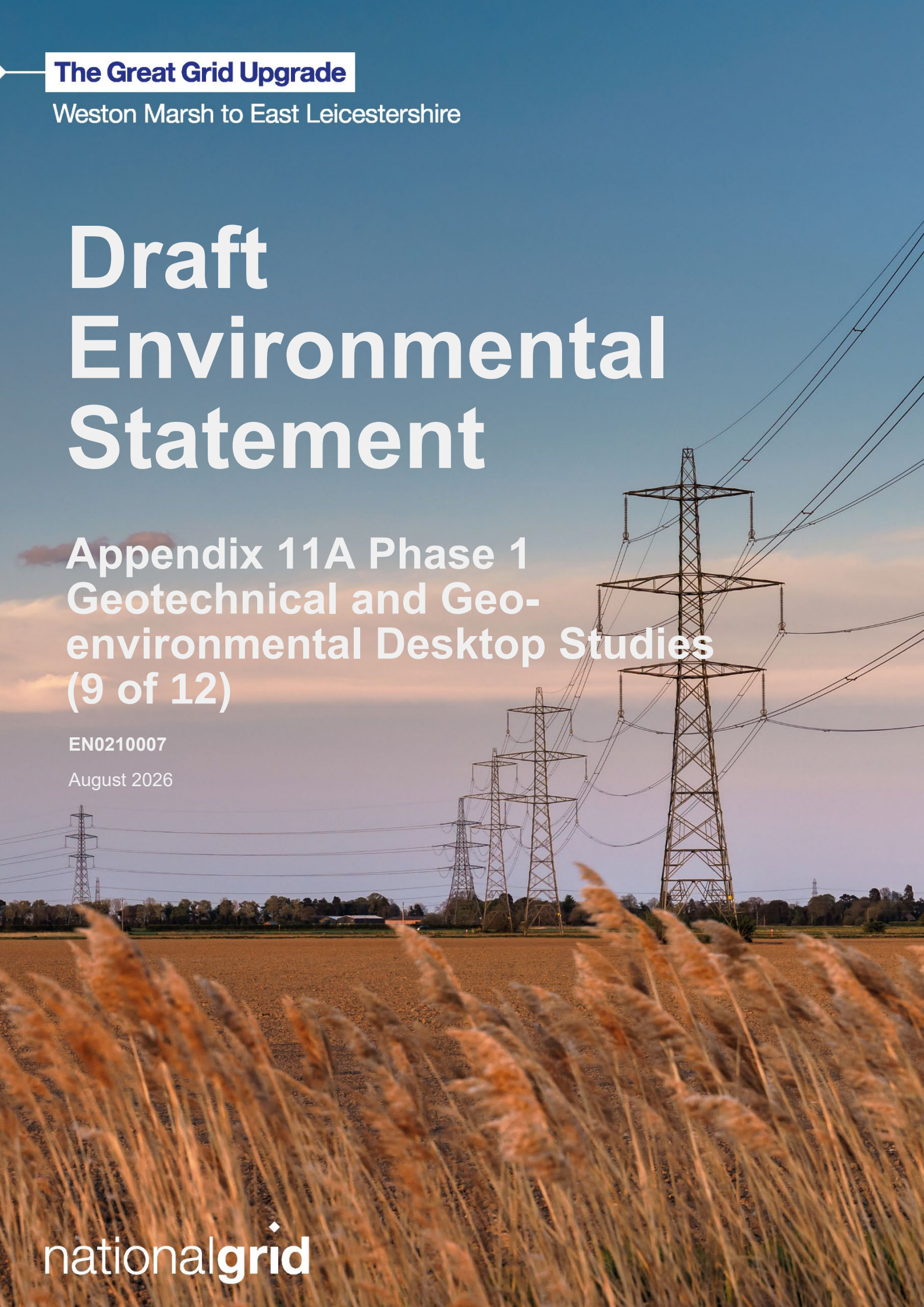




The Great Grid Upgrade

Weston Marsh to East Leicestershire

Draft Environmental Statement

Appendix 11A Phase 1 Geotechnical and Geo- environmental Desktop Studies (9 of 12)

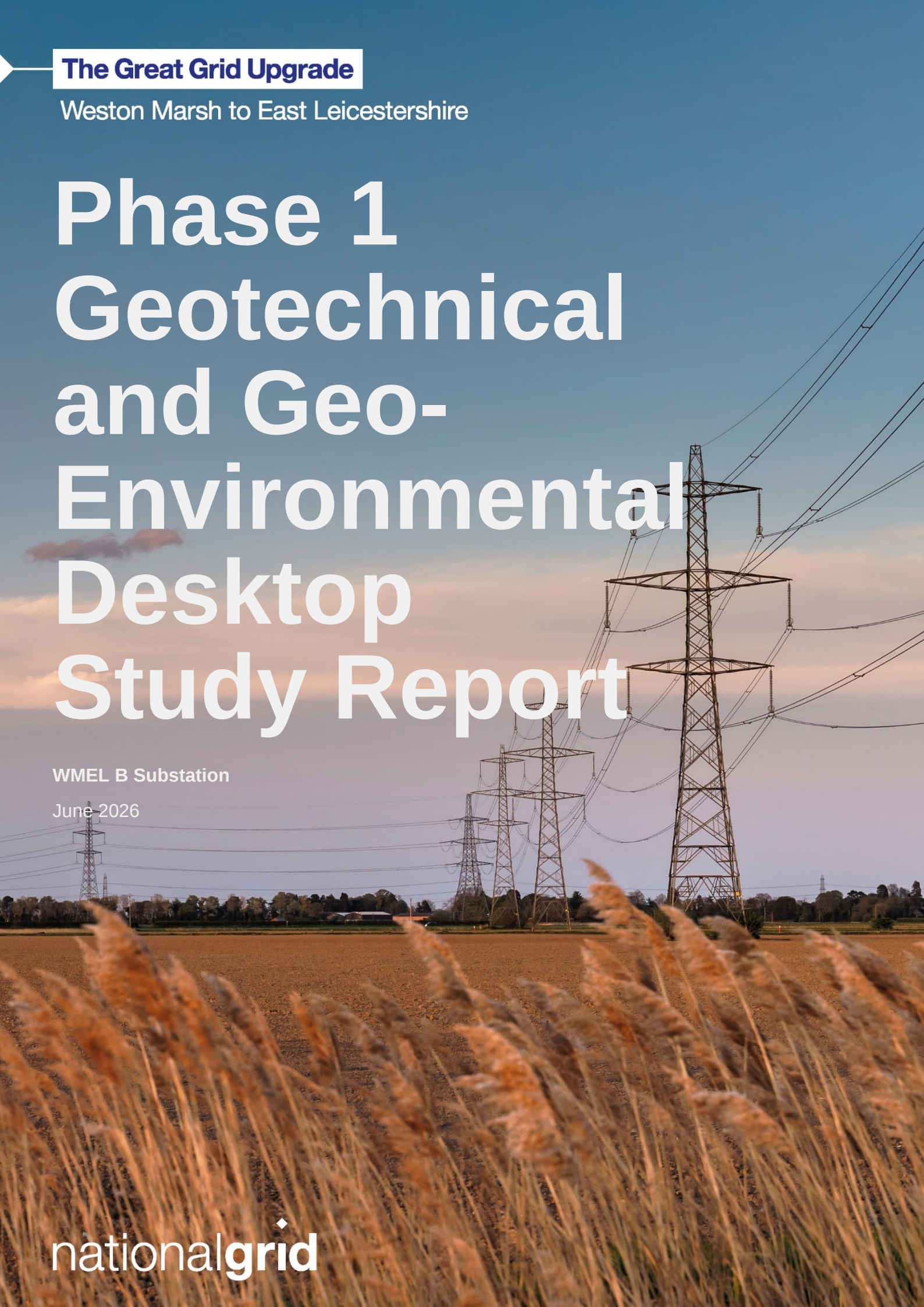
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August 2026

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11A. Phase 1

Geotechnical and Geo- environmental Desktop Studies



The Great Grid Upgrade

Weston Marsh to East Leicestershire

Phase 1 Geotechnical and Geo- Environmental Desktop Study Report

WMEL B Substation

June 2026

nationalgrid

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The methodology adopted and the sources of information used by AAJV in providing its services are outlined in this Report. The work described in this Report was undertaken between November 2025 and January 2025, alongside for the Design Freeze (DF) 2 Revision (Rev) A Redline Boundary between March 2026, and April 2026, and for the DF2 Rev B Redline Boundary in June 2026. is based on the conditions encountered and the information available during the said periods of time. The scope of this Report and the services are accordingly factually limited by these circumstances. AAJV disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to AAJV's attention after the date of the Report.

Any risks identified in this Report are perceived risks, based on the information reviewed during the desk study and therefore partially based on conjecture from available information. The study is limited by the non-intrusive nature of the work and actual risks can only be assessed following a physical investigation of the Site.

The opinions expressed in this report and the comments and recommendations given are based on a desk assessment of readily available information. At this stage intrusive investigations have yet to be undertaken at Site to establish actual ground and groundwater conditions.

Reference to historical Ordnance Survey (OS) maps provides invaluable information regarding the land use history of a Site. However, it should be noted that historical evidence will be incomplete for the period pre-dating the first edition and between the release of successive maps.

Executive Summary

On the instructions of National Grid Electricity Transmission (NGET), the AECOM Arup Joint Venture (AAJV) has undertaken a Phase 1 Geotechnical and Geo-environmental Desk Study for the proposed WMEL-B Substation site to provide baseline ground information to support the Development Consent Order (DCO) application and to inform future ground investigation and design stages. The Site is being redeveloped as part of the wider Weston Marsh to East Leicestershire (WMEL) scheme.

The proposed works are anticipated to include earthworks (cut and fill), construction of access roads and construction of a new substation. The site is located adjacent to Ostler Lane, Melton, Leicestershire, LE14 3PL, approximately 130m southwest of Wartnaby and 6km northwest of Melton Mowbray, Leicestershire and is centred on National Grid Reference SK 70324 22338. The site covers an area of approximately 148ha and is situated in a rural setting predominantly consisting of agricultural fields. The site spans multiple agricultural fields and features three north to south trending gullies across a southern sloping topography.

Existing infrastructure comprising of overhead transmission lines passes cross the Site diagonally from the northeast towards the south with associated overhead line towers present in the northeast (SK 70551 22843) and central east (SK 70502 22514) and central towards the south (SK 70465 22249) of the Site. These connect into offsite electricity towers from the northeast and to the south on a roughly northeast-south bearing orientation beyond the Site extents.

The published geological mapping covering the Site (1:10,000 scale Map Sheet SK72SW dated 2000) and historical BGS exploratory hole records in the local area, indicate that the Site is underlain by the Oadby Till Member. This comprises of Diamicton with lenses of sand, gravel, clay and silt, as well as silty clay with chalk and flint fragments, overlying the Charmouth Mudstone Formation which comprises mudstones with beds of limestone and sand. Areas of Head and Alluvium are expected to be present on site, local to the gully features. An Area of Infilled Ground is mapped to be locally associated with the Marlstone Rock Formation in the northeast of the Site and is suspected to be a result of shallow ironstone mining. Due to topography, geology, water courses and surface water features in proximity to the Site, there is potential for shallow and perched groundwater. Linear features of the Normanton Hill Fault are mapped across the north, middle and south of the Site trending west and downthrown 15m to the northern side. A buried superficial deposit filled valley feature is mapped to encroach on the southern corner of the Site and to trend northeast, following adjacent and southeast of the Site boundary. Deeper superficial deposits are expected to be present in these areas. The site is located within the NOTTS Coal Mining Reporting Area with no Development High Risk Areas are in proximity; the BGS mineral map indicated the Site to be in a region of deep (up to 1200m) coal mining. The Environment Agency's Groundwater Protection Policy adopts aquifer designations that are consistent with the Water Framework Directive. Superficial and bedrock deposits at the Site are classified as a Secondary (undifferentiated) aquifer and have a medium to high vulnerability to pollution. The Groundsure GIS data does not record the Site to lie within 500m of any Source Protection Zones (SPZ) and no Licensed Groundwater Abstractions have been identified within 1km of the Site.

Notable potential sources of contamination on-site are localised areas of Made Ground (associated with the area of artificial ground (infilled land) recorded in the northeastern area of the site and on-site structure development and removal), infilled land (associated with the former ponds and potential surface mining in the northeast of the Site recorded as infilled land) and general agricultural use across the majority of the Site throughout its mapped history. The DF2 Revision B boundary includes a substantial section in the northeast of the Site which has a high Radon potential (i.e. where the number of properties affected by Radon is at 30% to 100%). Off-site sources comprise of storing use and disposal of waste exemptions, registered to agricultural buildings proximate to the Site boundary, Made Ground, infilled land associated with former ponds and tramway cuttings, historical railway land, an electrical substation, unspecified tank and industrial land use (cleaning supplies and agricultural contractors within the industrial estate to the northeast). Risks from these potential contaminant sources have been assessed for three identified receptor groups (Human Health, Controlled Waters and Property). Generally, Very Low/Low risks have been assigned to most scenarios, excluding scenarios associated with leaching of contaminants and migration in groundwater and surface run-off impacting the Secondary A Aquifer (Bedrock) and on-site fishpond, which have been assigned Moderate / Low risk. The contaminant linkages that have been assessed and the risks assigned are based on the information provided and high-level understanding of the development proposals. Risk ratings may be reviewed as more information on the proposed design is developed and / or as intrusive investigation data provides a more robust characterisation of site conditions. Due to the high Radon potential identified in the northeast part of the Site, if buildings or confined spaces are proposed within this area then targeted ground investigation may be required to confirm Radon presence and magnitude. Specific consideration of Full Radon Protection Measures for any occupied buildings located in the northeast sector should be considered.

Overall, numerous geotechnical risks have been identified on site, resulting in various constraints to the proposed development and requiring further investigation, risk assessment and suitable mitigation within future works and designs. The most notable risks include likely variable lateral and vertical ground conditions, variable depth and composition superficial geology related to the presence of a buried valley, presence of shallow / perched groundwater, potential for aggressive ground conditions, susceptibility of soils to instability at steep slope angles, the presence of shallow clay soils susceptible to shrink-swell and the presence of compressible Made Ground associated with shallow historical mining. Appropriate engineering solutions will be required to mitigate these risks and will be developed following intrusive ground investigation.

It is recommended that the ground investigation is undertaken in accordance with UK Specification for Ground Investigation 3rd Edition. In brief, the outline scope of works is anticipated to include boreholes, trial pitting, in-situ testing (including Standard Penetration Testing, California Bearing Ratio Tests, Infiltration Tests and Percolation Tests), sampling of soil and groundwater, geotechnical and geo-environmental laboratory testing and groundwater and gas monitoring.

Access for a site reconnaissance (walkover) was not available prior to the completion of this revision; however, the Site will be visited by AECOM Arup Joint Venture Geotechnical / Geo-environmental Engineers to inform future works.

1. Introduction

1. Introduction

1.1 Terms of Appointment

- 1.1.1 On the instructions of National Grid Electricity Transmission (NGET), hereafter referred to as 'the Client', The AECOM Arup Joint Venture (AAJV) has carried out a Phase 1 Geotechnical and Geo-environmental Desk Study assessment of the Site known as WMEL-B Substation, herein referred to as "the Site".

1.2 Background and Proposed Development

- 1.2.1 The report has been produced on the assumption that the Site, defined by the Design Freeze (DF) 2 Revision (Rev) B Redline boundary (Draft Order Limit Boundary – DF2 REVB – 18/05/2026), will be redeveloped as a new substation, as part of the wider Weston Marsh to East Leicestershire (WMEL) development.
- 1.2.2 It is anticipated that the development will require significant earthworks (Cut and Fill) to achieve a suitable founding level across the Site, alongside the construction of additional access roads. It is noted that the proposed site layout is still under development and consequently subject to change. The findings of this report should be reviewed if changes in alignment / Site areas are proposed.
- 1.2.3 The development of the Site is anticipated to comprise the following:
- Clearing and stripping of the existing site.
 - Construction of new access roads (including any crossings).
 - Earthworks, including excavation levelling and landscaping for external areas and the construction of an attenuation pond. Retaining structures may also be required to achieve required levels.
 - Installation of services and site drainage.
 - Construction of the new substation and overhead line towers / gantries associated with the substation.
- 1.2.4 Figures referenced as part of this report have been included in Appendix A.

1.3 Report Objectives

- 1.3.1 The primary objective of this report is to provide baseline information to support the Development Consent Order (DCO) for the scheme and inform ground investigation scope and specification, alongside subsequent interpretative reporting and design stages of the project.
- 1.3.2 This report has been authored following the recommended best practice outlined in accordance with Eurocode 7 (BS EN 1997-2:2007) and the UK government guidance

resource “Land contamination: risk management (LCRM)” (Updated 2025) and comprises:

- A description of the Site layout and setting.
- A review of the Site’s geological, hydrological and hydrogeological setting, and publicly available geo-environmental information to build up understanding of the Site and surrounding environmental setting/sensitivity.
- The identification and review of potential geotechnical hazards and constraints, including the production of a geotechnical risk register, with consideration given to the presence of historical mining and underground structures.
- An appraisal of current and historical development and land use across the Site and in the surrounding area, with a particular emphasis on identifying potential on-site and off-site contamination sources.
- Preliminary review of Unexploded Ordnance (UXO) risk.
- The production of an initial Conceptual Site Model and Preliminary (Qualitative) Risk Assessment in accordance with the guidance document Environment Agency, Land Contamination: Risk Management. (LCRM 2025).
- A Preliminary Engineering Assessment and recommendations for additional geotechnical and geo-environmental investigation.

1.4 Sources of Information

1.4.1 The following sources of information have been considered in the authoring of this report:

- 1:10,000 scale British Geological Survey (BGS) geological maps (Map Sheet SK72SW, dated 2000 and SK62SE, 1999)
- 1:50,000 scale BGS geological map (Map Sheet 142 Melton Mowbray, dated 2002)
- 1:10,000 BGS Mineral Resources Map of Leicestershire and Rutland (dated 2002)
- 1:10,560 scale BGS Geological Survey of England and Wales County Series maps (Map Sheet Leicestershire 12 SE, dated 1906)
- BGS Geological Memoir (Map Sheet 142 Melton Mowbray)
- BGS GeoIndex borehole records
- Natural England Agricultural Land Classification Map East Midlands ALC005
- The Environment Agency’s MAGIC interactive map
- Mining Remediation Authority Map Viewer
- Mining Remediation Authority mine plans sheets 43 7021, 43 7022 and 43 6822 (Asfordby Colliery “Deep Main Seam”)

- DF2 Rev B Groundsure GIS Dataset and Historical OS Maps (Sourced via Groundsure)
- Fellows International Group Preliminary UXO Risk Assessment from June 2026 (included in Appendix C).

1.4.2 Specific information sources are referenced throughout the document, and a bibliography is included on page ii.

1.4.3 It is noted that a Site reconnaissance has not been feasible at the time of reporting due to land access. Once the Site reconnaissance has been completed, the findings of this report should be reviewed and updated as necessary.

1.4.4 The Detailed Unexploded Ordnance (UXO) Risk Assessment for the Site is also awaited at the time of writing and findings should be reviewed and incorporated into subsequent ground investigation specifications.

2. Site Setting

2. Site Setting

2.1 Location

2.1.1 The site is located next to Ostler Lane, Melton, Leicestershire, LE14 3PL, approximately 6km northwest of Melton Mowbray and west of the village of Wartnaby (Figure 1). It is centred on National Grid Reference SK 69973 22591.

2.2 Description and Setting

- 2.2.1 The site covers an area of approximately 148ha and is defined by the Redline boundary shown in Figure 1. The site is currently used as agricultural fields. The site spans multiple agricultural fields and features three north to south trending gullies across a southern sloping topography. Three streams are present within the gully features running from their sources to the north of the Site towards the south. One gully forms the eastern boundary of the Site with the stream continuing along the Site’s southern boundary and crossing the southern section of the Site, with a larger pond located at the southeast corner. The area surrounding this stream is heavily vegetated. The waterways from the other two gulleys connect with this near the southern border of the Site. A small pumping station is noted within a wooded area on the eastern site boundary.
- 2.2.2 The levels of southern sloping site range from a maximum height of approx. 151m Above Ordnance Datum (AOD) at the northern border, reducing to a height of approx. 112m AOD at the southern border (Figure 2). The overall site is gently sloping, where gradients are indicated as less than 3.5°. The incised gully features have more steeply sloping sides orientated inwards towards the invert at angles generally between 5.71° and 15° and locally greater than 15° associated with the aforementioned streams.
- 2.2.3 A LiDAR survey undertaken by Air Photo Services Ltd in May 2026, encompassing the DF1.5 Rev A boundary, supported evidence of ridge and furrow and headland farming microtopography across much of the Site. An area of Disturbed Ground is also identified in the northeast corner of the site; however, no details are provided regarding the nature or origin of the disturbance.
- 2.2.4 The surrounding land uses are summarised in Table 2.1.

Table 2.1 Features Surrounding the Site

Direction	Summary
North	The site is bound immediately by Six Hills Lane with agricultural land and Stonepits Farm.
South	The site is bound immediately by a stream from a fishpond and agricultural land, with the southernmost section being bound by

Direction	Summary
	agricultural land and then Main Street and the surrounding small village of Saxelbye.
East	The site is bound immediately by ponds connected by a stream, with a playing field at 300m beyond. The easternmost section is immediately bound by the village of Wartnaby.
West	The site is bound immediately by Ostler Lane, agricultural land and a farmstead, then the village of Grimston.

3. Geological and Environmental Setting

3. Geological and Environmental Setting

- 3.1.1 The environmental setting including the topography, geology, hydrogeology and hydrology are the key factors that influence the way in which contaminants in the soil or groundwater can be transported on or off site, and also the way in which contamination can affect applicable receptors including controlled waters and users of the Site. It also impacts on the ground profile and geotechnical properties of soils underlying the Site.
- 3.1.2 The environmental setting of the site has been assessed by making reference to the information sources detailed in Section 2.

3.2 Geology and Soils

Published Geology & Exploratory Hole Records

- 3.2.1 AAJV has reviewed publicly available information and summarised the anticipated geological succession for the Site. The published 1:50,000 (Map Sheet 142 Melton Mowbray, 2002), 1:10,000 (Map Sheet SK72SW, 2000 and SK62SE, 1999) and 1:10,560 (Map Sheet Leicestershire 12 SE, 1906) scale geological maps of the area produced by the BGS and presented in the Groundsure Report indicate the Site is underlain by the geological succession summarised in Table 3.1. Extracts of the superficial deposit and bedrock maps are included in the Groundsure Geo-Insight GIS data (Figure 3 and Figure 4).
- 3.2.2 The BGS GeoIndex Onshore Viewer maps Linear features on site; the inferred Normanton Hill Fault is mapped across the north, middle and south of the Site trending west and downthrown 15m to the northern side. A buried superficial deposit filled valley is mapped to broadly trend from the southwest and turns towards the east at the location of site. The edge of the buried valley is mapped to encroach on the southern corner of the Site and to trend northeast, following adjacent and southeast of the Site boundary by approximately 100m. An area of Infilled Ground is recorded within the BGS GeoIndex Onshore Viewer maps locally associated to the Marlstone Rock Formation in the northeast section of the Site, this site broadly correlates with the “Disturbed Ground” identified in the Air Photo Services Ltd survey. Ironstone working is recorded at Wartnaby in the associated Geological Memoir and this section of Infilled ground is attributed to “Former Clay and Ironstone Pits” within Map Sheet 142.

Table 3.1 Geological Succession from Published Mapping

Age	Parent Unit	Geological Stratum	Stratum	BGS Lexicon Description	Mapped Occurrence	Anticipated Thickness (m)
Quaternary Period	Artificially modified ground	Artificial	Infilled Ground	Infilled Ground is an area where the pre-existing land surface has been excavated (Worked Ground) and subsequently partially or wholly backfilled (Made Ground).	Present across the northeast section of the Site and associated with the Marlstone Rock Formation	Unproven
Quaternary Period	Mass movement deposits	Superficial	Head-Clay, silt, sand and gravel	Poorly sorted and poorly stratified, angular rock debris and/or clayey hillwash and soil creep, mantling a hillslope and deposited by solifluction and gelifluction processes	Mapped within gully features	Unproven
Quaternary Period	Fluvial deposits	Superficial	Alluvium-Clay, silt, sand and gravel	Clay, silt, sand and gravel. Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel	Present at southern point of site where gully features connect	Unproven
Anglian Stage	Wolston Glacigenic Formation	Superficial	Oadby Till Member-Diamicton	Diamicton, grey, weathering brown, characterised by Cretaceous and Jurassic rock fragments; subordinate lenses of sand and gravel, clay and silt. Clay, brown to grey, and silty clay, with chalk and flint fragments Locally subdivided into the Oadby Till Member (Lias-rich)-Diamicton subgroup described as Clay, brown to grey, and silty clay, with	Mapped across the Site and is expected to be encountered site wide	Up to 20, typically 1-7

Age	Parent Unit	Geological Stratum	Stratum	BGS Lexicon Description	Mapped Occurrence	Anticipated Thickness (m)
				chalk and flint fragments; rich in 'Lias' rock fragments. Geological mapping indicates that the Lias rich portion is stratigraphically below the generic portion.		
Pliensbachian Age - Toarcian Age	Lias Group	Bedrock	Marlstone Rock Formation	Sandy, shell-fragmental and ooidal ferruginous limestone interbedded with ferruginous calcareous sandstone, and generally subordinate ferruginous mudstone beds	Present locally at the north section and mapped across the northeast section of the Site.	5-10
Pliensbachian Age	Lias Group	Bedrock	Dyrham Formation	Pale to dark grey and greenish grey, silty and sandy mudstone, with interbeds of silt or very fine-grained sand (locally muddy or silty), weathering yellow. Variably micaceous. Impersistent beds or doggers of ferruginous limestone (some ooidal) and sandstone. This stratum is indicated to be predominantly interbedded siltstone and mudstone, however, becomes solely sandstones in the northwest.	Mapped across the north of the Site	15-25
Sinemurian Age - Pliensbachian Age	Lias Group	Bedrock	Charmouth Mudstone Formation- Mudstone	Dark grey laminated shales, and dark, pale and bluish grey mudstones; locally concretionary and tabular limestone beds; abundant argillaceous limestone, phosphatic or ironstone (sideritic mudstone) nodules in some areas;	Mapped across the majority of the Site	110-130

Age	Parent Unit	Geological Stratum	Stratum	BGS Lexicon Description	Mapped Occurrence	Anticipated Thickness (m)
				organic-rich paper shales at some levels; finely sandy beds in lower part in some areas		

BGS Borehole Records

- 3.2.3 The BGS maintains an archive of historical exploratory hole records throughout the UK. AAJV has searched the database and those which are considered to provide useful information on the ground profile at the Site are highlighted as part of the extract below.
- 3.2.4 Boreholes SK72SW68 (dated May 1943) and SK72SW101 (dated Aug 1993), and Openholes SK72SW110 (dated April 1995) and SK72SW111 (dated May 1995) have been referenced in producing this report (Appendix B). Copies of these exploratory hole records are included as Appendix B and relevant information from the records is considered as part of the Preliminary Ground Model in Section 8.

Soils and Soil Chemistry

- 3.2.5 Information obtained from Soilsclapes describes the soils within the majority of the Site (Soilscape 18) as 'slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils', but with the soil transitioning to 'freely draining slightly acid but base-rich soils' (Soilscape 7) in the northeast section of the Site, and 'lime-rich loamy and clayey soils with impeded drainage' (Soilscape 9) in the south of the Site.
- 3.2.6 Natural England (Agricultural Land Classification Map East Midlands ALC005) reports the Agricultural Land Use Classification to be 'good to moderate' agricultural land, with the soil transitioning to 'very good' agricultural land in the northeast and the south of the Site.
- 3.2.7 The BGS Soil Chemistry datasets provide indicative information on regional concentrations of five potentially harmful elements (PHEs): arsenic (As), cadmium (Cd), chromium (Cr), nickel (Ni) and lead (Pb) in soil, as presented with the Groundsure GIS data.
- 3.2.8 Elevated concentrations of these PHEs can exist because of natural geological conditions or possible anthropogenic contamination. The following BGS estimated soil chemistry levels are attributed to the vicinity of the Site based on the geometric mean concentrations of available data. Concentrations are locally increased in the northeast section of the Site associated with the Marlstone Rock Formation. These are considered an outlier to the typical soil chemistry and have been recorded separately within in Table 3.2.

