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11.0 GEOLOGY, HYDROLOGY AND LAND CONTAMINATION

11.1 Introduction

- 11.1.1 This chapter of the Environmental Statement (ES) addresses the potential effects relating to geology, hydrology and land contamination of the Proposed Development, which will increase the extraction of secondary aggregate materials from Gale Common Ash Disposal Site.
- 11.1.2 This chapter describes the existing geological and hydrogeological conditions at the Proposed Development Site (hereafter referred to as 'the Site'), and assesses the likely nature and existing sources of contamination that may be present at the Site. In addition, an assessment of the likely ground conditions to be encountered is made, based on a review of existing site investigations conducted at the Site. Having established baseline conditions, an assessment is made of the potential impacts to the existing geological and hydrological conditions from the Proposed Development and likely mitigation measures identified.
- 11.1.3 This chapter is supported by Appendix 11A: Phase 1 Desk Study (ES Volume II). It should be noted that some of the potential impacts and effects relating to the hydrogeology underlying the Site are also addressed within the Flood Risk Assessment (FRA) document which accompanies the planning application.

11.2 Legislation and Planning Policy Context

Legislative Background

- 11.2.1 The development of land in the UK must take into account the regulatory context of the work, and provide information as is appropriate to the development proposed and be in accordance with UK good practice. An environmental assessment of the condition of the Site must not only consider the potential receptors of human health and controlled waters, but also include a review of the relevant legislation and planning policy that applies to the Site and its immediate environs.

European Legislation

Water Framework Directive

- 11.2.2 The European Union (EU) Water Framework Directive (WFD) (2000/60/EC) is one of the key European Directives setting the context for the hydrogeological assessment included within this chapter. The purpose of the WFD is to establish a framework for the protection and improvement of groundwater, inland surface waters (rivers and lakes), transitional waters (estuaries), and coastal waters. The risk to surface waters has been considered in the FRA.
- 11.2.3 The Directive requires the UK to classify the current condition of key waterbodies (giving a 'Status' or 'Potential') and to set objectives to either maintain the condition or improve it where a waterbody is failing minimum targets. Any activities or developments that could cause deterioration within a nearby waterbody or prevent the future ability of a waterbody to reach its target status, must be mitigated to reduce the potential harm and allow the aims of the WFD to be realised.

Industrial Emissions Directive

- 11.2.4 The Industrial Emissions Directive (IED) (2010/75/EU) was adopted on November 24, 2010, and entered into force in January 2011. The IED included revisions to the existing Environmental Permitting Regulations (EPR) including the requirement to establish a baseline report for all regulated sites storing and handling hazardous materials, as required in article 22 of the IED. This process is outlined in the European Commission Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions (2014/C136/03) (the Guidance).
- 11.2.5 The Guidance presented a seven-stage approach to generating a 'baseline report' which presents the condition of the land under a site for 'relevant hazardous substances' present at the site. Following completion of a desktop assessment, collation of a targeted set of baseline site condition data for the site may be needed to meet this requirement, including collection of samples of soil and groundwater and their analysis.

11.2.6 Article 16 of the IED requires monitoring of groundwater and soil condition to be carried out every five and ten years respectively, with the scale and scope of this monitoring determined based on the findings of the baseline report.

Groundwater Daughter Directive

11.2.7 The Groundwater Daughter Directive (GDD) (2006/118/EC) was adopted in November 2006 and sets out the approach to protect groundwater against pollution and deterioration in response to Article 17 of the WFD. The transposition of the GDD into law in England & Wales is achieved through the Groundwater Regulations (2009), implemented in England and Wales through the Environmental Permitting Regulations (2010) and two Directions to the Environment Agency from the Secretary of State and National Assembly for Wales. The first Direction sets out the principles for classifying groundwater and surface water bodies and the second Direction sets out water quality standards and groundwater threshold values.

7th Environment Action Programme

11.2.8 The 7th Environment Action Programme (EAP) (Decision No. 1386/2013/EU) entered into force in January 2014, and is guided by the following long term vision:

“In 2050, we live well, within the planet’s ecological limits. Our prosperity and healthy environment stem from an innovative, circular economy where nothing is wasted and where natural resources are managed sustainably, and biodiversity is protected, valued and restored in ways that enhance our society’s resilience. Our low-carbon growth has long been decoupled from resource use, setting the pace for a safe and sustainable global society.”

11.2.9 The 7th EAP is based around three priority areas requiring more action, including:

- protect nature and strengthen ecological resilience;
- boost resource-efficient, low-carbon growth; and
- reduce threats to human health and wellbeing linked to pollution, chemical substances, and the impacts of climate change.

11.2.10 In relation to geology, hydrology and ground conditions, the first priority area identifies further action on soil protection and sustainable use of land, while the third area covers challenges to human health including air and water pollution, excessive noise and toxic chemicals.

National Legislation

11.2.11 There are three key statutes dealing with the risks posed to human health and the environment associated with historic land contamination, namely:

- Part 2A of the Environmental Protection Act 1990 (the ‘Contaminated Land’ regime);
- The Water Resources Act 1991; and
- The Town & Country Planning Act 1990.

11.2.12 In the UK, Part 2A of the Environmental Protection Act 1990, as introduced by Section 57 of the Environment Act 1995, makes provision for identifying ‘contaminated land’, the circumstances in which remediation is required and who is responsible for that remediation. Under Part 2A, ‘contaminated land’ in respect of which remediation may be required is *“any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substance in, on or under the land, that –*

- *significant harm is being caused or there is a significant possibility of such harm being caused; or*
- *pollution of controlled waters is being or is likely to be caused.”*

11.2.13 Under the Water Resources Act 1991, ‘controlled waters’ are defined as including both surface waters and groundwater. Once a site is classified as ‘contaminated land’ then remediation is required to render significant pollutant linkages (i.e. the source-pathway-receptor relationships

that are associated with significant harm and/ or pollution of controlled waters) insignificant, subject to a test of reasonableness.

- 11.2.14 The Town & Country Planning Act 1990 recognises land potentially affected by contamination as a material consideration for planning applications and that associated risks should be considered at the planning stage of any development. Compliance with the act can be achieved by following the assessment framework which underpins Part 2A of the Environmental Protection Act 1990.
- 11.2.15 A number of specific regulations have been enacted to implement the statutory European legislation into UK law and to introduce other national legislation. These regulations include:
- The Anti-Pollution Works Regulations 1999;
 - The Control of Pollution (Oil Storage) (England) Regulations 2001;
 - The Environmental Damage (Prevention and Remediation) Regulations 2009; and
 - The Environmental Permitting (England and Wales) Regulations 2016, which control discharge of water to surface water and groundwater.

