking account of losses of agricultural land below 20ha if they are deemed to be significant when the decision is made. Natural England must be consulted for all development proposals that are both: likely to cause the loss (or likely cumulative loss) of 20ha or more of BMV land and which are not in accordance with an approved development plan. For all development proposals, unnecessary loss of best and most versatile (BMV) land is to be avoided.</p> <p>The Applicant has consulted with Natural England in relation to the Proposed Development and although it is unlikely to result in the loss of more than 20 ha of BMV land, the potential for smaller losses of BMV land is acknowledged and the likely effects of the Proposed Development are assessed in Section 13.10, taking into account the embedded mitigation measures in Table 13.14.</p>
Natural England (2012) Technical Information Note TIN049	<p>States that the ALC agricultural land grading system, which considers climate, site, and soil characteristics, is used by Natural England to give advice to planning authorities when development is proposed on agricultural land or other greenfield sites that could potentially grow crops.</p>

13.4 Data gathering methodology

Study area

- 13.4.1 Baseline data collection has been undertaken to obtain information over the study area as described below. The current baseline conditions (based on information acquired to date) are presented in **Section 13.5: Baseline**.
- 13.4.2 All elements of the Proposed Development are included in **Section 13.5: Baseline**. However, as set out in paragraph 13.2.5, the presentation of baseline data and the Phase 1 geoenvironmental reports split the Proposed Development components into two main areas:
- The first area is in a predominantly urban setting and includes the majority of the proposed built infrastructure. This includes:
 - ▶ the EfW CHP Facility (leased area and additional area), CHP Connection Corridor, Access Improvements, and the Temporary Construction Compound located on land immediately east and of the EfW CHP Facility.
 - The second area comprises all Grid Connection elements and is in a predominantly rural setting, it includes:
 - ▶ the Grid Connection Corridor including the Common Grid Connection (Options 1 and 2), the Walpole Grid Connection (Option 1), the Walsoken Grid Connection (Option 2), two Grid Connection Temporary Construction

¹⁸ <https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land>, accessed June 2021.



Compounds immediately north of Lynn Road, the Walpole Grid Connection to the Walpole Substation, the Walsoken Grid Connection to the Walsoken Substation, and a Temporary Construction Compound at the Walpole Substation.

- 13.4.3 For geology, soils and agricultural land assessment, the study area is defined as the Proposed Development boundary. This is because there is no external zone of influence for geology, soils, and agriculture beyond this, as geology, soils and agricultural land are geographically discrete and not substantially influenced by changes to the surroundings. Baseline information for these receptors has been gathered through desk study, and the findings are reported in Section 13.5 Baseline.
- 13.4.4 For hydrogeology and ground conditions (land contamination) there is a zone of influence beyond the Proposed Development boundary. Baseline information for hydrogeology and ground conditions has been acquired through completion of phase 1 geo-environmental desk studies for all areas of the Proposed Development, and an intrusive ground investigation of the EfW CHP Facility (leased area).
- 13.4.5 For land contamination, the spatial scope is the Proposed Development boundary plus a Zone of Influence (ZOI) of 250m beyond this. The scoping report applied a buffer of 1km to the EfW CHP Facility (leased area), however based on the geological and hydrogeological conditions present, 250m is considered the likely maximum spatial extent (considering contaminant degradation, dilution and dispersion in the environment) at which significant land contamination effects are likely to have the potential to be realised through potentially active contaminant linkages.
- 13.4.6 The 250m ZOI has also been applied to hydrogeology for all elements of the Proposed Development based on the groundwater conditions within the study area, as the superficial and bedrock geology is classified as unproductive strata. Groundwater is present, however, this is typically perched above lower permeability layers, and there is limited potential for vertical or lateral migration.
- 13.4.7 The study area will be reviewed and amended in response to such matters as selecting the Grid Connection option, identifying additional impact pathways, and responding, where appropriate, to feedback from consultation. The boundary of the Proposed Development provides a design envelope for the PEIR, however the soils and agriculture assessment will reflect the fact that the land directly affected by construction works will be a much smaller area within the Proposed Development boundary.

Desk study

- 13.4.8 A summary of the desktop data used to inform the assessment is provided in **Table 13.6** below.


Table 13.6 Desktop data for Soils, Geology, Hydrogeology and Ground Conditions

Desktop data	Source of desktop data	Details of the information
Designated sites Aquifer designations and groundwater vulnerability Geological SSSIs information Provisional ALC maps, published by the former Ministry of Agriculture Fisheries and Food (MAFF) Post 1988 ALC Grades, published by MAFF LandIS Soilscape	MAGIC.gov.uk website	Full coverage of the study area to inform site baseline, presence of receptors and their sensitivity.
On-line Geindex 1:50,000 digital geology Borehole Record Viewer (offers access to the National Geoscience Data Centre collection of onshore scanned boreholes, shafts and well records)	British Geological Survey (BGS)	Full coverage of the study area to inform site baseline, presence of receptors and their sensitivity.
Envirocheck (Order No. 220808700_1_1, October 2019) Includes regulatory and other database information on water, waste including landfills, geology, hazardous substance, industrial land uses, sensitive land uses	Landmark	Partial coverage. Coverage of the EfW CHP facility, data is included in the Geoenvironmental Phase 1 and 2 Desk Study and Interpretative Report ¹⁹ .
Environmental and GIS data including information on geohazards, 1:10,000 and 1:50,000 historical mapping	Groundsure	Proposed development area and 250m buffer. Coverage of the entire Proposed Development site plus a 250m buffer (includes the area already covered by equivalent data supplied by Landmark Envirocheck Report as above).
Unexploded Ordnance (UXO) mapping	Zetica Limited	Full coverage of study area.
Contaminated land register data RIGS (regionally important geological sites)	Local authorities	Full coverage of study area.
Wood (2021) MVV, Wisbech Phases 1 and 2 Geoenvironmental Desk Study and Interpretative Report, Draft Report, May 2021.		Phase 1 geoenvironmental desk study and Phase 2 site investigation completed in July 2020 for the EfW CHP Facility (lease area), report has been expanded to include Phase 1 desk study for the EfW CHP Facility (additional area), the CHP Connection

¹⁹ MVV (2020) Wisbech Phases 1 and 2 Geoenvironmental Desk Study and Interpretative Report, Draft Report, July 2020.



Desktop data	Source of desktop data	Details of the information
		Corridor, Access Improvements and Temporary Construction Compound. Phase 1 geoenvironmental desk study also completed for the Grid Connection study area. These provide full coverage of the Proposed Development PEIR red line boundary with at least a 250m buffer.
Wood (2021) MVV, Medworth Grid Connection Phase 1 Geoenvironmental Desk Study, Draft Report, May 2021.		All areas of the Proposed Development are covered by Phase 1 Geoenvironmental Desk study for the Grid Connection study area, in combination with an update of the Combined Phase 1 and 2 Geoenvironmental report for the EfW CHP Facility (leased area) to include Phase 1 assessment of the EfW CHP Facility (additional area), the CHP Connection Corridor, Access Improvements and Temporary Construction Compound. These provide full coverage of the Proposed Development PEIR red line boundary with at least a 250m buffer.

Survey work

13.4.9 A summary of the survey results used to inform the assessment undertaken to date and the outstanding data requirements are provided in **Table 13.7** below.

Table 13.7 Surveys for Soils, Geology, Hydrogeology and Ground Conditions assessment

Survey	Survey dates	Survey methodology	Outstanding requirements	survey
Phase 1 Geo-environmental desk study and Phase 2 intrusive ground investigation of the Energy from Waste CHP facility site	Walkover survey for desk study completed October 2019, ground investigation completed during February and March 2020.	Works were carried out in general accordance with UK technical guidance and standards for contaminated land and geotechnical assessment, including the <ul style="list-style-type: none"> UK Government, Land Contamination Risk Management (LCRM), 2020 (previously CLR11²⁰ as identified in the Scoping Report) BSI (2015): BS5930 – Code of Practice for ground investigations. BSI (2004): BS EN 1997-1: Eurocode 7: Geotechnical Design 	Additional site walkover/intrusive ground investigation to be completed of relevant elements of the Proposed Development prior to construction.	

²⁰ Environment Agency, Contaminated Land Report 11 (CLR11) Model Procedures for the Management of Land Contamination (2004) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>, accessed June 2021.



Survey	Survey dates	Survey methodology	Outstanding requirements	survey
		<ul style="list-style-type: none"> - Part 1: General Rules. • BSI (2004): UK National Annex to Eurocode 7: Geotechnical design – Part 1: General Rules. • BSI (2007): BS EN 1997-2: Eurocode 7 – Geotechnical design – Part 2: Ground Investigation and testing. • BSI (2007): UK National Annex to Eurocode 7 – Geotechnical design – Part 2: Ground Investigation and testing. 		
Phase 1 Geo- environmental desk study for Grid Connection		<ul style="list-style-type: none"> • UK Government, Land Contamination Risk Management (LCRM), 2020. 	Targeted site walkover/intrusive ground investigation within Grid Connection study area to be completed prior to construction.	

13.5 Baseline

Current baseline

EfW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility – Soils (including Agricultural Soils)

Soils

13.5.1 BGS 1:50,000 scale mapping on the BGS GeoIndex²¹ shows that superficial deposits are present across the study area and comprise tidal flat deposits, including mud flat and sand flat deposits. These deposits consist of unconsolidated sediment, mainly mud and/or sand. They are normally encountered as a consolidated soft silty clay, with layers of sand, gravel and peat²².

13.5.2 The Soilscape mapping viewed on the MAGIC interactive map shows that the naturally occurring soils on in the study area are loamy and clayey soils of coastal flats with naturally high groundwater. These soils have a loamy texture, lime-rich to

²¹ <https://mapapps2.bgs.ac.uk/geoindex/home.html>, accessed June 2021

²² <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=TFD>, accessed June 2021



moderate fertility and the main land cover associated with them is arable agricultural land with some grassland. However, the majority of the land within the EfW CHP Facility (i.e., the leased area), the CHP Connection Corridor and Access Improvements has been previously developed for light industrial use within the last twenty to thirty years or earlier and is now urbanised meaning that most of the natural soils are likely to have been removed, covered by buildings or hardstanding or covered by imported fill materials, in addition to having potential to have been affected by contaminants associated with the historical land uses.

- 13.5.3 The EfW CHP Facility (additional area) and the adjacent Temporary Construction Compound (TCC 1), east of the EfW CHP Facility Site are currently on greenfield land (though some previous development is evident on the EfW CHP Facility (additional area)). These areas are identified as a Broad Location for Growth by Fenland District Council in the Adopted Fenland Local Plan (2014), Policy LP8.

Agricultural land

- 13.5.4 The provisional Agricultural Land Classification (ALC) classification at 1:250,000 scale shows most of the EfW CHP Facility Site as Grade 2 land, and, at the northern extent of the CHP Connection Corridor only, as urban land. Most of the area shown as Grade 2 has been previously developed and is now urban, reflecting the low resolution of the provisional ALC map, and also that the pre 1988 ALC grading has not been updated to reflect urban expansion since this time.