Table 3.2 Estimated Soil Chemistry

Potentially Harmful Element	Most significant estimated concentration (mg/kg)	Estimated geometric mean concentration (mg/kg)
Arsenic	60 - 120	15 - 25
Cadmium	<1.8	<1.8
Chromium	>180	90 - 120
Lead	<100	<100
Nickel	80 - 100	30 - 45

Ground Stability Records

- 3.2.9 Table 3.3 summarises the Groundsure hazard ratings for natural ground subsidence hazards on site. The Groundsure data set is based on the BGS GeoSure Dataset comprising six layers representing a different natural ground stability hazard that occurs in Great Britain. The GeoSure datasets are described using a simple Class A to E potential hazard classification (A = Low, E = High).
- 3.2.10 It is noted that the below does not constitute AAJV's assessment of risk of these hazards and the Preliminary Geotechnical Risk Register in Appendix F should be referred to for further information.
- 3.2.11 It is noted that the Groundsure GIS data does not record recent / historical natural cavity incidents on or in the vicinity of the Sites. There is potential for the limestone bedrock at the Site to contain karst features (Marlstone Rock Formation). Karst features can result in abnormal ground conditions and voids, posing a risk of subsidence / ground collapse.

Table 3.3 Ground Stability Records

Hazard Type	Hazard Class Description
Collapsible Ground Stability	Class B - Deposits with potential to collapse when loaded and saturated are unlikely to be present.
Compressible Ground Stability	Class A - Compressible strata are not thought to occur. Note, Class D (Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the Site). Strata locally mapped to the Infilled Ground in northeast section of the Site, and to the Alluvium where the gully features connect in the south of the Site.
Ground Dissolution Stability	Class A - Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.
Landslide Ground Stability	The majority of the Site is classified as Class B - Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the Site should always be considered. Minor pockets of Class C are noted at the field boundaries close to the gully features in the north and west of the Site. Class C - Slope instability problems may be present or

Hazard Type	Hazard Class Description
	anticipated. Site investigation should consider specifically the slope stability of the Site.
Running Sand Ground Stability	Class B - Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly. Class B is mapped to be present site wide apart from areas of Class A present in the west and northeast of the Site. Note, Class C (Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water). Strata locally mapped to the Alluvium where gulley features connect in the south of the Site.
Shrinking or Swelling Clay Ground Stability	Majority of the Site is Class C - Ground conditions predominantly medium plasticity. Areas of outcropping Head Deposits (associated with channels across the Site) are noted as Class B - Ground conditions predominantly low plasticity.

Ground Movements and Seismic Hazard

- 3.2.12 A Review of the BGS GeoIndex recorded earthquake maps (Modern and Historical) shows only one record of seismic activity in the proximity of the Site. The seismic activity was recorded as a 2.6 on the Richter scale (local magnitude) in 2007 record approximately 85m north of the Site, indicative of a minor event.
- 3.2.13 In 2020 BGS seismologists completed a seismic hazard assessment for the UK, producing seismic hazard plans for the country. This was undertaken with support from the Institution of Civil Engineers (ICE), other UK-based seismologists and engineers and with oversight from the British Standard Institution (BSI) sub-committee B/525/8 for Eurocode 8 (EC8): Earthquake resistant design of structures.
- 3.2.14 The report states “The maps confirm that seismic hazard is generally low in the UK but that the hazard is slightly higher in areas like Wales and north central England. This largely reflects the higher historical earthquake activity in these regions.
- 3.2.15 A review of this plan has shown that the Site is located in a low seismicity area, with a peak ground acceleration (PGA) of less than 0.02g for a 10% probability in 50 years (475 year return period) and 0.02 - 0.04g for a 2% probability in 50 years (2,500 year return period). These values sit within the typical low range for England, and it is therefore inferred, that the Site’s seismic risk is consistent with the generally low risk for the UK, as stated by the BGS.

3.3 Mining and Mineral Extraction

Planning Policy for Mineral Use

- 3.3.1 The National Plan Policy Framework (NPPF) for England (2021) requires minerals planning authorities to promote sustainable use of mineral resources in their Local Plans. This includes defining mineral safeguard zones to ensure that specific mineral resources of local or national importance are not sterilised by non-mineral development (but not assuming that the identified minerals will be worked). If it is necessary for non-mineral development to take place then the local planning authority should set out policies to encourage the prior extraction of minerals, where practicable and environmentally feasible.
- 3.3.2 When determining planning applications local planning authorities must ensure that, amongst other matters, that there are no unacceptable impacts on the natural and historic environment, human health or aviation safety (taking into account cumulative effects from multiple sites); unavoidable noise, dust and particle emissions, and vibrations are controlled, mitigated or removed at source; and to not normally permit other developments in mineral safeguard zones.
- 3.3.3 The 1:100,000 BGS Mineral Resources map of Leicestershire and Rutland (2002) and BGS GeoIndex record the Site to be outside the boundary of the area assessed for sand and gravel at the indicated resource level. Sub-alluvial and River Terrace deposits are mapped to be present approximately 1.8km south of the Site. The mineral map indicates the Site to be in a region of deep coal at depths of up to 1200m.

Historical Aggregate/ Mineral Quarrying, Mining and Surface Ground Workings

- 3.3.4 The Groundsure report and BGS GeoIndex identify a single location of a historical Surface mineral working within 1000m of the Site (Figure 6). Wartnaby Pit located approx. 220m north of the north boundary, is described as a surface mineral working of Ironstone, however historical mapping (discussed in Section 4) shows the presence of tramways coming adjacent to the Sites redline boundary which may indicate the presence of unrecorded workings, this may be the source of the “Infilled Ground” shown on BGS Geological Plans for the area. The site is no longer in operation. It is noted however that there are a number of surface ground workings identified in the Groundsure GIS data from historical OS Mapping within 250m of the Site. These are summarised in Table 3.4.

Table 3.4 Surface Ground Working (<250m from site)

Distance and Direction	Dates on Mapping	Description
On site - Approx 270m SE from west border, approx. 150m NW of site centre	1883, 1902, 1959	Pond

On site - Approx. 155m NE from west site redline boundary, approx. 350m W of site centre	1883, 1902, 1994	Pond
On site - Bordering the east site redline boundary, approx. 430m NE of site centre	1883, 1902, 1916, 1950, 1959, 1994	Pond
On site - Approx 85m N from north site redline boundary, approx. 530m N of site centre	1883, 1902, 1994	Pond
On Site - Bordering the southeast redline boundary, approx. 525m SE of site centre	1883, 1902, 1916, 1950, 1959, 1969, 1994	Fish Pond
Approx. 12m E from east site redline boundary, approx. 520m NE of site centre	1902, 1916, 1939, 1950, 1959, 1969, 1994	Pond
Approx. 10m N from north site redline boundary, approx. 640m N of site centre	1915, 1959	Unspecified Ground Workings
Approx. 10m N from north site redline boundary, approx. 640m N of site centre	1915, 1950, 1959	Unspecified Quarry (Overlaps with Unspecified Ground Workings above)
Approx. 60m N from north site redline boundary, approx. 905m N of site centre	1915, 1939, 1950	Cuttings
Approx. 10m N from north site redline boundary, approx. 990m N of site centre	1883, 1902	Pond
Approx. 65m N from north site redline boundary, approx. 1040m N of site centre	1883, 1902, 1916, 1939, 1950	Pond
Approx. 120m N from north site redline boundary, approx. 1095m N of site centre	1883, 1902, 1916, 1939, 1950	Pond
Approx. 240m NW from north site redline boundary, approx. 1150m NW of site centre	1883, 1902, 1916, 1939, 1950	Road Cuttings
Approx. 185m N from north site redline boundary, approx. 1115m NW of site centre	1883, 1902, 1916, 1939, 1950	Railway Cuttings

Approx. 120m N from north site redline boundary, approx. 1095m N of site centre	1883, 1902, 1916, 1939, 1950	Railway Cuttings
Approx. 105m N from north site redline boundary, approx. 1090m N of site centre	1969	Unspecified Heap
Approx. 215m NW from north site redline boundary, approx. 1140m N of site centre	1883, 1902, 1916, 1939, 1950	Cuttings
Approx. 160m NE from north site redline boundary, approx. 1045m N of site centre	1883	Ironstone Pit (extent of workings may relate to BGS infilled ground, and therefore intrude into the Northeast of the Site)

Coal Mining

- 3.3.5 The Mining Remediation Authority Map Viewer (accessed 27th November 2025) identity the Site to be within the NOTTS Coal Mining Reporting Area. The site is not located on or near any Development High Risk Areas, Mine Entry Zones of Influence or Surface Mining Areas. The site is located with Abandoned Mines Catalogue numbers 16889 and 16890.
- 3.3.6 The Mining Remediation Authority Map Viewer (accessed 21st April 2026) identifies 3 mine plans records that are within the Site's redline boundary. Asfordby Colliery "Deep Main Seam" sheets; 43 7021, 43 7022 and 43 6822 detail the locations of deep coal mining passages that pass underneath the Site from the mine entry points approximately 1800m southeast of the southern redline boundary and trend northwest across the Site. The mine shafts are at depths of between 410m and 445m below ordnance datum, trending shallower towards the northwest of the Site. The Deep Main Seam is underlain by the Parkgate Seam approximately 22m below but does not appear to cross the Site boundary. Dates of construction are as follows; sheet 43 7021 constructed May 1992, sheet 43 7022 constructed December 1992 and sheet 42 6822 constructed August 1993. All relevant mines were abandoned 18th of August 1997.

3.4 Radon

- 3.4.1 At the northeast section of the Site, north of the inferred Normanton Hill Fault, the Groundsure GIS data estimates properties affected by radon is at 30 to 100%, therefore full radon protection measures are indicated as being required.
- 3.4.2 The estimated properties affected by radon for the majority of the Site, as per the Groundsure GIS data, is at <1% and 1 to 3% in some areas, therefore no radon protection measures are indicated as being required. The United Kingdom Health Security Agency (UKHSA) has published reports containing Radon Affected Area maps for the whole of the United Kingdom. The UKHSA defines Radon Affected

Areas as those with 1% chance or more of a house having a radon concentration at or above the action level of 200 becquerels per cubic metre (Bq m⁻³).

3.5 Hydrogeology

Aquifer Classification

- 3.5.1 The Environment Agency's (EA) Groundwater Protection Policy adopts aquifer designations that are consistent with the Water Framework Directive. Definitions of the various aquifer types can be found on the Environment Agency section of the gov.uk website. The bedrock deposits of the Dyrham Formation and the Marlstone Rock Formation present in the northern corner of the Site are classified as a Secondary A Aquifer, with the rest of the Site being classified by the EA as a Secondary (undifferentiated) Aquifer. All superficial deposits across the Site are characterised as a Secondary (undifferentiated) Aquifer.
- 3.5.2 The EA describes Secondary A Aquifers 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' and Secondary B Aquifers are described as 'lower permeability layers that may store and yield limited amounts of groundwater through characteristics like fissures and eroded layers'. A Secondary (undifferentiated) Aquifer occurs where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock types.

Groundwater Vulnerability

- 3.5.3 The Environment Agency's Combined Groundwater Vulnerability Map of the area shows that the superficial deposits and bedrock at the Site have a medium, medium - high and high vulnerabilities to pollution.
- 3.5.4 The vulnerability of the bedrock aquifer is 'medium' across the majority of the Site, with areas of 'medium - high' and 'high' in the north of the Site. All associated terminology/definitions are detailed below, taken from EA report SC040016/R, 2017:
- 3.5.5 High - These are high priority groundwater resources that have very limited natural protection. This results in a high overall pollution risk to groundwater from surface activities. Operations or activities in these areas are likely to require additional measures over and above good practice pollution prevention requirements to ensure that groundwater is not impacted.
- 3.5.6 Medium - High - These are high priority groundwater resources that have limited natural protection. This results in a medium-high overall pollution risk to groundwater from surface activities. Activities in these areas may require additional measures over and above good practice to ensure they do not cause groundwater pollution.
- 3.5.7 Medium - These are medium priority groundwater resources that have some natural protection resulting in a moderate overall groundwater risk. Activities in these areas should as a minimum follow good practice to ensure they do not cause groundwater pollution.
- 3.5.8 Medium - Low - These are lower priority groundwater resources that have some natural protection resulting in a moderate to low overall groundwater pollution risk.

Activities in these areas should follow good practice to ensure they do not cause groundwater pollution.

- 3.5.9 Low - These are low priority groundwater resources that have a high degree of natural protection. This reduces their overall risk of pollution from surface activities. However, activities in these areas may be a risk to surface water due to increased run-off from lower permeability soils and near-surface deposits. Activities in these areas should be adequately managed to ensure they do not cause either surface or groundwater pollution.
- 3.5.10 Permeability data presented as a part of the Groundsure GIS data indicates that the permeability of the Charmouth Mudstone Formation is recorded as low, the Dyrham Formation recorded as low to moderate and the Marlstone Rock Formation on the north redline boundary as between moderate and high. Oadby Till Member is recorded as having a permeability of between low and moderate, and both Head deposits and Alluvium being recorded as between very low and high.

Source Protection Zones

- 3.5.11 In terms of identifying the risk of contamination from potential polluting activities in a given area to groundwater sources (wells, boreholes and springs) used for supplying public drinking water, the Environment Agency identifies Source Protection Zones (SPZ). These show the extent of a groundwater source catchment and are divided into three zones, definitions of which are outlined below:
- 3.5.12 SPZ1 – Defined by a 50-day travel time from any pollution below the water table to the groundwater source, with a minim radius of 50 m. It is the area immediately around an abstraction point for domestic / food supply purposes and is where groundwater is the most vulnerable to pollution.
- 3.5.13 SPZ2 – Defined by a 400-day travel time from a point below the water table, with a minim radius of 250 – 500 m, depending on the size of the abstraction.
- 3.5.14 SPZ3 – Defined as the area around a groundwater source where all groundwater is presumed to end up at the abstraction point, covering the entire catchment area based on the volume abstracted and effective rainfall.
- 3.5.15 The Groundsure GIS data and the EA's Source Protection Zone map does not record the Site to be located within 500m of a groundwater SPZ.

Licensed Groundwater Abstractions

- 3.5.16 No Licensed Groundwater Abstractions have been identified within 1km of the Site according to the Groundsure GIS data.

3.6 Hydrology

Surface Water Features and Drainage

- 3.6.1 Groundsure GIS data have identified surface water bodies and tributaries associated with the Austen Dyke (a tributary of the Wreake; Water Body ID GB104028047560). The tributaries run from north to south within the western part of the Site redline

boundary, through the centre of the Site, adjacent to the eastern site redline boundary, and approximately 300 m outside the north-west site redline boundary.

- 3.6.2 Eight potentially infilled ponds marked on historical mapping are located across the Site. A large Fish Pond is located in the southeast of the Site and three smaller ponds are also present on site (84m south of the north boundary, 11m east of the west boundary and adjacent to the east boundary and extending off-site).
- 3.6.3 Several off-site ponds are present, located: 118m and 214m west of the Site, 105m, 139m and 166m north of the Site, adjacent and 18m to the east of the Site and 6m south of the Site. Three ponds are located approximately 300m towards the northeast outside of the Site boundary. Two ponds are located approximately 155m and 500m outside the Site boundary towards the north of the Site boundary. Two ponds are located 98m and 141m east of the southern part of the Site.
- 3.6.4 The Smite, from Source to Dalby Brook, runs parallel approximately 600m north of the northern site redline boundary, and the Eye/Wreake, from Langham Brook to the Soar, runs approximately 900m south of the southern site redline boundary. An historical Weir and sluices associated with the Fish Pond was present until 1920.

Licensed Surface Water Abstractions

- 3.6.5 No licenced surface water abstractions have been identified within 1km of the Site according to the Groundsure GIS data.
- 3.6.6 Records held by the Local Authority for private abstractions indicate that there are no groundwater abstractions within 1km of the Site.

Risk of Flooding from Surface Water

- 3.6.7 The Environment Agency flood risk map for planning and long-term flood risk map was reviewed alongside the Groundsure flood zone data and confirmed that the following flooding risks are recorded for the Site.
- 3.6.8 The majority of the Site is mapped to be within Flood Zone 1, with regards to flooding from rivers. The Groundsure GIS data records the water course trending southwest on the southern border of the Site to be associated with flooding from river, locally indicated to be Flood Zone 2 and Flood Zone 3. A Flood Zone 1 is defined as land has a less than 0.1% (1 in 1,000) chance of flooding from rivers or the sea.
- 3.6.9 The Groundsure GIS data records the highest risk of surface water flooding at the Site to be 1 in 30 year (3.3%), locally corresponding to the gully features trending north-south across the Site. Extending further from the gulleys, surface water flooding risk lowers to 1 in 100 year. The majority of the Site is indicated to not be at risk of surface water flooding but is identified as a nitrate vulnerable zone. Potential remanence of the historical Weir and sluices (present up until 1920) is flagged as an abnormal risk.

4. Historical & Planned Development

4. Historical & Planned Development

4.1 Historical Ordnance Survey Mapping and Aerial Photographs

- 4.1.1 Historical Ordnance Survey (OS) maps of the Site and the wider environs were provided in the Groundsure Map Insight GIS data (scales 1:2,500, 1:10,560 and 1:10,000) and as well as using Google Earth Pro, these maps are reviewed in this Section. The historical Ordnance Survey (OS) maps obtained with the Groundsure GIS data cover the period from 1883 to 1994.
- 4.1.2 Table 4.1 presents a summary of the main features present on and within approximately 250m radius of the Site boundary. AAJV notes that only indicative map scales are provided. Where dates are stated, these refer to the dates of maps on which the features are present, have changed use or are no longer annotated, and do not necessarily refer to the exact dates of existence of a particular feature. Development that may have occurred between map editions is recorded as occurring on the latter published map, hence there are some limitations to the accuracy to the date of development unless supplementary evidence is available.

Table 4.1 Summary of History

Time Period (Scale)	Key Features On-site	Key Features within approximately 250m
1883 and 1884 (1:10,560) 1884 (1:2,500)	The site is largely undeveloped, comprising several agricultural fields separated by boundaries, some of which are shown to be vegetated by trees. Building 1 - A small unlabelled building is located approximately 210m from the south boundary (SK 70464 22077). Three unlabelled buildings are located in the northwest quarter of the Site: Building 2 - approximately 73m from the west boundary (SK 69898 22238). Building 3 - approximately 130m from the west boundary (SK 69975 22216). Building 4 - approximately 200m from the west boundary (SK 70026 22245). Building 5 - A small unlabelled building is located approximately 183m from the north boundary (SK 70431 22832). A large fishpond is located in the southeast of the Site, with an associated weir and sluices. An unnamed stream flows in a south-westerly direction originating from the fishpond, passing through the Site. Small ponds are located on-site at the following locations: Pond 1: 355m west of the east boundary (SK 70308 22727). Pond 2: 218m west of the east boundary (SK 70493 22583). Pond 3: 492m west of the east boundary, close to the centre of the Site (SK 70210 22492) Pond 4: 41m east of the west boundary (SK 69792 22388). Pond 5: 149m east of the west boundary (SK 69959 22284). Pond 6: 110m east of the west boundary (SK 70057 22053).	The surrounding area is largely undeveloped, comprising several agricultural fields. A road is present to the west of the Site, at its closest 44m to the west. An area of woodland is located adjacent to the west of the northern part of the Site. A stream flowing in a southerly direction is located adjacent to the east of the Site. A pond is located adjacent to the east of the Site. Ponds are located: • 57m (SK 69697 22319), 118m (SK 69683 22210) and 214m west (SK 69623 22107) of the Site. • 8m (SK69948 22646), west of the Site. • Adjacent to the north (SK 70129 23345, 53m north (SK 70070 23375) and 105m north (SK 70066 23434). • Adjacent to the east of the Site (SK 70699 22770). • 6m south of the Site (SK 70088 21447). • 147m southeast of the Site (SK 70742 21271). A small number of properties are present in the surrounding area; the village of Saxelby is located from 210m southwest, a vicarage is located 205m east, Fishpond House is located 10m southeast, Glebe Farm is located 188m southeast and the village of

Time Period (Scale)	Key Features On-site	Key Features within approximately 250m
	Pond 7: 85m east of the west boundary (SK 70126 21927). Pond 8: 84m south of the north boundary (SK 70308 22894). Pond 9: 11m east of the west boundary (SK 69964 22702). Pond 10: Adjacent to the east boundary (SK 70715 22517) and extending off-site. Pond 11: Adjacent to the north boundary (SK 69869 23227) and extending off-site. A footpath orientated east-west crosses the southern part of the Site, with a second footpath orientated northwest-southeast crossing the northeastern corner of the Site. On the 1:2,500 scale map, several of the field boundaries within the Site are shown as having streams running parallel to them.	Wartnaby (unlabelled) is located from 62m east. Several of the field boundaries within the surrounding area are shown as having streams running parallel to them. A tramway is located 83m north of the Site, orientated east-west. An area of ground workings is located from 90m north of the Site, with a building ('Stonepit Houses') within this area 181m northeast of the Site. The workings are partially labelled as '...Pit (Ironstone)' 180m north of the Site. Three features labelled 'P' are located 78m, 207m and 250m east of the Site in Wartnaby village, potentially representing pumps. A further potential pump is located 206m southeast of the Site at Glebe Farm.
1902 and 1904 (1:10,560) 1903 (1:2,500)	Building 1 (SK 70464 22077) is no longer present, with larger buildings present 10m to the east (Building 6, SK 70487 22090) and west (Building 7, SK 70452 22063) of its location. Building 8 is present in the south of the Site (SK 70121 21558). Building 2 (SK 69898 22238) is no longer present. Building 5 (SK 70431 22832) is no longer present.	The area of woodland located adjacent to the west of the northern part of the Site has expanded to the west; this area is labelled as Ten Acre Plantation. A pond is located 18m east of the Site (SK 70723 22703). Ponds are located 139m north (SK 69911 23401), 166m north (SK 69804 23385, with a pump adjacent) and 196m north (SK 69857 23437) of the Site. The workings from 90m north of the Site are no longer labelled as an ironstone pit. Two further potential pumps are located 186m and 227m southeast of the Site at Glebe Farm. A pond is located close to Glebe

Time Period (Scale)	Key Features On-site	Key Features within approximately 250m
1915 and 1916 (1:10,560)	Pond 1 is now shown as rises (SK 70308 22727). Building 6 (SK 70487 22090) is no longer present. Building 9 (SK 70659 22734) is shown towards the northeast of the Site approximately 41m west of the east site boundary. Partial coverage showing the northern part of the Site.	Farm 190m southeast of the Site (SK70635 21054). The existing tramway has been extended, with a new branch of the tramway and an area of potential surface workings extending from adjacent to the north of the Site. The area of woodland adjacent to the west of the northern part of the Site is labelled as Marriott's Wood. The pond adjacent to the north (SK 70129 23345) is no longer present. Two of the features labelled 'P' located 207m and 250m east of the Site in Wartnaby village are no longer labelled. Partial coverage of the area surrounding the northern part of the Site.
1920 (1:2,500)	The weir and sluices adjacent to the fishpond in the southeast of the Site are no longer shown on the map. Partial coverage showing the northern part of the Site.	No significant change. Partial coverage of the area surrounding the northern part of the Site.
1950 (1:10,560)	No significant change.	The tramway is no longer mapped however the associated potential surface workings from adjacent to the north of the Site are still shown on the map. The pond 57m west of the Site (SK 69697 22319) is no longer present. Buildings are present in this area 61m and 78m west of the Site.

Time Period (Scale)	Key Features On-site	Key Features within approximately 250m
		The potential pumps located 206m and 227m southeast of the Site at Glebe Farm are no longer labelled.
1959 (Provisional Scale)	No significant change.	The potential pumps located 78m east of the Site in Wartnaby village and 186m southeast of the Site at Glebe Farm are no longer labelled.
1967 and 1968 (1:2,500) 1969 (1:10,000)	Electricity towers and an associated overhead line are present resembling their current position, orientated approximately north-south (SK 70606 23204, SK 70556 22840; SK 70506 22509; SK 70466 22240, SK 70416 21911, SK 70362 21523). Pond 1 (SK 70308 22727), Pond 3 (SK 70210 22492) and Pond 4 (SK 69792 22388) are no longer shown. Building 7 marked as two separate smaller buildings - Building 10 (SK 70442 22055) and Building 11 (SK 70432 22026). Building 9 (SK 70659 22734) is no longer present. An embankment is shown to the south of the fishpond in the southeast of the Site, sloping downward to the south. Partial coverage of the eastern part of the Site.	A pumping station and issues are shown adjacent to the east at the location of Pond 8 (SK 70701 22781). An electricity tower is located 40m south of the Site. The pond 53m north of the Site (SK 70070 23375) is no longer present. The cuttings associated with the former tramway and the area of potential surface workings from adjacent to the north of the Site are no longer shown. 'Stonepit Houses' 181m northeast of the Site have been replaced by three new properties, resembling the current configuration. One of these is labelled 'Berlea Farm' 235m north of the Site, with five silos located from 250m north of the Site. The buildings from 62m east in the village of Wartnaby are labelled as 'Friars Well Farm'. Two additional buildings are located 48m and 80m east, resembling the present-day configuration. A pond is located 220m southwest of the Site (SK 70014 21126).

Time Period (Scale)	Key Features On-site	Key Features within approximately 250m
1972 and 1973 (1:2,500)	Building 3 (SK 69975 22216) is no longer present Pond 9 11m east of the west boundary (SK 69964 22702) is now labelled as a spring. Issues are labelled 9m east of the west site boundary (SK 69973 22672). Partial coverage of the western part of the Site.	Partial coverage of the area surrounding the eastern part of the Site. Buildings of Saxelby Lodge Farm are located 215m west of the northern part of the Site. The pond 196m north (SK 69857 23437) of the Site is no longer present. A pond is located 200m southwest of the Site (SK69947 21195). Partial coverage of the area surrounding the western part of the Site.
1976 (1:10,000)	Pond 11 adjacent to the north boundary (SK 69869 23227) is no longer present. Partial coverage of the western part of the Site.	No significant change. Partial coverage of the area surrounding the western part of the Site.
1991, 1992, 1993 and 1994 (1:2,500)	No significant change.	A pond is located 208m south of the Site (SK 70190 20965). An electrical substation is located 230m southeast of the Site.
1999 and 2000 (Google Earth aerial imagery)	Pond 2 (SK 70493 22583), Pond 5 (SK 69959 22284) Pond 6 (SK 70057 22053), and Pond 7 (SK 70126 21927) are no longer visible Building 4 (SK 70026 22245) and Building 8 (SK 70121 21558) are no longer present The locations of other remaining on-site ponds are covered by trees. A stockpile of material is present adjacent to the north boundary (SK 70052 23293).	The surrounding area approximately resembles its current configuration. The pond 8m west of the Site is no longer visible. The locations of other remaining off-site ponds are covered by trees.
2004, 2006 and 2007 (Google Earth aerial imagery)	The stockpile of material adjacent to the north boundary (SK 70052 23293) is no longer visible.	No significant change.