National Planning Policy

- 11.2.16 The National Planning Policy Framework (NPPF) (Ministry for Housing, Communities and Local Government, 2019) ensures that land contamination issues must be considered at the planning stage of development and that land must be 'suitable for use', stating in paragraph 178 that planning policies and decisions should ensure that:

"a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);

after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and

adequate site investigation information, prepared by a competent person, is available to inform these assessments."

- 11.2.17 Furthermore, paragraph 179 places the responsibility for ensuring that no harm from developments on land featuring land contamination issues upon the developer and/or landowner:

"Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner."

Local Planning Policy

- 11.2.18 The Local Plan for Selby is currently undergoing a period of transition, as summarised below:
- adopted 2005 – Local Plan (Selby District Council, 2005);
 - adopted 2013 – Selby District Core Strategy Local Plan (Selby District Council, 2013);
 - underwent consultation between 2014 and 2017 – Selby Sites and Policies Plan (Selby District Council, 2014-17); and
 - carried out focussed engagement between June and August 2015 with various residents, businesses and stakeholders (Selby District Council, 2015).
- 11.2.19 Policy ENV2 of the Local Plan sets out measures for developments on potentially contaminated land, namely:

"Proposals for development which would give rise to, or would be affected by, unacceptable levels of noise, nuisance, contamination or other environmental pollution including groundwater pollution will not be permitted unless satisfactory remedial or preventative measures are incorporated as an integral element in the scheme. Such measures should be carried out before the use of the site commences".

“Where there is a suspicion that the site might be contaminated, planning permission may be granted subject to conditions to prevent the commencement of development until a site investigation and assessment has been carried out and development has incorporated all measures shown in the assessment to be necessary”.

11.2.20 Policy ENV4 of the Local Plan sets out measures for installations handling or storing hazardous substances:

“Proposals involving the storage or use of hazardous substance, or developments in the vicinity of sites where hazardous substances are being stored or used, will only be permitted where the District Council is satisfied that:

There is no unacceptable risk to the public or the natural environment; and

Opportunities for the development of land in the vicinity will not be severely restricted.”

11.2.21 In addition to The Local Plan for Selby, North Yorkshire County Council (NYCC) has the following local development plans:

- the ‘saved’ policies of the North Yorkshire Waste Local Plan (NYCC, 2006) – adopted 2006; and
- the ‘saved’ policies of the North Yorkshire Minerals Local Plan (NYCC, 1997) – adopted 1997.

11.2.22 Policy 7/3 “Reworking of deposited Waste” of the ‘saved’ policies of the Waste Local Plan, is specifically relevant to proposed activities at the Site. The reworking of deposited waste will only be permitted where:

“the proposals represent the Best Practicable Environmental Option; and

re-working would achieve material planning benefits that would outweigh any environmental or other planning harm which might result.”

11.2.23 NYCC (along with the City of York and the North York Moors National Park Authority) are currently preparing a Joint Minerals and Waste Plan. This was due to be adopted in March 2018. The Joint Minerals and Waste Plan was submitted to the Secretary of State in November 2017 and was examined in Spring 2018. The authorities are currently working on a series of proposed modifications which will be consulted on in due course..

11.2.24 While the contents of the Joint Minerals and Waste Plan have yet to be adopted, the contents of the Plan are still a material consideration for planning applications.

11.2.25 Policy D13 – “Consideration of applications in Development High Risk Areas” is relevant to this chapter, given the history of mining in the area. The policy states that:

“Where development, other than exempt development as defined in the Development High Risk Exemptions list, is proposed within Development High Risk Areas identified by the Coal Authority, proposals should be accompanied by a Coal Mining Risk Assessment and where necessary incorporate suitable mitigation measures in relation to land stability.”

11.2.26 As such, a Coal Mining Risk Assessment may be required as part of any planning application process.

Other Relevant Legislation, Policy, Standards and Guidance

11.2.27 The Building Act 1984 is supported by the Building Regulations 2000, which contain detailed information regarding the preparation of a site for redevelopment and resistance to contaminants.

11.2.28 The Environment Agency provides general guidance on the management of land contamination in document 'GPLC1 - Guiding Principles for Land Contamination' (Environment Agency, 2010). The Environment Agency also acts as a statutory consultee for developments requiring an Environmental Impact Assessment (EIA). The Environment Agency’s primary concern in the management of contaminated land through the planning regime is in respect of the protection of the water environment.

11.2.29 Model Procedures for the Management of Contaminated Land, Contaminated Land Report 11 (referred to in this ES as 'CLR11') (Department of the Environment, Food and Rural Affairs (Defra), 2004) outlines the approach for the evaluation of contamination in line with UK Government legislation, Environment Agency and National House-Building Council (NHBC) requirements. The procedures recommend the application of a risk based approach with the first tier assessment being a Phase 1 Desk Study to identify previous and current site uses, geological setting and historical contamination records. The approach to further investigation is then based on the risk established by virtue of the Phase 1 Report (Appendix 11A, ES Volume II). If a site has no historical or current evidence of contaminative uses, the scope of further investigation can be less than sites with a long standing history of potentially contaminative uses.

11.3 Assessment Methodology and Significance Criteria

Methodology for Assessing Baseline Conditions

11.3.1 Baseline information has been obtained in order to assess the likelihood of finding contamination and its potential nature and extent. In accordance with good practice, baseline conditions have been identified from documentary research of the Site history, geology, hydrogeology and hydrology, and review of a commercially available regulatory database. The assessment has involved a review of the Groundsure Reports for the Proposed Development in Appendix 11A: Phase 1 Desk Study (ES Volume II), existing site investigation reports relating to the Gale Common Ash Disposal Site as well as publicly available British Geological Survey (BGS) mapping (BGS, 2019) and the Environment Agency website (Environment Agency, 2018). This information has then been used to formulate a Conceptual Site Model (CSM) to allow an assessment of potential environmental risks. The above information has been synthesised, so that characterisation of the baseline conditions of the Site can occur.

11.3.2 Potential receptors were then identified and their relative sensitivity evaluated as described within Table 11.1. The criteria used to determine the sensitivity of receptors and the magnitude of impacts have been developed by technical specialists and has been applied to similar land development proposals. Where appropriate, for the purpose of this assessment, risk likelihood has been interpreted as being equal to the impact rating (e.g. low likelihood/ low impact).