EfW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility – Geology

- 13.5.5 No artificial ground or made ground is recorded within the study area by the British Geological Survey (BGS)²³.
- 13.5.6 Superficial deposits are present across the study area and comprise tidal flat deposits, including mud flat and sand flat deposits. These deposits consist of unconsolidated sediment, mainly mud and/or sand. They are normally encountered as a consolidated soft silty clay, with layers of sand, gravel and peat²⁴. On the EfW CHP Facility Site (leased area) the tidal flat deposits comprised two stratigraphic groups comprising clay/silt (0.90 to >4.20m thickness), including thin peat bands or peat traces, and very fine sand (15.70 to 20.20m thickness)²⁵.
- 13.5.7 Bedrock underlying the study area is the Ampthill Clay Formation, which comprises mudstone, mainly smooth or slightly silty, pale to medium grey with argillaceous limestone (cementstone) nodules, with some rhythmic alternations of dark grey mudstone in the lower part and topmost beds typically encountered as pale grey marls with cementstone. The Ampthill Clay Formation is typically around 50m in thickness in Fenland²⁶.

²³ <https://mapapps2.bgs.ac.uk/geoindex/home.html>, accessed June 2021

²⁴ <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=TFD>, accessed June 2021

²⁵ Wood (2020), Wisbech Phases 1 and 2 Geoenvironmental Desk Study and Interpretative Report, Draft Report, July 2020 (41310-WOOD-XX-XX-RP-OC-0001_S3_1).

²⁶ <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=AMC>, accessed June 2021



EfW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility – Geodiversity

- 13.5.8 There are no international or national geodiversity sites located within this study area.
- 13.5.9 There are no Regionally Important Geological and Geomorphological Sites (RIGS) or Locally Important Geological Sites (LIGS) located within this study area.
- 13.5.10 Cambridgeshire Geological Society is developing walks within Wisbech 'island'²⁷ in partnership with Wisbech and Fenland Museum and Fenland Archaeology Group. This is due to Wisbech being a major Fenland town on the River Nene and located on the 'Silt Fen', an extensive area of marine silts which, despite the uniformity of its geology, its low-lying character shows small changes in elevation in places, with some land rising above 5 metres. The silt fen lies on middle Jurassic Clays that come to the surface to the west where the silts have been eroded. To the east is a band of younger Jurassic Clay and then the Cretaceous rocks of the Greensand and Chalk. The walks will take in features of landscape and historical interest including the river as it winds its way through the town. No areas within the study area have been identified as being part of the planned walks.

EfW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility – Hydrogeology

- 13.5.11 The superficial deposits and bedrock underlying the study area are classed by the Environment Agency as unproductive strata. There are no groundwater Source Protection Zones (SPZ) in the study area. Based on the low groundwater sensitivity it was agreed by PINS that hydrogeological impacts could be scoped out for the EfW CHP Facility Site (leased area). The same low hydrogeological sensitivity applies to the other components of the EfW CHP Facility Site (additional area), CHP Connection Corridor, Access Improvements and the Temporary Construction Compound adjacent to the EfW CHP Facility, and hydrogeological impacts can, therefore, be scoped out for these components of the Proposed Development and are not assessed further in the EIA.
- 13.5.12 Despite the absence of sensitive groundwater receptors, the 2020 site investigation on the EfW CHP Facility Site (leased area)²⁸ confirms that shallow groundwater is present and is likely to be present across all of the study area.
- 13.5.13 During the 2020 investigation on the EfW CHP Facility (leased area), groundwater was encountered in silt/clay (Tidal Flat Deposits) at 2.7m and 4.5m below ground level (bgl) in trial pits. This investigation also found perched groundwater in made ground at 0.32m bgl. Groundwater on the site was noted to be influenced by nearby drainage channels (details of these drainage channels are provided in **Chapter 12: Hydrology**). Groundwater in the deeper Tidal Flat Deposits was found to be under sub-artesian pressure (presenting a positive vertical gradient), due to the overlying low permeability clays, which are underlain by silty sand/sand deposits of between

²⁷ <http://www.fenedgetrail.org/wisbech>, accessed June 2021

²⁸ Wood (2020), Wisbech Phases 1 and 2 Geoenvironmental Desk Study and Interpretative Report, Draft Report, July 2020 (41310-WOOD-XX-XX-RP-OC-0001_S3_1).



15 and 20m thickness that were encountered at between 1.7 and 5.0m bgl. Deeper groundwater in the Tidal Flat Deposits was observed to flow in a north-westerly direction, in the direction of the River Nene (see **Chapter 12: Hydrology**). Groundwater monitoring indicated that the drainage channels are unlikely to be in connectivity with this deeper groundwater unit.

13.5.14 Based on the available information dewatering will be required during excavations and any underground works on the EfW CHP Facility Site. Suitable dewatering systems will be designed to control groundwater during construction and prevent potential effects on the stability of any adjacent structure foundations and underground services. The management of groundwater in excavations will be addressed in the Construction Environmental Management Plan (CEMP), notably in relation to the prevention of surface water pollution (see **Chapter 12: Hydrology**) and the design of suitable dewatering systems and safe excavations will also be addressed through compliance with The Construction Design and Management Regulations 2015 (CDM 2015). The EfW CHP Facility design, including deep structures such as the waste bunker, will be in accordance with design standards to mitigate geotechnical hazards including shallow groundwater.

EfW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility – Land Contamination

13.5.15 Based on the desk study for the EfW CHP Facility (leased area) potential sources of contamination that may be present or are confirmed to be present within the study area and that required further assessment include, on the EfW CHP Facility CHP facility:

- Fuel tanks;
- A septic tank;
- Waste storage/waste handling activities;
- Made ground and,
- Natural peat deposits.

13.5.16 The ground investigation of the EFW CHP Facility (leased area) found that following the interpretation of the results of soil and groundwater sampling and gas monitoring that the following potential sources of contamination required further assessment:

- Ground gas from natural peat deposits presenting a risk to humans and property through gas ingress into buildings and subsequent inhalation / accumulation.
- Organic contaminants in soil associated with onsite current activities presenting a risk to services including potable water supply pipes through permeation.

13.5.17 On other areas, including the EfW CHP Facility (additional area), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility, the desk study identified the following potential sources of contamination that may be present within the study area and that require further assessment:

- Unknown storage/other activity within hedged area;



- Onsite disused railway line, former railway line and railway land including sidings and a goods shed;
- Made ground including infilled drainage channels;
- Various offsite historical and current works; and
- Offsite former petrol filling station.

Grid Connection study area (includes: the Common Grid Connection [Options 1 and 2], the Walpole Grid Connection [Option 1], the Walsoken Grid Connection [Option 2], two Grid Connection Temporary Construction Compounds immediately north of Lynn Road, the Walpole Grid Connection to the Walpole Substation, the Walsoken Grid Connection to the Walsoken Substation, and, a Temporary Construction Compound at the Walpole Substation (hereafter the 'Grid Connection Study Area') – Soils (including Agricultural Soils)

Soils

13.5.18 BGS 1:50,000 scale mapping shows superficial deposits across the Grid Connection study area, comprising Tidal Flat Deposits, including mud flat and sand flat deposits. These deposits consist of unconsolidated sediment, mainly mud and/or sand. They are normally encountered as a consolidated soft silty clay, with layers of sand, gravel and peat²⁹. Tidal flat deposits are deposited on extensive nearly horizontal marshy land in the intertidal zone that is alternately covered and uncovered by the rise and fall of the tide. They may form the top surface of a deltaic deposit. They are characteristically low relief.

13.5.19 The Soilscape mapping viewed on the MAGIC interactive map shows that across the entire Grid Connection study area, the naturally occurring soils are loamy and clayey soils of coastal flats with naturally high groundwater. These soils have a loamy texture, lime-rich to moderate fertility and the main land cover associated with them is arable agricultural land with some grassland.

13.5.20 A BGS borehole close to the Grid Connection study area indicates the following soil sequence:

- BGS ID: 505889: BGS Reference: TF41SE14, British National Grid (27700): 549326,312148³⁰: records 0.3m of topsoil (firm to stiff brown slightly sandy silty clay with some rootlets and occasional fine gravel, underlain by stiff becoming soft grey and brown mottled thinly laminated friable sandy silty clay with some rootlets and thin soft peat laminations to 2.0m depth, underlain by soft brown very silty clay with some lenses of sand and decayed rootlets to 3.0m. Below 3.0m silty sand and sand extends to 14.0m depth, where glacial till was encountered to 15.0m underlain by glacio-lacustrine clays to the base of the borehole at 26.0m.

Agricultural land

13.5.21 Provisional Agricultural Land Classification (ALC) classification grades are available for the Grid Connection study area and these comprise Grade 1 and Grade 2 land.

²⁹ <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=TFD>, accessed June 2021

³⁰ http://scans.bgs.ac.uk/sobi_scans/boreholes/505889/images/12091463.html, accessed June 2021



Areas shown as Grade 1 include the Walpole substation, the Common Grid Connection, the southern portion of the Walpole Grid Connection, the Walsoken Grid Connection including the Walsoken substation, and an area further north on the Walpole Grid Connection, south of School Road at West Walton, the remainder is shown as Grade 2. As stated in relation to the other elements of the Proposed Development in paragraph 13.5.4, this reflects the low resolution of the provisional ALC map and that the pre 1988 ALC grading has not been updated to reflect urban expansion since this time.

- 13.5.22 A post 1988 ALC grade has been assigned to one small area of the Common Grid Connection south of the A47 road. This area classed as Grade 3a land comprises the north edge of a field south of the A47 and covers an area of approximately 0.5ha. Soil grades 1 to 3a are defined by the UK Government as being best and most versatile (BMV) land³¹.

Grid Connection study area – Geology

- 13.5.23 No artificial ground or made ground is recorded within the study area by the British Geological Survey (BGS)³².
- 13.5.24 Superficial deposits are present across the study area and comprise tidal flat deposits, including mud flat and sand flat deposits. These deposits consist of unconsolidated sediment, mainly mud and/or sand. They are normally encountered as a consolidated soft silty clay, with layers of sand, gravel and peat³³.
- 13.5.25 Bedrock underlying the study area is the Ampthill Clay Formation, which comprises mudstone, mainly smooth or slightly silty, pale to medium grey with argillaceous limestone (cementstone) nodules, with some rhythmic alternations of dark grey mudstone in the lower part and topmost beds typically encountered as pale grey marls with cementstone. The Ampthill Clay Formation is typically around 50m in thickness in Fenland³⁴.