Time Period (Scale)	Key Features On-site	Key Features within approximately 250m
2010 (Google Earth aerial imagery)	A small rectangular structure (appearing to be a stack of hay bales) is located approximately 167m east of the Site's western boundary (SK 70104 22668). A small stockpile of material is located adjacent to the north site boundary in a field approximately 158m west of the Site's eastern boundary (SK 70418 22819).	No significant change.
2011 (Google Earth aerial imagery)	The rectangular structure and stockpile seen on-site in 2010 are no longer present.	No significant change.
2012 (Google Earth aerial imagery)	Building 10 (SK 70442 22055) is no longer present. Unknown infrastructure developed into a depression, in the centre of the southern part of the Site (SK 70516 22087).	No significant change.
2018 (Google Earth aerial imagery)	No significant change.	Earthworks are visible on an area of land 220m north of the Site. A building surrounded by hardstanding has been constructed 20m east of the Site. A new building has been constructed at Glebe Farm 200m southeast of the Site. A pond is located 53m east of the Site (SK 70544 21243). A development of several farm buildings and silos is present from 80m southeast of the Site, with outdoor areas surrounding the buildings covered by hardstanding and stockpiles. Earthworks are visible to the north of this development 130m southeast of the Site.
2019 (Google Earth aerial imagery),	No significant change.	The area where earthworks were present 220m north of the Site is now covered by

Time Period (Scale)	Key Features On-site	Key Features within approximately 250m
		hardstanding and appears in use as a storage yard. The area where earthworks were present 130m southeast of the Site is now occupied by an expansion of the hardstanding and a new building from 65m southeast of the Site.
2021 (Google Earth aerial imagery)	No significant change.	A new building has been constructed at Glebe Farm 150m southeast of the Site. The hardstanding from 65m southeast of the Site has been further extended, to 20m southeast of the Site. An area of land 70m east of the Site has been developed into a car park, adjacent to the building 20m east of the Site.
2022 (Google Earth aerial imagery)	No significant change.	No significant change.
2025 (Google Earth aerial imagery)	No significant change.	The pond 53m east of the Site has been extended to the north and is now 30m from the Site.

4.2 Unexploded Ordnance Risk

Wartime Land-use

- 4.2.1 Based on a review of 1920 historical maps (1:2,500 scale), the Site was located near Wartnaby and Saxelby, small towns during Wartime Britain and based on CIRIA C681 could have been close to aerial bombing. This is considered unlikely due to the lack of military targets (military bases, ports or industrial centres), the land-use of the Site was agricultural purposes.
- 4.2.2 The site was located near the following wartime sites of interest; Grimston has been identified as a WW2 military target and is located west of the Site.

Post War Development

- 4.2.3 An analysis of the post war 1950 historical map 1950 (1:10,560 scale) does not show any major changes potentially indicating no bombing took place in the Site area. However, due to the agricultural use of the area, and the level of redevelopment, the chances of an unexploded Ordnance (UXO) going unnoticed are low.

Unexploded Ordnance Mapping

- 4.2.4 The regional Unexploded Bomb Risk Map published by Zetica show the Site lies within a Low risk area, which is defined by Zetica as an 'area indicated as having 15 bombs per 1000 acres or less. It is noted that these maps only include information on potential for bombing to have occurred in the area, and do not include all potential sources of UXO such as historical land use.
- 4.2.5 Based on the findings of the above assessments and the Preliminary UXO Risk Assessment undertaken in June 2026, AAJV recommends that a Detailed UXO Risk Assessment is undertaken prior to the commencement of any intrusive investigation, this recommendation will be reviewed once further UXO information has been obtained. At the time of writing AAJV is awaiting the Detailed UXO Risk Assessment.

5. Review of Historical Site Investigation

5. Review of Historical Site Investigation

- 5.1.1 AAJV has undertaken a high-level review of a list of historical ground investigation reports noted to be on the National Grid Enterprise Content Management (ECM) and have found that none of the historical ground investigation reports available relate to the Site. If relevant historical reports become available, this report or subsequent reporting should be updated to include associated findings.

6. Regulated Activities and Statutory Consultation

6. Regulated Activities and Statutory Consultation

6.1 Introduction

- 6.1.1 The key relevant features that characterise the Site and surrounding area are summarised in this Section, along with an indication of the risk to the land quality of the Site.
- 6.1.2 Information on groundwater and surface water abstractions is detailed previously and is not repeated here.
- 6.1.3 Generally, any regulated activities within 250 m of the Site could, depending upon their nature, represent potential off-site sources of contamination. Whilst a 500 m search area was generally adopted this Section places emphasis on those activities present within 250 m.

6.2 Regulatory Database Review

- 6.2.1 Table 6.1 summarises information on regulated processes contained in the Groundsure GIS data. The report collates data from a variety of sources including the EA and BGS. All data suppliers are referenced in the report.
- 6.2.2 Regulatory information is excluded from the table below where it is not within the specified distances, where there is no information for the given topic or where entries are duplicated.

Table 6.1 Summary of Regulatory Information

Subject	Number present	Details
	On site	0-250m
Licensed Waste Management Facilities and Industrial Land Uses		
Waste Exemptions	0	130 • A using waste exemption for use of waste in construction is listed approximately 225 m west of the Site boundary. Permission reference: WEX095725. • Treating (1 record), disposing (1 record), using (1 record) and sorting (2 records) waste exemptions are listed approximately 215 m west of the Site boundary. Permission reference: WEX274100. • Treating (1 record), disposing (1 record), using (1 record) and sorting (2 records) waste exemptions are listed approximately 220 m west of the Site boundary. Permission reference: WEX403911. • A using waste exemption for spreading waste on agricultural land is listed approximately 85 m northwest of the Site boundary (2 records). Permission reference: WEX328588; WEX459367. • Storing (1 record), disposing (3 records) and using (3 records) waste exemptions for agricultural waste only are listed approximately 110 m west of the Site boundary. Permission reference: EPR/WF0436KZ/A001. • Storing (2 records), disposing (2 records), using (3 records) and treating (2 records) waste exemptions are listed approximately 109 m west of the Site boundary. Permission reference: WEX036217. • A using (1 record) waste exemption is listed at approximately 102 m west of the Site boundary. Permission Reference: WEX203686.

Subject	Number present		Details
	On site	0-250m	
			- Storing (1 record), disposing (3 records) and using (5 records), waste exemptions are listed at approximately 118 m west of the Site boundary. Permission Reference: WEX054330; WEX191531; WEX324504. - Treating (4 records), using (6 records), disposing (3 records) and storing (1 record) waste exemptions are listed approximately 70 m east of the Site boundary. Permission reference: EPR/GH0374AZ/A001. - Disposing (9 records), treating (11 records), storing (5 records) and using (16 records) waste exemptions are listed approximately 90 m east of the Site boundary. Permission reference: WEX321666; WEX194400; WEX032852. - A using waste exemption for burning of waste as fuel is listed approximately 240 m north of the Site boundary. Permission reference: EPR/GF0000CN/A001. - Using (3 records) waste exemptions are listed approximately 195 m north of the Site boundary. Permission reference: WEX408283; WEX141065; WEX280198. - A using waste exemption for use of waste in construction fuel is listed approximately 195 m south of the Site boundary. Permission reference: EPR/NF0436AA/A001. - Using (16 records), storing (6 records), disposing (4 records) and treating (4 records) waste exemptions are listed approximately 194 m south of the Site boundary. Permission reference: WEX158174; WX423873.
Recent Industrial Land Uses	7	11	Pumping Station – Located within the Site towards the northeast corner of the Site boundary. It is noted that whilst the Groundsure dataset identifies this as an on-site feature, the data point does not correspond to the actual position of the pumping station as shown on aerial imagery and historical

Subject	Number present		Details
	On site	0-250m	
			maps, which is located off-site adjacent to the site's eastern boundary. Identified in Table 4.1. This pumping station is labelled as a 'sewage' pumping station on the Environment Agency's MAGIC Map website. • All Purpose Cleaning Supplies Ltd – Located approximately 37 m east of the Site boundary. • Friars Well Industrial Estate & Business Centre – Located approximately 71 m east of the Site boundary. • Safehold Self Storage – Located approximately 94 m east of the Site boundary. • GW Johnson agricultural contractors – Located approximately 91 m east of the Site boundary. • Wind Turbine – Located approximately 150 m west of the Site boundary. • Electricity Towers (6 records on-site, 2 records off-site) – Cross the Site boundary diagonally from the northeast towards the south (existing National Grid Infrastructure). Off-site towers located approximately 223 m north and 30 m south of the Site boundary. • Pumps (3 records) – Located approximately 155 m north, 197m south and 241 m south of the Site boundary. • Electrical Substation – Located approximately 168m southeast of the Site boundary.
Historical Industrial Land Uses	0	26	• Pumping Station (1 record dated 1969) adjacent to the east of the Site boundary. • Unspecified Tank (1 record dated 1969) approximately 245 m north of the Site boundary. • Unspecified Tank (1 record dated 1904) approximately 234 m south of the Site boundary.

Subject	Number present		Details
	On site	0-250m	
			• Unspecified Quarry (1 record dated 1950) adjacent to the north of the Site boundary. • Unspecified Heap (1 record dated 1969) approximately 143 m north of the Site boundary. • Unspecified Ground Workings (2 records dated 1883 and 1959) from adjacent to the north to approximately 90 m north of the Site boundary. • Pump (1 record dated 1972) approximately 169 m north of the Site boundary. • Ironstone Pit (1 record dated 1883) approximately 200 m north of the Site boundary. • Ground Workings (1 record dated 1972) approximately 141 m north of the Site boundary. • Tramway Sidings (3 records dated 1883, 1902 and 1916) from adjacent to the north to approximately 177 m north of the Site boundary. • Cuttings (13 records dated 1883, 1902, 1916, 1950, 1959) from approximately 37 m north to 222 m north of the Site boundary.
Historical Tanks	0	1	• Unspecified Tank (1 record dated 1920) approximately 204 m east of the Site boundary.
Historical Energy Features	0	1	• Electricity Substation (1 record dated 1968) approximately 168 m southeast of the Site boundary.
Sensitive Land Uses			
Listed Buildings	0	3	• Tower Cottage And Attached Wall; Tower House And Attached Wall (Grade II) approximately 245 m east of the Site boundary. • The Old Rectory (Grade II) approximately 184 m south of the Site boundary.

Subject	Number present		Details
	On site	0-250m	
			Church Farmhouse (Grade II) approximately 227 m south of the Site boundary.
Conservation Area	0	2	- Wartnaby approximately 31 m east of the Site. - Saxelbye approximately 32 m south of the Site.
Nitrate Vulnerable Zone	2	2	- Soar (surface water) covering the majority of the Site and extending off-site to the north, east, south and west. - Smite (surface water) locally encroaching on the north of the Site and extending off-site to the north.
Agri-Environment Schemes			
Environmental Stewardship Scheme Agreement	1	1	Entry Level plus Higher-Level Stewardship covers most of the Site, with the exception of the northernmost part of the Site. and two areas in the southwest part of the Site, and extends to the northwest, northeast, southeast and southwest of the Site boundary.
Countryside Stewardship Scheme Agreement	1	1	Countryside Stewardship (Middle Tier) covers most of the Site, with the exception of five areas in the central part of the Site and an area in the southwest part of the Site, and borders or is within 250 m of all site boundaries.
Tree Felling Licences	3	2	- A Selective Fell/Thin (Conditional) Tree Felling licence covers an area of approximately 0.48 ha within the southeast of the boundary. - A Clear Fell (Conditional) licence covers approximately 0.48 ha within the west of the boundary. - A Selective Fell/Thin (Conditional) license coves approximately 1.53 ha within the southeast of the boundary.

Subject	Number present	Details
	On site	0-250m
		• A Selective Fell/Thin (Conditional) license covering approximately 0.37 ha is located approximately 28 m north of the boundary. • A Selective Fell/Thin (Conditional) license covering approximately 0.25 ha is located approximately 237 m northeast of the boundary.

- 6.2.3 The site falls within the southwest extent of the 3km Holwell Mouth Site of Special Scientific Interest (SSSI) Impact Risk Zone and there is approximately 4.08 ha of Priority Habitat Inventory deciduous woodland within the Site boundary. However, information relating to environmental designations (for example, SSSI and Ancient Woodland) will be reviewed separately and have therefore not been taken forward for further assessment in this report.
- 6.2.4 No entries were recorded for the following: Scheduled Ancient Monuments; Historical Landfills; Active or recent landfills; Local Nature Reserves (LNR); Fuel Stations; World Heritage Sites; Control of Major Accident Hazards Sites (COMAH); Explosive Sites; Notification of Installations Handling Hazardous Substances (NIHHS); Planning Hazardous Substance Consents; Planning Hazardous Substance Enforcements; Contemporary Trade Directory Entries; Contaminated Land Register Entries and Notices; Discharge Consents; Prosecutions Relating to Controlled Waters; Enforcement and Prohibition Notices; Integrated Pollution Controls; Local Authority Integrated Pollution Prevention and Control; Local Authority Pollution Prevention and Controls; Local Authority Pollution Prevention and Control Enforcements; Pollution Incidents to Controlled Waters; Prosecutions Relating to Authorised Processes; Registered Radioactive Substances; Substantiated Pollution Incident Register; Water Industry Act Referrals.

6.3 Regulatory Consultation

Planning Information

- 6.3.1 The Melton Borough Council web-based planning portal (Melton Borough Council, n.d.) was reviewed to identify whether there are existing planning conditions which relate to the Site area. No planning applications onsite, within 250 m of the Site boundary or considered relevant to the development were identified.
- 6.3.2 Leicestershire County Council deals with planning applications for waste management and minerals extraction and related development. A postcode search of the web-based planning portal (Leicestershire County Council, 2025) did not identify any applications considered potential contamination sources or relevant to the development in the vicinity of the Site.

7. Site Reconnaissance

7. Site Reconnaissance

- 7.1.1 Access for a site reconnaissance (walkover) was not available prior to the completion of this report.
- 7.1.2 An external inspection of the Site will be undertaken by a suitably qualified and experienced AAJV Engineer prior to a later issue of this document. The report will be subsequently updated to reflect the findings.
- 7.1.3 The aim of the visit will be to:
- Identify the range of activities carried out on the Site.
 - Identify any obvious potential sources of ground contamination (e.g., visual evidence of spills, asbestos, stressed vegetation) or geotechnical issues (e.g. slope instability).
 - Validate the provisional risk ratings presented in this report.
- 7.1.4 Accordingly, all risk ratings presented herein are provisional and based on a precautionary assessment of available desktop data. These will be reviewed and updated within interpretative reporting following the completion of the walkover and intrusive investigations.
- 7.1.5 The site will be revisited ahead of any intrusive works by AAJV Geotechnical / Geo-environmental Engineers to inform future works. Any findings additional to those outlined in this report will be accounted for in subsequent reporting and specifications.

8. Preliminary Ground Model

8. Preliminary Ground Model

8.1 Introduction

- 8.1.1 The anticipated ground model presented in this Section is preliminary and will require confirmation through a site-specific intrusive ground investigation which would inform the development of the Site and detailed design. As part of this, the investigation and assessment of the risk posed by geotechnical hazards (presented in Appendix F) will also be required.

8.2 Preliminary Ground Model

- 8.2.1 Based on the review of published geological information and a selection of historical exploratory hole records, the ground conditions within the Site are anticipated to comprise the sequence presented in Table 8.1.
- 8.2.2 Only a single borehole elevation has been recorded onsite, this borehole is noted as commencing at 112m AOD. In the absence of additional data, estimate of the depth to base has been based on this single elevation; however, it is likely that there will be variations on-site based on the sloping topography.

Table 8.1 Preliminary Ground Model for Substation B Site.

Stratum	Anticipated Occurrence and Generalised Description	Anticipated Thickness (m)	Depth to Base (mAOD) from BGS site records
Topsoil	Topsoil, anticipated to be present side wide owed to the Site's current usage as agricultural land.	c. 0.3 - 0.45	111.07 to 111.055
Local Infilled Ground	An area where the pre-existing land surface has been excavated (Worked Ground) and subsequently partially or wholly backfilled (Made Ground). Mapped exclusively to the northeast section of the Site and very locally associated with the Fishpond on the southeast border, assumed to be attributed to former Clay and Ironstone Pits.	c. 0 – 4*	Depth Unproven
Clay, silt, sand and gravel - Head	Poorly sorted and poorly stratified, angular rock debris and/or clayey hillwash and soil creep, mantling a hillslope and deposited by solifluction and gelifluction processes. Mapped to present within the gulley features.	Variable, and localised	

Stratum	Anticipated Occurrence and Generalised Description	Anticipated Thickness (m)	Depth to Base (mAOD) from BGS site records
Clay, silt, sand and gravel - Alluvium	Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. Present at southern point of site where gulley features connect.	Variable, and localised	
Oadby Till Member	Diamicton, grey, weathering brown, characterised by Cretaceous and Jurassic rock fragments; subordinate lenses of sand and gravel, clay and silt. Clay, brown to grey, and silty clay, with chalk and flint fragments. Anticipated to be present site wide.	c. 0 - 20**	103 - 83
Ironstone - Marlstone Rock Formation	Sandy, shell-fragmental and ooidal ferruginous limestone interbedded with ferruginous calcareous sandstone, and generally subordinate ferruginous mudstone beds. Anticipated to be locally present to the northeast section of the Site overlaying the Dyrham Formation.	c. 5 - 10	Depth unproven
Mudstone - Dyrham Formation	Pale to dark grey and greenish grey, silty and sandy mudstone, with interbeds of silt or very fine-grained sand. Anticipated to be present across the north of the Site overlaying the Charmouth Mudstone.	c. 0 - 25	Depth unproven
Mudstone - Charmouth Mudstone Formation	Dark grey laminated shales, and dark, pale and bluish grey mudstones. Abundant limestone and ironstone nodules with quartz pebbles. Anticipated to be present site wide, potentially encountered initially as a completely weathered material.	c. 110 - 130	Depth unproven

**Estimate based on limited evidence of surface workings present*

***Historical BGS Logs provide an inconsistent depth of this stratum's thickness, outliers recorded greater depths up to 57m bgl (SK72SW101).*

8.3 Preliminary Groundwater Conditions

- 8.3.1 Groundwater was encountered at 14m bgl in borehole SK72SW68 (dated May 1943) but not recorded in all other logs. A borehole located in Wartnaby, identified in the geological memoir, was taken to 26.5m to extract groundwater from the top of the

Dyrham Formation. A shallow groundwater profile should be assumed, given the presence of springs in the area and the anticipated site geology.

9. Conceptual Site Model and Preliminary Risk Assessment

9. Conceptual Site Model and Preliminary Risk Assessment

9.1 Introduction

- 9.1.1 The preliminary CSM (Conceptual Site Model) has been developed to identify potentially complete contaminant linkages that may require further investigation to assess their existence and/ or potential significance. The potential sources of contamination on or in the vicinity of the Site, receptors on or near the Site, and pathways on or near the Site are discussed within the following Sections.
- 9.1.2 A summary of the applicable legislative and planning framework, and AAJV’s approach to assessment used in the following Sections is presented in Appendix E.

9.2 Sources of Potential Contamination

- 9.2.1 Based on the Site setting, history and land-uses described in preceding Sections, the following sources of contamination and contaminants of potential concern (CoPC) listed in Table 9.1 have been identified.
- 9.2.2 The CoPC are based on information provided in the Department of Environment Industry Profiles, known contamination identified at the Site and AAJV’s industry experience.

Table 9.1 Potential Sources of Contamination

Source	Description	CoPC
Agricultural Land Use	On-site - The site largely comprises arable fields. Off-site - The surrounding area within 250m largely comprises arable fields. Saxelby Lodge Farm is located 215m west of the northern part of the Site. Exemptions for storing, using and disposing of agricultural waste associated with agricultural buildings located near the Site.	TPH (anticipated to be minimal associated with spills), ammoniacal nitrogen, herbicides, pesticides. Specific to agricultural waste exemptions – buried farm plastics, asbestos roofing sheets, silage, agrochemical containers.
Made Ground	On-site - Associated with the area of on-site artificial ground (infilled ground)	Metals and metalloids, cyanides (total, free), semi-volatile organic compounds (SVOCs), volatile

	identified across the northeastern area of the site from BGS mapping, development of 11 no. unlabelled historical buildings (10 no. no longer present) and the current on site electricity towers. Off-site - Associated with development and removal of 1 no. weir and sluices (1883 -1903) and development of 1 no. embankment.	organic compounds (VOCs), total petroleum hydrocarbons Criteria Working Group (TPH CWG), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCBs), pH, asbestos-containing material (ACM)/asbestos. Ground gas (methane (CH₄), carbon dioxide (CO₂)).
Infilled Land	On-site - Area of infilled ground identified across the northeastern area of the site from BGS mapping, 8 no. potentially infilled ponds (Ponds 1 – 7, 11). Off-site - 1 no. potentially infilled former tramway cuttings and 1 no. former potential surface workings identified from historical mapping, 5 no. potentially infilled ponds.	Metals and metalloids, cyanides (total, free), SVOCs, VOCs, TPH CWG, PAH, PCBs, pH, ACM / asbestos Ground gas (CH₄, CO₂), Glycols, ash, clinker, herbicides
Sewage Pumping Station	Off-site - Sewage pumping station along the eastern boundary of the Site (1967 – present).	Metals, petroleum hydrocarbons, PCBs, phenols, chlorine, Ammoniacal nitrogen, phosphorus, pathogens, ground gas
Historical Railway Land	Off-site - Tramway adjacent to the north of the Site (1915 – 1950).	Metals and metalloids, SVOCs, VOCs, PAH, PCBs, sulphate, ACM/asbestos, herbicides, glycols, ash, clinker, herbicides
Miscellaneous Features	On-site 2 no. stockpile of materials; one adjacent to the north boundary identified in aerial imagery from 1999 and one 158m west of the east site boundary identified in the aerial imagery from 2010, which are no longer present	Unknown

	but may have residual materials leftover. Off-site Unspecified tank (dated 1920) approximately 204 m east of the Site boundary.	
Industrial Land Use	Off-site Cleaning supplies business 37m east and agricultural contractors 91m east of the Site.	Metals and metalloids, SVOCs, VOCs, PAH, TPH, ammoniacal nitrogen, herbicides, pesticides.
Electrical Substation	Off-site Located approximately 168 m southeast of the Site boundary, present from 1968.	TPH and PCBs.

Ground Gas Sources

- 9.2.3 The identified sources of ground gas within Section 8.2 above have been further characterised in Table 9.2 below using BS 8576:2013 “Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)” – Figure 6 to determine the ground gas generation potential of the sources.

Table 9.2 Potential Sources of Ground Gas Contamination

Source	BS 8576 Ground Gas Generation Potential	Justification
Made Ground	Very Low to Low	Due to the nature of the buildings on-site (11 no. unlabelled buildings (10 no. no longer present), the current onsite electricity towers and other structures (1 no. weir and sluices, shown on historical maps from 1883 -1903, development of 1 no. embankment), with 1 no. sewage pumping station offsite on east site boundary, the risk from ground gas generation is considered to be Very Low in accordance with BS 8576, as it is likely that the Made Ground present is of low biodegradable organic content (<5% organic matter). Dependent on the nature of material placed the risk of potential generation of ground gas associated with the Made Ground may be slightly elevated in some areas. However, in line with BS 8576 the maximum generation potential for Made Ground is still anticipated to be Low.
Natural Radon	Moderate	At the northwest border of the Site, north of the inferred Normanton Hill Fault, the Groundsure GIS data estimates

		properties affected by radon is at 30 to 100%, This requires targeted ground investigation to prove otherwise.
Infilled land	Low	Screening of historical maps ranging from 1883 – 2025 provide evidence of potential infilling on-site of 8 no. ponds (Pond 1 – 7, 11) and off-site of 1 no. former tramway cuttings, 1 no. potential surface workings and 5 no. infilled ponds. The ponds have a diameter of ranging from approximately 5 – 25 m and were potentially infilled from 1915-1999. In addition, whilst it is not shown on historical maps, the BGS mapping has identified an area of infilled ground covering the northeastern area of the site (approximately 375 m across). It is not known when this area was infilled but is anticipated to be prior to 1968 when the electricity pylons in this area were first identified. Given the size of the ponds and the lack of information regarding the fill that may have been placed at these locations and based on BS 8576, the maximum generation potential for Made Ground is still anticipated to be Low.
Sewage Pumping Station	Moderate	The pumping station off-site adjacent to the site's eastern boundary (1967 – Current) has been identified as a sewage pumping station. There is a lack of information available relating to this pumping station and therefore a precautionary approach has been taken that there is the potential for sewage sludge to have been deposited on or close to the Site. According to BS8576 represents a Moderate ground gas generation potential source which will require further consideration.

Mining Remediation Authority and Preliminary Mine Gas Risks

- 9.2.4 In October 2021, Contaminated Land Applications in Real Environments (CL:AIRE) published updated guidance on mine gas risk assessment: 'Good Practice for Risk Assessment for Coal Mine Gas Emissions'. The site has been characterised for preliminary mine gas risk in accordance with CL:AIRE guidance as the Site is within a Mining Remediation Authority Mining Reporting Area (representing Step 1 in the preliminary mine gas risk flow chart in CL:AIRE Figure 13.1). The following information has been reviewed for the Site to determine the mine gas risk level.

Table 9.3 Preliminary Mine Gas Risks

Step No.	Question	Answer	Discussion
2	Are mine entries >50m from the Site boundary?	Yes	No known mine entries identified on the MRA Map Viewer are indicated to be present within 50 m of the Site boundary.
	Are mine workings >150m depth?	Yes	The 1:10,000 BGS Mineral Resources map of Leicestershire and Rutland (2002) and BGS

			GeoIndex indicates the Site to be in a region of deep coal at a depth of up to 1200 m. As summarised in Section 3, the Mining Remediation Authority Map Viewer (accessed 21st April 2026) identifies 3 mine plans records that are within the Site's redline boundary. Asfordby Colliery "Deep Main Seam" sheets; 43 7021, 43 7022 and 43 6822 detail the locations of deep coal mining passages that pass underneath the Site from the mine entry points approximately 1800m southeast of the southern redline boundary and trend northwest across the Site. The mine shafts are at depths of between 410m and 445m below Ordnance Datum, trending shallower towards the northwest of the Site. The Deep Main Seam is underlain by the Parkgate Seam approximately 22m below but does not appear to cross the Site boundary.
	No faults or other potential pathways connecting surface to deeper unflooded workings?	Unknown	GeoIndex faults are listed within the Site boundary. Interaction between faults and deep mine workings is unknown.
	Outside an area of past or probable shallow workings on Mining Remediation Authority viewer?	Yes	The MRA Map Viewer does not identify any known past or probable shallow workings within the Site boundary.
3	Workings between 30m and 150m but permanently flooded or covered by 10m+ of low permeability superficial deposits?	No	The mine plans available from the MRA Map Viewer indicates that workings underlying the Site are at greater depth than the range indicated in Step 3 of CL:AIRE Figure 13.1 (>400m depth).
	Mine entries >50m from site boundary?	Yes	No known mine entries identified on the MRA Map Viewer are indicated to be present within 50 m of the Site boundary.

The preliminary risk is indicated to be Low with reference to CL:AIRE guidance suggesting that the assessment should be reviewed once the development design is finalised.

Potential Receptors

9.2.5 Potential receptors associated with the Site are shown in Table 9.4.

Table 9.4 Potential Receptors

Receptor Group	Receptor	Description
Human Health	Construction and ground investigation workers	Workers involved in the GI and construction phases.
Controlled Waters	Maintenance workers	Maintenance workers visiting the substation during its operational phase.
	Adjacent site users	Workers/Residents of the Farm buildings towards the northwest and residential buildings towards the northeast and southwest (closest properties located approximately 53 m to the west of the Site on Ostler Lane).
	Secondary (undifferentiated) Bedrock & Superficial Aquifer	Spans entirety of the Site.
	Secondary A Bedrock Aquifer	Encroaches the northeast corner of the Site.
	Surface waters	A large Fish Pond is located in the southeast of the Site. Three ponds are located on site; 84m south of the north boundary, 11m east of the west boundary and adjacent to the east boundary and extending off-site. Surface water bodies part of the Austen Dyke (tributary of the Wreake) run from north to south within the west of the Site boundary, through the centre of the Site, adjacent to the east boundary and approximately 300 m outside of the Site boundary to the northwest. The Smite, from Source to Dalby Brook, runs parallel approximately 600 m north of the northern site redline boundary Eye / Wreake from Langham Brook to Soar, runs approximately 900m outside the Site border to the south. Several off-site ponds are present, located: 118 m and 214 m west of the Site, 105 m, 139 m and 166 m north of the Site, adjacent and 18 m to the east of the Site and 6 m south of the Site. Three ponds are located approximately 300 m towards the northeast outside of the Site boundary. Two ponds are located approximately 155m and 500 m outside the Site boundary towards the north of the Site boundary.