Sensitivity/ Importance of Receptors

11.3.3 Using information gathered during the desk-based study, the presence and relative sensitivity of receptors at risk from potential land contamination and risks to geological/ geomorphologic features have been evaluated by consideration of the following factors:

- surrounding land uses, based on mapping and site visits and consideration of the occupants of adjacent sites;
- proposed end-use, based on the nature of the Proposed Development;
- type of construction operations that will be necessary as part of the Proposed Development;
- surrounding sites of nature conservation importance;
- underlying groundwater;
- surrounding sites and/ or areas of geological/ geomorphologic importance; and
- geology, hydrogeology and hydrology of the Site and its surrounding area.

11.3.4 The sensitivity of receptors or geological features that could be affected by the Proposed Development is described qualitatively according to the categories presented in Table 11.1.

Table 11.1 - Descriptive Scale for Sensitivity of Receptors

QUALITATIVE DESCRIPTION	RECEPTOR SENSITIVITY		
	Low	Medium	High
End users (operational workers/ visitors)	“Hard” end use (e.g. industrial, car parking)	Landscaping or open space	Residential, allotments and play areas
Surrounding land uses	Industrial area	Open space or commercial area	Residential area
Construction workers	Minimal disturbance of ground	Limited earthworks	Extensive earthworks and demolition of buildings
Ecological sites	No sites of significant ecological value close by	Locally designated ecological sites	Nationally or internationally designated ecological sites, including Sites of Special Scientific Interest (SSSIs), Local and National Nature Reserves, Special Protection Areas etc.
Built environment	Not applicable	Buildings, including services and foundations	Nationally or internationally designated sites of historic value or other sensitivity
Geology/ geomorphology	Areas of superficial geology or geomorphologic features with no special significance	Other areas of potential mineral resources Exposed geological features of local importance or educational value	Nationally or internationally designated geological sites Local Geological Sites SSSIs Mineral reserve allocated on Local Minerals Plan
Groundwater	Non aquifer Low quality resource No abstractions within 1 km	Secondary Aquifer Abstraction point within 1 km SPZ within 1 km of the Site	Principal Aquifer High quality resource Abstraction point within 250 m SPZ on-site

11.3.5 The Site was then considered in detail with respect to the proposed construction, operational, restoration and post-restoration phases, and any ground contamination or soil quality related impacts considered likely to result are described herein and, where possible, quantified.

Prediction of Potential Impacts

11.3.6 The potential impacts (or risks) associated with contaminated land have generally been assessed by means of a hazard-pathway-receptor model (the Pollutant Linkage), where the following definitions apply:

- hazard = source of contamination;
- receptor = the entity that is vulnerable to harm from the hazard; and
- pathway = the means by which the hazard can come into contact with the receptor.

11.3.7 This assessment considers both the impacts of any existing contaminants at the Site, and the potential for the Proposed Development to impact on land quality and receptors on and adjacent to the Site. The assessment also considers the potential for the Proposed Development to impact upon any geological/ geomorphologic features.

Contamination Sources (Hazards)

11.3.8 Land contamination sources can be described qualitatively according to the categories shown in Table 11.2. This is a qualitative judgement which has been developed in line with accepted methodology for Phase 1 desk studies and Part 2A contamination studies.

Table 11.2 - Descriptive Scale for Different Sources of Land Contamination

QUALITATIVE DESCRIPTION OF SOURCE (HAZARD)	PREVIOUS LAND USE
Low	Greenfield site, or previous or on-going activities with low potential to cause contamination (e.g. residential, retail or offices) OR site investigation data indicating no significant contamination
Medium	Previous or on-going activities with some potential to cause moderate contamination (e.g. railways, collieries, scrap yards) OR site investigation data indicating limited contamination
High	Previous or on-going activity on or near to site with high potential to cause land contamination (e.g. gasworks, chemical works, landfills) OR site investigation data including widespread or severe contamination

11.3.9 If a hazard has been identified and potentially sensitive receptors are present, then the potential impacts associated with the Proposed Development can be predicted by considering the pathways by which the hazard may affect the receptors. Table 11.3 indicates the most likely potential impacts that may occur in relation to the Proposed Development for different categories of receptor.

Table 11.3 - Summary of the Most Likely Sources of Potential Land Contamination Impacts that May Affect Sensitive Receptors

END USERS (OPERATIONAL WORKERS/ RESIDENTS/ VISITORS)	SURROUNDING LAND USES (INCLUDING OFF SITE RESIDENTIAL AREAS)	CONSTRUCTION WORKERS	SENSITIVE WATER RESOURCES	ECOLOGICAL SITES	BUILT ENVIRONMENT
Direct or indirect ingestion of contaminated soil (operation).	Inhalation or deposition of wind-borne dust (construction)	Direct or indirect ingestion of contaminated soil (construction)	Existing and/or new pollutant pathways (construction and/ or operation)	Phytotoxic impacts on plants (operation)	Chemical attack of buried concrete structures (operation)
Concentration of flammable or asphyxiating in-ground gases in enclosed spaces (operation).	Migration of contamination in sub-surface strata (including gases) (construction and/ or operation)	Concentration of flammable or asphyxiating gases in confined spaces (construction)	Generation of liquid and/ or mobile contaminants (operation)	Toxic impacts on fauna (operation and/ or construction)	Concentration of flammable/ explosive gases in confined spaces. (operation)
Inhalation of harmful in-ground vapours / dusts indoors and outdoors (operation).	N/A	Inhalation of asbestos during building demolition (construction)	N/A	Indirect impacts via contamination of water resources (operation and/ or construction)	Permeation of water supply pipelines. (operation)

11.3.10 The potential impacts are assessed based on the existing use and predicted construction, operation, restoration and post-restoration stages of the Proposed Development.

11.3.11 The magnitude of a potential impact is described wherever possible by using the terms defined in Table 11.4.

Table 11.4 - Descriptive Scale for the Impacts of Land Contamination

MAGNITUDE OF IMPACT	EXAMPLES OF TYPICAL IMPACTS
High	Loss of exposed designated geological feature Very high risk of exposure of a sensitive receptor to potentially harmful levels of contamination via a confirmed pathway
Medium	Quarrying of rock for imported fill, or substantial changes due to cuttings Proven source – pathway – receptor pollutant linkage identified with elevated level of contamination recorded/ or potential to be present
Low	Superficial disturbance to geology; changes in geomorphology Identified source – pathway – receptor pollutant linkage identified but contamination likely to be low risk
Very low	Changes to made ground deposits No source – pathway – receptor pollutant linkage identified

Significance of Effects

11.3.12 For each potential impact identified, an assessment has been made of the likely level of the significance of effect.