Grid Connection study area – Geodiversity

- 13.5.26 There are no international or national geodiversity sites located within the Grid Connection study area.
- 13.5.27 There are no RIGS or LIGS located within the Grid Connection study area.
- 13.5.28 Cambridgeshire Geological Society is developing walks within Wisbech 'island'³⁵ in partnership with Wisbech and Fenland Museum and Fenland Archaeology Group. This is due to Wisbech being a major Fenland town on the River Nene and located on the 'Silt Fen', an extensive area of marine silts which, despite the uniformity of its geology, its low-lying character shows small changes in elevation in places, with some land rising above 5 metres. The silt fen lies on middle Jurassic Clays that come to the surface to the west where the silts have been eroded. To the east is a band of younger Jurassic Clay and then the Cretaceous rocks of the Greensand

³¹ www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land

³² <https://mapapps2.bgs.ac.uk/geoindex/home.html>, accessed June 2021

³³ <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=TFD>, accessed June 2021

³⁴ <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=AMC>, accessed June 2021

³⁵ <http://www.fenedgetrail.org/wisbech>, accessed June 2021



and Chalk. The walks will take in features of landscape and historical interest including the river as it winds its way through the town. The Wisbech and Fenland Museum holds important collections of local fossils and rocks.

Grid Connection study area – Hydrogeology

- 13.5.29 The superficial deposits and bedrock underlying the Grid Connection study area are classed by the Environment Agency as unproductive strata³⁶. There are no groundwater Source Protection Zones (SPZ) in the study area. Based on the low groundwater sensitivity on the EFW CHP Facility Site (leased area) it was agreed by PINS that hydrogeological impacts could be scoped out. The Grid Connection study area has the same low hydrogeological sensitivity as the EFW CHP Facility (leased area). Significant effects on groundwater are, therefore, unlikely as a result of the Proposed Development within the Grid Connection study area and as such hydrogeological impacts have been scoped out and are not assessed further in the EIA.
- 13.5.30 A BGS borehole (BGS ID: 505889; BGS Reference: TF41SE14, British National Grid (27700): 549326,312148³⁷) close to the Grid Connection records groundwater being encountered at 3.0m and rising to 1.8m in 20 minutes. The groundwater was encountered at the interface between a silty clay layer from 2.0 to 3.0 metres below ground level and the underlying silty sand.
- 13.5.31 Shallow groundwater may be encountered locally in excavations for the Grid Connection in permeable layers within the tidal flat deposits, or, where made ground is present, at the base of made ground above less permeable natural materials.

Grid Connection study area – Land Contamination

- 13.5.32 Based on the desk study for the Grid Connection study area, potential sources of contamination that may be present or are confirmed to be present within the study area and that required further assessment include:
- Onsite historical landfill at former Wisbech Canal;
 - Onsite localised made ground (road embankment, former railway line south of Green Lane/southeast of Walsoken Substation, demolished farm buildings, former kilns, disused/demolished poultry houses);
 - Onsite Walsoken and Walpole substations;
 - Onsite natural peat deposits;
 - Offsite petrol station (near Light Lane);
 - Offsite pollution incident at drainage ditch north of the site and,
 - Offsite former refuse tip (south of Walsoken substation).

³⁶ <https://magic.defra.gov.uk/MagicMap.aspx>, accessed June 2021

³⁷ http://scans.bgs.ac.uk/sobi_scans/boreholes/505889/images/12091463.html, accessed June 2021



All elements of the Proposed Development: Ecology and Hydrology

- 13.5.33 There are interactions between soils and agricultural land receptors and ground conditions with ecological and hydrological receptors, the baseline for ecological and hydrological receptors is detailed in **Chapter 11: Biodiversity** and **Chapter 12: Hydrology** respectively.

Future baseline

- 13.5.34 This section sets out how the current baseline is predicted to change by the time the Proposed Development is due to be constructed and then operated (construction to take place 2023-2026 with operation 2026 – 2066).

EfW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility

- 13.5.35 No changes are anticipated in the baseline condition of the EFW CHP Facility (leased area) or the Access Improvements area, as the land is assumed, in the absence of construction works to continue being used and managed in its present function.
- 13.5.36 The greenfield land on which the EfW CHP Facility (additional area) and the Temporary Construction Compound adjacent to the EfW CHP Facility is likely to undergo commercial development in the short to medium term as a result of the land being allocated for urban extension in Fenland Local Plan 13 (2014), Policy LP8.
- 13.5.37 With respect to land contamination, this is managed in England by Part 2A of the Environmental Protection Act and the Town and Country Planning Act 1990. Part 2A requires local authorities to identify potentially contamination land in their area and ensure potential risks from historical contamination are assessed and mitigated accordingly. For future developments, The Town and Country Planning Act requires the consideration of the potential for contamination to be present and ensure a site is suitable for the proposed end use. There is potential for the reintroduction of the former March to Wisbech Railway to go ahead on the CHP Connection Corridor, and in this instance it is likely that assessment of the land quality in relation to land contamination would be needed, which could result in remediation being needed.

Grid Connection study area

- 13.5.38 The Proposed Development elements within the Grid Connection study area are likely to remain in their current use including agriculture, roads and substations, with no significant effects on soil resources and agricultural land anticipated.
- 13.5.39 With respect to land contamination, investigation of the landfill at the former Wisbech Canal within the Common Grid Connection has already been completed by the Borough Council of King's Lynn and West Norfolk under Part 2A of the Environmental Protection Act³⁸ and no remedial measures have been deemed necessary within the study area. No other potential contamination sources have been investigated under Part 2A within the Grid Connection study area, and it is

³⁸ https://www.west-norfolk.gov.uk/info/20138/contaminated_land/100/contaminated_land_part_2a, accessed June 2021



therefore reasonable to conclude that there would not be a change in the Grid Connection Corridor land contamination status over time.

- 13.5.40 Soil and agricultural land resources are geographically discrete, and without development, these resources will still be subject to land management effects (e.g., farming activities) which could improve or degrade the resource, however, it is not possible to predict these effects sufficiently to quantify them.
- 13.5.41 Soil and agricultural land will be subject to the effects of climate change. The MAGIC interactive map shows that the priority habitats within the southwest and northern areas of the Grid Connection study area are in an area assessed to be at low vulnerability to climate change, based on established climate change adaptation principles. Whilst this assessment does not refer specifically to soils, soils will be affected by climate change, notably by changes to rainfall patterns, such as increased intensity of flooding which can contribute to soil compaction, waterlogging and erosion.

13.6 Scope of the assessment

- 13.6.1 This section sets out the scope of the PEIR assessment for geology, hydrogeology and ground conditions (land contamination). In response to the feedback received to date as set out in **Section 13.2**, and the refinement of the Proposed Development red line boundary for the PEIR stage, this section also incorporates soil and agricultural land.

Spatial scope

- 13.6.2 The spatial scope of the assessment for soil, agricultural land and geology, covers the PEIR boundary of the Proposed Development, the spatial scope of the assessment for hydrogeology and ground conditions (land contamination) covers the PEIR boundary of the Proposed Development together with the ZOI that have formed the basis of the study area, as described in **Section 13.4**.
- 13.6.3 As described above, for the purposes of baseline data gathering, the Grid Connection study area is treated as a distinct study area due to its linear shape, its location in a predominantly rural setting, and the type of development proposed, which mainly features lengths of below ground and above ground cables, in addition to infrastructure to connect into either the existing Walsoken or Walpole substations, and associated temporary access and alternative temporary construction compounds.
- 13.6.4 The other Proposed Development elements are: the EfW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility. These are also treated as a distinct study area due to their urban setting.

Temporal scope

- 13.6.5 The temporal scope of the assessment of hydrogeology and ground conditions (contaminated land) is consistent with the period over which the development would be carried out and, therefore, covers the construction and operational periods. As



stated in **Chapter 4 Approach to the EIA**, the environmental effects associated with the decommissioning phase are considered similar to those reported for the construction phase works, albeit with a lesser duration of one year. This is because any decommissioning works would be likely to require a similar working area, and result in similar (or less) ground disturbance. The likely significance of effects relating to the construction phase assessment reported in relation to ground conditions, soils and agricultural land are therefore applicable to the decommissioning phase.

- 13.6.6 Effects on geology, soil and agricultural land may arise during the construction period but will not continue into the operational period.
- 13.6.7 The assessment has been based on the construction programme set out in **Section 3.9** of this PEIR.
- 13.6.8 The operational period covers the period 2026 to 2066.

Potential receptors

- 13.6.9 The spatial and temporal scope of the assessment enables the identification of receptors that may experience a change because of the Proposed Development.
- 13.6.10 The receptors identified for the EfW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility that may experience significant effects associated with land contamination are outlined in **Table 13.8**.
- 13.6.11 The receptors identified for the Grid Connection study area that may experience significant effects associated with land contamination are outlined in **Table 13.9**.

Table 13.8 Land contamination receptors scoped in for further assessment (EfW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility)

Receptor group	Receptors included in group
Human Health	Commercial site users/ farm workers. Members of the public/ landowners. Residents
Property	Agriculture (crops and livestock) Buildings, structures, utilities and infrastructure.
Controlled Waters	Surface waters (surface water drainage channels).



Table 13.9 Land contamination receptors scoped in for further assessment (Grid Connection study area)

Receptor group	Receptors included in group
Human Health	Commercial site users/ farm workers Members of the public/ landowners Residents
Property	Agriculture (crops and livestock) Buildings, structures, utilities and infrastructure.
Controlled Waters	Surface waters (surface water drainage channels).

13.6.12 The soil and agricultural land receptors identified for the Grid Connection study area that may experience significant effects are outlined in **Table 13.10**.

Table 13.10 Soils and agricultural land receptors scoped in for further assessment (Grid Connection study area)

Receptor	Relevant assessment criteria	Likely significant effects
Construction phase		
Soil and agricultural land quality	<p>Planning guidance and the National Planning Policy Framework (NPPF) refer to the need to protect Best and Most Versatile (BMV) agricultural land (ALC grades 1-3a).</p> <p>The NPPF also states that planning decisions should “<i>contribute to and enhance the natural and local environment by protecting and enhancing ... soils (in a manner commensurate with their statutory status or identified quality in the development plan)</i>”</p>	<p>Changes to soil structure due to inappropriate storage and/or handling and/or due to the use of heavy machinery which causes compaction, resulting in waterlogging of land, potentially soil erosion and loss of soil organic matter and reductions in/loss of soil functions.</p> <p>Soil erosion (loss of soil resource, degradation of BMV land), caused by run off from stockpiles and/or runoff from stripped soil. Soil erosion can lead to eutrophication of local waterbodies. The risks to water environment receptors from silty run-off are assessed in Chapter 12: Hydrology.</p>
		<p>Land-take for development, resulting in change of land cover and permanent loss of topsoil resources and soil functions and permanent loss of agricultural land.</p>

13.6.13 The following geology, soils, hydrogeology, and ground conditions (land contamination) receptors are scoped out from being subject to further assessment, because potential effects are not considered likely to be significant.



13.6.14

Table 13.11 summarises receptors scoped out for the EfW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility and **Table 13.12** receptors scoped out for the Grid Connection study area.