		Two ponds are located 98 m and 141 m east of the southern part of the Site. All listed surface waters are located within the Site delineated drainage basin
Property	Crops	Crops in fields in the surrounding area.
	Building & Infrastructures: Concrete	Concrete foundations associated with the substation.
	Building & Infrastructures: Structures with enclosed spaces	Substation buildings on-site. Current onsite building (SK 70439 22054). Adjacent properties (closest located approximately 53 m to the west of the Site on Ostler Lane).
	Building & Infrastructures: Services	Underground services passing beneath the Site associated with the new substation.

Potential Pathways

9.2.6 Potential pathways associated with the proposed development are shown in Table 9.5.

Table 9.5 Potential Pathways

Pathway Group	Pathway
Human Health	Ingestion of soil and dust.
	Ingestion of groundwater.
	Inhalation of dust - indoor and outdoor.
	Dermal contact - indoor and outdoor.
	Vapour intrusion and inhalation – indoor and outdoor.
	Gas ingress – explosive atmosphere.
	Gas ingress – inhalation.
Controlled Waters	Leaching and vertical migration through unsaturated zone.
	Lateral migration in groundwater.
	Vertical migration in groundwater.
	Direct run-off to surface water.
	Baseflow from groundwater to surface water.
	Migration via preferential pathways (services trenches, faults etc.).
Property	Gas intrusion – explosion.
	Direct contact – corrosion.
	Direct contact - permeation of water pipe.
	Crop uptake via root system.

Discounted Sources / Pathways / Receptors

9.2.7 The following sources, pathways and receptors are discounted from the conceptual site model with the justification presented:

Table 9.6. Discounted Sources / Pathways / Receptors

Group	Discounted Item	Justification
Receptors	SSSI Impact Risk Zone and Priority Habitat Inventory deciduous woodland	The site falls within the southwest extent of the 3km Holwell Mouth Site of Special Scientific Interest (SSSI) Impact Risk Zone and there is approximately 1.05 ha of Priority Habitat Inventory deciduous woodland within the Site boundary and 4.8 ha within 250m of the Site boundary. However, information relating to environmental designations (for example, SSSI and Ancient Woodland) will be reviewed separately and have therefore not been taken forward for further assessment in this report.
	Building & Infrastructures: Concrete	The proposed substation development on-site and identified nearby properties are likely to have subsurface foundation structures. However, potential concrete corrosion has not been assessed here, as it will be evaluated as part of the geotechnical hazard register.

9.3 Preliminary Risk Assessment

- 9.3.1 AAJV’s approach to the preliminary risk assessment follows the guidance outlined in CIRIA C552 (2001) and is described in further detail in Appendix E.
- 9.3.2 The qualitative preliminary risk assessment of the possible linkages of the above sources, exposure and transport pathways and receptors is provided in Table 9.7 below.

Table 9.7 Summary of Initial Conceptual Site Model and Risk Assessment

Source	Receptor		Exposure Pathway	Probability	Consequence	Risk Category	Justification
On-site Made Ground Infilled Land Agricultural Land Sewage Pumping Station Stockpile Natural Radon	Human Health – On-site	Construction and Ground Investigation Workers	Ingestion of soil and dust. Ingestion of groundwater. Inhalation of dust – indoor and outdoor. Dermal contact – indoor and outdoor.	Unlikely	Medium	Low	On-site sources and their associated contaminants are listed in Table 9.1. The site is primarily undeveloped agricultural land. Made Ground is anticipated in the northeastern area of the site associated with the area of artificial ground (infilled land) mapped by the BGS and across the rest of the site in limited areas due to the presence and removal of structures onsite, within the areas of the current electricity towers and due to presence of a sewage pumping station and historical unspecified miscellaneous stockpile. Potentially infilled land is associated with the area of infilled land mapped by the BGS in the northeastern area of the site and across the rest of the site with historical ponds. These are considered unlikely to present a substantial source of contamination. It is noted that the area of infilled land identified through BGS mapping does not correspond to a feature identified from historical maps. For construction workers, it is anticipated that soils and groundwater will be disturbed during the GI and construction phases, as well as the
		Maintenance Workers	Ingestion of soil and dust. Ingestion of groundwater. Inhalation of dust – indoor and outdoor. Dermal contact – indoor and outdoor.	Unlikely	Medium	Low	
	Human Health – Off-site	Adjacent Site Users	Inhalation of dust – indoor and outdoor.	Unlikely	Medium	Low	

Source	Receptor	Exposure Pathway	Probability	Consequence	Risk Category	Justification
						potential for workers to enter confined spaces (such as excavations). However, due to the nature of the on-site sources which are unlikely to present a substantial source of contamination, the risk is considered to be Low. It is unlikely for maintenance workers to come into direct contact with the soils or groundwater, with building and hardstanding surface coverage within the proposed development limiting the likelihood of soil disturbance and particulates becoming airborne. The lack of disturbance of the soils is also considered to limit the risk to off-site receptors of inhalation of dust particulates. It should be noted that during GI and construction phases the possibility of dust becoming airborne and travelling offsite is possible due to ground disturbance, however it is anticipated that mitigation of this through the use of dust suppressants will be in place where/when necessary. The risk to construction workers can be mitigated through toolbox talks, appropriate PPE and RPE and working in like with Construction and Design Management Regulations. (see Appendix E).
	Construction and	Gas migration through ground	Low	Severe	Moderate	No sources of ground gas generation or volatile vapours are noted to be

Source	Receptor	Exposure Pathway	Probability	Consequence	Risk Category	Justification
	Human Health – On-site	Ground Investigation Workers				associated with the presence of agricultural land. For Made Ground and infilled land, in accordance with BS 8576 the potential for gas generation is classified as 'Very Low to Low'. For construction workers, there is the potential for workers to enter confined spaces (such as excavations) where there is a 'Very Low to Low' risk ground gases could accumulate.
		Maintenance Workers	Low	Severe	Moderate	There is the potential for mine gas associated with abandoned mines identified in the MRA Abandoned Mines Catalogue to affect the Site. The preliminary MRA Preliminary Mine Gas Risk Assessment suggests low risk (Table 9.3). Maintenance workers could come into contact with ground gases if entering buildings within the proposed development where ground gases could accumulate.
	Human Health – Off-site	Adjacent Site Users	Low	Severe	Moderate	One no. current building is located on-site, and 4 no. buildings are noted within 250m of the Site, resulting in the presence of enclosed spaces for ground gas to accumulate. However, due to the limited gas generation potential of the sources identified, the risk in line with CIRIA C522 is considered to be Low.

Source	Receptor		Exposure Pathway	Probability	Consequence	Risk Category	Justification
			Gas migration through ground and/or via faults to surface and ingress – inhalation.				The cluster of faults poses potential risk of radon gas (30-100%) this requires targeted ground investigation to prove otherwise. Specific consideration of Full Radon Protection Measures (membrane and underfloor venting) for any occupied buildings (e.g., control rooms, welfare units) located in the northeast sector should be considered.
	Human Health – On-site	Construction and Ground Investigation Workers	Vapour intrusion and inhalation – indoor and outdoor.	Unlikely	Medium	Low	For vapour intrusion associated with the Made Ground and infilled land, Made Ground is associated with infilled land associated with ponds. These are considered unlikely to present a substantial source of vapours and therefore the risk is considered to be Low.
		Maintenance Workers	Vapour intrusion and inhalation – indoor and outdoor.	Unlikely	Medium	Low	
	Human Health – Off-site	Adjacent Site Users	Vapour intrusion and inhalation – indoor and outdoor.	Unlikely	Medium	Low	
			Ingestion of groundwater	Low	Medium	Moderate / Low	The Groundsure data and Environment Agency’s MAGIC Map identifies the presence of a sewage pumping station on-site. Given determined moderate risk of ground gas generation (Table 9.2) and potential contamination from metals, petroleum hydrocarbons, PCBs,

Source	Receptor	Exposure Pathway	Probability	Consequence	Risk Category	Justification	
						phenols, chlorine, ammoniacal nitrogen, phosphorous and pathogens and the low risk of ground gas accumulation, the overall risk is considered Moderate/Low.	
On-site Made Ground Infilled Land Agricultural Land Sewage Pumping Station Stockpiles Natural Radon	Controlled Waters	Secondary (Undiff.) Aquifer (Superficial and Bedrock)	Leaching and vertical migration through unsaturated zone. Vertical migration in groundwater. Preferential Migration	Low	Low	Low	The vulnerability of the bedrock aquifer is 'medium' across the majority of the Site, with areas of 'medium - high' and 'high' in the north of the Site. There is the potential for preferential migration: Groundsure data shows 4 no. geological faults associated with the Site (3 no. onsite, 1 no. ~ 24m from north site boundary) MRA Abandoned Mines Catalogue shows abandoned mines catalogue under the Site Potentially resulting in increased permeability via fracture networks, increased vertical and lateral connectivity and rapid flow The substation development is likely to create large areas of hardstanding surface cover which would reduce the potential for infiltration to areas of soft landscaping only. The risk to the groundwater within Secondary (Undifferentiated) aquifers from the Made Ground, infilled land and agricultural land is considered to be Low. These sources are

Source	Receptor	Exposure Pathway	Probability	Consequence	Risk Category	Justification
						considered unlikely to present a substantial source of contamination.
	Secondary A Aquifer (Bedrock)	Leaching and vertical migration through unsaturated zone. Vertical migration in groundwater. Preferential Migration	Low	Medium	Moderate / Low	Bedrock encroaching the northeast corner of the Site is classified as Secondary A Aquifer. Secondary aquifers provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands. secondary A aquifers comprise permeable layers that can support local water supplies and may form an important source of base flow to rivers. There is the potential for preferential migration: Groundsure data shows 4 no. geological faults associated with the Site (3 no. onsite, 1 no. ~ 24m from north site boundary) MRA Abandoned Mines Catalogue shows abandoned mines catalogue under the Site Potentially resulting in increased permeability via fracture networks, increased vertical and lateral connectivity and rapid flow The substation development is likely to create large areas of hardstanding surface cover which would reduce the potential for infiltration to areas of soft landscaping only.

Source	Receptor	Exposure Pathway	Probability	Consequence	Risk Category	Justification
						The identified on-site sources are considered unlikely to present substantial sources of contamination, therefore a Low likelihood has been assessed. The risk to the groundwater from the Made Ground, infilled land and agricultural land is therefore considered to be Moderate/Low.
	Surface Waters On-site - Austen Dyke (tributary of the Wreake); 3 no. small ponds Off-site (within site drainage basin) – 15 no. Ponds, Smite from Source to Dalby Brook and Eye / Wreake	Lateral migration in groundwater. Baseflow from groundwater to surface water. Direct run-off to surface water. Migration via preferential pathways – faults and abandoned mine Baseflow from groundwater to surface water.	Unlikely	Medium	Low	The risks to surface water receptors depend on the proximity and gradient (groundwater base flow) of the source to the surface water feature and the ground conditions (permeability of the near-surface geology). Groundsure hydrology data shows surface water bodies part of the Austen Dyke (tributary of the Wreake) run from north to south within the west of the Site boundary and through the centre of the Site and adjacent to the eastern site boundary. A large fish pond and 3 no. small ponds are located on-site and several ponds are also present off-site, the closest 6m south of the Site boundary. 5 no. ponds and part of the Austen Dyke (tributary of the Wreake), Smite from Source to Dalby Brook and Eye / Wreake from Langham Brook to Soar fall within the Site drainage basin 300 – 750 m from the Site boundary. Groundwater is anticipated to flow towards the south towards the river

Source	Receptor		Exposure Pathway	Probability	Consequence	Risk Category	Justification
			from Langham Brook to Soar fall				Wreake and the fishpond. However, there is a lack of site specific data to confirm the groundwater flow direction. There is the potential for preferential migration: Groundsure data shows 4 no. geological faults associated with the Site (3 no. onsite, 1 no. ~ 24m from north site boundary)
			On-site - Fish Pond	Low	Medium	Moderate /Low	MRA Abandoned Mines Catalogue shows abandoned mines catalogue under the Site Potentially resulting in increased permeability via fracture networks, increased vertical and lateral connectivity and rapid flow The substation development is likely to create large areas of hardstanding surface cover which would reduce the potential for infiltration to areas of soft landscaping only and may increase magnitude of surface-runoff
On-site Made Ground Infilled Land Sewage Pumping Station Stockpiles Natural Radon	Property	Crops	Crop uptake via root system.	Unlikely	Mild	Very Low	Crops are present in fields surrounding the Site. There is the potential for plant uptake from airborne dust deposited from the Site onto adjacent areas and from contaminants leaching into groundwater and migrating off-site. However as stated above the sub-station hardstanding cover that will be present across the majority of the Site

Source	Receptor	Exposure Pathway	Probability	Consequence	Risk Category	Justification
						is likely to mitigate the generation of dust. It is considered unlikely that concentrations of contaminants are present which could result in a reduction in crop yield or loss of value or a reduction in produce quality. However, there is no groundwater and soil data available for review and therefore the risk cannot be entirely discounted.
On-site Made Ground Infilled Land Agricultural Land Sewage Pumping Station Stockpiles Natural Radon	Property Services	Direct contact – corrosion.	Unlikely	Mild	Very Low	The proposed substation development on-site and identified nearby properties are likely to have subsurface foundation structures. However, potential concrete corrosion has not been assessed here, as it will be evaluated as part of the geotechnical hazard register. In addition, utilities are expected to be installed in the subsurface to serve the new substation, as well as being present associated with existing off-site properties. It is considered unlikely that aggressive ground conditions that would cause corrosion of steel structures, however there is no groundwater data available for review and therefore the risk cannot be entirely discounted.

Source	Receptor	Exposure Pathway	Probability	Consequence	Risk Category	Justification
	Structure s with enclosed spaces	Gas intrusion – explosion. Accumulation	Low	Severe	Moderate	The presence of methane within a certain range (limits of flammability, 5-15%) poses an explosion risk within enclosed spaces. Where methane concentrations are encountered between these two ranges there is the possibility of ignition/explosion. Sources of ground gas generation or volatile vapours are not noted to be associated with the presence of agricultural land, however there is a potential risk from the sewage pumping station, further investigation is required. For Made Ground and infilled land, in accordance with BS 8576 the potential for gas generation is classified as 'very low to low'. Due to the limited gas generation potential of the sources identified, the risk in line with CIRIA C522 is considered to be Low. The cluster of faults poses potential risk of radon gas (30-100%) this requires targeted ground investigation to prove otherwise. Specific consideration of Full Radon Protection Measures (membrane and underfloor venting) for any occupied buildings (e.g., control rooms, welfare units) located in the northeast sector should be considered.

Source	Receptor	Exposure Pathway	Probability	Consequence	Risk Category	Justification
Off-site Made Ground Infilled Land Agricultural Land Natural Radon Historical Railway Land Industrial Land Use Tank Electrical Substation	Human Health – On-site	Construction and Ground Investigation Workers Inhalation of dust - indoor and outdoor. Ingestion of groundwater.	Low	Medium	Low	Off-site sources and their associated contaminants are listed in Table 9.1. Made Ground is anticipated to be present within 250m of the Site boundary in limited areas due to development and removal of weir and sluices, shown on historical maps from 1883 -1903, development of 1 no. embankment, tramway cuttings not shown on historical maps after 1968 and 3 no. potentially infilled ponds. These are considered unlikely to present a substantial source of contamination. For construction workers the risk is typically slightly increased above that for other onsite receptors. However, it is not anticipated that soils associated with off-site sources will be disturbed during the GI and construction phases such that dust generation could occur. Due to the nature of the off-site sources which are unlikely to present a substantial source of contamination, the risk is considered to be Low. The cluster of faults poses potential risk of radon gas (30-100%) this requires targeted ground investigation to prove otherwise. Specific consideration of Full Radon Protection Measures (membrane and underfloor venting) for any occupied buildings
		Maintenance Workers Inhalation of dust - indoor and outdoor. Ingestion of groundwater.	Unlikely	Medium	Low	
		Construction and Ground Investigation Workers Gas migration through ground and/or via faults to surface and ingress - explosive atmosphere. Gas migration through ground and/or via faults to surface and ingress - inhalation.	Low	Severe	Moderate	
		Maintenance Workers Gas through ground and/or via faults to surface and ingress - explosive atmosphere. Gas through ground and/or via	Low	Severe	Moderate	

Source	Receptor	Exposure Pathway	Probability	Consequence	Risk Category	Justification
		faults to surface and ingress - inhalation.				(e.g., control rooms, welfare units) located in the northeast sector should be considered.
Off-site Made Ground Infilled Land Agricultural Land Natural Radon Historical Railway Land Industrial Land Use Tank Electrical Substation	Controlled Waters	Secondary A Aquifer (Bedrock)	Low	Medium	Moderate / Low	The majority of the bedrock and superficial geology across the Site is classified as Secondary (undifferentiated) aquifer with Bedrock encroaching the northeast corner of the Site is classified as Secondary A Aquifer. The identified off-site Made Ground and infilled land are considered unlikely to present substantial sources of contamination. The potentially infilled tramway cuttings are
		Secondary (Undiff.) Aquifer (Superficial and Bedrock)	Unlikely	Medium	Low	anticipated to be up groundwater gradient of the Site, given that flow is expected to be towards the south towards the river Wreake. However, there is a lack of information on groundwater levels and flow directions to confirm this, The risk to the groundwater from off-site sources is therefore considered to be Low. Groundsure hydrology data shows surface water bodies part of the Austen Dyke (tributary of the Wreake)
		Surface Waters On-site - Austen Dyke	Unlikely	Medium	Low	run from north to south within the west of the Site boundary and through the centre of the Site and adjacent to the eastern site boundary. A large fish pond and 3 no. small ponds are

Source	Receptor	Exposure Pathway	Probability	Consequence	Risk Category	Justification
	(tributary of the Wreake); 3 no. small ponds Off-site (within site drainage basin) – 12 no. Ponds, Smite from Source to Dalby Brook and Eye / Wreake from Langham Brook to Soar fall	Direct run-off to surface water. Migration via preferential pathways – faults and abandoned mine Baseflow from groundwater to surface water.				located on-site and several ponds are also present off-site, the closest 6m south of the Site boundary. 5 no. ponds and part of the Austen Dyke (tributary of the Wreake), Smite from Source to Dalby Brook and Eye / Wreake from Langham Brook to Soar fall within the Site drainage basin 300 – 750 m from the Site boundary. As previously discussed, due to site conditions there is the potential for preferential migration through increased permeability via fracture networks, increased vertical and lateral connectivity and rapid flow The substation development is likely to create large areas of hardstanding surface cover which would reduce the potential for infiltration to areas of soft landscaping only and may increase magnitude of surface-runoff Groundsure hydrology data shows a surface water body part of the Austen Dyke (tributary of the Wreake) runs adjacent outside of the east boundary.
	On-site - Fish Pond	Lateral migration in groundwater. Baseflow from groundwater to surface water. Direct run-off to surface water. Migration via preferential	Low	Medium	Moderate /Low	

Source	Receptor		Exposure Pathway	Probability	Consequence	Risk Category	Justification
			pathways –faults and abandoned mine Baseflow from groundwater to surface water.				
Off-site Made Ground Infilled Land Agricultural Land Natural Radon Historical Railway Land Industrial Land Use Tank Electrical Substation	Property	Services	Direct contact - corrosion	Unlikely	Mild	Very Low	The proposed substation development on-site is likely to have subsurface foundation structures. However, potential concrete corrosion has not been assessed here, as it will be evaluated as part of the geotechnical hazard register. In addition, utilities are expected to be installed in the subsurface on-site to serve the new substation. As noted above, the potentially infilled tramway cuttings are anticipated to be up groundwater gradient of the Site, given that flow is expected to be towards the south towards the river Wreake and may therefore flow from outside the Site to downgradient receptors. However, there is a lack of information on groundwater levels and flow directions to confirm this. The identified off-site Made Ground and infilled land are considered unlikely to present substantial sources of contamination.

Source	Receptor	Exposure Pathway	Probability	Consequence	Risk Category	Justification
						There is no groundwater data available for review and therefore the risk to steel structures from aggressive ground conditions cannot be entirely discounted.
	Structure s with enclosed spaces	Gas intrusion - explosion. Accumulation	Low	Severe	Moderate	The presence of methane within a certain range (limits of flammability, 5-15%) poses an explosion risk within enclosed spaces. Where methane concentrations are encountered between these two ranges there is the possibility of ignition/explosion. Made Ground and infilled land is a potential source of ground gas generation. In accordance with BS 8576 the potential for gas generation is classified as 'very low to low'. Due to the limited gas generation potential of the sources identified. The risk in line with CIRIA C522 is considered to be Low. The cluster of faults poses potential risk of radon gas (30-100%) this requires targeted ground investigation to prove otherwise. Specific consideration of Full Radon Protection Measures (membrane and underfloor venting) for any occupied buildings (e.g., control rooms, welfare units) located in the northeast sector should be considered.

10. Review of Geotechnical Risk and Preliminary Engineering Assessment

10. Review of Geotechnical Risk and Preliminary Engineering Assessment

10.1.1 A preliminary geotechnical risk register is given in Appendix F which describes the main ground related hazards on the Site (excluding ground contamination) and mitigation measures which may be implemented to eliminate or reduce the risk by means for further investigation or during the design.

10.1.2 The most significant risks are:

- Significant potential for a magnitude of settlement associated with land raise and compressible superficial deposits.
- Obstructions related to boulders within the Glacial Till.
- Potential for settlement associated with compressible infilled ground in the northeast section of the Site, as a result of historical surface mineral mining.
- Potential of shallow ground water, potential for water ingress to cuttings and excavation.
- Differential settlements associated with localised superficial deposits (alluvium/head) and changes in bedrock strata in the north of the Site.
- Aggressive Ground Chemistry associated with sulphide bearing stratum across the Site.
- Variable stratigraphy and depth to bedrock and geotechnical material properties leading to unexpected ground conditions encountered.

10.1.3 More details regarding geotechnical risks can be found in the Geotechnical Risk Register in Appendix F. The Geotechnical Risk Register is a live document and will be further developed and updated in the following reports with more recent information and upon the Site walkover. These risks should be further explored and updated following site specific ground investigation.

10.2 Preliminary Engineering Assessment

10.2.1 The preliminary engineering assessment is based on the proposed development at DF2 Rev B Redline Boundary level civil design for the WMEL- B substation. No intrusive investigations have been undertaken to support the assessments at the time of writing; therefore, the high-level commentary and preliminary recommendations are reliant on limited publicly available desk-based sources as referenced throughout the document.

Foundations

10.2.2 Shallow foundations are likely to be feasible in areas of cut and limited levels of fill for lightly loaded structures with typical settlement tolerances. Within the northeast of the

Site shallow foundations should be avoided due to the presence of infilled ground and associated risk of compressibility and uneven settlement.

- 10.2.3 In areas of significant fill there may need to be a hold period between completion of the fill platform and construction of structures to allow for consolidation settlement. This hold period will be informed by settlement modelling but may be in the order of several months or longer. Consolidation periods could potentially be accelerated through the use of surcharge loading (pre-loading) and vertical band drains, subject to detailed settlement analysis and monitoring.
- 10.2.4 The superficial soils that comprise the Oadby Till Member show a degree of lateral variation in terms of thickness and grain size content; this has the potential to lead to differential settlement across the foundations. The extent of this differential settlement needs to be determined by undertaking site specific ground investigation to identify lateral changes in the soils across the Site.
- 10.2.5 The clay/silt dominated superficial material is likely to exhibit shrink/swell behaviour because of seasonal variations in water content and exposure to frosts. Any proposed foundations and ground slabs will need to consider uplift pressures exerted on the underside of the foundation because of these soils, and also potentially by a high groundwater table. Ground improvement or excavation and replacement may be a potential treatment method to reduce the potential for swell due to changes in moisture content or alternatively heave protection can be utilised.
- 10.2.6 Heavily loaded structures, structures with strict settlement tolerances, or structures in areas of significant fill may need to be founded on piles, particularly given the anticipated settlements of the large fill embankment and underlying ground. The most suitable pile type is dependent on the weathering profile of the underlying bedrock profile. Piled foundations would need to consider settlement of the fill platform or underlying ground which may induce negative skin friction, and may need to be considered in pile design.
- 10.2.7 Suitable foundation selection and design should be considered following the Site-specific Ground Investigation.

Excavations / Areas of Cut

- 10.2.8 At this stage, excavations are anticipated to be required to create a level development platform due to the varying elevations across the Site. It is presently assumed that cuttings are feasible using normal excavation plant; however, this will be confirmed through targeted ground investigation to establish the excavatability of the bedrock and inform the appropriate excavation techniques.
- 10.2.9 Ground investigation and subsequent earthworks classification testing will be required to assess suitability of the excavated soils/bedrock for material re-use. Site won clays which dominate the Site will require strict controls on moisture content to ensure that they are not placed too wet or dry of their optimum moisture content.
- 10.2.10 There is potential for re-bound heave of the in-situ clays (be it residual soil from weathered bedrock or the superficial Boulder Clay) following removal of overburden. Given the low permeability, it may take a period of weeks to months (potentially longer) for porewater pressures to dissipate and the full heave quantity to be realised. In addition to the unloading heave detailed above, there is a potential for

additional heave due to swelling and stress relaxation the mudstone. The anticipated heave will depend on the thickness and deformability of the cohesive materials beneath the level of the cutting, therefore the ground characteristics at the Site should be assessed with ground investigation information to inform detailed substation design.

Groundwater Considerations

- 10.2.11 Only one of the regional BGS boreholes (SK72SW68) reviewed recorded a groundwater strike at 14m bgl with an additional borehole, identified in the geological memoir, being taken to a depth 26.5m to extract groundwater from the top of the Dyrham Formation. However, given the anticipated low permeability of the subsurface, groundwater tables are likely to occur at shallower depths. Particularly within the gullies identified on the Site, the groundwater table is likely to be shallow and potentially dictated by the brooks considering the springs identified to the north. Excavations should therefore anticipate potential groundwater encounters.
- 10.2.12 The superficial Till which covers most of the Site, is largely described as being a predominantly cohesive material, however, this material is noted as having subordinate lenses of sand and gravel which may be susceptible to running sand conditions when in the presence of shallow groundwater, leading to instability in pits and excavations. The Superficial Head deposits and Alluvium also have similar potential if found to be granular.
- 10.2.13 The Groundsure report has indicated that the Site has a low risk from running sands for the majority of the Site, noting that the development of running sand conditions is unlikely. Running sand conditions may be present locally associated to the Alluvium mapped to where the gully features connect in the south of the Site. Depending on flow rates, some dewatering may be required during construction.
- 10.2.14 Groundwater conditions at the Site are poorly defined and must therefore be assumed to be shallow until proven otherwise by a suitable ground investigation. As a result, the risk of excavation instability is high, and appropriate groundwater control measures will be required during excavations.
- 10.2.15 Permanent groundwater control measures (e.g. land drainage) will likely be required for permanent excavations on the Site. Cut off drains may be installed along cut slopes given the springs identified to the north of site.

Retaining Structures

- 10.2.16 If constraints do not permit managing level changes with unsupported slopes at angles deemed suitable by slope stability analysis, then slopes may require steepening through engineered retaining walls or potentially reinforced earth fill. Various forms of retaining wall will be suitable at the proposed development site.

Cutting slopes

- 10.2.17 If steep slopes are required beyond that achievable from cutting within natural material as assessed through slope stability analysis then retaining walls or reinforced earth may be required.