11.3.13 Where geological receptors are present, then their importance (sensitivity) has been determined (see Table 11.1) and the potential impact of the Proposed Development qualitatively predicted (see Table 11.4).

11.3.14 Effects are classified based on the identified sensitivity/ importance of the receptor and the predicted magnitude of the impact, using the standard assessment matrix set out in Table 11.5, in conjunction with professional judgement of site-specific factors that may be of relevance.

Table 11.5 - Matrix to Determine the Significance of an Effect (Prior to Mitigation)

MAGNITUDE OF IMPACT	SENSITIVITY/ IMPORTANCE OF RECEPTOR			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very low	Minor	Negligible	Negligible	Negligible

11.3.15 This chapter considers that major or moderate effects are significant for the purposes of the EIA Regulations, in accordance with standard EIA practice and as set out in Chapter 2: Assessment Methodology.

11.3.16 If potentially significant effects are identified, measures are proposed to mitigate the risks from the hazards. However, industry best practices will be applied whether there is the potential for significant effects, or not. The assessment is undertaken on the assumption that best practice will be implemented during construction and operation. The generic categories of mitigation are outlined in Table 11.6.

Table 11.6 - Generic categories of mitigation

CATEGORY OF MITIGATION	DESCRIPTION OF MITIGATION MEASURES
Remedial works	Remedial work may be required to allow the development to proceed. The scope and nature of any remedial work is likely to be highly dependent on the results of investigations and subsequent risk assessments.
Design changes	Significant effects can be reduced by changes in design e.g. protective measures to prevent build-up of flammable gases, or modification of layouts to ensure that sensitive end uses are sited away from likely areas of contamination. Relocation of built features away from geologically important features. Consideration of the construction method proposed for underground structures to minimise potential impacts on groundwater.
Protective measures during construction	Many of the potentially significant effects on the construction workforce can be mitigated by the use of appropriate protective equipment, such as gloves and respiratory protection, and effective dust suppression techniques.
Environmental management	Environmental management may be required to prevent construction work and future operations from giving rise to land contamination

Extent of Study Area

- 11.3.17 The Site encompasses the land required for the Proposed Development. The Site location is shown in Figure 1.1 in ES Volume III.
- 11.3.18 To ensure all potentially significant influences on conditions within the Site are understood, the study area encompasses:
- the Site;
 - a 500 m buffer around the Site for licensed discharge consents and Environment Agency recorded pollution incidents; and
 - a 2 km buffer around the Site for surface water abstraction licences.

Information Sources

Desk Study

- 11.3.19 A Phase 1 Desk Study (Appendix 11A, ES Volume II), was conducted to determine the baseline ground conditions and potentially contaminative land uses. As part of this assessment, Groundsure Reports for the Proposed Development were commissioned from Groundsure Limited.
- 11.3.20 The Groundsure Reports summarise environmental information typically available in the public domain from a variety of sources. Information is included on authorisations, permits, discharge consents, water abstractions, groundwater, surface water, ecological sensitivities, licensed waste management and disposal facilities, consented trade effluent discharges, records of unlicensed landfills in the search area, trade directory entries of potentially contaminating activities, Control of Major Accident Hazards (COMAH) registered sites, radon risk, coal (and other) mining and natural subsidence risk, and sensitive land uses (nature reserves, protected areas, sensitive habitats). It is noted that the Groundsure database is updated periodically and therefore it may not document recent developments/ registrations in the Site area or activities which have not been declared.
- 11.3.21 In addition, copies of previous investigations conducted at the Site were made available by the Applicant for review, including:
- Phase 1 Contaminated Land Assessment, Eggborough Power Limited (RPS, 2017); and

- The Engineering Geology of Devensian Deposits Underlying Lagoons at Gale Common, Yorkshire (Taylor et al., 1976).

Consultation

11.3.22 Consultation undertaken during the preparation of this ES Chapter is presented in Table 11.7 below.

Table 11.7 - Consultation summary table

CONSULTEE	DATE (METHOD OF CONSULTATION)	SUMMARY OF CONSULTEE COMMENTS	SUMMARY OF RESPONSE/ HOW COMMENTS HAVE BEEN ADDRESSED
Environment Agency	8 th January 2019 (letter included in EIA Scoping Opinion).	<i>“The site overlies a Principal and Secondary B aquifer, so any pathways for contamination must be strictly controlled to avoid pollution of the principle and secondary aquifers from any historic contamination identified on the site from previous or current use. At this stage, we do not provide detailed site-specific advice or comments with regard to land contamination issues, apart from identifying the site sensitivity as above.”</i>	The presence of any previous or current contaminant sources have been assessed using the Groundsure Report (Appendix 11A, ES Volume II). No significant contamination sources have been identified.
Danvm Drainage Commissioners	18 th December 2018 (email response included in EIA Scoping Opinion).	<i>“The application may increase the impermeable area to the site and the applicant will therefore need to ensure that any existing or proposed surface water system has the capacity to accommodate any increase in surface water discharge from the site.....if the surface water were to be disposed of via a soakaway system, the IDB would have no objection in principle but would advise that the ground conditions in this area may not be suitable for soakaway drainage. It is therefore essential that percolation tests are undertaken to establish if the ground conditions are suitable for soakaway drainage throughout the year.”</i>	No soakaways proposed as part of the development, surface water will be discharged to River Aire via settlement lagoons and a pumping station
Natural England	17 th December 2018 (email response included in EIA Scoping Opinion).	<i>“The ES should thoroughly assess the impact of the proposals on non-statutory sites, for example.....Regionally Important Geological and Geomorphological Sites (RIGS). Natural England does not hold comprehensive information on these sites. We therefore advise that thelocal RIGS group should be contacted with respect to this matter”.</i>	No Regionally Important Geological and Geomorphological Sites (RIGS) have been identified within the study area.

11.4 Baseline Conditions

Existing Baseline

- 11.4.1 This section describes the Site in its current state (without the Proposed Development) and the sensitivity of the receiving environment to change.

Designated Sites

- 11.4.2 The Site is located within a nitrate vulnerable zone (which is considered to have a moderate sensitivity).
- 11.4.3 No other environmentally sensitive sites, including Sites of Special Scientific Interest, Special Protection Areas, Special Areas of Conservation, Ramsar sites, or National or Local Nature Reserves, were identified within 2 km of the Site.
- 11.4.4 There is one Site of Importance for Nature Conservation (SINC) within the site boundary. This designation has no statutory protection in the UK, but local authorities are expected to take account of the need to protect them in deciding their planning and development policies.