Table 13.11 Geology, soils, hydrogeology, ground conditions receptors scoped out of further assessment (EfW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility)

Receptor	Impact	Justification	Agreement
Geology and geodiversity	Damage to examples of geodiversity	There are no designated geological sites within the study area.	The EIA Scoping Opinion provided by PINS required that effects on geology be considered for all areas of the Proposed Development. The conditions providing justification for scoping out of effects on geology/geodiversity on the EfW CHP Facility (leased area) are common to the entire study area, therefore, it is proposed to scope out geology/geodiversity for the EfW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility.
Hydrogeology	Impacts on shallow groundwater	The superficial deposits and bedrock geology underlying the the EfW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility are classed as unproductive strata. Whilst shallow groundwater is present, it is typically perched on top of less permeable layers within the tidal flat deposits and does not form a continuous or productive aquifer. There are no known groundwater abstractions within the study area and no SPZs. Although there are no sensitive groundwater receptors, embedded mitigation measures for ensuring that pollution of controlled waters does not occur during the construction phase are outlined in Table 13.14 .	The EIA Scoping Opinion provided by PINS required that effects on hydrogeology be considered for all areas of the Proposed Development. The conditions providing justification for scoping out of effects on hydrogeology on the EfW CHP Facility (leased area) are common to the entire study area, therefore, it is proposed to scope out hydrogeology.



Receptor	Impact	Justification	Agreement
Soils and agricultural land	Loss of soil, impacts on soil function, loss, or degradation of agricultural land	The EfW CHP Facility, the CHP Connection Corridor and Access Improvements are located on brownfield land. The EfW CHP Facility (additional area) and the adjacent Temporary Construction Compound, east of the EfW CHP Facility Site are currently on greenfield land (though some previous development is evident on the EfW CHP Facility (additional area), which is currently identified as Provisional ALC Grade 2. However, this area is allocated for urban extension in Fenland Local Plan 13 (2014), Policy LP8. Additionally, the construction compound will be temporary (for the Proposed Development construction phase) and the land will be reinstated as greenfield as part of the Proposed Development.	<p>The EIA Scoping Opinion provided by PINS states that soil resources could be scoped out at the EfW CHP Facility Site (leased area). The conditions providing justification for scoping out of effects on hydrogeology are common to the study area with the exceptions noted at the EFW CHP Facility Site (additional area), and the Temporary Construction Compound. Both areas are on land allocated for urban expansion, and the Temporary Construction Compound will be reinstated as greenfield land as part of the Proposed Development and, therefore, it is proposed to scope out soil resources for EfW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EfW CHP Facility.</p> <p>The EIA Scoping Opinion provided by Natural England requires consideration of effects on BMV agricultural land. The only greenfield areas are the EFW CHP Facility Site (additional area), and the Temporary Construction Compound. Based on this land being allocated for urban expansion by Fenland District Council the loss of this agricultural land is already accounted for within the planning system, effects on agricultural land from the Proposed Development have not been assessed further.</p>
Land contamination	Health effects on construction workers	Risks to construction workers have been scoped out of the assessment on the basis that these risks will be dealt with under health and safety legislation including: The Health and Safety at Work Act 1974; The Management of Health and Safety at Work Regulations 1999; and The Construction (Design and Management) Regulations 2015. Compliance with this legislation should ensure that	Agreed with PINS during Scoping.



Receptor	Impact	Justification	Agreement
		no significant adverse effects on these receptors should occur because of the Proposed Development during its construction or operation.	
Land contamination	Effects on human health and environmental receptors due to operation of the EfW CHP Facility	<p>Standard construction practices and actions would be undertaken to meet the legislative requirements of CDM 2015 in the design of the EfW CHP Facility.</p> <p>Risks to workers are dealt with under The Health and Safety at Work Act 1974 as outline above.</p> <p>During its operation, the EfW CHP Facility will be regulated under an Environmental Permit under the Environmental Permitting (England and Wales) Regulations 2016, which regulates emissions to the environment and requires operators to provide information on the site condition, typically including soil and groundwater quality.</p>	<p>PHE requires emissions to and from the ground to be considered for the operational phase.</p> <p>Avoidance of significant effects on human health and environmental receptors will be achieved through regulatory compliance during construction and operation.</p>

Table 13.12 Geology, soils, hydrogeology, and land contamination receptors scoped out of further assessment (Grid Connection study area)

Receptor	Impact	Justification	Agreement
Geology and geodiversity	Damage to examples of geodiversity	There are no designated geological sites within the study area.	The EIA Scoping Opinion provided by PINS required that effects on geology be considered for all areas of the Proposed Development. The conditions providing justification for scoping out of effects on geology/geodiversity at the EFW CHP Facility Site (leased area) are common to the Grid Connection study area, therefore, it is proposed to scope out geology/geodiversity for all elements of the Grid Connection study area.



Receptor	Impact	Justification	Agreement
Hydrogeology	Impacts on shallow groundwater	<p>The superficial deposits and bedrock geology underlying the Grid Connection are classed as unproductive strata. Whilst shallow groundwater is present, it is typically perched on top of less permeable layers within the tidal flat deposits and does not form a continuous or productive aquifer. There are no known groundwater abstractions within the study area and no SPZs.</p> <p>Although there are no sensitive groundwater receptors, embedded mitigation measures for ensuring that pollution of controlled waters does not occur during the construction phase are outlined in Table 13.14.</p>	The EIA Scoping Opinion provided by PINS required that effects on hydrogeology be considered for all areas of the Proposed Development. The conditions providing justification for scoping out of effects on hydrogeology at the EFW CHP Facility Site (leased area) are common to all areas of the Proposed Development and, therefore, it is proposed to scope out hydrogeology for the Grid Connection study area.
Land contamination	Health effects on construction workers	Risks to construction workers have been scoped out of the assessment on the basis that these risks will be dealt with under health and safety legislation including: The Health and Safety at Work Act 1974; The Management of Health and Safety at Work Regulations 1999; and The Construction (Design and Management) Regulations 2015. Compliance with this legislation should ensure that no significant adverse effects on these receptors should occur because of the Proposed Development during its construction or operation.	Agreed with PINS during Scoping.

Likely significant effects (all components of the Proposed Development)

- 13.6.15 Potential effects on ground conditions (land contamination) receptors that have been taken forward for assessment in relation to all elements of the Proposed Development, comprising:
- the EFW CHP Facility (leased and additional areas), CHP Connection Corridor, Access Improvements and Temporary Construction Compound adjacent to the EFW CHP Facility, and,



- the Grid connection study area (the Common Grid Connection [Options 1 and 2], the Walpole Grid Connection [Option 1], the Walsoken Grid Connection [Option 2], two Grid Connection Temporary Construction Compounds immediately north of Lynn Road, the Walpole Grid Connection to the Walpole Substation, the Walsoken Grid Connection to the Walsoken Substation, and, a Temporary Construction Compound at the Walpole Substation).

13.6.16 Potential effects on soils and agriculture receptors that have been taken forward for assessment in relation to the Grid Connection study area only are summarised in **Table 13.13**.

Table 13.13 Potential effects of the Proposed Development on land contamination receptors, and potential effects of the Proposed Development elements within the Grid Connection study area, scoped in for further assessment

Activity and impact	Potential effect	Receptor
Construction – effects on ground conditions receptors		
Construction activities located on, or adjacent to landfill or other potentially contaminated sites such as industrial/waste management facilities and fuel storage/distribution facilities or (ground gas risk only) on peat deposits	Mobilisation of contamination via numerous pathways (including groundwater, surface water, preferential pathway creation and leaching from soil) resulting in contamination of controlled waters (where potential sources of contamination have been identified).	Controlled waters receptors (surface waters).
	Mobilisation of contamination to human health receptors via numerous pathways (including groundwater, surface water, leaching from soil, migration of vapours and windblown dusts) resulting in health effects.	Human health receptors (commercial site users, farm workers, members of the public, landowners, residents).
	Build-up of gases in confined spaces in existing or newly constructed infrastructure on and adjacent to the land required for the Proposed Development.	Human health receptors (commercial site users, farm workers, members of the public, landowners, residents). Property (enclosed spaces) – new and existing infrastructure.
	Damage to infrastructure from aggressive ground conditions (such as sulphate attack on concrete) and geohazards including unstable ground conditions.	Human health receptors, land and property (including existing and new infrastructure).
Construction vehicle and equipment maintenance and storage of fuels/oils for	Accidental spillages and leaks resulting in ground contamination and risks to	Controlled waters receptors (surface waters).



Activity and impact	Potential effect	Receptor
construction vehicles and equipment	controlled waters during construction. This includes the potential for leakage of bentonite during Horizontal Directional Drilling (HDD).	
Operation – effects on ground conditions receptors		
Presence of significant quantities of artificial ground, disturbed landfill material or excavated and re-used material beneath permanent infrastructure.	Risks to human health from presence of contaminants in near surface soils as a result of disturbance to landfill, railway land or other artificial ground or soil affected by historical contamination or other excavated and reused material.	Human health receptors (commercial site users, farm workers, members of the public, landowners, residents).
	Mobilisation of landfill leachate or leachate from other made ground, contaminated groundwater migration, which, if not properly managed, could accumulate and/or migrate to controlled waters.	Controlled waters receptors (surface waters).
	Build-up of ground gases in confined spaces in existing or newly constructed infrastructure.	Human health receptors (commercial site users, farm workers, members of the public, landowners, residents).
		Property (enclosed spaces) – new and existing infrastructure.
	Accidental spillages and leaks impacting controlled waters during operation and maintenance activities.	Controlled waters receptors (surface waters).
Construction phase – soil and agricultural land receptors (Grid Connection study area only)		
Changes to soil structure due to inappropriate storage and/or handling and/or due to the use of heavy machinery which causes compaction, resulting in waterlogging of land, potentially soil erosion and loss of soil organic matter and reductions in/loss of soil functions.	Compaction would decrease permeability of the soils and lead to waterlogging of land, and potentially soil erosion and loss of soil organic matter. Heavy machinery can also lead to the loss of topsoil resource through mixing with subsoil.	Soil and agricultural land.
Soil erosion (loss of soil resource, degradation of BMV land), caused by run off from stockpiles and/or runoff from stripped soil.	Soil erosion can lead to eutrophication of local waterbodies in addition to loss of the soil resource. The risks to water environment receptors from silty run-off are assessed in Chapter 12: Hydrology .	Soil and agricultural land.



Activity and impact	Potential effect	Receptor
Land-take for development, resulting in change of land cover and permanent loss of topsoil resources and soil functions and permanent loss of agricultural land.	Permanent loss of agricultural land. Permanent loss of topsoil resources and soil functions.	Soil and agricultural land.

13.6.17 Damage to infrastructure from aggressive ground conditions, contaminants in soils/groundwater and geohazards including unstable ground conditions and settlement has been scoped out of the assessment as this will be covered in design through compliance with CDM 2015. The basis of the structural design for the Proposed Development and any mitigation for geo hazards will be completed in accordance with design standards to minimise the risk of structural or geotechnical instability. This also applies to hazards including ground gas and contaminants with potential to permeate water pipes.