- 10.2.18 Slope angles of up 70° are likely to be achievable in the stiff Glacial Till and underlying Mudstones using techniques such as soil nailing with a flexible mesh. Steeper angles may be achievable where flexible is replaced with a shotcrete facing.
- 10.2.19 Alternatively, alternative methods could be used such as contiguous or secant piled retaining walls (potentially anchored to control deflections), or king post retaining walls which would require less room for excavation and replacement than traditional gravity retaining wall solutions. The exact form of retaining wall suitable within cut slopes would be subject to the findings of ground investigations and detailed design.

Fill slopes

- 10.2.20 If steep slopes are required beyond that achievable with engineered fill as assessed by slope stability analysis then retaining structures or addition of reinforcement may be required.
- 10.2.21 If retaining walls are required then gabion or gravity / pre-cast cantilevered retaining wall solutions may be appropriate.
- 10.2.22 Use of geogrids or mechanically stabilised earth would allow for steep slopes to be constructed up to around 70 degrees. Should steeper angles be required then retaining walls such as gabions or precast / in-situ concrete may be required. The exact form of retaining wall suitable within fill slopes would be subject to the findings of ground investigations and detailed design.

Earthworks / Areas of Fill

- 10.2.23 Topsoil, Alluvium and Head Deposits can be highly compressible when loaded. These materials are not suitable for use as structural fill but may be reused in landscaping areas to avoid unnecessary off-site removal.
- 10.2.24 The area of infilled ground is anticipated to be compressible and therefore are not suitable for reuse as a founding material.
- 10.2.25 The underlying in-situ Glacial Till and Charmouth Mudstones are likely over consolidated and are therefore likely to be stiff response and not compress as much in comparison and could be re-used as mass fill on site. Notwithstanding this significant settlement is anticipated due to the magnitude of fill required at the proposed development site which will need to be accounted for in design and construction sequencing.
- 10.2.26 Settlement of cohesive fill and underlying in-situ ground induced by the placement of earthworks is likely to occur over a timescale of weeks to months (or more). Settlement analysis should be undertaken during the detailed design phase to assess this, informed by site-specific GI data. Settlement monitoring may need to be undertaken during construction to ensure that settlement remains within predicted and acceptable limits.
- 10.2.27 Drainage works (e.g. culverts) may be required in the gullies to allow the existing stream to run beneath the fill platform. Land drainage will also likely be required to manage groundwater flow paths below embankments.

Road Pavements

- 10.2.28 As a part of the development, new access roads will be required. It is anticipated that the shallow soils across the Site may contain pockets of weak material due to lateral variations in the superficial deposits. Proof rolling of the formation level will be required, and any loose or soft spots should be removed and replaced with an engineer fill, in accordance with a suitable specification.
- 10.2.29 Subsurface information required for pavement design, such as California Bearing Ratio (CBR) and subgrade modulus, etc are not currently available and should be confirmed following detailed ground investigation.

Infiltration Drainage

- 10.2.30 Much of the Site is underlain by Oadby Till, which is anticipated to contain a high proportion of clay and silts, which will result in a soil with low permeability. Consequently soil, infiltration drainage is unlikely to be feasible for the Site. It is however noted that Till is a variable material, and there is the potential for pockets of more granular dominated material that may prove a more suitable for infiltration drainage discharge.
- 10.2.31 At this stage, it should be assumed infiltration drainage at this site is unlikely to be feasible and as such other options will be required to explored (e.g. attenuation ponds).

Ground Chemistry

- 10.2.32 The majority of the Site is underlain by Charmouth Mudstone of the Lias Group, a known pyrite containing strata (BRE, 2017). Additionally, the Dyrham Formation interbedded Mudstone and Siltstone mapped at the north end of site is likely to be sulphide / sulphate bearing (although potentially to a lesser extent than the Charmouth Mudstones). The superficial glacial tills are likely to have contain sulphide / sulphate due to their parent material constituent content.
- 10.2.33 Therefore, there is a risk of chemical attack for embedded concrete structures, leading to deterioration if not properly mitigated. The highest concentration of elements is locally associated to the area of infilled ground in the northeast of the Site. This should be further assessed during site GI and appropriately accounted for in concrete design following the appropriate BRE design sulphate class.
- 10.2.34 This may preclude ground improvement with lime stabilisation at the Site, as this can react with natural sulphates and may lead to ground heave.

Geotechnical Complexity Class

- 10.2.35 The geotechnical works relate to the construction of a new substation, alongside earthworks to allow for producing a consistent site level and the addition of new access roads.
- 10.2.36 The existing ground investigation information available for the Site is limited, there is uncertainty in the lateral variations in the contents of superficial soils, the depth of bedrock and the groundwater regime across the Site.

- 10.2.37 It is recommended that Geotechnical Complexity Class GCC2 is applied to this site in accordance with EC7, with the caveat that this classification must be confirmed with an appropriate ground investigation to explore the geotechnical risks highlighted in this study.

Geotechnical Category

- 10.2.38 Geotechnical structures are classified into a Geotechnical Category that combines the uncertainty and complexity of the ground and ground-structure interaction with the consequence of failure of the structure.
- 10.2.39 The project is currently classified as Geotechnical Category 2 as defined in BS EN 1997 in accordance with CD 622 for the proposals stated in Section 1.1. Geotechnical Category 2 encompasses conventional geotechnical structures with no exceptional risk or difficult ground or soil loading conditions, most earthworks will fall into this category.

11. Conclusions

11. Conclusions

11.1 Geotechnical Conclusions

- 11.1.1 Considering the findings from this report, from a geotechnical perspective, significant amounts of earthworks and potential retaining structures are likely to be required to manage level changes on site.
- 11.1.2 Based on a review of the preliminary ground model, the Site generally comprises Oadby Till on top of Dyrham Mudstone and Charmouth Mudstone, with minor pockets of Head and Alluvium associated with gulley features. An area of infilled ground is present in the northeast section of the Site, locally associated with the Marlstone Rock Formation overlaying the Dyrham Mudstone. It is likely the origin of the infilled ground is related to surface mining for ironstone within the Marlstone Rock Formation. The preliminary ground model indicates the possibility for deep superficial deposits reflecting the information presented in borehole SK62SE in the south of the Site. Further ground investigation is required to inform the foundations, earthworks and retaining structures design solutions.
- 11.1.3 The presence of highly compressible soils within the gulley features combined with the southern sloping topography and large areas of fill, provides a high possibility for significant degrees of settlement and some soils may need excavation and treatment before being reused for filling.
- 11.1.4 Further assessment and investigation are required to confirm ground conditions, investigation hazards and inform design development as outlined in Section 12.

11.2 Geo-environmental Conclusions

- 11.2.1 The key changes to the geo-environmental assessment within Issue 03 of this report are the inclusion of a small number of additional features identified through review of the revised Groundsure historical mapping and regulatory datasets, most notably Made Ground associated with the area of artificial ground (infilled land) mapped by the BGS in the northeastern area of the site and an electrical substation which has been present approximately 168m southeast of the Site since 1968. These features have been incorporated into the potential sources identified in Section 9.2. The risk ratings within the Preliminary Risk Assessment are unchanged.
- 11.2.2 Based on the desktop screening undertaken in this report it is concluded that the environmental setting of this site can be characterised as largely undeveloped, comprising of several agricultural fields. Review of Groundsure data and historical maps identified potential contamination sources. Notable potential sources of contamination on-site are localised areas of Made Ground (associated with the area of artificial ground (infilled land) recorded in the northeastern area of the site and on-site structure development and removal), infilled land (associated with the former ponds and potential surface mining in the northeast of the Site recorded as infilled land), sewage pumping station and general agricultural use across the majority of the

Site throughout its mapped history. Off-site sources comprise of storing use and disposal of waste exemptions, registered to agricultural buildings, Made Ground, infilled land associated with former ponds and tramway cuttings, historical railway land, an electrical substation, unspecified tank and industrial land use (cleaning supplies and agricultural contractors within the industrial estate to the northeast).

- 11.2.3 Risks from these potential contaminant sources have been reviewed for the following three identified receptor groups:
- Human Health – Construction and GI workers, maintenance workers and adjacent site users in the local area.
 - Controlled Waters Receptors – Secondary (undifferentiated) Bedrock & Superficial Aquifer, Secondary A Bedrock Aquifer, surface waters on-site (Austen Dyke, fish pond and 3 no. small ponds) and off-site in the Site drainage basin.
 - Property – Crops in the surrounding fields and proposed on-site substation and adjacent buildings and infrastructure potentially at risk of ground gas (needs further assessment).
- 11.2.4 In summary, the risk of encountering ground contamination is generally Very Low / Low, however some Moderate / Low risk scenarios, e.g. leaching of contaminants and migration in groundwater and surface run-off impacting the Secondary A Aquifer (Bedrock) and on-site fish pond, have been identified on or surrounding the Site.
- 11.2.5 The source-pathway-receptor contaminant linkages that have been assessed and the risks assigned as part of this PRA are based on the information provided and high-level understanding of the development proposals available at the time of the review. Risk ratings may be reviewed as more information on the proposed design is developed and / or as intrusive investigation data provides a more robust characterisation of site conditions.
- 11.2.6 In line with BS 8576 the maximum generation potential for Made Ground and infilled land is anticipated to be Low. Preliminary mine gas risk assessment indicated risk to be Low with reference to CL:AIRE guidance, suggesting that the assessment should be reviewed once the development design is finalised. Overall, the risk of encountering ground gas is low, however potential sewage sludge deposited on-site at the sewage pumping station, according to BS8576, represents a moderate potential ground gas generation source, requiring further consideration.
- 11.2.7 The cluster of faults poses a potential moderate risk of radon gas (30-100%); this requires targeted ground investigation to prove otherwise. Specific consideration of Full Radon Protection Measures (membrane and underfloor venting) for any occupied buildings (e.g., control rooms, welfare units) located in the northeast sector should be considered.

12. Recommendations

12. Recommendations

- 12.1.1 It is recommended that a site-specific ground investigation, followed by interpretative reporting, is undertaken to confirm ground and groundwater conditions, establish a ground model, and derive geotechnical and geo-environmental parameters to inform the design and identify ground-related risks.
- 12.1.2 The geotechnical investigation should be designed with consideration to BS EN 1997-1:2024, BS EN 1997-2:2024 (Eurocode 7: Geotechnical Design- Parts 1 and 2), and BS 5930:2015+A1:2020.
- 12.1.3 The geo-environmental investigation should be designed with due consideration of the requirements of BS 10175:2026.
- 12.1.4 In summary, key objectives to be addressed by the investigation include:
- A site walkover for confirmation of the ground and groundwater conditions and validation of the any potential contamination sources, pathways, risks or any other features deemed detrimental to the proposed development that fell outside the data and scope of the desktop study and initial Conceptual Site Model. During the Site walkover further investigation to determine if the pumping station is designed for 'sewage' and if that is the case if sewage sludge is deposited on-site.
 - Chemical status of soil for the purpose of risk assessment to human health, groundwater and for preliminary waste classification to inform disposal / storage.
 - Chemical status of groundwater and surface water in order to determine risks to controlled waters.
 - Confirm the ground model proposed in this desk study and constrain the extent of vertical/lateral variations across the Site.
 - Confirm the presence of backfilled made ground.
 - Ground gas assessment following BS 8485:2015+A1:2019 (Code of practice for the design of protective measures for methane and carbon dioxide). Supported by CL:AIRE RB17 to determine the potential risks to the proposed development, surrounding properties, and construction site workers.
 - Confirm the ground water regime at the Site, and the presence of any seasonal variations in ground water levels.
 - In-situ and laboratory thermal resistivity testing to inform cable rating and spacing designs.
 - Verification of anticipated geotechnical hazards.
 - Identification of geotechnical design parameters.
 - Targeted ground investigation to confirm Radon presence and magnitude subject to location of proposed developments.
 - Inform design of proposed developments.

- 12.1.5 The outline scope of ground investigation is anticipated to include boreholes, trial pitting, in-situ testing (including Standard Penetration Testing, California Bearing Ratio Tests, Infiltration Tests and Percolation Tests), sampling of soil and groundwater, geotechnical and geo-environmental laboratory testing and groundwater and gas monitoring.
- 12.1.6 By undertaking an intrusive ground investigation, an assessment of the ground and groundwater profiles may be carried out along with an assessment of the geotechnical and geo-environmental risks associated with the Site. This will allow a refined risk assessment and conceptual site model (CSM) to be developed in accordance with Land Contamination Risk Management (LCRM) methodology. The ground investigation will allow a quantitative assessment as to whether any of the potential risks identified in this study are present and are of material concern to the development.
- 12.1.7 It is recommended that a non-intrusive geophysical survey be undertaken to support the intrusive ground investigation by tracing the bedrock level between the confirmed locations. This will allow for greater confidence in the thickness of superficial deposits across the Site and investigate if the southern portion of the Site is not within the margin of the nearby buried valley.
- 12.1.8 The findings from the ground investigation should be interpreted within an interpretative Ground Investigation Report. This would also inform successive Geotechnical Design Reports as required as the design progresses.
- 12.1.9 Liaison with the existing stakeholders, asset owners, landowners etc. should be undertaken to confirm their requirements and expectations with regard to the proposed works and developments, alongside any constraints.
- 12.1.10 PAS128 Type D, C and B (and A as required) surveys should be undertaken (prior to intrusive investigations), and ground penetrating radar (GPR) and cable avoidance tools used prior to breaking ground. It should be ensured that any existing utilities are identified and fully traced prior to the commencement of GI and construction works if near proposed exploratory hole locations. A hand dug inspection pit will be required, dug to at least 1.20m bgl using insulated hand tools, with cable-avoidance tool (CAT) scanning periodically. Only after this process should mechanical intrusive investigation commence. Procedures to be adopted in the event underground utilities are encountered and these must be detailed in the Risk Assessments and Method Statements (RAMS) for the GI works.
- 12.1.11 At the time of writing AAJV is awaiting further Detailed UXO Risk Assessment information for the Site. AAJV recommends that this assessment is undertaken prior to the commencement of any intrusive investigation, this recommendation will be reviewed once the further UXO information has been obtained.

13. References

13. References

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Appendix A

Figures

Appendix A Figures

Figure 1 - Site Location Plan

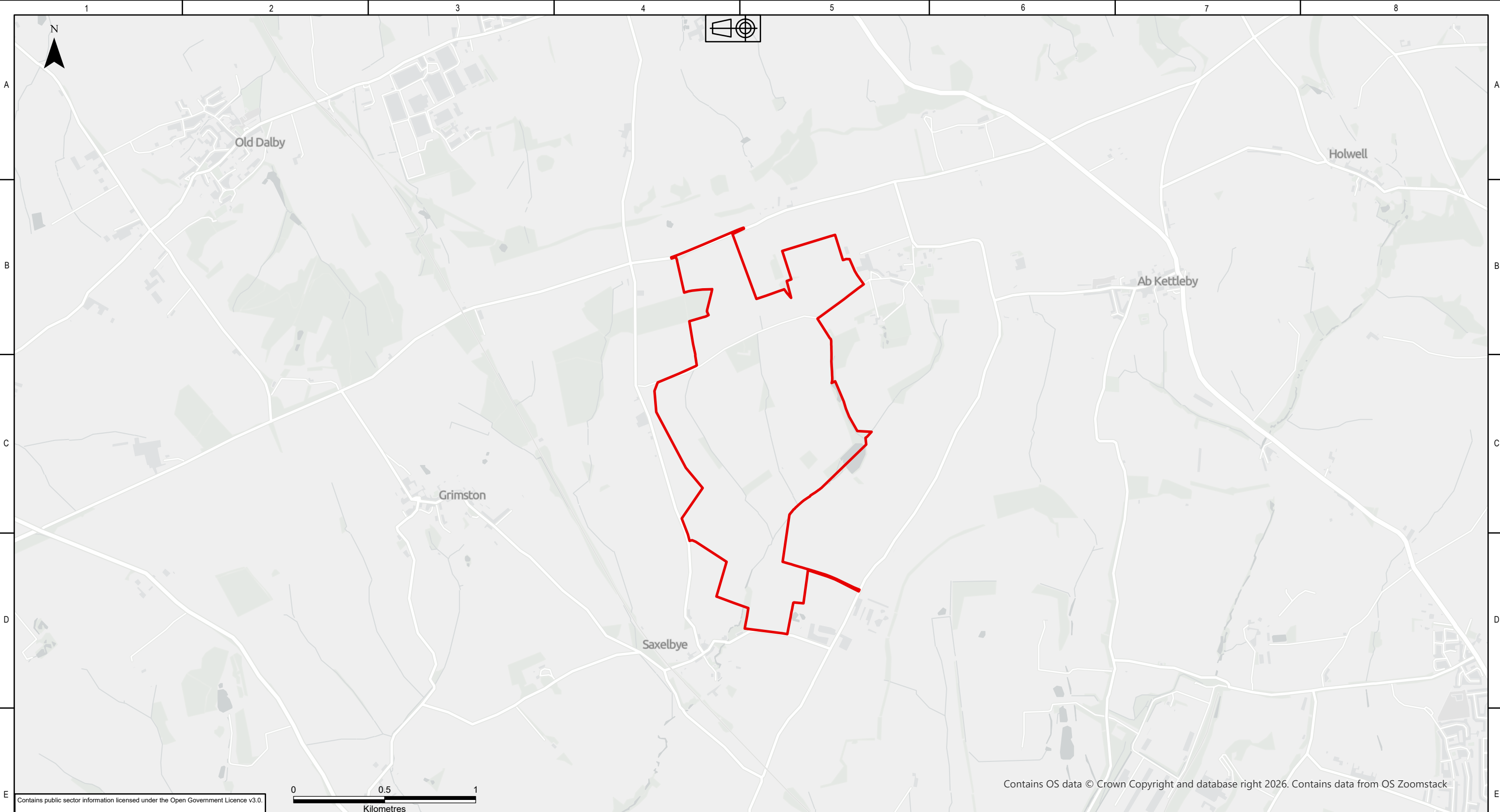
Figure 2 - Topography and Slope

Figure 3 - Superficial, Artificial and Mass Movement Deposits

Figure 4 - Bedrock Geology and Linear Features

Figure 5 - Hydrogeology, Hydrology and Flood Zones

Figure 6 - Geotechnical and Geo-environmental Constraint Plan



KEY PLAN

Legend

WMEL B Substation Desk Study Site Boundary (DF2.0B)

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Site

Weston Marsh to East Leicestershire - Substation B

Title

Phase 1 Geotechnical and Geo-environmental Desk Study: Figure 1 Site Location Plan

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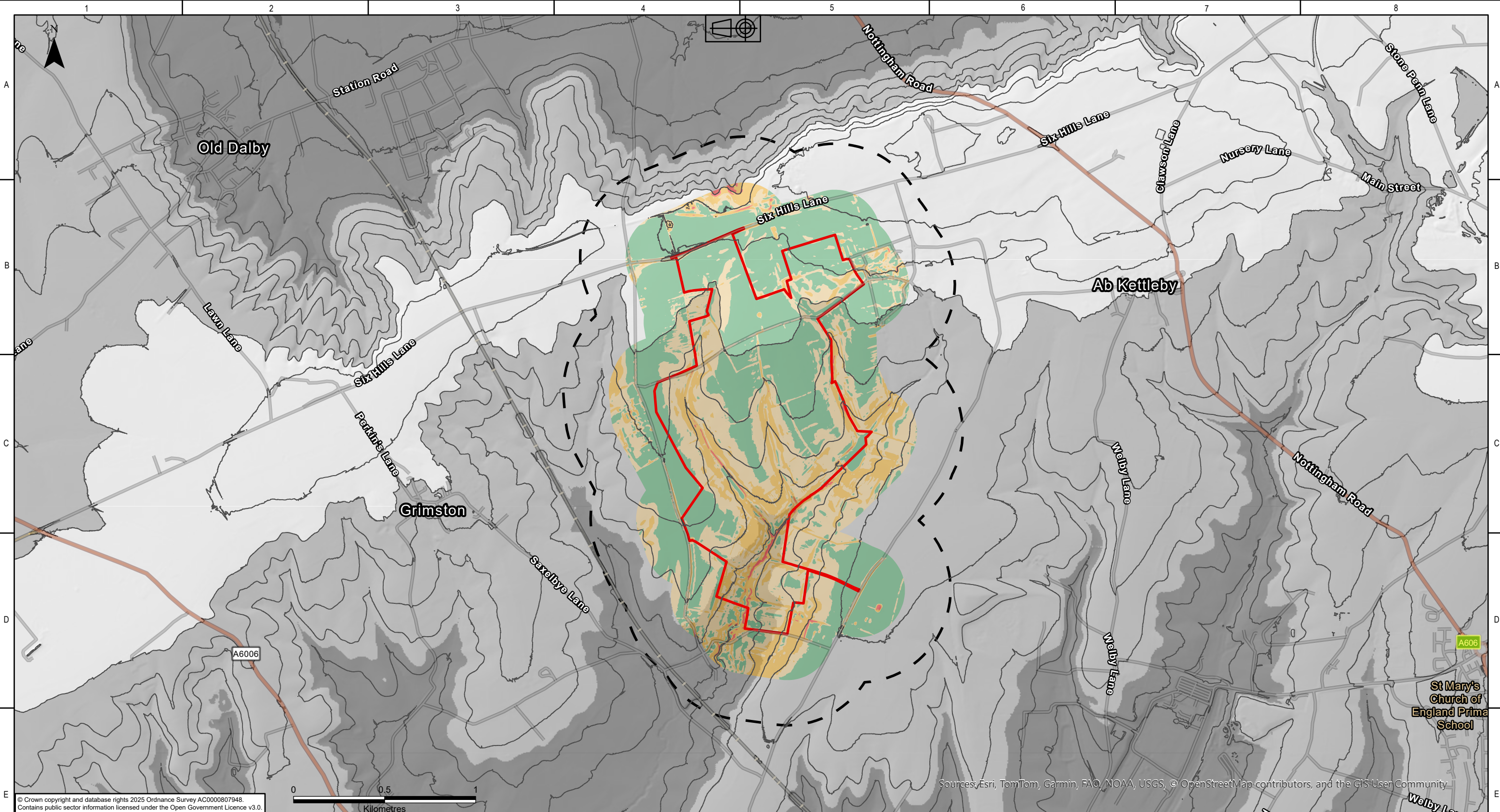
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KEY PLAN

Legend

WMEL B Substation Desk Study Site Boundary (DF2.0B)

500m Study Area

Digital Terrain Model LiDAR (1m)

Elevation (m)

31 - 75

76 - 105

106 - 140

141 - 230

Topographic Slope Gradient

Less than 3.5°

3.5° to 5.71°

5.71° to 15°

Greater than 15°

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Phase 1 Geotechnical and Geo-environmental Desk Study: Figure 2 Topography and Slope

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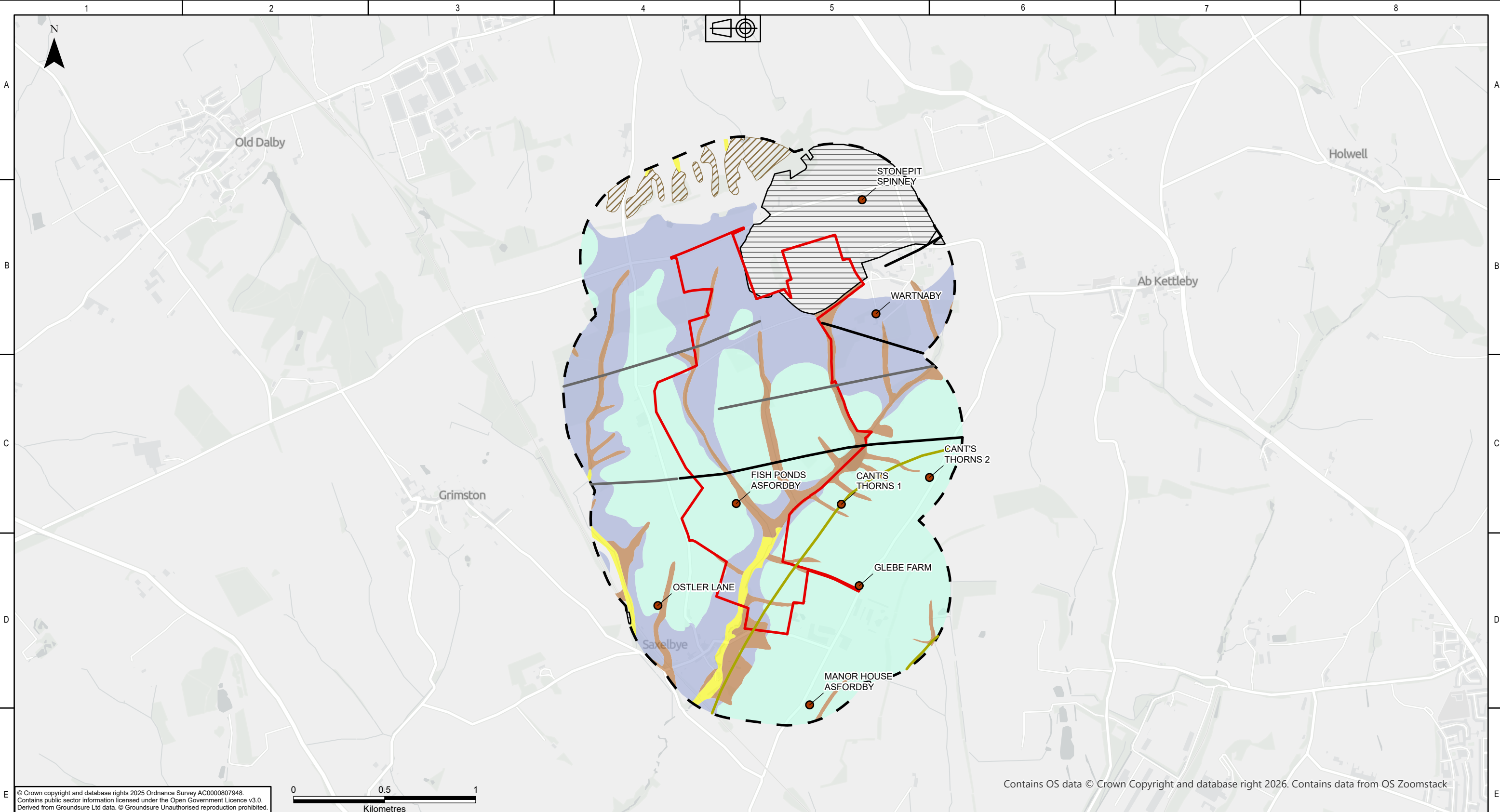
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KEY PLAN

Legend

- WMEL B Substation Desk Study Site Boundary (DF2.0B)
- 500m Study Area
- Boreholes
- Faults Linear Features 50K
 - Approximate margin of buried (superficial deposit-filled) channel or valley; beads to outside
 - Fault, inferred, crossmark on downthrow side, throw in metres
 - Fault, inferred, displacement unknown
- Geology Constraints
 - Artificial Made Ground 50K
 - Landslide deposits
- Superficial Geology 50K
 - Alluvium-Clay, silt, sand and gravel
 - Head-Clay, silt, sand and gravel
 - Oadby Till Member (Lias-rich)-Diamicton
 - Oadby Till Member-Diamicton

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Site

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Title

Phase 1 Geotechnical and Geo-environmental Desk Study:
Figure 3
Superficial, Artificial and Mass Movement Deposits