Existing and Previous Land Uses

- 11.4.5 Table 11.8 details the history of of the Site, including the existing Gale Common Ash Disposal Site, as based on available OS historical mapping provided as part of the Groundsure Report (Appendix 11A: Phase 1 Desk Study, ES Volume II).

Table 11.8 - Review of Historical Maps relating to the Site

DATE	ON SITE LAND USE	OFF SITE LAND USE
1852	Agricultural land use with small patches of woodlands present on open fields with Whitefield Lane acting present as a country lane.	Agricultural land use.
1892-1894	No significant changes asides from the erection of St Nicholas Chapel.	Northfield Quarry appears approx. 800 m west of the Site.
1907-1908	No significant changes.	Presence of an air shaft approx. 750 m north-east of the Site, giving indication of underground mine workings in the surrounding area.
1938-1948	No significant changes.	Presence of an unspecified quarry approx. 100 m north of Whitefield Lane.
1950	No significant changes.	No significant changes.
1967	No significant changes.	No significant changes
1977	Development of Gale Common Ash Disposal Site occurred and now an Ash Disposal and Ash Sludge Dewatering Plant (ASDP) are present. Stage one of the infilling is underway and St Nicholas Chapel now used as a depot for the Gale Common Ash Disposal Site.	A section of the M62 can be seen running north of Gale Common. Continued expansion of Northfield Quarry is also shown.
1984	Stage II ash deposition has now commenced south of Stage I.	Northfield Quarry now renamed Womersley Quarry with only the northernmost section still active, and the rest primarily disused.

DATE	ON SITE LAND USE	OFF SITE LAND USE
2002	No significant changes.	No significant changes.
2010	No significant changes.	No significant changes.
2014	No significant changes.	No significant changes.

11.4.6 Prior to the Gale Common Ash Disposal Site's use as a disposal site for pulverised fuel ash (PFA), the earliest available historic maps (1852) indicate that the Gale Common Ash Disposal Site comprised marsh, woodland/ agricultural land and remained this way until planning permission was granted in the 1960s for disposal of slurried PFA. Construction of Stage I ash disposal area commenced in 1964 and was operational until 1995. Stage II ash disposal area of the Gale Common Ash Disposal Site is shown to have been constructed after 1983, with Stage III ash disposal area being constructed after 2009. The nearby coal fired power stations, Ferrybridge 'C' and Eggborough, have since been closed and export of PFA from these power stations to the Gale Common Ash Disposal Site has now ceased.

Surrounding Area

11.4.7 The earliest available historic mapping demonstrates that most of the surrounding land use is agricultural, apart from the south-east of the Site where the Lancashire and Yorkshire Railway line and Northfield Limestone Quarry are present.

11.4.8 An airshaft is present 750 m north-east of the Site on the 1905 historic map, indicating that below ground mine workings are present beneath the wider area.

11.4.9 From 1948 there is presence of an unspecified quarry north of Whitefield Lane.

11.4.10 The surrounding land use remained unchanged until Kellingley Colliery was built in 1965.

11.4.11 From 1975 to the present day, surrounding land use has remained predominately unchanged, with the exception of the construction of a small race track to the north-east and the infilling of Northfield Quarry in the west.

Superficial Geology

11.4.12 A review of the Groundsure Reports (Appendix 11A: Phase 1 Desk Study, ES Volume II), BGS 1:50,000 solid and drift geology sheet 78 for Wakefield, existing site investigation records and publicly available BGS borehole records have been reviewed to identify the likely geological sequence at the Site.

11.4.13 From a review of BGS information and the geology sections of the Groundsure Reports (Appendix 11A: Phase 1 Desk Study, ES Volume II), the following superficial deposits have been identified as potentially being present beneath the Site:

- Brighton Sand Formation;
- Hemingbrough Glaciolacustrine Formation;
- Lacustrine Beach Deposits; and
- Peat.

11.4.14 Although not mapped, areas of the Site are also likely to be underlain by some areas of Made Ground (e.g. quarry spoil) associated with historic developments on the Site. The nature and thickness of the Made Ground is not known.

Bedrock Geology

11.4.15 The geological map and Groundsure Report (Appendix 11A, ES Volume II) indicate that the Site is underlain by both Roxby Formation in the western half of the Site and Sherwood Sandstone bedrock to the eastern half of the Site. The BGS Geindex describes the Sherwood Sandstone Group as "Red, yellow and brown sandstone which is part pebbly; conglomeratic in lower part; pebbles generally extraformational quartz and quartzite, with some intraformational clasts;

subordinate red mudstone and siltstone” and the Roxby Formation as “Reddish brown mudstone and siltstone, with subordinate sandstone. Sulphates (gypsum, anhydrite) are common towards base”.

Coal Mining

11.4.16 The Groundsure Report (Appendix 11A: Phase 1 Desk Study, ES Volume II) indicates that the Site lies within an identified coal mining reporting area. The Coal Authority Report indicates that the Site is an area that could be affected by underground mining in two seams of coal, Silkstone & Top Beeston, located at a depth of 640 m to 720 m below ground level and last worked in 2009. The Coal Authority Report records 75 settled damage claims relating to ground subsidence.

11.4.17 The sensitivity of the geology is considered to be medium in accordance with Table 11.1 above, on the basis that the bedrock geology has been subject to historical coal mining beneath the Site and the Proposed Development could affect the potential for further coal extraction.

Hydrogeology

11.4.18 The Environment Agency aquifer classifications for the identified superficial deposit and bedrock underlying the Site is summarised in Table 11.9 below:

Table 11.9 - Summary of Environment Agency Aquifer Classifications

FORMATION	ENVIRONMENT AGENCY AQUIFER CLASSIFICATION	AQUIFER DEFINITION
Superficial deposits		
Brighton Sand & Lacustrine Beach Deposits	Secondary A Aquifer	Defined by the Environment Agency as “permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers”.
Hemingbrough Glaciolacustrine	Unproductive Strata	Defined by the Environment Agency as “rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow”.
Bedrock		
Sherwood Sandstone	Principal Aquifer	Defined by the Environment Agency as “layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer”.
Roxby Formation	Secondary B Aquifer	Defined by the Environment Agency as “predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.”