13.7 Embedded environmental measures

13.7.1 A range of environmental measures have been embedded into the development proposals as outlined in **Section 3.3**. **Table 13.14** outlines how these embedded measures will influence the soil, agricultural land and ground conditions (land contamination) assessment.

Table 13.14 Summary of the embedded environmental measures and how these influence the soil, agricultural land and ground conditions (land contamination) assessment

Receptor	Changes and effects	Embedded measures and influence on assessment
BMV agricultural land and soil	Potential for some temporary and permanent soil displacement, resulting in changes to soil structure due to inappropriate storage and/or handling and/or due to the use of heavy machinery which causes compaction, resulting in waterlogging of land, potentially soil erosion and loss of soil organic matter and reductions in/loss of soil functions.	Soil on BMV land that is temporarily displaced during UGC and OHL construction, including all Temporary Construction Compounds, will be reinstated approximately in its original location where possible. The selection of predominantly OHL rather than UGC for the Grid Connection to the Walpole substation limits the amount of disturbance to BMV land in comparison to trenching. Soil handling, storage and reinstatement measures will be integrated into the Construction Environmental Management Plan (CEMP) to avoid damage to soil. The use of imported fill materials for the Grid Connection that would displace soil and the use of soil strengthening that would compromise BMV land quality will be limited to that required to ensure the stability of the Grid Connection.



Receptor	Changes and effects	Embedded measures and influence on assessment
BMV agricultural land and soil	Compaction of soil	<p>As outlined in Chapter 3, the construction of the UGC and OHL would not require the formation of new permanent access tracks. Some temporary access tracks may be needed to enable construction teams to access each pole location. Farm or field entrances would be used wherever possible, and the majority would not require modification. Those which do are likely to require the importation of crushed stone on a geotextile mat. This allows for easy removal and reinstatement.</p> <p>If ground conditions require it, a temporary track of either metal, wood or plastic, would be used for vehicles to access the working areas. This would be removed once construction is complete.</p> <p>Tracked vehicles or wheeled vehicles of similar weight to typical farm vehicles will be used to install the UGC and OHL.</p> <p>Measures to avoid soil compaction will be integrated into the CEMP to avoid damage to soil.</p>
Soil	Potential for some temporary and permanent soil displacement during UGC and OHL construction, potential for soil strengthening to be needed for pole installation.	<p>Soil that is temporarily displaced during trenching to install underground cables or pole installation will be reinstated approximately in its original location where possible.</p> <p>The use of imported fill materials for the Grid Connection that would displace soil and the use of soil strengthening that would compromise soil functions (including biomass, hydrological, carbon cycling) will be limited. It may be required to ensure the stability of a small number of wood poles used for the OHL section of the Grid Connection. This will be confirmed following intrusive site investigation.</p> <p>Permanently displaced soil will be reused within the Proposed Development boundary where practicable.</p> <p>Construction strategies will be implemented that will seek to maximise the reuse of excavated clean materials where practicable and feasible. Prior to construction, a materials management plan (MMP) will be prepared that outlines where excavated non-waste materials will be reused in line with the CL:AIRE Definition of Waste Code of Practice (DoWCoP). The MMP will include a declaration by a Qualified Person that the MMP has been completed in accordance with the DoWCoP and that best practice is being followed.</p>



Receptor	Changes and effects	Embedded measures and influence on assessment
BMV agricultural land and soil	Permanent loss of BMV land and soil due to land take and soil sealing for construction of the substation.	The substation connection is likely to take the form of a small compound within or adjacent to the existing Walpole substation or within the Walsoken substation. Land take for the substation connection is expected to be comparatively small (significantly less than 20ha and likely to be less than 0.1 ha). Design details and precise location are subject to agreement with the [DNO] and shall be confirmed for the ES.
Ground conditions receptors	Creation of new contaminant migration pathways resulting in significant effects on human health, the environment or property.	Phase 1 geo-environmental desk studies for all elements of the Proposed Development have been completed and the relevant reports are appended to the PEIR. A Phase 2 contaminated land ground investigation was undertaken for the majority of the EfW CHP Facility (leased area). Further ground investigation will be completed as required to inform the design of the Proposed Development in accordance with the UK Government's LCRM guidance, so that following development the land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990.
Ground conditions receptors	Creation of new contaminant migration pathways.	Where the cable route crosses the known historical landfill at the former Wisbech Canal within the Grid Connection study area, horizontal directional drilling (HDD) will be used to avoid encountering the waste materials by going below it. Ground investigation will be carried out to allow a suitable design depth for the HDD route to safely avoid the landfill and mitigate risks to the new infrastructure from landfill leachate. Alternatively the pre-positioning of a conduit, installed by Cambridgeshire County Council Highways in connection with committed junction improvement works will be used. Main roads or watercourses will be crossed by HDD or other trenchless technology where this represents the best environment solution and is financially and technically feasible.
Ground conditions receptors	Release of contaminants to the environment during construction resulting in effect on human health, environmental or property receptors.	During both construction and operation, vehicle maintenance and refuelling of machinery will be undertaken within designated areas where spillages can be easily contained, and machinery will be routinely checked to ensure it is in good working condition. Areas at risk of spillage or containing hazardous materials, such as vehicle maintenance areas and hazardous



Receptor	Changes and effects	Embedded measures and influence on assessment
		substance stores (including fuel, oils and chemicals) will comply with industry good practice, be bunded, have appropriate containment and segregation and will be risk assessed and carefully sited to minimise the risk of hazardous substances entering the drainage system, or the local watercourses, or sensitive land based receptors. Where feasible, such areas will be sited at least 10m from a watercourse and away from areas at risk of flooding. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage.
Ground receptors	conditions Effects on human health due to unanticipated contamination being encountered during construction work.	Contamination if found will be subject to appropriate risk assessment and if necessary, either removed, treated and/or mitigated as part of the Proposed Development. The CEMP will include an unexpected contamination protocol.
Ground receptors	conditions Effects on human health, damage to the environment or property due to ground instability.	The basis of the structural design for the Proposed Development will be completed in general accordance with design standards to minimise the risk of structural or geotechnical instability.
Ground receptors	conditions Effects on human health, damage to the environment or property.	Any disposal off-site of excavated material will be undertaken in consultation with the landowner/occupier and in accordance with the Waste Management Regulations.
Ground receptors	conditions Effects on human health, damage to the environment or property.	Construction strategies will be implemented that will seek to maximise the reuse of excavated clean materials onsite where practicable and feasible. Prior to construction, a materials management plan (MMP) will be prepared that outlines where excavated non-waste materials will be reused in line with the CL:AIRE Definition of Waste Code of Practice (DoWCoP). The MMP will include a declaration by a Qualified Person that the MMP has been completed in accordance with the DoWCoP and that best practice is being followed.
Ground receptors	conditions Effects on human health, damage to the environment or property.	The Applicant will confirm that the land used for the development is suitable for the proposed use with respect to the potential for soil and groundwater contamination and, that where necessary, risk-based remediation is undertaken in line with Environment Agency (2020) guidance (Land Contamination: Risk Management [LCRM]).



Receptor	Changes and effects	Embedded measures and influence on assessment
Ground receptors	conditions Effects on human health, damage to the environment or property.	The precise design of any remediation strategy will be confirmed in the detailed design.
Ground receptors	conditions Pollution of ground or controlled waters (surface water).	If water being pumped from excavations is suspected to be contaminated, appropriate measures will be taken in accordance with Environment Agency guidance and the Environmental Permitting Regulations to prevent uncontrolled or unauthorised releases of this water to ground or to the water environment.
Ground receptors	conditions Pollution of ground or controlled waters (surface water).	Any temporary onsite storage of excavated materials suspected or confirmed to be contaminated will be on impermeable sheeting, covered over and with adequate leachate/ runoff drainage to prevent migration of contaminants from the stockpile. Materials will be segregated where possible to prevent cross-contamination occurring. Such materials will only be reused if they are confirmed as suitable for use in line with the requirements of the Materials Management Plan.
Ground receptors	conditions Unauthorised emissions to land during the operation of the EfW CHP Facility.	The EPR regime requires operators to use best available techniques (BAT), and to demonstrate the measures they have taken to protect the land, both in terms of physical pollution prevention measures such as hardstanding and bunds and the management systems and procedures in place to prevent accidental releases of pollutants to land. This lowers the risk of emissions to soil or groundwater occurring during permitted operations. Risks to human health during the operational phase must also be controlled through compliance with The Health and Safety at Work Act 1974.



13.8 Assessment methodology

13.8.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to the EIA**, and specifically in **Sections 4.5 to 4.7**. However, whilst this has informed the approach that has been used for the soil and agricultural land assessment and the ground conditions (land contamination) assessment, it is necessary to set out how the respective methodologies have been applied, and adapted as appropriate, to address the specific needs of the assessments.

General approach: Ground conditions (land contamination)

13.8.2 This section describes the approach for the assessment of the effects of the Proposed Development on the ground conditions (contaminated land) receptors, as outlined in the Scoping Report.

13.8.3 The approach to the assessment and management of contaminated land is usually based on the risk presented by the contamination for a circumstance, i.e. the probability and consequence of an event occurring. However, environmental impact assessment seeks to identify the magnitude of a change in status from baseline (impact) caused by the Proposed Development and the consequences of those changes (effects).

13.8.4 In this assessment we will define the impact and its effect as a change in risk, and then assess the magnitude of the change in risk from baseline, through the construction phase to post development conditions. The methodology used for assessing the risk presented by contaminated land is set out below.

Risk assessment

13.8.5 The process of managing contaminated land, as set out in LCRM, is based on risk assessment. The assessment of risks from contaminated land is based upon the identification and subsequent assessment of a contaminant linkage. A contaminant linkage requires the presence of:

- Source of contamination;
- Receptor capable of being adversely effected and,
- Pathway capable of exposing a receptor to the contaminant.

13.8.6 The risk assessment aims to assess the significance of each potential contaminant linkage. The key to the classification is that the designation of risk is based upon the consideration of both:

- The magnitude of the potential consequence (i.e. severity). It takes into account both the potential severity of the hazard and the sensitivity of the receptor; and,
- The magnitude of probability (i.e. likelihood). It takes into account both the presence of the hazard and receptor and the integrity of the pathway.

13.8.7 The definitions for the qualitative risk assessment have been taken from "Guidance for the Safe Development of Housing on Land Affected by Contamination" Annex 4 R&D Publication 66: 2008 Volume 2.