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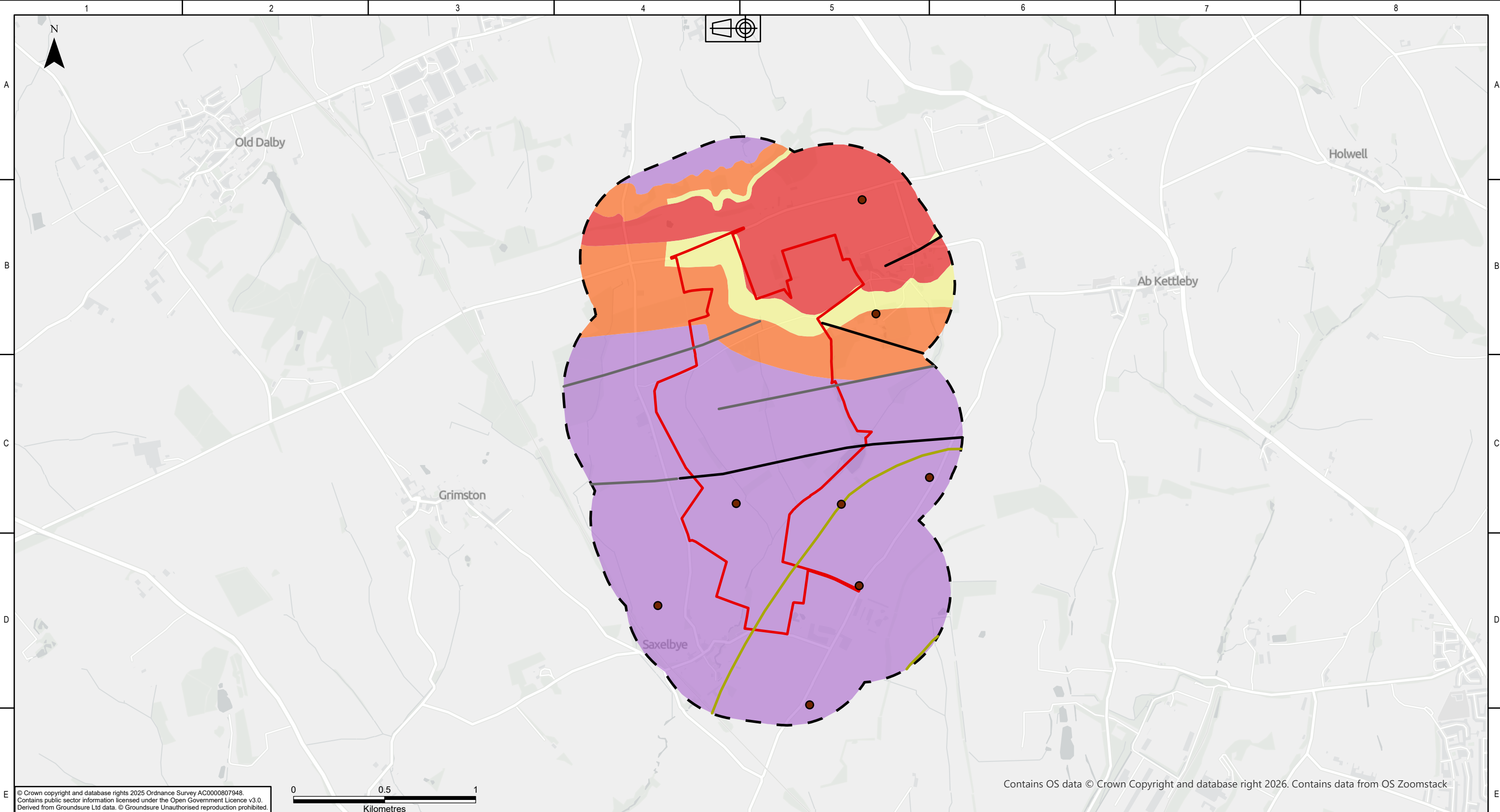
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KEY PLAN

Legend

- WMEL B Substation Desk Study Site Boundary (DF2.0B)
- 500m Study Area
- Boreholes
- Faults Linear Features 50K
 - Approximate margin of buried (superficial deposit-filled) channel or valley; beads to outside
 - Fault, inferred, crossmark on downthrow side, throw in metres
 - Fault, inferred, displacement unknown
- Bedrock Geology 50K
 - Charmouth Mudstone Formation-Mudstone
 - Dyrham Formation-Sandstone
 - Marlstone Rock Formation-Ooid-ironstone
 - Dyrham Formation-Sandstone

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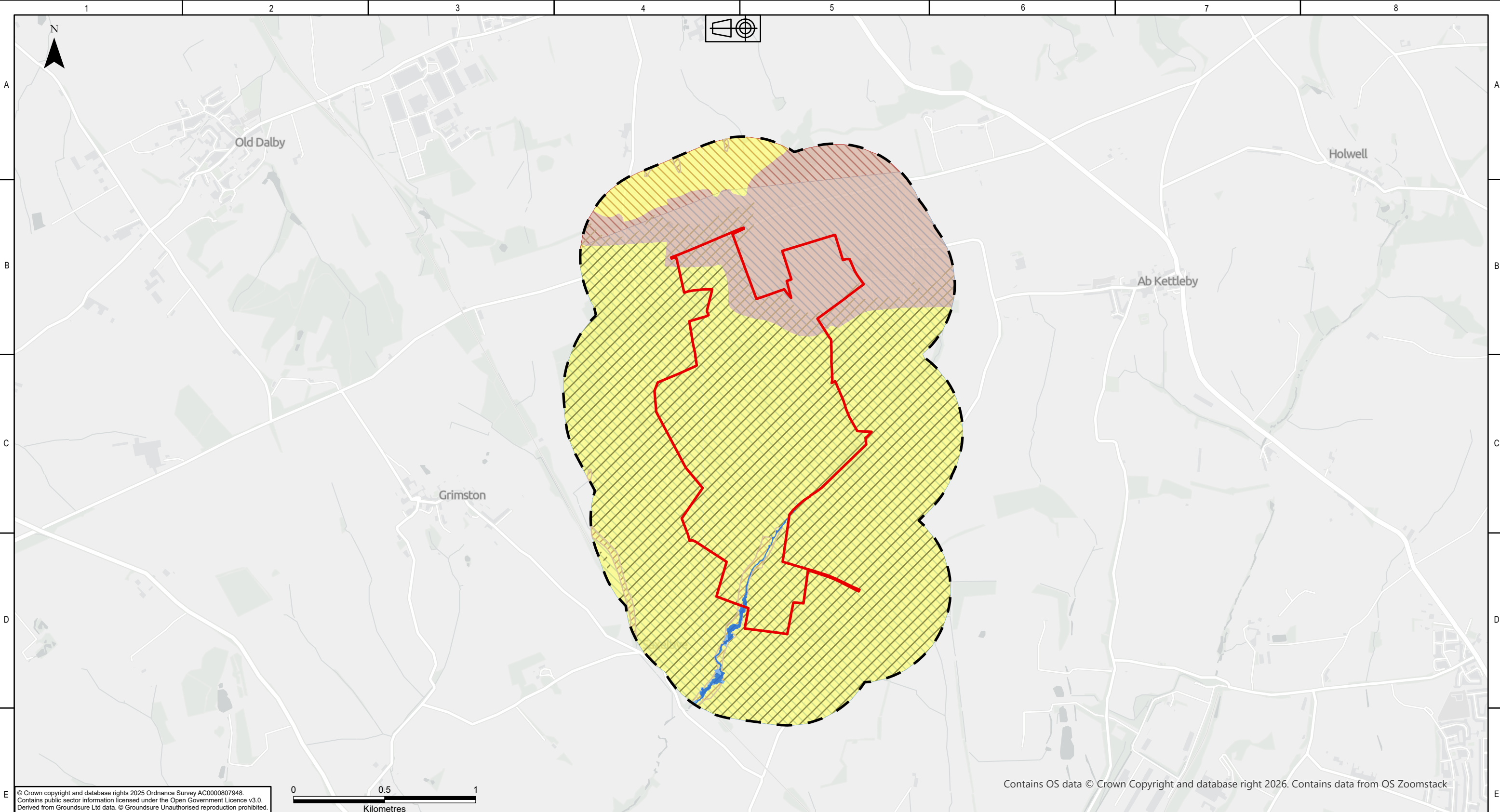
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Phase 1 Geotechnical and Geo-environmental Desk Study:
Figure 4
Bedrock Geology and Linear Features

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KEY PLAN

Legend

WMEL B Substation Desk Study Site Boundary (DF2.0B)

500m Study Area

Surface Water Bodies

Flood Zone 3

Flood Zone 2

Aquifer Classification

Secondary A Superficial Aquifer

Secondary A Bedrock Aquifer

Secondary Superficial Aquifer Undifferentiated

Secondary Bedrock Aquifer Undifferentiated

Waterbodies

Lower Trent Erewash - Secondary Combined

Soar - Secondary Combined

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Weston Marsh to East Leicestershire - Substation B

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Phase 1 Geotechnical and Geo-environmental Desk Study:
Figure 5
Hydrogeology, hydrology and flood zones

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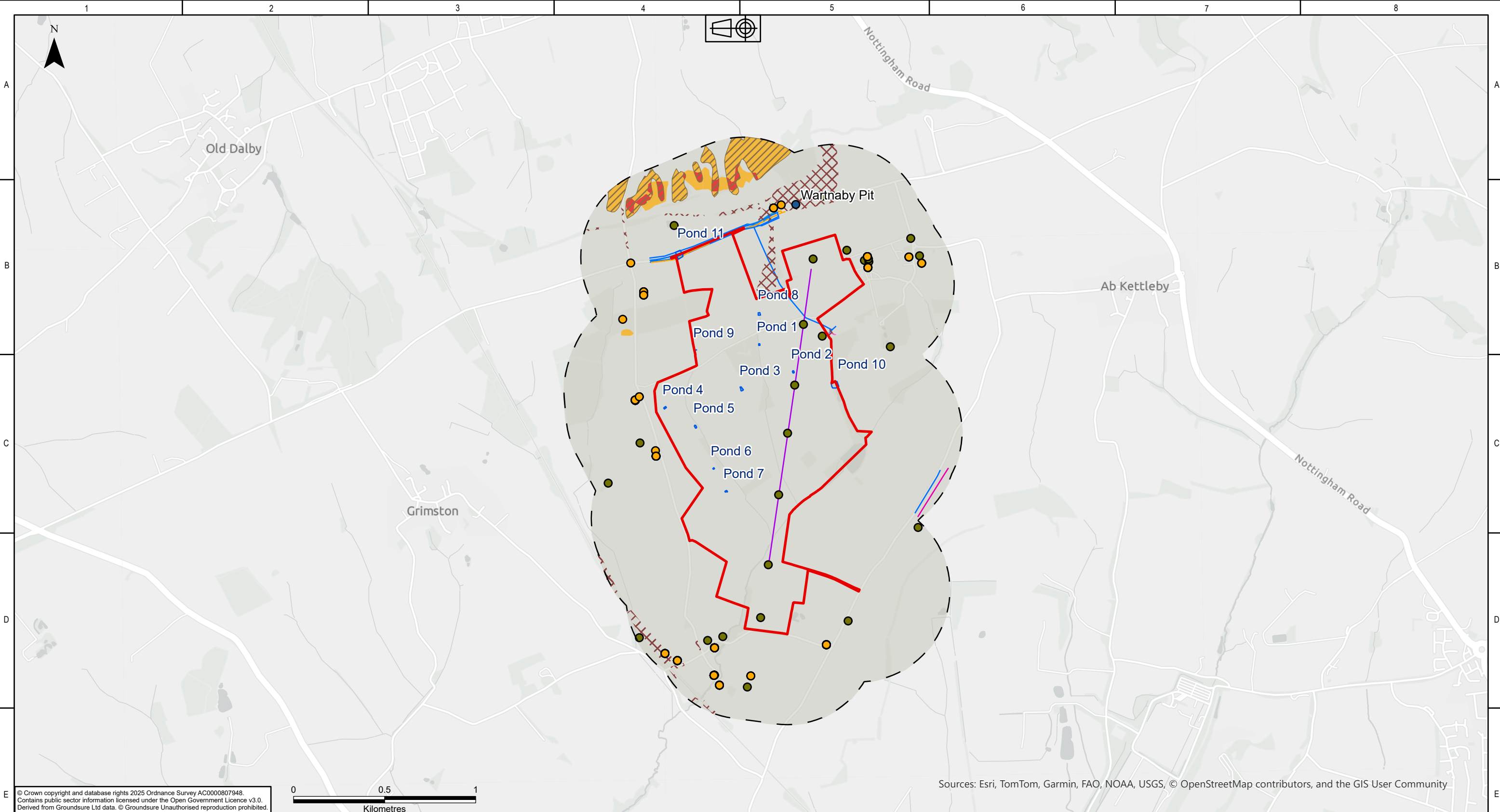
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KEY PLAN

Legend

WMEL B Substation Desk Study Site Boundary (DF2.0B)

500m Study Area

Brit Pits

Recent Industrial Land Uses

Landfill Waste Exemptions

Historical Ponds

Historical Industrial Land Use

Coal Mining Reporting Area

Landslip 50K

Landslide deposits

Landslides

Moderate

High

PAS128 Type D Utilities Survey

EHV Electricity

HV Electricity

LV Electricity

Gas

Water

Telecom

Note: PAS128 Type D Information (Issued 17/02/2026) is displayed for information only and not suitable for construction, this information comes from an incomplete survey dataset that does not cover the full DF2 Rev B Site Boundary. Further utilities may be present within the Site Boundary. Features illustrated have been sourced from Groundsure's Insight product and publicly available datasets. Additional unrecorded hazards and constraints to those shown may be present. Site reconnaissance and ground investigation are required to confirm hazards and constraints.

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Phase 1 Geotechnical and Geo-environmental Desk Study: Figure 6 Geotechnical and Geo-environmental Constraint Plan

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Appendix B BGS Boreholes

Appendix B BGS Boreholes



SK 72 SW 68
Date: 14.10.1947
142

7095 2290

A description of the Strata pierced should be given as follows:-

	Thickness of each Stratum		Total depths from the surface	
	Feet	Inches	Feet	Inches
Soil,	1	6		
2 Brown Clay,	8	0	9	6
Bottle Clay Grey Clay,	35	6	45	0
Brown Clay,	2	0	47	0
Soft Sandstone,	11	0	58	0
Hard do.	3	0	61	0
Ironstone,	18	0	79	0
Grey Clay,	8	0	87	0

The 18 ft. of 'Ironstone' is difficult to correlate with the local succession, which on account of non workings - trial borings, is known in some detail. It is almost certainly NOT identical of the Marlstone.

11/7/47

The ironstone is probably the equivalent of the green sands with water of 142/91. no Clays below Marlstone.

Sumo submersible pump. Capacity 3000 gph. 1947.

Supply from this bore is pumped to Marlstone Spring P.S.

Min. supply from bore. Spring was 60,000 gph. in 1947.

A Section to scale showing the size of the well or boring, strata pierced, rest level of water, and other particulars, should also be forwarded to the Ministry.



To be furnished in Triplicate.

WELLS AND BOREHOLES

Information to be supplied to the Ministry of Health

SK 72SW 7095 2290

142
101
SK72/6

Name of District MELTON MOWBRAY URBAN (Borehole situated at Wartnaby)	
If the District is a Rural District, name of Contributory Place concerned	
Level of surface of ground <u>above Ordnance Datum</u>	459 O.D.
Depth and diameter of shaft or boring, or of each	87ft.-12" dia.
Depth or depths at which water was found	46ft.
Estimated Quantity of Water required in Gallons per day	100,000
Yield of water in gallons per diem as ascertained by continuous pumping during 14 days or otherwise	93,600
Level of water <u>above Ordnance Datum</u> at commencement of pumping	450 O.D.
Level of water <u>above Ordnance Datum</u> <u>after 14 days.</u>	437.5 O.D.
Level of water <u>above Ordnance Datum</u> at cessation of pumping	
Pumping continued see statement.	
Time taken for water to return to original rest level after pumping ceased	
A tabulated Statement should be sent showing the quantity of water pumped in each 24 hours during the duration of the test together with the level of the water <u>above Ordnance Datum</u> at the end of each day. If there should be any stoppage, the reason and duration should be stated.	
Limit of deviation from vertical as specified in inches per 100 feet.	
Deviation as ascertained by measurement.	Approx. 1/2 in.
Distances of the well or borehole from any other known wells or boreholes in the neighbourhood	
Quality. (Copies of chemical and bacteriological analyses should be annexed. Information as to the mineral constituents of the water is desirable)	A number of in the vill nearest 87 away. Already supplied.
A 6" to the mile Ordnance map showing (in red) the precise situation of the well or borehole	do. do.
Date of completion of well or borehole	23.7.42.
Well or borehole sunk by Messrs F. Smith & Son Ltd., GRIMSBY.	
Signed <i>[Signature]</i> ENGINEER & SURVEYOR MELTON MOWBRAY U.B.C.	
Date 13th May 1943.	

Normally the pumping test should be continuous over a period of 14 days.
This form should be signed by the Engineer for the proposed works.

now Leicester C.B.L., under Water Order 1959, No. 411 Leicester Water Order

K 20 a

P.T.O. *[Signature]*

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A description of the Strata pierced should be given as follows:-

	Thickness of each Stratum		Total depths from the surface	
	Feet	Inches	Feet	Inches
Soil,	1	6		
² Brown Clay,	8	0	9	6
² <i>Coarse clay</i> Grey Clay,	35	6	45	0
Brown Clay,	2	0	47	0
Soft Sandstone,	11	0	58	0
¹ <i>Hard</i> do.	3	0	61	0
Ironstone,	18	0	79	0
Grey Clay,	8	0	87	0

The 18 ft. of 'Ironstone' is difficult to correlate with the local succession, which on account of non working trial borings, is known in some detail. It is almost certainly NOT ironstone of the Marlstone.

W.H.
7/3/46

The ironstone is probably the equivalent of the green sands with water of 142/91. The Clays below Marlstone

Sumo submersible pump. Capacity 3000 gpl. 1947.

Supply from this loc. to pump to Walsley Spring P.S.

Min. supply from loc + spring was 60,000 gpd. in 1947

A Section to scale showing the size of the well or boring, strata pierced, rest level of water, and other particulars, should also be forwarded to the Ministry.



WARTNABY BOREHOLE.

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Date.	Level of Water O.D.	Quantity Pumped per day. gall.
1942.		
Jul. 23 (Commenced Pumping)	450.00	
Aug. 7	439.75	93,600
14	456.80	57,000
21	434.20	57,200
28	426.80	76,700
Sep. 4	419.80	79,900
11	412.80	66,740
Oct. 3	401.50	60,000
After this date the quantity pumped was approximately 20,000 galls. per day, and water level gradually rose.		
1943.		
Mar. 11	426.50	
May. 13	438.00	

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The Royal Institute of Public Health & Hygiene

25, Gower Square
London, W.C.

1st April, 1913.

ANALYSIS OF BOREHOLE AT WARTNABY
for Milton Montrey A.D.C.

Total solids dried at 100°C
loss on ignition (after re-carbonating)
Chlorine in Chlorides
" x 1.647 = Sodium Chloride

Nitrates

Nitrogen as Nitrates

Saline ammonia

Albuminate ammonia

Oxygen absorbed in 3 hours
at 57°C.

Hardness - Total
(Soap test)

" Temporary

" Permanent

Poisonous metals - Lead }
" " - Cobalt }

Pts. per 100,000.

43.5

7.0

3.50

5.76

NIL

0.78

0.0014

0.003

0.008

~~24.0~~

24.0

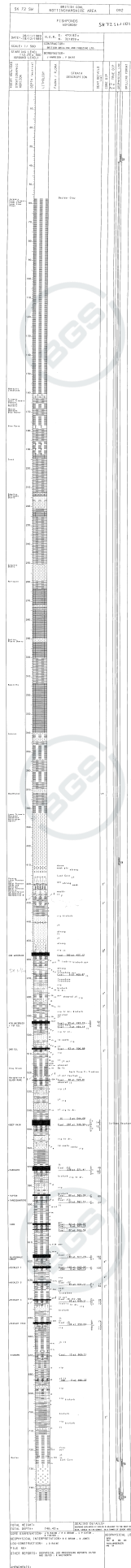
13.0

11.0

NIL

From a consideration of the above data, no exception
can be taken to the use of this water for domestic
purposes on chemical grounds.

Alan W. Stewart, B.Sc., F.I.C.,
Director
Chem. Labs.





Naif No. SN 89/221

SK 72 SW 101

Section of : FISHPOND SURFACE BOREHOLE

6 INCH MAP
N.G. Quarter Sheet

B.H. Reg. No.

Purpose : To prove the Coal Measures for Asfordby Mine

SK 72 SW

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EXACT LOCATION, NATIONAL GRID CO-ORDINATES : E 470183 m
N 321859 m

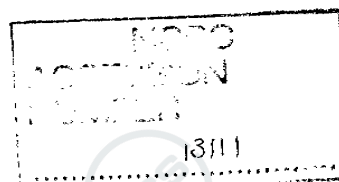
LEVEL AT WHICH BORE COMMENCED RELATIVE TO ORDNANCE DATUM : 112.29 m Above O.D.

DATE OF BORING : 28 11 1989 to 18 12 1989

CONTRACTOR : British Drilling and Freezing Company Ltd

BOREMASTER : J Harrison and P Shirt

COMMERCIAL
IN CONFIDENCE



Core Examined by : J D Raine , R E Brown , N Fear

Geophysical Logs Interpreted by : R E Brown , N Jones

Borehole Data and History Sheet and Sealing Report are appended.

Geophysical survey comprising the following suite of logs were carried out in the borehole :

by B.P.B. plc. :-

Gamma Ray, L.S. Density, Caliper, Neutron Porosity, and Sonic general logs, (1 : 100)

Gamma Ray, Caliper, L.S. Density and Filtered Short-Spaced Density, (1 : 20) over the major coal seams.

Sidewall Sonic at selected horizons around the Deep Main and Parkgate seams ;

by Schlumberger

Formation Microscanner and Gamma Ray.

Further processing of the above logs was undertaken by TSRE for verticality , breakout and dipmeter analysis (Report No 09.90)

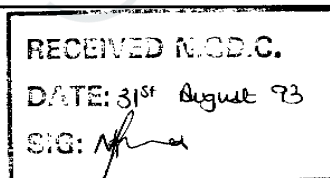
Copies of the results of these surveys are held at both the Geological Branch of British Coal, Nottinghamshire Group , and at British Coal, TSRE , Geological Branch.

A geophone assembly was cemented in the borehole at The Deep Main horizon, at 545.00 metres depth.

The borehole was sealed by Halliburton plc., and a copy of the sealing report is appended.

No cores were recovered from the surface to 410.00 m. or below 728.76. and the borehole description for these sections have been deduced from geophysical logs and chipping samples.

The six inch to one mile Geological Survey Sheet, SK 72 SW, indicates that the borehole began in RECENT Glacial Boulder Clay, overlying JURASSIC Lower Lias Clays.



SK72SW 101

Section of :- FISHPONDS borehole from Surface

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	No record ;			
		2.00	2.00	-110.29
	Boulder Clay ;			
		56.99	57.00	-55.29
Jurassic Lower Jurassic Lower Lias Clays				
	Mudstone , thin limestone bands ;			
		100.00	157.00	44.71
Hydraulic Limestones				
	Mudstone , strong , (calcareous)			
		3.30	160.30	48.01
	Limestone ;			
		2.10	162.40	50.11
Triassic Upper Triassic Penarth Lilstock				
	Siltstones ;			
		2.80	165.20	52.91
Westbury				
	Mudstone , silty layers ;			
		2.40	167.60	55.31
Mercia Mudstone Blue Anchor				
	Siltstone ;			
		3.90	171.50	59.21
	Mudstone , silty layers , gamma high at 176.20			
		5.10	176.60	64.31
Glen Parva				
	Gypsum ;			
		1.70	178.30	66.01
	Siltstone , thin sandstone layers ;			
		6.90	185.20	72.91
	Mudstone ;			
		1.60	186.80	74.51
	Gypsum ;			
		0.40	187.20	74.91
	Mudstone , silty at top ;			
		2.30	189.50	77.21

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Gypsum ;	0.50	190.00	77.71
	Mudstone , silty at top ;	2.00	192.00	79.71
	Gypsum ;	0.40	192.40	80.11
	Marl ;	2.00	194.40	82.11
Trent	Siltstone , sandy layers ;	13.20	207.60	95.31
	Siltstones ;	4.80	212.40	100.11
	Marl ;	0.40	212.80	100.51
Edwalton Hollygate Skerry	Sandstone ;	0.70	213.50	101.21
	Marl ;	1.00	214.50	102.21
	Sandstone fine , silty layers ;	1.70	216.20	103.91
	Mudstone ;	0.60	216.80	104.51
	Sandstone ;	3.70	220.50	108.21
	Siltstone fine , muddy at top ;	2.10	222.60	110.31
	Marl ;	2.40	225.00	112.71
	Siltstone , muddy at base ;	25.20	250.20	137.91
Cotgrave Skerry	Sandstone ;	8.60	258.80	146.51
Harlequin	Siltstone ;	4.70	263.50	151.21

Section of :- FISHPONDS borehole from Surface

SK72SW101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Marl ;	8.50	272.00	159.71
	Sandstone ;	1.00	273.00	160.71
	Marl ;	0.70	273.70	161.41
	Sandstone ;	0.50	274.20	161.91
	Marl ;	2.70	276.90	164.61
	Sandstone ;	0.20	277.10	164.81
	Marls ;	12.60	289.70	177.41
Carlton Plains Skerry	Sandstone , muddy layers ;	2.00	291.70	179.41
	Marl / Mudstone ;	8.30	300.00	187.71
	Siltstone ;	13.60	313.60	201.31
Radcliffe	Marl ;	26.00	339.60	227.31
Colwick	Sandstone ;	1.00	340.60	228.31
	Mudstone ;	1.70	342.30	230.01
	Sandstone ;	1.70	344.00	231.71
	Siltstone ;	2.00	346.00	233.71
	Mudstone , silty and sandy layers ;	7.60	353.60	241.31

Section of :- FISHPONDS borehole from Surface

SK72SW101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
Woodthorpe	Sandstone ;	0.40	354.00	241.71
	Siltstone , [muddy layer 0.50 at 357.00]	6.00	360.00	247.71
	Mudstone , silty at top ;	5.60	365.60	253.31
	Siltstone , muddy layers ;	3.80	369.40	257.11
	Sandstone ;	1.70	371.10	258.81
	Siltstone with Sandstone ;	7.10	378.20	265.91
	Mudstone , silty at top ;	4.00	382.20	269.91
	Sandstone , siltstone layers , marl 0.20 at 388.20 ;	27.79	409.99	297.70
	Start of cores 410.00 ;			
	Sandstone fine to medium , pale grey , occasional rusty brown irregular patches , moderately cemented , low angle dune sets in part , moderately strong , rare greenish blue patches ;			
Lower Triassic Sherwood Sandstone Nottingham Castle	sharp , planar	0.37	410.37	298.08
	Sandstone coarse , rusty brown staining throughout , occasional pale grey / green areas , poorly cemented , vaguely conglomeratic in top 0.10 , occasional rounded quartz pebbles up to 0.05 , rare mudstone rounded clasts up to 0.05 , elongated mudstone clasts becoming more common below 411.20 , matrix coarser down , clasts orientated with bedding , red brown reduction rim to mudstone clasts ;			
	passage	1.26	411.63	299.34
	Sandstone coarse , red brown , poorly cemented with rare small elongated mudstone clasts sharp	0.18	411.81	299.52

Section of :- FISHPONDS borehole from Surface

SK72SW101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Sandstone fine to medium , brown grey , moderately well cemented , occasional brown stained bands , becoming coarser below 412.70 , vague dune sets , becoming dark to base ;			
	passage	0.95	412.76	300.47
	Sandstone coarse , red brown , poorly cemented , broken core in parts , rare small mudstone clasts , becoming finer in basal 0.20 , generally brownish grey , vague dune set bedding in parts ;			
	sharp	0.92	413.68	301.39
	Lost Core ;			
		2.00	415.68	303.39
	Breccio-Conglomerate , de-matricised , pebbles of fine grained quartzite 90 % , blue grey siltstone with possible chert , varying in size from 0.3 x 0.02 to 0.02 x 0.02 ;			
	sharp , irregular	0.25	415.93	303.64
Permian Lower Permian Basal Sands and Breccias				
	Sandstone fine to medium , pale grey in top 0.10 , red brown staining below , poorly cemented , occasional subvertical joints , occasional red brown muddy laminae , occasionally micaceous ;			
	passage	0.83	416.76	304.47
	Sandstone medium to fine , red brown , moderately cemented , vague laminations in part ;			
	sharp	0.29	417.05	304.76
	Sandstone fine , red / brown , moderately well cemented , rare large red / brown mudstone clasts across core at 417.18 , brownish / grey band from 417.25 to 417.30 , paler and darker laminations below ;			
	sharp	0.32	417.37	305.08