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- 11.4.19 Soils at the Site (except those associated with Hemingbrough Glaciolacustrine deposits) are classified as having a high leaching potential, meaning that they may readily transmit liquid discharges and pollutants.
- 11.4.20 The eastern section of the Site, where Whitefield Lane joins Selby Road (A19) is located within a Source Protection Zone – Zone 3 Total Catchment.
- 11.4.21 The Groundsure Report (Appendix 11A: Phase 1 Desk Study, ES Volume II) records one active groundwater abstraction on site attributed to The Hambleton Abstraction Partnership for “*Spray Irrigation*”. One historic on site groundwater abstraction was highlighted; the licence holder is listed as Huddlestone and it was granted for “*Spray Irrigation*”. A further historic on site groundwater abstraction licence is attributed to The Hambleton Abstraction Partnership for “*Spray Irrigation*”. A further two variations of a single historic groundwater abstraction has also occurred on site and were attributed to J E Hartley Ltd for “*General Farming and Domestic Use*”. 39 historic groundwater abstractions occurred within 2 km of the Site plus 12 active groundwater abstractions. Abstractions, both historic and active occur within both the secondary A and principal aquifers within 1 km of the Site and are summarised in Appendix 11A: Phase 1 Desk Study (ES Volume II)
- 11.4.22 Given that the Site is underlain by a Secondary A aquifer within the superficial deposits and a Principal aquifer within the bedrock, both of which feature groundwater extractions, groundwater at the Site is considered to represent a highly sensitive receptor.
- Radon*
- 11.4.23 The Groundsure Report (Appendix 11A: Phase 1 Desk Study, ES Volume II) indicates that the Site is not located in a Radon Affected Area, as less than 1% of properties are above the Action Level and no radon protective measures are necessary in construction of new properties or extensions.
- Previous Investigations of the Site*
- 11.4.24 With reference to the Phase 1 desk study (Appendix 11A, ES Volume II), there have been no previous ground investigations conducted at the Site.
- Potential Pollutant Linkages*
- 11.4.25 In order for an area of potential contamination identified within the confines of the Site to pose a significant level of risk to the Proposed Development or the wider environment, a potential source (hazard) and sensitive target or receptor has to be identified, together with a plausible and effective pathway by which the receptor may be exposed to any given hazard.
- 11.4.26 Based upon the available information, potential sources of contamination within the Site include:
- PFA/ colliery shale deposits
 - Made Ground (demolition rubble from former buildings and waste from site processes); and
 - on site infrastructure e.g. fuel tanks, waste oil tanks, PFA disposal area liners, site effluent drains and interceptors.
- 11.4.27 Based upon the available information, potential sources of contamination outside of the Site (typically within 500 m of the Site, unless otherwise specified) include:
- nearby industrial activities, historic or present, and their associated contamination;
 - nearby historic landfill sites;
 - historic and present agricultural land use (e.g. use of pesticides, fertilisers and plant machinery); and
 - off-site pollution incidents located within 500 m of the Site, having a minor to significant impacts on air, land and water.
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Potential Contaminants of Concern

11.4.28 Potential compounds of concern associated with the identified potential sources of contamination may include, but are not limited to:

- Polycyclic Aromatic Hydrocarbons (PAHs);
- metals including arsenic, zinc lead, copper and cadmium;
- pyritic minerals;
- ground gases including carbon dioxide, methane and hydrogen sulphide;
- hydrocarbons e.g. diesel, lubricating oils, petrol;
- Polychlorinated Biphenyls; and
- asbestos.

Potential Receptors

11.4.29 Based upon the available information, the following are considered potential pathways for the following receptors:

- Human health –
 - dermal contact with substances in shallow soil and/ or shallow groundwater;
 - inhalation of substances in dust;
 - inhalation of vapours from soil and/or shallow groundwater; and
 - accidental ingestion of soil/ dust and/ or shallow groundwater during potential groundworks.
- Controlled waters –
 - vertical migration through unsurfaced areas, vegetated areas and hard-standing (where there are joins/ cracks) and drains/ pipework into the Made Ground/ shallow soil;
 - lateral and vertical migration within the Made Ground and superficial deposits, e.g. leaching from soils in the unsaturated zone into shallow groundwater;
 - preferential lateral and vertical migration along routes of underground services, pipelines and associated trenches (including granular backfilling materials);
 - lateral and vertical migration within shallow groundwater in the Made Ground/ superficial deposits, including to deeper groundwater;
 - lateral and vertical migration within deeper groundwater in the bedrock; and
 - lateral migration within groundwater to surface water courses.
- Infrastructure –
 - direct contact of substances within shallow groundwater with concrete foundations, plastic water pipes etc.; and
 - migration of ground gases and accumulation in confined spaces (e.g. basements, service ducts).
- Ecology –
 - plant uptake and subsequent ingestion by fauna.

11.4.30 Environmental receptors identified in the conceptual site model (Appendix 11A: Phase 1 Desk Study, ES Volume II) for the Proposed Development (i.e. baseline conditions) are summarised in Table 11.10 below:

Table 11.10 - Summary of Baseline Receptors and Risk

RECEPTOR	RISK	ASSUMPTIONS
Site workers	Low	Potential of direct contact, ingestion or inhalation of contaminated particulates, dust and vapour is possible during any ground works. Assumes correct use of suitable personal protective equipment (PPE) and compliance with site operating procedures.
Future built infrastructure Site workers	Low	It is anticipated that new buildings on site are likely to be temporary, require shallow foundations or offer no opportunity for the accumulation of gas. Therefore, while the presence of ground gas must be considered where excavations are undertaken, there is little risk to buildings from either the accumulation of gas or from aggressive ground given the type of construction associated with the Proposed Development. Subsidence associated with deep long wall mining is also noted to be an issue in this area and a coal mining risk assessment may be required at the detailed design stage, based on the detailed design. However, no significant foundations are expected to be required in the areas impacted by subsidence.
Controlled waters (Groundwater and Surface water)	Low	Due to stockpiling of the extracted site won material and disturbing of soils, there is a chance of leaching/ surface run off of substances from these newly exposed materials migrating to groundwater/ surface water drains and subsequently into watercourses off site. With appropriate mitigation measures, i.e. materials are adequately contained, excavations are adequately drained and plant machinery is washed down in designated areas, the risk of run off from the proposed excavation of PFA material is low.
Controlled waters (Groundwater)	Medium	Data from existing boreholes will provide an idea of groundwater conditions within the ash disposal areas. However the condition of wider site infrastructure is not currently known, as such, ground investigation near fuel tanks, banded waste oil tanks, vehicle wash down areas and site drains may be required in order to assess if contamination has leaked from these structures into the wider environment.