13.8.8 The likelihood classifications for the contaminant linkages being realised is presented in **Table 13.15**.

Table 13.15 Likelihood classifications of contaminant linkage being realised

Classification	Definition	Examples
High Likelihood	There is contaminant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.	a) Elevated concentrations of toxic contaminants are present in soils in the top 0.5m in a residential garden. b) Ground/groundwater contamination could be present from chemical works, containing several underground storage tanks, having been in operation on the same site for over 50 years.
Likely	There is contaminant linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.	a) Elevated concentrations of toxic contaminants are present in soils at depths of 0.5-1.0m in a residential garden, or the top 0.5m in public open space. b) Ground/ groundwater contamination could be present from an industrial site containing an Underground Storage Tank (UST) present between 1970 and 1990. The tank is known to be single skin. There is no evidence of leakage although there are no records of integrity tests.
Low Likelihood	There is contaminant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place and is less likely in the shorter term.	a) Elevated concentrations of toxic contaminants are present in soils at depths >1m in a residential garden, or 0.5-1.0m in public open space. b) Ground/groundwater contamination could be present on a light industrial unit constructed in the 1990s containing a UST in operation over the last 10 years – the tank is double skinned but there is no integrity testing or evidence of leakage.
Unlikely	There is contaminant linkage, but circumstances are such that it is improbable that an event would occur even in the very long-term.	a) Elevated concentrations of toxic contaminants are present below hardstanding. b) Light industrial unit <10 yrs old containing a double skinned UST with annual integrity testing results available.

13.8.9 The magnitude of the potential consequence of a contaminant linkage gives an indication of the sensitivity of a given receptor to a particular source or contaminant of concern under consideration. It is based on full exposure via the linkage being examined. The classification of consequence is presented in **Table 13.16**.



Table 13.16 Classification of consequence

Classification	Human Health	Controlled Water	Ecology	Property Structures/ Crops and animals	Examples
Severe	Highly elevated concentrations likely to result in “significant harm” to human health as defined by the EPA 1990, Part 2A, if exposure occurs.	Equivalent to Environment Agency (EA) Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce.	Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population.	Catastrophic damage to crops, buildings or property.	<p>Significant harm to humans is defined in the Contaminated Land Statutory Guidance as death, life threatening diseases (e.g. cancers), other diseases likely to have serious impacts on health, serious injury, birth defects, and impairment of reproductive functions. Major fish kill in surface water from large spillage of contaminants from site.</p> <p>Highly elevated concentrations of Hazardous or priority substances present in groundwater close to small potable abstraction (high sensitivity).</p> <p>Explosion, causing building collapse (can also equate to immediate human health risk if buildings are occupied).</p>
Medium	Elevated concentrations which could result in “significant harm” to human health as defined by the EPA 1990, Part 2A if exposure occurs.	Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce.	Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population.	Significant damage to crops, buildings or property.	<p>Significant harm to humans is defined in the Contaminated Land Statutory Guidance as death, life threatening diseases (e.g. cancers), other diseases likely to have serious impacts on health, serious injury, birth defects, and impairment of reproductive functions. Damage to building rendering it unsafe to occupy e.g. foundation damage resulting in instability.</p> <p>Ingress of contaminants through plastic potable water pipes.</p>



Classification	Human Health	Controlled Water	Ecology	Property Structures/ Crops and animals	Examples
Mild	Exposure to human health unlikely to lead to “significant harm”.	Equivalent to EA Category 3 pollution incident including minimal or short-lived effect on water quality; marginal effect on amenity value, agriculture or commerce.	Minor or short-lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population.	Minor damage to crops, buildings or property.	Exposure could lead to slight short-term effects (e.g. mild skin rash). Surface spalling of concrete.
Minor	No measurable effects on humans.	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	Repairable effects of damage to buildings, structures and services.	The loss of plants in a landscaping scheme. Discoloration of concrete.



13.8.10 The risk matrix to link the likelihood and consequence is shown in **Table 13.17**. Risks of moderate or higher are potentially significant and are shown in bold in the table.

Table 13.17 Risk Matrix

Likelihood:	Unlikely	Low Likelihood	Likely	High Likelihood
Potential Consequence:				
Severe	Moderate/low risk	Moderate Risk	High Risk	Very High Risk
Medium	Low	Moderate/low risk	Moderate Risk	High Risk
Mild	Very low risk	Low Risk	Moderate/low risk	Moderate Risk
Minor	Very low risk	Very low risk	Low Risk	Low Risk

13.8.11 The overall risk definitions are summarised in **Table 13.18**.

Table 13.18 Risk Definitions

Risk	Definition
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the Site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.
High	Harm is likely to arise to a designated receptor from an identified hazard at the Site without remediation action. Realisation of the risk is likely to present a substantial liability to the Site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.
Low	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely at worst that this harm if realised would normally be mild. It is unlikely that the Site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
Very Low	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst that this harm if realised would normally be mild or minor.



- 13.8.12 Where a risk classification of moderate or greater has been determined it is considered that the source–pathway–target contaminant linkage requires some form of risk management or intervention.
- 13.8.13 As the first step, such risk management or intervention would normally take the form of further investigation, with the additional knowledge gained allowing the risk to be more accurately assessed and potentially the classification may be lowered. However, if the risk classification remains at moderate or above then remediation, in the form of mitigation, may be required to reduce or remove the source of contamination or disrupt the pathway to the target or receptor.

Determination of significance

- 13.8.14 To use risk assessment as the basis for the evaluation of the significance of effects of a Proposed Development in relation to land contamination, it is necessary to evaluate the change in risk from baseline conditions to those during and following the project. In order to define the baseline risk the initial assessment and classification of risk is carried out for the study area in its pre-development state. A separate assessment of risk will then be conducted for the site post-development (including environmental measures inherently embedded in the development) to enable an evaluation of the change in risk due to the project.
- 13.8.15 **Table 13.19** uses the risk classification pre- and post-development as the basis for a significance evaluation matrix for the purposes of EIA.


Table 13.19 Land quality (contamination) significance evaluation matrix

		Risk post-development (including embedded measures)						
		Very Low	Low	Moderate / Low	Moderate	High	Very High	
<i>Risk pre-development</i>	Existing receptors	Very High	Major Positive (Significant)	Major Positive (Significant)	Moderate Positive (Potentially Significant)	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)
		High	Major Positive (Significant)	Moderate Positive (Potentially Significant)	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)
		Moderate	Moderate Positive (Potentially Significant)	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)
		Moderate / Low	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)
		Low	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)
		Very Low	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)	Major Negative (Significant)
	No receptor present pre-development	N/A	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)	Major Negative (Significant)	Major Negative (Significant)

Risks that remain at moderate, high, or very high post-development are unlikely to be considered acceptable and further mitigation or assessment will be required to enable the development to proceed.

- 13.8.16 If the embedded measures are effective the risks post development should be less than moderate; or the risks from the project are likely to be considered unacceptable.
- 13.8.17 However, there may be circumstances where development can proceed, and moderate and above risks remain, where it can be demonstrated through tools such as cost benefit analysis that remediation is not appropriate or cost effective e.g. groundwater contamination where cost benefit analysis indicates that remediation is not warranted.



13.8.18 The findings of the desk study and ground investigation form the baseline against which the potential impact of the project, alone and cumulatively with other developments, can be assessed. The assessment is based on both receptor importance and the nature and magnitude of the impact as a result of the project, and the mitigation considered necessary is identified and residual effects with this in place determined.

General approach: Soils and agricultural land (Grid Connection study area)

13.8.19 The soils and agriculture assessment will focus on likely significant effects on:

- Soil resources; and
- Agricultural land resources.

13.8.20 The assessment of likely significant effects for soils and agriculture is based on the extent of soils and agricultural land that might be affected and whether the effects would be temporary or permanent. The assessment is informed by:

- Information about the construction and operational activities associated with the Grid Connection elements of the Proposed Development;
- Relevant national policy, strategy, legislation and guidance documents and,
- Stakeholder engagement feedback.

13.8.21 The assessment takes into consideration the sensitivity of the affected receptor or resource and the magnitude of change from the baseline conditions resulting from the Proposed Development. This results in an evaluation of significance and an indication of likely significant effects. In order to ensure potential effects are assessed at a worst-case scenario it will be assumed that land mapped provisionally as grade 1 or 2 in the provisional ALC mapping is of grade 1 or 2 quality.

Receptor sensitivity

13.8.22 Definitions of receptor sensitivity used in the assessment are provided in **Table 13.20**.

13.8.23 The receptor sensitivity assessment approach is designed to take account of key soil functions and ecosystem services, including as a growing medium for crops, as a store of organic matter including carbon, providing habitat and supporting biodiversity, and soil's role in the hydrological cycle. There are interactions between soil and receptors covered in other chapters, and other relevant assessments are provided in **Chapter 11: Biodiversity** and **Chapter 12: Hydrology**.

Table 13.20 Sensitivity of receptor / resource

Sensitivity	Criteria / description
Very High	Grade 1 and 2 ALC agricultural land. Soils directly supporting a National Site Network SAC or SPA site, or Ramsar site



Sensitivity	Criteria / description
	Peatlands – blanket bog, raised bog, fen peat soils* (mapped peatland and peatland with any statutory designation including SSSI).
High	Grade 3a ALC agricultural land. Soils (other than peat) directly supporting a UK designated site (e.g. SSSI, Local Nature Reserves (LNR)). Peatland not previously mapped and with no designation**.
Moderate	Grade 3b ALC agricultural land. Soils (other than peat) supporting non-statutory designated sites (e.g., Local Wildlife Sites, Ancient Woodland, Open Mosaic Habitat).
Low	Grade 4 and 5 ALC agricultural land. Soils (other than peat) supporting non-designated notable or priority habitats, soils on greenfield sites not in agricultural use (e.g., amenity land in urban areas, parks and gardens).
Very low	Other soils, not in agricultural use (e.g., badly damaged or contaminated soils, soils on previously developed land, including soils formerly sealed by development).

*Mapped on National Soils Resources Institute Soilscapes map

**Site with potential for peat deposits >0.3m thickness, may be identified through survey e.g. Phase 1 Extended Habitat Survey

- 13.8.24 Planning guidance and the National Planning Policy Framework (NPPF) refer to the need to protect BMV agricultural land (ALC grades 1-3a). Hence other agricultural land is regarded as of lower sensitivity. The Grid Connection site runs through an area where agricultural land is typically grade 1 or 2 land, which is the best available both locally and nationally.
- 13.8.25 In accordance with the NPPF which states that undeveloped land can perform many functions, including for wildlife, flood risk mitigation, carbon storage or food production³⁹, **Table 13.20** assigns the highest sensitivity to soils performing key agricultural functions, organic matter (including carbon) storage/cycling functions, flood risk mitigation and biodiversity/wildlife supporting functions at a national level.
- 13.8.26 Disturbance of soil cannot be avoided during construction of the Grid Connection elements of the Proposed Development and it is acknowledged that soil is vulnerable to damage during handling and storage, even if the effect is only temporary, and that some soil types are less resilient to handling than others. Embedded mitigation measures are outlined in **Table 13.14** which show how the Proposed Development will minimise impacts on BMV land through design and management of the construction phase, including reinstating soil approximately in its original location where possible, avoiding soil compaction, and including soil handling, storage and reinstatement measures in the CEMP.