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Sandstone medium to coarse , banded in part , generally red / brown with occasional grey grey / green patches and bands , rare elongated mudstone clasts parallel to bedding , becoming darker below 418.00 , vaguely brecciated below 418.40 with small red / brown mudstone clasts and rare white quartzitic pellets , becoming finer in basal 0.20 ;			
	passage	1.63	419.00	306.71
	Siltstone and Sandstone , interlaminated , generally dark red / brown , occasional irregular pale grey areas and bands , moderately well cemented , 0.01 chocolate brown mudstone band across core at 419.28 , more sandy to base ;			
	sharp	0.60	419.60	307.31
	Sandstone very coarse , vaguely breccio-conglomeratic , abundant fine chocolate mudstone clasts , occasional large red / brown mudstone clasts in basal 0.10 , very loosely cemented ;			
	sharp , erosive	0.13	419.73	307.4
	Mudstone , chocolate brown , occasional grey green irregular patches , occasional coarse sandstone bands up to 0.05 cm , occasional fine siltstone bands , dip 2 deg. ;			
	sharp	0.28	420.01	307.72
	Sandstone medium to coarse , chocolate brown , occasional 0.02 bluish / grey silty bands , poorly cemented , occasionally broken core , occasional conglomeratic bands ;			
	sharp	0.24	420.25	307.96
Basal Permian Breccia				
	Breccio-Conglomerate , abundant elongated and rounded clasts of quartz , blue / grey siltstone and de-natured igneous , 0.03 cm occasionally up to 3 cm , sandstone coarse , chocolate brown matrix , poorly cemented , 0.05 sandstone fine pale grey band at 422.20 ;			
	sharp	2.45	422.70	310.41

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
Carboniferous Westphalian B	Mudstone silty , red / brown , with 0.04 cm chocolate brown sandstone coarse breccio-conglomeratic band at 422.80 ;			
	sharp	0.32	423.02	310.73
	Dolerite , deeply weathered , chocolate brown , abundant fine mineralised veins , moderately strong , fragmented in top 0.10 and base ;			
	sharp	0.98	424.00	311.71
	Mudstone , chocolate brown , becoming blue / grey mottled and silty to base , weathered mineralised dolerite band from 424.16 to 424.20 , slumped at base ;			
	passage	0.28	424.28	311.99
	Sandstone with Siltstone , grey / green , abundant fine laminae occasionally chocolate brown , occasional mottled areas ;			
	passage	0.29	424.57	312.28
	Mudstone silty , red brown , occasional grey / green areas , listric in part , occasional coarser sandy areas , generally weak ;			
	sharp	1.06	425.63	313.34
	Sandstone fine , red brown , silty in parts , occasional chocolate brown mudstone areas , grey green and listric at base ;	0.37	426.00	313.71
	Fault Gouge , Mudstone , chocolate brown , listricised , ??? , subvertical fault plane through core ??? ;	0.40	426.40	314.11
	Seatearth Mudstone , dark purple , listricised ;			
	sharp	0.19	426.59	314.30
	Seatearth Mudstone silty , occasionally smooth , chocolate brown / purple , mustard mottled , listric throughout , occasional large red / brown mudstone bands , occasional stained ferruginous nodules ;			
	sharp	2.43	429.02	316.73

SK72SW 101

Section of :- FISHPONDS borehole from Surface

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Mudstone , smooth , occasionally silty in part , chocolate brown , irregular purple and grey green mottled areas , occasional listrics across core , generally weak , occasional plant debris including stems , dip 2 to 5 deg.	1.54	430.56	318.27
	Seatearth Mudstone , purple / brown staining , occasional grey / green mottles , occasional rootlets , occasional large listrics , moderately strong ; passage	0.46	431.02	318.73
	Siltstone fine , purple / brown , rare grey / green mottled areas , occasional silty mudstone bands , local plant debris ; passage	1.68	432.70	320.41
	Siltstone , silty mudstone bands , purple / brown throughout , occasional sandy laminae , occasional plant debris including stems ; passage	1.60	434.30	322.01
	Siltstone with Sandstone , 80 : 20 , purple / brown , grey / green mottles and bands , occasional bioturbation , some plant debris , occasional coarse sandy laminae , rare ripples , dip 2-5 degrees , becoming more sandy to base ; sharp	2.66	436.96	324.67
	Sandstone fine , generally massive , abundant red / brown staining and pale brown patches , vague dune bedding in parts , rare large mudstone clasts ; 2.77	439.73	327.44	
	Breccio-Conglomerate ; large fragments of angular grey / green mudstone up to 0.05 x 0.02 , fine sandstone purple / brown matrix ; erosive	0.11	439.84	327.55
	Sandstone fine , brown / purple , fine pale grey laminae, occasional more ferruginous patches , some dune bedding ; passage	0.21	440.05	327.76

SK72SW 101

Section of :- FISHPONDS borehole from Surface

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Sandstone fine , purple / brown mottles throughout , occasional dune lamination , micaceous in parts , sub-vertical joints in parts , ferruginous pellets to base ;			
	passage	1.75	441.80	329.51
	Sandstone fine , well cemented , grey / green in parts with abundant purple / brown staining , some dune bedding occasionally truncated , large sub-vertical , open joints throughout ;			
	passage	3.40	445.20	332.91
	Sandstone fine , purple / brown stained throughout , occasionally red / brown , rare pale grey laminations in parts , large open sub-vertical joints and fractures sometimes mineralised , well cemented , strong ;			
	passage	1.20	446.40	334.11
	Sandstone fine , generally massive , purple / brown staining throughout , common brown mottles , some dune bedding , mudstone parting 0.02 at 447.51 large sub-vertical open joints throughout , generally strong and well cemented ;			
		2.18	448.58	336.29
	Sandstone , purple / brown , mottled greenish / grey , dune laminations in parts , broken and fragmented from 448.80 to 449.10 and from 449.27 to 449.43 , occasional ferruginous areas , well cemented ;			
	passage	1.10	449.68	337.39
	Sandstone , rare silty partings , fine laminated , purple / brown and grey / green mottled throughout , bedding generally horizontal , well cemented , strong ;			
	passage	1.72	451.40	339.11
	Sandstone with Siltstone , 95 : 05 , fine grained , purple / brown with occasional grey / green mottles and areas , ferruginous in parts , truncated ripples common throughout , micaceous in parts , becoming less silty below 454.30 , occasional purple spots ;			
	sharp , wavy	3.55	454.95	342.66

SK72SW 101

Section of :- FISHPONDS borehole from Surface

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Mudstone , smooth , listric , dark grey to black , dip 2 deg. ;			
	sharp	0.11	455.06	342.77
	Mudstone , totally listric , purplish / brownish / grey ;			
	sharp	0.09	455.15	342.86
	Mudstone , purplish / grey to 455.17 , end of staining , grey / black , below , listric in parts , dip 2 - 5 deg. ;			
	sharp	0.12	455.27	342.98
Second Waterloo ;				
	coal , bright , pyritic nodules in parts			
	sharp	1.85	457.12	344.83
	Seatearth Mudstone , grey , rootlets common , weak ;			
		0.24	457.36	345.07
	Seatearth Mudstone , roots and listrics common , ferruginous nodules common in basal 0.30 ;			
		1.28	458.64	346.35
	Seatearth Siltstone , vague fine sandy wisps , ferruginous nodules common ;			
	passage	0.42	459.06	346.77
	Sandstone fine , abundant fine silty laminae , root disturbed in parts ;			
	sharp	0.07	459.13	346.84
	Siltstone fine , muddy layers , some plant debris , occasional ironstone bands , generally weak ;			
	passage	0.72	459.85	347.56
	Mudstone silty , occasional ironstone bands , plant debris , common listric surfaces towards base ;			
	passage	0.97	460.82	348.53
	Mudstone , very listric , very weak , seatearth texture ;			
	sharp	0.30	461.12	348.83

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Siltstone fine , carbonaceous , black , irregular off-white bioturbated sandy wisps and laminae , small fusain chunks , small brown sphaerosiderite grains , common pyritic debris , fusainous plants ;			
	sharp	0.30	461.42	349.13
	Siltstone with Sandstone , 70 : 30 , finely interlaminated , root disturbed in parts , generally black , irregular ferruginous nodules in parts ;			
	passage	0.18	461.60	349.31
	Mudstone silty , black , occasional ferruginous silty layers , plant debris in parts , becoming carbonaceous in basal 0.05 , ferruginous nodules throughout , crushed non-marine lamellibranchs ;			
	sharp , irregular	0.22	461.82	349.53
	Seatearth Mudstone silty , immature , grey / green , sphaerosiderite in top 0.20 , rootlets throughout ;			
	sharp	1.00	462.82	350.53
	Siltstone fine with Sandstone , 90 : 10 , finely interlaminated and interlayered , occasional discrete sandstone bands up to 0.10 ;			
	sharp	1.16	463.98	351.69
	Sandstone fine , abundant silty wisps , vague micaceous carbonaceous planes , some bioturbation , well cemented and strong ;			
	sharp)	0.67	464.65	352.36
	Siltstone fine with Sandstone , 50 : 50 in top 0.20 , becoming 95 : 05 below , very finely interlaminated , consistent 5 - 7 deg. dip throughout , occasional plant debris to base ;			
		0.87	465.52	353.23
	Mudstone silty , dark , with fine sandy laminae and layers up to 0.02 , ripple drift , occasional ferruginous bands ;			
	passage	0.42	465.94	353.65

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Mudstone silty , well bedded , occasional darker muddy laminæ in top 0.20 , occasional plant debris , locally bioturbated ;			
	passage	0.46	466.40	354.11
	Mudstone , darker below , poorly bedded , common listrics in basal 0.10 , occasional ironstone bands, plant debris ;			
	sharp	0.25	466.65	354.36
	Ironstone ;			
		0.06	466.71	354.42
	Mudstone , silty in part , dark , slightly carbonaceous , occasional coalified plant debris , some pyritic debris , fusainous debris , non-marine lamellibranchs at base ;			
	sharp , attached	0.10	466.81	354.52
	Coal , bright , fragmented at base ;			
		0.06	466.87	354.58
	Mudstone , coaly , dark , very carbonaceous , 0.01 sandstone layer at top ;			
	sharp	0.06	466.93	354.64
	Seatearth Siltstone fine , locally mudstone silty , grey / green tinge , common small ironstone nodules , dark in top 0.07 , occasional paler coarser disturbed patches , listric surfaces , roots including Stigmæria ;			
		1.36	468.29	356.00
	Seatearth Mudstone , grey , locally completely listric , small ironstone nodules ;			
	passage	0.27	468.56	356.27
	Seatearth Mudstone silty , occasional listrics , occasional paler coarser brown patches , immature ;			
	sharp , irregular	1.18	469.74	357.45
	Ironstone , diffuse mudstone lenses ;			
		0.27	470.01	357.72
	Mudstone silty , occasional listrics , locally siltstone fine in patches , immature seatearth texture ;			
	sharp , irregular	1.20	471.21	358.92

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Ironstone	0.09	471.30	359.01
	Mudstone silty , locally siltstone muddy , rare pale fine sandstone laminae , occasional ironstone nodules ;			
	sharp , planar	0.75	472.05	359.76
	Sandstone fine , rare dark siltstone laminae ;			
	sharp	0.02	472.07	359.78
	Siltstone fine with Sandstone , 90 : 10 , becoming 70 : 30 below , laminae and lenses , common sandy burrows from 472.99 to 473.38 , occasional ironstone nodules and ferruginous patches , rare ripple drift , occasional diastems ;			
	sharp , planar	1.63	473.70	361.41
	Sandstone fine , pale grey , rare micaceous carbonaceous planes becoming common below 474.10 , occasional paler patches , calcareous , occasional burrows , occasional silty laminae below 474.34 ;			
		1.01	474.71	362.42
	Sandstone and Siltstone , 60 : 40 locally 50 : 50 , laminae thin layers and lenses , occasional micaceous carbonaceous planes , occasional ripple drift , locally bioturbated ;			
	passage	0.57	475.28	362.99
	Siltstone fine , locally medium , common fine sandstone mini lenses , occasional fine sandstone laminae , bioturbated completely at base ;			
	sharp , planar	0.58	475.86	363.57
	Sandstone fine , pale grey , with disturbed siltstone fine laminae , 90 : 20 , occasional micaceous carbonaceous planes , locally fragmented ;			
	sharp	0.12	475.98	363.69
	Siltstone fine with Sandstone , 80 : 20 at top , 50 : 50 below , interlaminated and interlayered , common mini lenses in top 0.20 , rare below , occasional rippled layers with diastems , bioturbated in top 0.30 , burrows below , train drift at 476.40 , rare micaceous carbonaceous planes ;			
		0.69	476.67	364.38

Section of :- FISHPOWDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Siltstone fine with Sandstone , 70 : 30 , 60 : 40 below , interlaminated and interlayered with lenses and mini lenses , occasional sand filled burrows , rare ironstone layers , occasional plant debris ;			
	passage	1.31	477.98	365.69
	Siltstone fine and Sandstone , 60 : 40 , interlaminated with thin lenses and minilenses , bioturbated , dip 2 deg. ;			
	sharp , planar	0.14	478.12	365.83
	Mudstone , slightly silty , well bedded , occasional ironstone bands up to 0.03 , occasional listrics , rare non-marine lamellibranchs , common tracks , abundant crushed pyritised non-marine lamellibranchs in basal 0.30 , 0.01 ferruginous sandstone band at base ;			
	sharp	1.12	479.24	366.95
	Mudstone , carbonaceous , becoming silty down with common ferruginous speckled laminae , thin ironstone bands , occasional listrics , several sheared wavy joints with clay film slickensides , non-marine lamellibranchs fragments , common non-marine lamellibranchs in basal 0.15 including Naiadites ;			
	horizontal	0.61	479.85	367.56
	Sandstone fine , pale , with ferruginous staining in top 0.02 , rare discontinuous silty laminae , roots , spherical pyritic nodules ;			
	sharp , loaded	0.08	479.93	367.64
	Siltstone fine with Sandstone , 95 : 05 , becoming 80 : 20 down , common laminae and lenses , locally slumped , rare plant debris , vague ripple drift in basal 0.10 , sand rich with ferruginous speckles at base ;			
	sharp , wavy	0.43	480.36	368.07
	Sandstone fine , pale grey , calcareous , siltstone fine lenses and disturbed layers , local rippling , discontinuous silty laminae , well cemented ;			
		0.18	480.54	368.25
	Siltstone fine with Sandstone , 80 : 20 , laminae and lenses , common slumping , rare comminuted plant debris ;			
	sharp	0.51	481.05	368.76

Section of :- FISHPONDS borehole from Surface

SK72SW101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Sandstone with Siltstone , 80 : 20 , interlaminated and interlayered , layers rare to base , common ripple drift , rare small pyritic nodules in basal 03 , occasional micaceous carbonaceous planes ; train drift in basal 0.15 ;			
	sharp	0.92	481.97	369.68
	Siltstone fine , occasional fine even sandstone laminae , moderately strong ;			
	passage	0.49	482.46	370.17
	Mudstone silty , well bedded , poorly laminated , 0.07 ferruginous band at base ;			
	sharp	0.52	482.98	370.69
	Siltstone fine , muddy , rare fine sandstone lenses in top 0.05 , occasional darker laminae below , occasional ironstone layers and nodules , well , few locally common tracks ;			
	sharp	0.97	483.95	371.66
	Mudstone , colour laminated , tracks , ironstone bands , slightly silty from 484.30 to 484.50 ;			
		0.77	484.72	372.43
	Mudstone , dark , colour laminated , weak , common listric surfaces , ironstone layers , subhorizontal slickensides , guillemites , non-marine lamellibranchs , dip 2 deg. , silty in basal 0.10 , ironstone band at base ;			
	sharp	0.31	485.03	372.74
	Siltstone , fine to medium , fine below 485.85 , locally colour laminated , well bedded , rare paler laminae below 487.00 , rare sandy laminae , occasional ironstone bands , moderately strong , rare plant debris ;			
	sharp	2.30	487.33	375.04
	Sandstone fine , discontinuous silty laminae , occasional ripple drift , rare bioturbated layers , train drift ;			
	erosive	0.45	487.78	375.49

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Siltstone fine and Sandstone , 80 : 20 , interlaminated and interlayer , discontinuous laminae and occasional mini-lenses , ripple sets , 0.06 ferruginous band at top and rarely below , vague train drift from 488.20 to 488.30 ;			
	passage	0.82	488.60	376.31
	Mudstone , silty in parts , locally colour laminated , moderately bedded , common listrics , common ironstone nodules , well jointed minor shear zones , ironstone bands ;			
		0.82	489.42	377.13
	Mudstone , grey , locally silty at top , locally colour laminated , occasional ferruginous bands and common ironstone nodules , gradually becoming darker to base , occasional non-marine lamellibranchs , occasional tracks , several vertical joints ;			
	passage	0.98	490.40	378.11
	Siltstone fine , muddy , plant fragments , common ironstone bands up to 0.06 ;			
	passage	0.89	491.29	379.00
	Mudstone , dark grey , colour laminated at top , occasional ironstone nodules becoming more common below 491.80 , occasional subhorizontal partings , few locally common tracks , rare plants including Calamites , rare non-marine lamellibranch guillemites at 491.90 ;			
		1.38	492.67	380.38
	Mudstone , canneloid ;			
		0.08	492.25	380.46
Fourth Waterloo / First Ell	Coal analysed ,			
	coal , mainly bright	52 cm		
	mudstone	1 cm		
	coal , mainly bright , abundant pyrites	7 cm		
	coal , mainly bright , some pyrites	32 cm		
	coal , dirty bright , fragmented	3 cm		
	Total	95 cm		
	detached	0.95	493.70	381.41

Section of :- FISHPONDS borehole from Surface

SK72SW101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Seatearth Mudstone , grey / green with darker patches , becoming paler in basal 0.10 with slight brownish tinge , common listrics , friable ;	0.11	493.81	381.52
	Lost Core ;	0.05	493.86	381.57
	Seatearth Mudstone ; sharp	0.25	494.11	381.82
	Coal , bright , very dirty , common thin mudstone laminae ; sharp , attached	0.03	494.14	381.85
	Seatearth Mudstone , grey with brownish tinge , numerous listrics , rare small ironstone nodules ; passage	0.47	494.61	382.32
	Seatearth Mudstone , grey , common ironstone nodules , common listrics , becoming stronger downwards ; siltstone muddy from 495.18 to 495.40 ; passage	0.97	495.58	383.29
	Seatearth Mudstone , slightly silty , occasional darker laminae locally disturbed , common large ironstones , few locally common listric coalified plant fragments , ? immature ; passage	0.82	496.40	384.11
	Siltstone medium , well bedded , immature seatearth texture at top , occasional ferruginous patches , occasional roots and plant debris including Neuropteris and Calamites ; passage	1.03	497.43	385.14
	Siltstone medium with Sandstone , 90 : 10 , unlaminated , massive , strong , rare roots and plants ; passage	0.17	497.60	385.31

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Siltstone fine with Sandstone , 95 : 05 , locally 60 : 40 at top , laminae and thin slumped layers at top , occasional lenses , locally disturbed , ? roots , locally slumped and slurried , occasional ripple drift to base , train drift in basal 0.10 , sandstone with discontinuous silty laminae from 498.18 to 498.33 ;			
	sharp , planar	0.84	498.44	386.15
	Siltstone fine , locally muddy , rare sandstone fine mini lenses and occasional large elongated ironstone lenses , occasional sand filled plant fragments , occasional plant fragments including Calamites abundant at base ;			
	passage	0.69	499.13	386.84
	Siltstone fine with Sandstone , lenses and mini lenses , occasional discontinuous laminae some poorly developed ripple drift , train drift ;			
	sharp , planar	0.07	499.20	386.91
	Sandstone fine , common micaceous carbonaceous planes , occasional siltstone layers in top 0.30 , rare below showing some ripple drift , occasional ferruginous speckled layers , slumped in basal 0.10 ;			
	passage	1.88	501.08	388.79
	Sandstone fine , pale grey , massive , calcareous ;			
	passage	0.43	501.51	389.22
	Sandstone fine , locally medium , with rare micaceous carbonaceous planes locally fragmented , occasional ripple drift ;			
	sharp	0.80	502.31	390.02
	Sandstone and Siltstone , 50 : 50 , laminae and thin layers , locally slumped , occasional micaceous carbonaceous planes in basal 0.05 , numerous load casts in middle ;			
	sharp	0.23	502.54	390.25
	Siltstone medium , rare sandstone fine lenses in top 0.03 , massive ;			
	passage	0.12	502.66	390.37

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Sandstone fine , common micaceous carbonaceous planes , ripple drift , common diastems ;			
	passage	0.17	502.83	390.54
	Sandstone and Siltstone , fine , common micaceous carbonaceous planes , well developed ripple drift ;			
	passage	0.22	503.05	390.76
	Siltstone fine to medium , rare sandstone fine lenses , minilenses and discontinuous laminae , occasional ferruginous bands , dip 0 - 2 deg.			
	sharp	0.61	503.66	391.37
	Sandstone , fine to medium , rare siltstone fine laminae and layers , slurried in top 0.25 , locally slumped ;			
	sharp	0.73	504.39	392.10
	Siltstone fine , rare sandstone fine lenses and minilenses , occasional ferruginous bands , occasional plants , locally muddy ;			
	sharp	0.53	504.92	392.63
	Sandstone with Siltstone , 90 : 10 , fine laminae , occasional coaly flecks ;			
	sharp	0.06	504.98	392.69
	Mudstone silty , ferruginous layers , rare sandstone fine lenses in basal 0.02 , occasional plant debris ;			
	passage	0.28	505.26	392.97
	Siltstone fine and Sandstone , 60 : 40 , laminae and lenses , rare ripple marks and mini lenses , rare plant fragments including Calamites ;			
	passage	0.07	505.33	393.04
	Mudstone , well bedded , locally silty near top , occasional ironstone nodules , occasional listric surfaces , occasional plant debris , becoming darker to base , tracks carbonaceous at base ;			
	passage	0.56	505.89	393.60

Section of :- FISHPONDS borehole from Surface

SK 72 SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
Second Ell	Mudstone , dark ; detached	0.06	505.95	393.66
	coal , mainly bright , discs 15 cm			
	mudstone 3 cm			
	coal ?dirty 3 cm			
	coal , bright 3 cm			
	coal , dirty 2 cm			
	coal , mainly bright , some pyrites 38 cm			
	coal , dirty 7 cm			
	coal , bright 3 cm			
	mudstone , carbonaceous 5 cm			
	coal , bright , with pyrites 14 cm			
	total 93 cm	0.93	506.88	394.59
	Seatearth Siltstone fine , grey ;	0.06	506.94	394.65
	Seatearth Mudstone , dark grey , pale grey silty mudstone patches , common listric surfaces , sheared , coal streaks ;			
	sharp	0.20	507.14	394.85
	Seatearth Siltstone fine , locally muddy , rare sandstone fine disturbed and discontinuous laminae and lenses ;			
	passage	0.19	507.33	395.04
	Siltstone fine and Sandstone , 50 : 50 , becoming 60 : 40 downwards , interbedded laminae and thin layers , common small ironstone nodules , common roots , immature seatearth texture , dip 2 deg. ;			
	sharp	0.95	508.28	395.99
	Sandstone fine , siltstone fine rare laminae and layers , becoming more common to base , root disturbed in top 0.25 , local ferruginous speckled horizons , occasional ferruginous patches at top , common slumping in top 0.15 , occasional plant debris ;			
	passage	0.84	509.12	396.83

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Sandstone and Siltstone , 50 : 50 , laminae and thin layers , common ripple sets , rare plants ; sharp	0.13	509.25	396.96
	Siltstone medium , massive , unlaminated ; sharp	0.11	509.36	397.07
	Siltstone fine with Sandstone , locally muddy , 80 : 20 at top becoming 95 : 05 down , laminae and thin layers , occasional lenses , occasional ironstone bands and ferruginous horizons , rare burrows , rare plant debris ; passage	1.06	510.42	398.13
	Mudstone silty , well bedded , very rare sandstone fine mini lenses , occasional ironstone bands , 0.04 ironstone at base , rare tracks ;	1.32	511.74	399.45
	Siltstone fine to medium , rare sandstone fine laminae and thin layers , locally slumped in top 0.25 , rare ripple drift in basal 0.10 , occasional ferruginous patches , strong ; sharp	0.54	512.28	399.99
	Mudstone , locally silty at top , well bedded becoming weaker downward , occasional ironstone bands and ferruginous patches , occasional listric surfaces , rare tracks ;	1.19	513.47	401.18
	Mudstone , weak , numerous listricated joints , pyritised tracks ; passage	0.50	513.97	401.68
	Mudstone , dark , weak to very weak , numerous listricated horizontal and subhorizontal joints , some sheared , abundant pyritised burrows , scattered ironstone lenses , ironstone band from 514.04 to 514.13 , thin carbonaceous band at top , occasional non-marine lamellibranchs including Naiadites , Planolites ophthalmoides at 514.68 and 515.50 , Goniatite at 515.45 , Lingula at 515.50 and 515.85 ; sharp	2.11	516.08	403.79

SK72SW101

Section of :- FISHPONDS borehole from Surface

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Mudstone silty, moderately strong, ironstone bands, partly calcareous and extremely strong, pseudo-recrystallised texture ;			
	sharp	0.25	516.33	404.04
	Clay Cross Marine Band 516.33 - 521.59			
	Mudstone, dark, moderate to moderately weak, broken below 517.00, numerous subvertical joints, listricised in parts, ironstone bands and nodules, abundant pyritised burrows above 517.00, Dunbarella at 516.38, occasional tracks, common fucoids ;	1.23	517.56	405.27
	Mudstone, clayey, very weak, totally slaked (drilling induced), broken ;	0.37	517.93	405.64
	Mudstone, dark, numerous pyritised fragmented plant debris / fucoids throughout, moderately weak to weak throughout, numerous subvertical joints and listricised subvertical surfaces in very broken core, dip on inclined listricated joints 10 to 15 degrees ;	3.50	521.43	409.14
	Mudstone, dark, moderately weak, broken core, faulted base ;			
	sharp, inclined, faulted	0.16	521.59	409.30
	Sandstone, moderately strong, silty layers at top ;	0.04	521.63	409.34
Westphalian A	Mudstone silty, moderately strong, ironstone bands ;			
	passage	0.25	521.88	409.59
	Mudstone, moderately weak to weak, listricated joints, numerous incipient fractures, dark at base, occasional ironstone nodules ;			
	sharp, inclined	0.34	522.22	409.93
	Mudstone, black, moderate, abundant thin ironstone lenses ;			
	passage	0.12	522.34	410.05

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Mudstone , dark , moderately weak , ironstone bands and lenses , listricated joints inclined towards base , non-marine lamellibranchs ;	0.52	522.86	410.57
	Mudstone , black , moderate , scattered pyritised and coaly plant fragments , non-marine lamellibranchs to 523.00 , fish debris at 523.21 ;			
	sharp	0.65	523.51	411.22
Black Rake	Coal , inferior at base ;			
		0.30	523.81	411.52
	Mudstone , carbonaceous , moderate , abundant coaly laminae in top 20 cm , rare below ;			
	sharp	0.69	524.50	412.21
	Seatearth Mudstone silty , moderately strong , abundant ironstone nodules , rootlets ;			
	passage	0.20	524.70	412.41
	Mudstone , dark , very weak , sheared ;			
		0.02	524.72	412.43
	Mudstone , silty at top , moderate , abundant ironstone nodules above 525.20 , abundant rootlets and sporadic listric surfaces ;			
	passage	0.72	525.44	413.15
	Mudstone , moderately weak to weak , abundant ironstone nodules at base , rootlets ;			
	sharp	0.45	525.89	413.60
	Mudstone , carbonaceous , moderate ;			
	passage	0.04	525.93	413.64
	Seatearth Mudstone silty , sandy lenses , moderate ;			
	sharp	0.07	526.00	413.71
	Siltstone with Sandstone , moderately strong to strong , highly contorted bedding ;			
	sharp	0.34	526.34	414.05