Future Baseline

11.4.31 In the event that the Proposed Development does not proceed, no significant changes to the existing baseline assumed for the Proposed Development are anticipated.

11.5 Development Design and Impact Avoidance

11.5.1 The following impact avoidance measures would either be incorporated into the design or are standard practices. These measures have therefore been taken into account during the impact assessment in Section 11.6. Any need for additional mitigation measures as identified as a result of the impact assessment are described (where necessary) in Section 11.7.

Construction

- 11.5.2 During the construction stages of the Proposed Development the Applicant's contractor(s) will be required to minimise adverse land contamination effects on sensitive receptors by implementing good operational practices (e.g. the control and drainage of excavations, the stockpiling of extracted materials and the deployment of suitable surface water drainage control).
- 11.5.3 Construction workers will be protected from contact with hazardous materials by adopting appropriate health and safety measures including an assessment of appropriate measures under the Control of Substances Hazardous to Health (COSHH) Regulations 2002. Such measures will include suitable PPE, hygiene facilities and the implementation of dust control where considered necessary.
- 11.5.4 Given the historical land use within the areas of the Gale Common Ash Disposal Site, there is potential for contamination to be encountered locally within excavations. The contractor(s) will be required to implement pollution control measures to deal with any contaminated land encountered during the works. These measures will include, as a minimum, the following:
- all workers will be briefed as the possibility of the presence of contaminants;
 - all workers will be required to wear PPE as applicable;
 - should any potentially contaminated ground, including isolated 'hotspots' of contamination, be encountered during excavations the contractor(s) will be required to investigate the area and then assess whether there is a need for containment or disposal of the material. The contractor(s) will also be required to assess whether any additional health and safety measures are required. Any such investigations will be required to be undertaken in consultation with the Environment Agency and other appropriate consultees.
 - in the event that contamination is identified during construction works, appropriate remediation measures will be taken to protect construction workers, future site users, water resources, structures and services;
 - the contractor(s) will be required to place arisings and temporary stockpiles away from watercourses and drainage systems, whilst surface water will be directed away from stockpiles to prevent erosion;
 - any waters removed from excavations by dewatering will be discharged appropriately, subject to the relevant licences being obtained; and
 - the contractor(s) will implement a dust suppression/ management system in order to control the potential risk from airborne contamination migrating off-site to adjacent sites, specifically the adjacent agricultural land, ecological receptors and nearby residential receptors.
- 11.5.5 Should any unconfirmed asbestos containing materials (ACMs) be encountered during the construction phase (such as within infilled ground/ Made Ground), associated works will be undertaken in accordance with the Control of Asbestos Regulations 2012, which includes measures set to safeguard human health and the environment.
- 11.5.6 Any services installed as part of the Proposed Development will be designed to prevent the creation of pathways for the migration of contaminants and be constructed of materials that are suitable for the ground conditions and designed use. For example water supply pipes will be designed in accordance with current good practice and applicable guidance to ensure pipes are protected from potential impacts associated with any contamination.
- 11.5.7 A site-specific (Phase 2) intrusive ground investigation will be undertaken prior to the commencement of construction works associated with the new site access arrangement, loading pad extension, internal access road upgrade, office extension and realignment of Whitefield Road. The Phase 2 ground investigation will be designed in order to:
- further investigate potential ground contamination associated with the previous land uses;

- assess the potential for contamination to have migrated on-site from the adjacent land uses;
- assess the potential risks associated with ground and mine gases;
- include testing of soils with respect to contamination (including asbestos) for a subsequent risk assessment and identify potential options for reuse of the soils; and
- provide better understanding of the ground conditions across the Proposed Development, including variations in bedrock profile, the presence of geological faulting and the certainty of geology.

11.5.8 In addition to this, a Coal Mining Risk Assessment may be required to determine the risks posed by the presence of mine workings below the Site and what mitigation may be required to facilitate the Proposed Development. However, this cannot be undertaken until the detailed design stage.

Operation

11.5.9 The Applicant will ensure that all extracted material including soils and colliery shale is suitable for its proposed use and will not result in an increase in contamination-related risks on identified receptors including any landscaped areas and underlying groundwater. An Outline Soil Management Plan is provided at Appendix 11B in ES Volume II.

11.5.10 The main potential source of oils and fuels on the Gale Common Ash Disposal Site is from plant and machinery. All plant and machinery will be checked regularly and where possible, the use of bunds/ drip trays will be employed. An emergency spillage action plan will be produced and provisions made to contain any leak/ spill.

11.5.11 Risks to surface water and groundwater from runoff will be reduced by the use of the existing Gale Common Ash Disposal Site drainage system, which collects runoff from all operational areas of the Gale Common Ash Disposal Site.

11.5.12 Liquid fuel storage areas will be appropriately bunded to ensure that, in the event of any spillage, the materials are safely contained. Most potentially significant effects to soil and groundwater can be avoided with good housekeeping and management practices adopted and adhered to.

Restoration

11.5.13 Any movement or stockpiling of material which is potentially contaminative must be appropriately managed and a soil management plan or similar should be employed to ensure that surface runoff or infiltration of stockpiled material does not lead to the establishment of a pollutant linkage. The removal of any oil storage tanks and associated bunds should be undertaken in such a manner that no accidental discharges to the environment occur.

11.6 Likely Impacts and Effects

Construction Impacts

11.6.1 Potential impacts during the construction phase may include the following:

- the discovery of soils exhibiting visual and olfactory evidence of contamination during groundworks and the potential disturbance of residual soil contamination through construction activities such as the removal of existing site drainage;
- the discovery of impacted groundwater/ surface water recovered during dewatering which may not be suitable for discharge without treatment;
- excavation and construction activities that may open and/ or modify potential pollutant linkages, including the disturbance of sediments from existing drainage channels and the PFA deposits;
- re-profiling of the Gale Common Ash Disposal Site including the possible introduction of new fill materials and the removal of unsuitable materials;
- disturbance of ground affected by subsidence and subsequent damage to infrastructure, etc;

- runoff from contaminated material exposed and/ or stockpiled during Site construction works;
- contamination arising from spillages associated with vehicles and construction materials;
- airborne contamination arising from potentially contaminated dust; and
- removal of any waste materials and/ or contaminated soil.