³⁹ NPPF, paragraph 118. b), <https://www.gov.uk/guidance/national-planning-policy-framework/11-making-effective-use-of-land>, accessed June 2021



13.8.27 The potential effects of the Grid Connection elements of the Proposed Development on soils have been assessed using the sensitivity classification relative to the provisional ALC grade of the land. This gives a very high sensitivity based on **Table 13.20**. This classification is based upon the soil's function as a medium for growing food and other biomass, however, soils on agricultural land also perform other inter-related soil functions, notably carbon and nitrogen cycle functions, providing habitat and supporting biodiversity, and hydrological cycle functions. Assessment of effects on soil resources using the agricultural classification is, therefore, considered to be appropriate for the Grid Connection based on the nature of the development, the current agricultural land use and the nature of the development, which following the construction phase, seeks to restore the land, with the exception of the proposed substation, to its current state and use.

Magnitude of change

13.8.28 The assessment of the magnitude of change from baseline conditions includes a consideration of the duration and reversibility of the change in the context of relevant legislation, policy standards and guidance. As the soils on the Grid Connection study area are located on agricultural land and are likely to constitute BMV land, the approach to the assessment of magnitude of change has been guided by current planning guidance and Natural England guidance (Natural England, 2012) for developments on agricultural land. It is recognised that there may be changes to other soil functions in addition to crop/biomass production as a result of development, however, in general, adverse effects on soil's biomass function would correspond to adverse effects on other key soil functions, and vice versa. For example, a healthy soil capable of performing its biomass function to a high standard should also be capable of other key functions, such as storing flood water and supporting biodiversity, however, compaction of this soil would lead to a reduction in all of these functions. **Table 13.21** provides examples of how the magnitude of change will be determined with respect to soils and agriculture features.

13.8.29 Magnitude of change may be either beneficial or adverse. The criteria and examples in **Table 13.21** focus on adverse changes, however, beneficial changes may also occur and will be considered on a case-by-case basis as required.

Table 13.21 Magnitude of change for agricultural land and soils

Magnitude	Description Example
Very high	Permanent or long term temporary (>5 years) loss or significant degradation* of over 80ha of agricultural land or soil.
High	Permanent or long term temporary (>5 years) loss or significant degradation of between 50ha to 80ha of agricultural land or soil.
Medium	Permanent or long term temporary (>5 years) loss or significant degradation of between 20ha to 50ha of agricultural land or soil.
Low	Permanent or long term temporary (>5 years) loss or degradation of up to 20ha of agricultural land or soil or temporary damage over 20ha which will rectify without mitigation.



Magnitude	Description Example
Very Low	Temporary damage to areas up to 20ha which will rectify without mitigation.

*Significant degradation in this context means that a key soil function is significantly reduced, an example could be that agricultural land classification is reduced due to changes in the soil's structure (e.g., due to compaction)

13.8.30 The magnitude of change on BMV land will depend on the area of land and agricultural land quality affected by the development. The Town and Country Planning (Development Management Procedure) (England) Order 2015, which applies to applications for planning permission under the Town and Country Planning Act 1990, only requires Natural England to be consulted on development that involves the loss of greater than 20 hectares of grades 1, 2 or 3a agricultural land. There is no specific equivalent requirement set out within the Planning Act 2008, although that Natural England is a prescribed consultee as part of the DCO application. Consequently, losses smaller than this threshold are considered to have a small magnitude effect on the national stock of BMV land. Losses of over 80 hectares of BMV land are equivalent to the size of a medium to large farm (80 hectares is close to the current average farm size in England⁴⁰) and consequently the magnitude of effect is considered to be very high. At a national policy level, total farm holdings below 20hectares in size are generally considered collectively as small farms⁴¹.

Evaluation of significance

13.8.31 During the assessment of effects for each identified receptor the sensitivity value in **Table 13.20** will be combined with the magnitude of change from **Table 13.21** to produce an overall significance rating based on the evaluation matrix shown in **Table 13.22** (which is the same as the generic significance evaluation matrix, **Table 4.1** in **Chapter 4: Approach to the EIA**). A 'significant' effect is assessed as a Moderate or Major rating at this stage of the EIA process. The latter will be subject to further investigation as part of the ES following refinement of design information. This approach will be based on professional judgement and carried out on a precautionary basis.

13.8.32 The evaluation of significance for soils will be undertaken using professional judgement, drawing upon information about the nature and extent of the soil resources present, their environmental setting and the type of development proposed.

13.8.33 The evaluation of significance for agricultural land quality will be undertaken using professional judgement, drawing upon information about the area of BMV agricultural land (defined as Grade 1, 2 and 3a of the ALC) which might be lost or damaged together with contextual data about BMV land within the study area.

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/972103/regionalstatistcs_overview_23mar21.pdf, accessed June 2021

⁴¹Defra statistical data on the structure of the agricultural industry <https://www.gov.uk/government/statistical-data-sets/structure-of-the-agricultural-industry-in-england-and-the-uk-at-june>, accessed June 2021



Table 13.22 Significance evaluation matrix

		Magnitude of change				
		Very high	High	Medium	Low	Very low
Sensitivity/importance/value	Very high	Major (Significant)	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Probably significant)
	High	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)
	Medium	Major (Significant)	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)
	Very Low	Moderate (Probably significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)

13.9 Preliminary assessment of ground conditions (land contamination) effects

13.9.1 This section describes the impacts and effects that would occur in relation to ground conditions receptors during the construction phase and covers all elements of the Proposed Development, other than where specific areas are referenced, as the mitigation approaches are applicable in all areas of the Proposed Development.

13.9.2 Construction will involve excavation of potentially contaminated soil and other materials, vehicle and plant movements over potentially contaminated soil, storage and handling of potentially contaminated materials. This could result in the following effects:

- Mobilisation of contamination in soils via surface run-off, leaching or groundwater migration resulting in contamination of controlled waters (offsite surface water in the form of land drains).
- Mobilisation of contamination in soils resulting in health effects on human health receptors (site visitors, adjacent land users) e.g., by dust migration or surface run-off.

Mitigation

13.9.3 In order to mitigate the potential negative effects associated with land contamination during the construction and operation of the project, the following embedded mitigation measures will be utilised.



- In accordance with The Environment Agency guidance document Land Contamination Risk Management (LCRM) and based upon the findings of the Phase 1 Geo-environmental Desk study and Phase 2 intrusive ground investigation to date, further ground investigation will be carried out to check for the presence of contaminants in areas not previously investigated where potential sources of contamination have been identified. This will enable the Developer to demonstrate that the land used for the development is suitable for the proposed use with respect to the potential for soil contamination and, that where necessary, risk-based remediation can be undertaken in line with LCRM. The precise design of any remediation strategy will be confirmed in the detailed design.
- All aspects of the construction work will be in accordance with the Construction (Design and Management) Regulations 2015.
- It is intended that HDD will be used to go under the landfill at the former Wisbech Canal in the Grid Connection site during construction of the UGC. The design of such works would be informed by the Phase 1 Geo-environmental Desk Study for the Grid Connection site and by ground investigation to confirm the depth and lateral extent of the landfill and the nature of the underlying natural material. Alternatively, the Applicant may use pre-positioned conduits installed as part of proposed highway improvement works at the Elm High Road/A47 junction. Both approaches will ensure that there is no disturbance of landfilled materials due to the Proposed Development that may create new pollutant migration pathways, and no significant risks to the new UGC infrastructure from landfill leachate/contaminated groundwater migration.
- Any disposal off-site of excavated material will be undertaken in consultation with the landowner/occupier and in accordance with the Waste Management Regulations.
- In line with good practice, and as part of the Construction Environmental Management Plan (CEMP), Pollution Prevention Plans (PPPs) will be drawn up to detail how surface waters will be protected in construction and operation.
- Any temporary onsite storage of excavated materials suspected or confirmed to be contaminated will be on impermeable sheeting, covered over and with adequate leachate/ runoff drainage to prevent migration of contaminants from the stockpile. Materials will be segregated where possible to prevent cross-contamination occurring. Such materials will only be reused if they are confirmed as suitable for use in line with the requirements of the Materials Management Plan (MMP).

Assessment of Operation Effects: Land Contamination

13.9.4

Table 13.23 presents the preliminary assessment of significant effects that would occur during the construction and operation phases, the relevant embedded measures and residual effects on land contamination receptors.



Table 13.23 Summary of preliminary ground conditions assessment

	Baseline Assessment			Assessment with the Proposed Development			Change in Risk (Significance)
	Likelihood	Consequence	Risk	Likelihood	Consequence	Risk	
Construction							
Mobilisation of contamination via numerous pathways (including groundwater, surface water, preferential pathway creation and leaching from soil) resulting in contamination of controlled waters (where potential sources of contamination have been identified)	Unlikely	Minor	Very Low	Low likelihood	Mild	Low	Minor negative (Not Significant)
Mobilisation of contamination to human health receptors (excluding construction workers) via numerous pathways (including groundwater, surface water, leaching from soil, migration of vapours and windblown dusts) resulting in health effects (where potential sources of contamination have been identified)	Unlikely	Minor	Very Low	Low likelihood	Minor	Very Low	Negligible (Not Significant)
Accidental spillages and leaks resulting in ground contamination and risks to controlled waters during construction. This includes the potential for leakage of bentonite	Unlikely	Minor	Very low risk	Low	Mild	Low	Minor negative (Not Significant)



	Baseline Assessment			Assessment with the Proposed Development			Change in Risk (Significance)
	Likelihood	Consequence	Risk	Likelihood	Consequence	Risk	
during Horizontal Directional Drilling (HDD)							
Operation and maintenance							
Risks to human health from presence of contaminants in near surface soils as a result of disturbance to landfill or other artificial ground or soil affected by historical contamination or other excavated and reused material	Low likelihood	Mild	Low	Unlikely	Mild	Very low	Minor positive (Not Significant)
Mobilisation of landfill leachate or leachate from other artificial/contaminated ground, contaminated groundwater migration, which, if not properly managed, could accumulate and/or migrate to controlled waters.	Unlikely	Mild	Very low	Low likelihood	Mild	Low	Minor negative (Not Significant)
Build-up of ground gases in confined spaces	Unlikely	Severe	Moderate / Low	Unlikely	Severe	Moderate / Low	Negligible (Not Significant)
Accidental spillages and leaks impacting controlled waters during operation and maintenance activities	Unlikely	Medium	Low	Unlikely	Mild	Very Low	Minor positive (Not Significant)



Future Monitoring

- 13.9.5 With the embedded mitigation measures there is no need for future monitoring once the project is operational.

Accidents/Disasters

- 13.9.6 No potential operational accidents or disasters relevant to land contamination have been identified.

Potential Changes to the Assessment as a Result of Climate Change

- 13.9.7 Future changes to baseline conditions resulting from climate change would not lead to any changes to the significance of any operational effects described above.

13.10 Preliminary assessment of soil and agricultural land effects

Effects on soil structure

- 13.10.1 The assessment below relates to potential changes to soil structure due to inappropriate storage and/or handling and/or due to the use of heavy machinery which causes compaction, resulting in waterlogging of land, potentially soil erosion and loss of soil organic matter and reductions in/loss of soil functions.

Magnitude of impact

- 13.10.2 There is potential for damage to soil structure, resulting in degradation of soil function and degradation of BMV land quality due to the Grid Connection elements of the Proposed Development. Relevant embedded mitigation measures, as outlined in **Table 13.14**, which affect the magnitude of impact include:
- the use of OHL for most of the Grid Connection to the furthest substation option at Walpole;
 - minimisation of the use of imported fill materials and the likelihood that all soil for the Grid Connection elements of the Proposed Development can be re-instated within the Grid Connection study area;
 - the inclusion of soil handling, storage and reinstatement measures and measures specifically to avoid soil compaction integrated into the CEMP;
 - ▶ including the use of tracked vehicles or wheeled vehicles of similar weight to farm vehicles;
 - ▶ use of temporary track of either metal, wood or plastic as needed and,
 - ▶ use of existing tracks and entrances where possible.
- 13.10.3 The magnitude of impact is likely to be very low, based on the above embedded measures.



Sensitivity or value of receptor

13.10.4 The agricultural land within the Grid Connection study area is assumed to be grade 1 or 2 ALC based upon the provisional ALC mapping, and this means that the soil within the Grid Connection study area is considered to be a very high sensitivity receptor.

Significance of residual effect

13.10.5 Therefore, it is predicted that, as the sensitivity of the receptor is **very high**, and the magnitude is **very low**, the effect is of **moderate adverse significance**, with moderate being potentially significant in EIA terms. The moderate adverse scenario is considered to be worst case; it reflects the fact that when soil is permanently or temporarily displaced there is potential for it to become damaged. The embedded mitigation measures, including the design of the Grid Connection elements of the Proposed Development (predominantly as OHL if the Walpole Substation is selected) as well as the measures in the CEMP will limit the potential for damage to soil/BMV land.

Soil erosion

13.10.6 The assessment below relates to loss of soil resource and degradation of BMV land, caused by run off from stockpiles and/or runoff from stripped soil.

Magnitude of impact

13.10.7 There is potential for soil erosion to occur across all soils that are excavated and stockpiled, and soils where vegetation is stripped. Relevant embedded mitigation measures, as outlined in **Table 13.14**, which affect the magnitude of impact include:

- the inclusion of soil handling, storage and reinstatement measures integrated into the CEMP;
- the use of tracked vehicles or wheeled vehicles of similar weight to farm vehicles;
- use of temporary track of either metal, wood or plastic as needed, and
- use of existing tracks and entrances where possible.

13.10.8 The magnitude of impact is likely to be very low, based on the above embedded measures.

Sensitivity or value of receptor

13.10.9 The agricultural land within the Grid Connection study area is assumed to be grade 1 or 2 ALC based upon the provisional ALC mapping, and this means that the soil within the Grid Connection study area is considered to be a very high sensitivity receptor.

Significance of residual effect

13.10.10 Therefore, it is predicted that, as the sensitivity of the receptor is **very high**, and the magnitude is **very low**, the effect is of **moderate adverse significance**, with moderate being potentially significant in EIA terms. The embedded mitigation



measures, including the design of the Grid Connection elements of the Proposed Development (predominantly OHL) which will limit the requirement for soil excavation/stripping of vegetation, and the soil protection measures in the CEMP will limit the potential for damage to soil/BMV land.

Permanent loss of agricultural land/ topsoil

13.10.11 The assessment below relates to potential for permanent loss of agricultural land and permanent loss of topsoil resources and soil functions.

Magnitude of impact

13.10.12 The potential for permanent loss of agricultural land is limited by the nature of the development and the embedded mitigation measures, as outlined in **Table 13.14**. There will be a small/negligible loss of BMV land with the installation of the OHL which will be largely limited to the poles themselves, however all soil should be reinstated approximately at its original location during UGC and OHL construction. There is potential for loss of soil and potentially BMV land associated with construction of the substation connection infrastructure. The substation infrastructure within the Grid Connection study area can potentially avoid viable BMV land by being located within the current substation boundary, which is effectively urban land, however the substation location, Walpole or Walsoken has not yet been confirmed in the design. There is likely to be some loss of soil resource/soil function due to the development of built infrastructure/soil sealing, however, this will be significantly less than 20 hectares (and is likely to be less than 0.1 hectare). The handling of topsoil will be carried out in accordance with soil protection measures in the CEMP. Any surplus soil generated e.g., by the substation connection infrastructure construction can likely be reinstated within the Grid Connection boundary, if not at its original location.

13.10.13 The magnitude of impact is likely to be very low or low for agricultural land and soil, based on the above measures.

Sensitivity or value of receptor

13.10.14 The agricultural land within the Grid Connection study area is assumed to be grade 1 or 2 ALC based upon the provisional ALC mapping, and this means that both the agricultural land and soil therein are considered to be very high sensitivity receptors.

Significance of residual effect

13.10.15 Therefore, it is predicted that, as the sensitivity of the receptor is **very high**, and the magnitude is **very low** or **low** (if agricultural land is developed for the substation connection), the effect is of **moderate** to **major adverse significance**, with moderate or above being potentially significant in EIA terms.

Future Monitoring

13.10.16 With the embedded mitigation measures there is no need for future monitoring once the project is operational.



Accidents/Disasters

- 13.10.17 No potential operational accidents or disasters relevant to soil or agricultural land have been identified.

Potential Changes to the Assessment as a Result of Climate Change

- 13.10.18 Future changes to baseline conditions resulting from climate change would not lead to any changes to the significance of any operational effects described above.

Cumulative effects

- 13.10.19 The consideration of cumulative effects will be presented in **Chapter 18: Cumulative Effects Assessment** of the ES. **Chapter 18** of the PEIR identifies those developments located within the respective zones of influence for each of the environmental topics considered.

Summary of residual effects on soils and agricultural land receptors (Grid Connection Site)

- 13.10.20 **Table 13.24** presents a summary of the preliminary assessment of significant impacts, any relevant embedded environmental measures and residual effects on soils and agricultural land receptors.


Table 13.24 Summary of significance of adverse [or beneficial] effects for soil and agricultural land receptors

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
Changes to soil structure due to inappropriate storage and/or handling and/or due to the use of heavy machinery which causes compaction, resulting in waterlogging of land, potentially soil erosion and loss of soil organic matter and reductions in/loss of soil functions	Very high	Very low	Moderate adverse	The moderate adverse significance reflects the very high sensitivity applied to the soil and agricultural land receptors. The moderate adverse scenario is considered to be worst case; it reflects the fact that when soil is permanently or temporarily displaced there is potential for it to become damaged. The embedded mitigation measures, including the design of the Grid Connection elements of the Proposed Development (predominantly as OHL if the Walpole substation is selected) as well as the measures in the CEMP will limit the potential for damage to soil/BMV land.
Soil erosion (loss of soil resource, loss of soil organic matter, degradation of BMV land), caused by run off from stockpiles and/or runoff from stripped soil	Very high	Very low	Moderate adverse	The moderate adverse significance reflects the very high sensitivity applied to the soil and agricultural land receptors. Relevant embedded mitigation measures which affect the magnitude of impact include: the inclusion of soil handling, storage and reinstatement measures integrated into the CEMP, the use of tracked vehicles or wheeled vehicles of similar weight to farm vehicles, use of temporary track of either metal, wood or plastic as needed, and use of existing tracks and entrances where possible. The design of the Grid Connection elements of the Proposed Development (predominantly as OHL) will limit the requirement for soil excavation/stripping of vegetation, and the soil protection measures in the CEMP will limit the potential for damage to soil/BMV land.
Permanent loss of agricultural land/Permanent loss of topsoil resources and soil functions	Very high	Very low to Low	Moderate to major adverse	There will be a small/negligible loss of BMV land with the installation of the OHL which will be largely limited to the poles themselves, however all soil should be reinstated approximately at its original location during UGC and OHL construction. There is potential for loss of soil and potentially BMV land associated with construction of the substation connection infrastructure. The substation infrastructure can potentially avoid viable BMV land by being located within the current



Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
				<p>substation boundaries, which is effectively urban land, however this has not yet been confirmed in the design. There is likely to be some loss of soil resource/soil function due to the development of built infrastructure/soil sealing however this will be significantly less than 20 hectares (and is likely to be less than 0.1 hectare). The handling of topsoil will be carried out in accordance with soil protection measures in the CEMP. Any surplus soil generated e.g., by the substation connection infrastructure construction can likely be reinstated within the Grid Connection study area, if not at its original location.</p>

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in Table 13.19 and is defined as very low, low, medium, high and very high.
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Table 13.20** above and is defined as very low, low, medium, high and very high.
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (probably significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Table 13.21**.



13.11 Consideration of optional additional mitigation or compensation

13.11.1 No additional mitigation measures are proposed at this stage to further reduce the soil, agricultural land or ground conditions effects that are identified in this PEIR. This is because all relevant and implementable measures have been embedded into the development proposals and are assessed above in this chapter. These measures are considered to be likely to be effective and deliverable and address the likely significant effects of the Proposed Development.

13.12 Implementation of environmental measures

13.12.1 **Table 13.25** describes the environmental measures embedded within the Proposed Development and the proposed means by which they will be implemented.

Table 13.25 Summary of indicative environmental measures to be implemented – relating to soil, agricultural land and ground conditions

Environmental measure	Responsibility for implementation	Proposed Compliance mechanism	PEIR section reference
Compliance with LCRM for assessment of potential land contamination and confirming site is suitable for use for the Proposed Development	Applicant	DCO Requirement	Section 13.9
Compliance with The Health and Safety at Work Act and regulations made under the Act (notably The Management of Health and Safety at Work Regulations 1999) for the protection of human health during the construction and operation phases	Applicant/Contractor	DCO – CEMP	Section 13.7
Soil protection measures defined for construction phase	Applicant/Contractor	DCO – CEMP	Section 13.10
Pollution Prevention Plans	Applicant/Contractor	DCO – CEMP	Section 13.10
Unexpected ground contamination protocol	Applicant/Contractor	DCO – CEMP	Section 13.10
Compliance with CAR 2012	Applicant/Contractor	DCO – CEMP	Section 13.3



Environmental measure	Responsibility for implementation	Proposed Compliance mechanism	PEIR section reference
Construction strategies will be implemented that will seek to maximise the reuse of excavated clean materials onsite where practicable and feasible Waste management during construction in accordance with Definition of Waste Code of Practice (DoWCoP)	Applicant/Contractor	DCO – MMP	Section 13.9

13.13 Next Steps

- 13.13.1 The preliminary assessment presented in this chapter is based on information obtained to date. It will be further influenced by responses received during the statutory consultation.
- 13.13.2 The final assessment will be presented in the Environmental Statement submitted with the DCO application.