Operational Impacts

11.6.2 Potential impacts during the operational phase may include the following:

- leaks, spills and contamination from storage of chemicals, fuels and wastes on site affecting site users and groundwater; and
- presence of gases, vapours and groundwater in the ground affecting site users and buildings.

Restoration Impacts

11.6.3 Potential impacts during the restoration phase may include the following:

- the discovery of soils exhibiting visual and olfactory evidence of contamination during restoration;
- restoration activities that may open and/ or modify potential pollutant linkages, including the disturbance of sediments;
- re-profiling of the Gale Common Ash Disposal Site including the removal of unsuitable materials;
- runoff from contaminated material exposed and/ or stockpiled during ground works;
- contamination arising from spillages associated with vehicles;
- airborne contamination arising from potentially contaminated dust; and
- removal of any waste materials and/ or contaminated soil.

Effects

11.6.4 It is concluded that, with the implementation of the impact avoidance measures and best practice guidance defined within Section 11.5, there is a low likelihood of the identified sensitive receptors being impacted upon by the Proposed Development throughout the construction, operation, restoration and post-restoration phases, as described in Table 11.11 below.

Table 11.11 - Summary of Impacts and Effects

DESCRIPTION OF IMPACT	MITIGATING FACTORS	SENSITIVITY OF RESOURCE/ RECEPTOR	MAGNITUDE OF IMPACT	CLASSIFICATION OF EFFECT
Impact to construction workers from contaminated soils, sediments and groundwater/ surface water encountered during construction	PPE requirements and engineering controls to be determined following groundwater monitoring as part of the future site investigation.	Medium (end users)	Low	Minor adverse (not significant)
Impact to groundwater and surface water from	Mitigation measures to be adopted including collection of runoff and/ or	High (ground-water)	Very low	Minor adverse (not significant)

DESCRIPTION OF IMPACT	MITIGATING FACTORS	SENSITIVITY OF RESOURCE/ RECEPTOR	MAGNITUDE OF IMPACT	CLASSIFICATION OF EFFECT
runoff and/ or leachates from stockpiled materials during construction	adequately covering or containing materials.			
Impact to groundwater through creation of new or exacerbation of existing pathways during construction	Potential for residual sources of contamination likely to be very limited. As no deep foundations are required, creation of pathways to groundwater is unlikely	High (ground-water)	Very low	Minor adverse (not significant)
Impacts to flora, fauna and agricultural land from contaminated soils encountered during construction	Contaminated soils anticipated to be restricted to the Proposed Development away from agricultural land and ecological habitats.	Medium (ecological sites)	Low	Minor adverse (not significant)
Impact to workers, off site residents and land from potentially contaminated dusts generated during construction	Adoption of suitable mitigation measures to minimise dust generation (e.g. damping down of materials).	Medium (construction workers, surrounding land uses)	Low	Minor adverse (not significant)
Impact to groundwater from spills, leachates and runoff during site operation	All fuel and chemical storage areas to be bunded.	High (ground-water)	Very Low	Minor adverse (not significant)
Impacts to buildings and site workers from gases, vapours and groundwater during operation	Risks to be minimised through completion of site investigation and adoption of design measures and engineering controls to minimise risks.	Low (built environment)	Low	Negligible adverse (not significant)
Impacts to buildings and infrastructure from mining-related subsidence	Risks will be minimised by the production of a coal mining risk assessment where appropriate and adoption of design-specific mitigation	Low (built environment)	Medium	Minor adverse (not significant)

11.7 Mitigation and Enhancement

- 11.7.1 As no significant effects have been identified, no additional mitigation measures are required.
- 11.7.2 Following completion of a ground investigation prior to the construction of the new site access arrangement, loading pad extension, internal access road upgrade, office extension and realignment of Whitefield Road, it will be possible to define the need for any additional mitigation measures further to the impact avoidance measures detailed in Section 11.5 Limitations or Difficulties.

11.8 Limitations of Difficulties

- 11.8.1 The identification of possible future receptors is based on the Proposed Development indicative design. Detailed method statements and/ or work plans for the construction activities at the Site are not available as a contractor has not yet been appointed, however it is considered reasonable to assume that proposed construction activities will follow industry best practice and relevant guidance and comply with current applicable legislation, and that standard construction techniques will be used.

11.9 Residual Effects and Conclusions

- 11.9.1 Based on the information as detailed herein, the construction, operation, restoration and post-restoration activities proposed at the Site would have the potential to generate a number of land contamination related adverse effects on identified receptors if appropriate impact avoidance measures (detailed in Section 11.5) are not implemented.
- 11.9.2 Given that the impact avoidance measures detailed in Section 11.5 will be employed and any further mitigation measures identified following pre-construction ground investigations for the new site access arrangement, loading pad extension, internal access road upgrade, office extension and realignment of Whitefield Road, the significance of effects related to potential geological, hydrogeological and contamination related risks associated with the Proposed Development during the construction, operation, restoration and post-restoration stages are likely to be minor adverse or negligible, and therefore not significant.

11.10 References

- British Geological Survey (BGS) *website* [Online] Available from: (www.bgs.ac.uk). Accessed February 2019.
- City of York Council, North York Moors National Park and North Yorkshire County Council (2018) *Minerals and Waste Joint Plan: Modifications to the Publication Draft, April 2018*.
- Department for Communities and Local Government (2014) *National Planning Policy for Waste, October 2014*.
- Department of the Environment, Food and Rural Affairs (Defra) (2004). *Model Procedures for the Management of Contaminated Land, Contaminated Land Report 11*.
- Environment Agency (2010). 'GPLC1 - Guiding Principles for Land Contamination'
Environment Agency section of the [data.gov.uk website](http://data.gov.uk) [Online]. Available from: (www.data.gov.uk). Accessed December 2018.
- Ministry for Housing, Communities and Local Government (2019) *National Planning Policy Framework*.
- North Yorkshire County Council (1997) *North Yorkshire Minerals Local Plan, adopted 1997*.
- North Yorkshire County Council (2006) *North Yorkshire Waste Local Plan, adopted 2006*.
- RPS (2017) *Phase 1 Contaminated Land Assessment*, Eggborough Power Limited.
- Selby District Council (2015) *Plan Selby Consultation*.
- Selby District Council (2014-17) *Consultation Draft Selby Sites and Policies Plan*.
- Selby District Council (2013) *Selby District Core Strategy*.
- Selby District Council (2005) *Local Plan*.
- Taylor et al. (1976) *The Engineering Geology of Devensian Deposits Underlying Lagoons at Gale Common, Yorkshire*.