Section of :- FISHPONDS borehole from Surface

SK 72 SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Sandstone fine , brown , ferruginous , very strong ;	0.12	526.46	414.17
	Siltstone fine with Sandstone , 70 : 30 , mostly parallel laminated , locally common burrows , some ripples and diastems towards base , common micaceous plant planes , subvertical joints throughout ;			
	passage	2.19	528.65	416.36
	Sandstone with Siltstone , 70 : 30 , common ripples and diastems throughout , common micaceous plant planes , local ferruginous patches , subvertical joints throughout ;			
	passage	1.50	530.15	417.86
	Siltstone with Sandstone , 80 : 20 , parallel lamination , subvertical joints throughout ;			
	sharp	0.53	530.68	418.39
	Sandstone medium , abundant micaceous plant planes in top 0.16 and below 531.22 , common siltstone clasts from 530.88 to 531.00 , common ripples and diastems , oblique joints throughout ;			
	passage	1.18	531.86	419.57
	Siltstone medium and Sandstone , 50 : 50 at top becoming 80 : 20 below 532.20 , common ripples and diastems in top section , subvertical joints throughout ;			
	passage	1.54	533.40	421.11
	Sandstone medium , oblique mineralised joints throughout ;			
	passage	0.75	534.15	421.86
	Siltstone and Sandstone , 50 : 50 , common burrows , common ripples and diastems often poorly developed , subvertical irregular joints throughout ;			
	sharp	0.65	534.80	422.51
	Siltstone with Sandstone , 80 : 20 , finely laminated with minilenses , subvertical joints throughout ;			
	passage	0.90	535.70	423.41

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Sandstone with Siltstone , 70 : 30 , common micaceous carbonaceous planes , fairly common ripples and diastems , subvertical joints throughout ;			
	sharp	0.49	536.19	423.90
	Sandstone medium , strong , rare micaceous carbonaceous planes becoming more common to base , common ripples and diastems , subvertical mineralised joints (? calcite) ;			
	erosive	3.31	539.50	427.21
	Sandstone and Siltstone , 50 : 50 , common ripples and diastems , some train drift towards base , common micaceous carbonaceous planes ;			
		0.15	539.65	427.36
	Siltstone fine , rare thin sandy laminae at top , occasional ironstone bands , subvertical joints throughout , ironstone 0.05 at base ;			
	sharp	1.31	540.96	428.67
	Mudstone silty , laminated , common ferruginous horizons , oblique joints in top 1.00 , ironstone lens at base ;			
	passage	2.25	543.21	430.92
	Mudstone , laminated , common ironstone lenses , becoming darker downwards , ironstone 0.02 at base ;			
	sharp	0.79	544.00	431.71
	Mudstone , dark ;			
		0.05	544.05	431.76
	Inferior Cannel ;			
		0.03	544.08	431.79
	Mudstone , carbonaceous ;			
		0.04	544.12	431.83

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
Deep Main Seam	Coal analysed			
	inferior coal , dull	3 cm		
	coal , dull	11 cm		
	coal , mostly bright	109 cm		
	coal , dull	10 cm		
	coal , bright	18 cm		
	mudstone , carbonaceous	5 cm		
	coal , dull	7 cm		
	coal , bright	59 cm		
	coal , dull (inc 4 cm bright)	21 cm		
	coal , bright	14 cm		
	coal , dull	3 cm		
	coal , bright	17 cm		
	inferior coal , bright	6 cm		
	coal , bright	4 cm		
	total	287 cm		
			2.87	546.99 434.70
	Seatearth Mudstone , brown , common carbonaceous layers , abundant listric surfaces ;		0.14	547.13 434.84
	Seatearth Mudstone , pale brown , abundant listrics ;			
	sharp		0.54	547.67 435.38
	Seatearth Siltstone fine , grey / brown ;			
	passage		0.21	547.88 435.59
	Seatearth Mudstone silty , dark grey , abundant ironstone nodules , occasional listric surfaces ;			
	passage		0.77	548.65 436.36
	Siltstone fine , thin sandy laminae in top 0.30 , dark grey , abundant thin parallel ferruginous bands , occasional roots , occasional inclined listric surfaces , non-marine lamellibranchs at 549.50 ;			
	passage		0.92	549.57 437.28
	Seatearth Mudstone silty , common ironstone nodules , common listrics , inclined coalified roots towards base ;			
	passage		0.32	549.89 437.60
	Seatearth Siltstone fine , grey ;			
	sharp		0.26	550.15 437.86

Section of :- FISHPONDS borehole from Surface

SK72SW101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Seatearth Mudstone silty , grey , common listrics ;			
	sharp	0.13	550.28	437.99
	Siltstone fine , grey , common ironstone nodules in top 0.40 , roots throughout , common coaly layers ;			
	passage	1.22	551.50	439.21
	Mudstone silty , grey , occasional coaly planes , occasional listric surfaces , ferruginous lenses towards base ;			
	passage	1.24	552.74	440.45
	Siltstone fine , common plant fragments , common small ironstone nodules ;			
	sharp	0.16	552.90	440.61
	Sandstone fine , locally abundant micaceous plant planes , common ripples and diastems , rare roots at top , locally common comminuted plant debris , common silty laminae with occasional train drift from 553.65 to 554.00 , and below 555.15 ;			
	passage	2.45	555.35	443.06
	Siltstone fine , rare thin parallel sandy laminae in top 0.15 , very rare below ;			
	sharp	0.67	556.02	443.73
	Mudstone silty , dark grey , common large ironstone lenses occasionally septarian ;			
	sharp	0.29	556.31	444.02
	Sandstone with Siltstone , 70 : 30 , laminae and thin bands , locally common burrows , common ripples and diastems , common micaceous plant planes , occasional load casts , sandstone band from 558.05 to 558.25 , ferruginous at base ;			
	sharp	2.65	558.96	446.67
	Sandstone , canky , strong , ripples and diastems , occasional discontinuous micaceous plant planes ;			
	sharp	0.45	559.41	447.12

Section of :- FISHPONDS borehole from Surface

SK 72 SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Sandstone medium , common ripples and diastems , common micaceous plant planes , Siltstone with Sandstone from 559.79 to 559.97 ; passage	0.84	560.25	447.96
	Siltstone fine , rare thin sandy wisps , occasional thin ironstone bands , silty mudstone from 560.98 to 561.09 , rare slumped horizons near top , moderately strong ; ironstone , 0.05 at base ;	7.82	568.07	455.78
	Mudstone , laminated , common ironstone lenses , common listric surfaces from 568.83 to 568.87 ; passage	0.88	568.95	456.66
	Mudstone , carbonaceous	0.08	569.03	456.74
Parkgate Seam	Coal analysed , coal , bright 49 cm inferior coal , dull 7 cm coal , bright 4 cm coal , dull 8 cm coal , mostly bright 14 cm coal , dull 5 cm coal , bright 52 cm coal , dull (inc thin bright) 10 cm coal , bright 14 cm coal , dull 5 cm coal , bright 53 cm inferior coal and dirt 5 cm inferior coal bright 5 cm inferior coal and dirt 7 cm total 238 cm	2.38	571.41	459.12
	Seatearth Mudstone , common coaly planes , common listric surfaces ;	0.46	571.83	459.54
	Seatearth Mudstone , grey , unlaminated , occasional listric surfaces , coal streaks at top ; passage	0.29	572.12	459.83

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Seatearth Mudstone silty , stronger than above with occasional disturbed darker layers , occasional small ironstone nodules becoming larger and more common down , occasional coal streaks , occasional plants including Calamites ;			
	passage	0.75	572.87	460.58
	Seatearth Siltstone fine , locally muddy at top , massive with rare discontinuous sand lenses , occasional large ironstone patches and iron filled roots ;			
	passage	1.24	574.11	461.82
	Sandstone with Siltstone , 70 : 30 , root disturbed laminae and thin layers ;			
	passage	0.15	574.26	461.97
	Siltstone fine with Sandstone , 95 : 05 , laminae and rare thin layers , occasional lenses , some rare bioturbation , rare rippling towards base ;			
	sharp	0.76	575.02	462.73
	Siltstone medium and Sandstone , 50 : 50 , locally 80 : 20 , laminae and thin layers , occasional ripple drift , occasional to rare train drift , highly bioturbated in top 0.20 , ;			
	passage	0.56	575.58	463.29
	Siltstone fine with Sandstone , 90 : 10 , locally 50 : 50 , laminae , thin layers , lenses and minilenses , occasional ripple drift and diastems , occasional beds of sandstone up to 0.03 thick , occasional burrows ;			
	passage	2.74	578.32	466.03
	Sandstone and Siltstone , 60 : 40 , laminae and thin layers , occasional micaceous carbonaceous planes , occasional burrows , train drift in basal 0.10 , common diastems ;			
	sharp	0.44	578.76	466.47
	Sandstone and Siltstone , 50 : 50 , laminae and thin layers , totally bioturbated , abundant small burrows ;			
	passage	0.20	578.96	466.67

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Sandstone with Siltstone , 90 : 10 , laminae and thin layers showing ripple drift , occasional diastems , occasional micaceous carbonaceous planes ;			
	sharp	0.31	579.27	466.98
	Sandstone and Siltstone , 50 : 50 , laminae and thin layers , occasional sandy lenses , bioturbated in top 0.25 , some ripple drift below with common diastems ;			
	sharp	0.58	579.85	467.56
	Sandstone with Siltstone , 90 : 10 , laminae and thin layers , occasional to locally common ripples , eroded in basal 0.20 ;			
	sharp	0.53	580.38	468.09
	Siltstone fine with Sandstone , 70 : 30 , laminae , lenses and lenticular layers , occasional ripple sets ; passage			
		0.56	580.94	468.65
	Sandstone with Siltstone , 70 : 30 , laminae and thin layers , common ripple sets ;			
	sharp	0.29	581.23	468.94
	Sandstone fine , pale grey , massive , rare coaly flecks ;			
	sharp	0.06	581.29	469.00
	Sandstone and Siltstone , 50 : 50 , laminae , thin layers and lenses , common rippled layers , common loading on some sandy lenses , occasional ferruginous speckled horizons ;			
	passage	1.35	582.64	470.35
	Siltstone fine with Sandstone , 80 : 20 , laminae lenses and rare layers , locally slumped , occasional small burrows near top ;			
	passage	0.57	583.21	470.92
	Sandstone and Siltstone , laminae , thin layers and lenses , interlaminated and interlayered , highly bioturbated from 583.46 to 583.85 with abundant burrows ;			
	sharp , detached	1.05	584.26	471.97

Section of :- FISHPONDS borehole from Surface

SK 72 SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
Tupton Seam				
	coal , bright	63 cm		
	coal , dull	15 cm		
	coal , bright	2 cm		
	total	80 cm		
	pull out in seam ;			
	attached	0.83	585.09	472.80
	Seatearth Mudstone , dark , abundant listrics , becoming less dark downwards with occasional locally common ironstone nodules ;			
	passage	1.26	586.32	474.03
	Mudstone , dark , moderately to well bedded with occasional rootlets near top , occasional pyritised debris , occasional to common listrics ;			
	passage	0.33	586.65	474.36
	Mudstone silty , dark , moderately to well bedded , occasional ironstone nodules , occasional listrics , becoming slightly carbonaceous down ;			
	passage	0.50	587.15	474.86
	Siltstone fine , dark , carbonaceous , almost cannelloid in appearance ;			
	sharp , attached	0.35	587.50	475.21
Threequarters Seam				
	coal analysed ,			
	inferior coal , bright	24		
	attached	0.24	587.74	475.45
	Seatearth Mudstone silty , dark , carbonaceous with some paler patches , occasional coal streaks ;			
	sharp	0.07	587.81	475.52
	Seatearth Sandstone fine , grey with darker grey patches , occasional coal streaks ;			
	passage	0.17	587.98	475.69

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Seatearth Siltstone fine to medium , rare locally 95 : 05 sandstone fine disturbed laminae , common ironstone nodules in basal 0.20 ;			
	passage	0.74	588.72	476.43
	Mudstone silty , becoming less silty down , grey to dark grey , occasional ironstone nodules , common listrics becoming rare to base , common roots , becoming less down ;			
	passage	1.06	589.78	477.49
	Mudstone , dark grey to black , occasional ironstone bands , occasional listric surfaces , some plant debris , occasional shelly ironstones , roots occasionally pyritic including Stigmaria , common listrics ;			
		0.67	590.45	478.16
	Mudstone , carbonaceous , non-marine lamellibranchs including Carbonicola , occasional shelly ironstones , occasional pyritic plant debris , occasional roots and guillemites towards base ;			
		0.73	591.18	478.89
	Mudstone silty , occasional ironstone bands and ferruginous patches , rare plant debris including Neuropteris , rare listric surfaces , common tracks and burrows , 0.06 ironstone band at base ;			
		3.08	594.26	481.97
	Mudstone , locally colour laminated , occasional small ironstone patches and nodules , rare ferruginous bands , occasional plant debris , common trace fossils ;			
	passage	2.12	596.38	484.09
	Mudstone , grey , locally silty , occasional large ironstone patches , some plant debris , ;			
		1.78	598.16	485.87
	Mudstone , dark grey becoming black down , occasional ironstone bands , common pyritic debris , occasional trace fossils ;			
	attached	1.37	599.53	487.24
Yard Seam	coal , mainly bright , some ?sandstone pods in top 0.01 ;			
		0.92	600.45	488.16

Section of :- FISHPONDS borehole from Surface

SK72SW101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Seatearth Mudstone silty, black, abundant rootlets, moderately strong ;			
	sharp	0.27	600.72	488.43
	Seatearth Mudstone, completely listric ;			
	sharp	0.06	600.78	488.49
	Seatearth Mudstone silty, black, moderately strong, occasional large listrics ;			
	sharp	0.27	601.05	488.76
	Coal, bright			
	sharp, attached	0.08	601.13	488.84
	Seatearth Mudstone, silty in parts, black, fine ferruginous rootlets, moderately strong ;			
	sharp	0.88	602.01	489.72
	Seatearth Mudstone, black, very listric throughout, occasional large ironstone nodules ;			
	sharp, attached	0.21	602.22	489.93
Yard Floor Coal				
	Coal ;			
	detached	0.37	602.59	490.30
	Seatearth Mudstone, occasional rootlets, generally weak ;			
	sharp	0.05	602.64	490.35
	Seatearth Siltstone fine with Sandstone, interlaminated and interlayered, 70 : 30, abundant sand filled roots, occasional small ferruginous patches ;			
	passage	1.12	603.76	491.47
	Siltstone fine with Sandstone, 80 : 20, locally 50 : 50, root disturbed in top 0.20, occasional ironstone lenses, rare truncated bedding ;			
	sharp	1.40	605.16	492.87

Section of :- FISHPONDS borehole from Surface

SK 72 SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Mudstone silty , occasionally smooth , occasional fine sandy laminae and layers up to 0.05 occasional plant debris , ferruginous bands , moderately strong , dip 0 to 2 degrees ;	1.65	606.81	494.52
	Mudstone silty , occasional coarser laminae , occasional plant debris , well bedded , occasional ferruginous bands , moderately strong , occasional pyritic plant debris , tracks , dip 0 to 2 deg. , non-marine lamellibranchs at 607.48 , less silty down ;			
	passage	4.19	611.00	498.71
	Mudstone , smooth , dark , well bedded , moderately strong , occasional ferruginous bands , occasional tracks and burrows , pyritic plant debris pyritised non-marine lamellibranchs at 611.50 , subvertical jointing at base ;			
	passage	3.90	614.90	502.61
	Mudstone , dark , smooth , poorly bedded , moderately strong , canneloid possible large burrow , occasional large pyritised plant stems ;			
		0.76	615.66	503.37
	Mudstone , black , well bedded , moderately strong , Estheria below 615.80 , grey with frequent esteria fragments below 615.80 , 05 ferruginous band at base ;			
	attached	0.33	615.99	503.70
Blackshale Group	Coal analysed			
	coal , bright	41 cm		
	coal , dull	6 cm		
	coal , bright	32 cm		
	coal , dull	9 cm		
	coal , bright	34 cm		
	coal , dull	14 cm		
	coal , bright	26 cm		
	inferior coal , dull	11 cm		
	inferior coal , bright	7 cm		
	total	180 cm		
	detached	1.80	617.79	505.50

Section of :- FISHPONDS borehole from Surface

SK72 SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Seatearth Siltstone fine , occasional sandy laminae , strong ;			
	sharp	1.18	618.97	506.68
	Seatearth Mudstone silty , occasional siltstone bands , roots common , ironstone nodules ;			
	sharp	0.21	619.18	506.89
	Seatearth Siltstone fine , fine sandy laminae in parts , irregular ferruginous nodules towards base ;			
	passage	0.32	619.50	507.21
	Siltstone fine with Sandstone , 70 : 30 , locally 90 : 10 , very finely interlaminated and layered , root disturbed in top 0.20 , dip 2 to 5 degrees , strong ;			
		1.10	620.60	508.31
	Siltstone fine , occasional sandstone laminae , abundant plant stems , occasional large ironstone nodules , 0.10 root disturbed sandstone layer at 621.12 ;			
	passage	0.74	621.34	509.05
	Siltstone and Sandstone , 50 : 50 , very finely interlaminated and interlayered , 0.10 sandstone dominant layer with ripple sets and erosive base at 621.46 , dip 0 to 2 degrees , becoming more sandy in basal 0.0			
	sharp	0.54	621.88	509.59
	Sandstone fine , discontinuous silty laminae , occasional siltstone clasts , generally massive ;			
	sharp , erosive	0.13	622.01	509.72
Mickley 1 / 2	Coal , analysed			
	coal , bright 17 cm			
	coal , dull 2 cm			
	coal , bright 86 cm			
	fitting	1.05	623.06	510.77
	Coal and Dirt ;			
		0.06	623.12	510.83

Section of :- FISHPONDS borehole from Surface

SK72SW101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Seatearth Mudstone , common rootlets and listrics , very weak ;			
	sharp	0.06	623.18	510.89
	Seatearth Sandstone fine , discontinuous siltstone laminae , root disturbed , very strong ;			
	sharp	0.52	623.70	511.41
	Seatearth Sandstone fine , massive in top 0.15 finely interlaminated with siltstone in basal 0.15 ;			
	passage	0.24	623.94	511.65
	Siltstone fine , fine even sandy laminae in parts , occasional ferruginous patches , sphaerosiderite in part , rootlets in top 0.20 ;			
	passage	0.78	624.72	512.43
	Mudstone , smooth sometimes silty , rare large ferruginous nodules , rare plant debris , dip 0 to 2 degrees ;			
		0.53	625.25	512.96
	Siltstone fine , common fine even sandy laminae , occasional ripple sets , truncated bedding , slurried with ball and pouch , sandstone % increases down , 0.10 ferruginous sandstone band at 626.24 ;			
	passage	1.35	626.60	514.31
	Sandstone fine , off white pale grey , fine silty laminae ;			
	sharp	0.30	626.90	514.61
	Siltstone fine , rare fine sandy laminae , generally massive , dip 0 to 2 degrees ;			
	passage	0.50	627.40	515.11
	Mudstone silty , poorly bedded , moderately strong , few ferruginous specks throughout , ferruginous lenses at 627.98 ;			
	sharp	0.76	628.16	515.87

Section of :- FISHPONDS borehole from Surface

SK72SW101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Siltstone fine , fine even sandy laminae , vague ripple drift and sandy lenses to base , dip 2 to 5 degrees , moderately strong ;	0.45	628.61	516.32
	Siltstone fine , locally muddy , strong , discontinuous sandstone laminae , few mini lenses , well laminated , 90 : 10 at top , laminae decrease down , Mudstone , slightly silty , with rare sandy laminae and 0.05 ironstone band from 628.81 to 628.94 ;			
	passage	0.84	629.45	517.16
	Mudstone , slightly silty , rare diffuse fine sandstone laminae , few ferruginous laminae and bands up to 0.03 , tracks and burrows ;			
	passage	0.42	629.87	517.58
	Mudstone , dark , carbonaceous in basal 0.15 , well laminated , locally colour laminated , rare ironstone lenses , coaly plant debris , pyritic nodules , rare non-marine lamellibranchs guilielmites ;			
	fitting	0.43	630.30	518.01
Mickley 3	Coal , analysed ;			
	coal , inferior 17 cm			
	coal , bright 38 cm			
	coal , dull 3 cm			
	coal , bright 23 cm			
	solid fitting cylinders total 81 cm			
		0.81	631.11	518.82
	Seatearth Mudstone , dark , brownish below ,	0.06	631.17	518.88
	Seatearth Siltstone medium , becoming fine below , common irregular sandstone fine laminae and patches , unlaminated in basal 0.10 , brownish , sand filled roots , moderately strong ;	0.84	632.01	519.72
	Seatearth Siltstone and Sandstone fine , poorly to unlaminated , root disturbed ;			
	passage	0.12	632.13	519.84

Section of :- FISHPONDS borehole from Surface

SK72SW101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Mudstone , slightly silty , immature seatearth , laminae root disturbed ;			
	passage	0.12	632.25	519.96
	Mudstone silty , sandstone fine laminae , rare down , rare mini lenses ,root disturbed , occasional ironstone nodules , occasional listrics ;			
	passage	0.65	632.90	520.61
	Siltstone fine with Sandstone , 60 : 40 at top becoming 90 : 10 down , continuous laminae , dip 2 to 5 degrees , rare ironstone nodules , root disturbed ;			
	sharp	0.29	633.19	520.90
	Seatearth Mudstone , dark , numerous listrics , ironstone nodules , friable , common roots ;			
	passage	0.87	634.06	521.77
	Siltstone fine , muddy , dark , slightly carbonaceous down , few locally common listrics , septarian ironstone bands up to 0.05 ;			
	sharp	0.46	634.52	522.23
	Siltstone fine , dark , moderately laminated , weak , root guillemites , rare fish debris ;			
	passage	0.65	635.17	522.88
	Mudstone , dark , moderately well laminated , common root guillemites , common inclined polished joints , 0.13 ironstone band with sandy laminae at 635.47 ;			
	passage	0.44	635.61	523.32
	Mudstone , dark , well laminated , blackish , common polished joints above 636.22 ;			
	sharp	1.08	636.69	524.40
	Ironstone	0.14	636.83	524.54
	Mudstone , dark locally black , well laminated , well bedded , occasional pyritised plant debris , small listrics , rare wormy ironstone bands ;			
	sharp	2.32	639.15	526.86

Section of :- FISHPONDS borehole from Surface

SK72SW101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Mudstone , carbonaceous , well bedded , plant debris , pyrite lenses at base ;			
	sharp	0.24	639.39	527.10
	Mudstone , cannelloid , subvertical parallel calcite filled joints ;			
	sharp	0.07	639.46	527.17
Mickley 4				
	inferior cannell , 45 cm			
	mudstone , cannelloid , ferruginous 10 cm			
	inferior coal, bright 10 cm			
	faulted base	0.65	640.11	527.82
	Seatearth Siltstone fine , dark , common listics ;	0.08	640.19	527.90
	Seatearth Mudstone , dark to black , unlaminated , numerous listrics , friable ;	0.21	640.40	528.11
	sharp	0.56	640.96	528.67
	Seatearth Siltstone medium , locally fine , fine diffuse sandy patches ;	0.20	641.16	528.87
	passage			
	Siltstone medium with Sandstone , 70 : 30 , laminae and lenses , root disturbed , strong ;	0.11	641.27	528.98
	sharp	0.11	641.27	528.98
		0.11	641.27	528.98
	Siltstone fine , dark , poorly laminated , common ironstone nodules , completely listric from 641.70 to 641.75 , immature seatearth ;	0.51	641.78	529.49
	sharp			

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Siltstone fine to medium , poorly laminated , few locally common listrics ;			
	passage	0.29	642.07	529.78
	Sandstone with Siltstone , 60 : 40 , laminae and thin layers , train drift , root disturbed in parts , strong , 0.02 ferruginous nodules ;			
	passage	0.46	642.53	530.24
	Sandstone with Siltstone , 80 : 20 , siltstone dominant in basal 0.05 common train drift , strong , root disturbed at top ;			
	sharp , 5 deg.	0.63	643.16	530.87
	Sandstone with Siltstone , 70 : 30 , fine sandstone with medium to coarse siltstone , interlaminated , common micaceous carbonaceous planes slightly ferruginous , common train drift ;			
	sharp , inclined	0.18	643.34	531.05
	Sandstone fine , few discontinuous siltstone laminae , few vague straight ripple sets ;			
	sharp	0.47	643.81	531.52
	Sandstone fine , discontinuous silty laminae , ripple sets , diastems , calcareous , very strong , common micaceous carbonaceous planes from 644.00 to 644.13 ;			
	sharp	1.49	645.30	533.01
	Sandstone fine to medium , discontinuous silty laminae , lingoid ripple sets , diastems ;			
	sharp	0.30	645.60	533.31
	Sandstone and Siltstone , interlaminated and layered , few lenses , ripple sets at top , bioturbated at bottom ;			
	passage	0.16	645.76	533.47
	Siltstone fine with Sandstone fine , 90 : 10 , laminae continuous , rare ironstone lenses , bioturbated in parts below 646.65 , Sandstone fine from 646.18 to 646.26			
	passage	1.09	646.85	534.56

Section of :- FISHPONDS borehole from Surface

SK72 SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Siltstone fine , muddy down , fine sandy laminae and lenses , 70 : 30 becoming 90 : 10 below 647.15 , rare sand filled burrows ;			
	passage	0.59	647.44	535.15
	Siltstone fine , moderately laminated , moderately strong ;			
	passage	0.76	648.20	535.91
	Siltstone fine with Sandstone , 95 : 05 , discontinuous laminae and mini lenses , muddy down , rare ferruginous patches ,			
	passage	0.80	649.00	536.71
	Mudstone , silty in parts , well bedded , tracks , 0.07 ferruginous band at top ;			
		0.33	649.33	537.04
	Mudstone , dark , locally black , well bedded and laminated , common ironstone lenses up to 0.05 , occasional small listrics , occasional root guilielmites , totally listric from 650.15 to 650.21 ;			
	sharp	0.88	650.21	537.92
	Mudstone , dark , slightly carbonaceous , well laminated and bedded , ferruginous patches , occasional subvertical fractures , fish scales ;			
	sharp	1.32	651.53	539.24
	Mudstone , carbonaceous , few coaly laminae , sub vertical calcite filled fractures ;			
	sharp	0.07	651.60	539.31

Section of :- FISHPONDS borehole from Surface

SK 72 SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
Mickley Thin				
	Coal analysed ;			
	coal , bright , subvertical fracture in top 35	54 cm		
	coal , bright	04 cm		
	coal , inferior	16 cm		
	Seatearth Mudstone , brown grey ,	3 cm		
	coal , inferior	2 cm		
	Seatearth Mudstone , listric	9 cm		
	Seatearth Mudstone , carbonaceous	4 cm		
	Coal , bright ,	12 cm		
	total	104 cm		
	sharp	1.04	652.64	540.35
	Seatearth Mudstone , brown ;	0.03	652.67	540.38
	Seatearth Sandstone with Siltstone fine , moderately strong , root disturbed , 01 listric layer at 652.78 ;	0.17	652.84	540.55
	Seatearth Siltstone and Sandstone , 60 : 40 , laminae disturbed by roots , occasional mini lenses , ferruginous sandstone from 654.10 to 654.19 ;	1.45	654.29	542.00
	sharp	1.45	654.29	542.00
	Sandstone medium , discontinuous micaceous planes , ripples and diastems throughout , occasional roots ;	0.32	654.61	542.32
	erosive	0.32	654.61	542.32
	Siltstone fine , very rare thin sandy laminae and thin lenses , occasional ironstone bands , ironstone 0.06 at base ;	2.47	657.08	544.79
	sharp	2.47	657.08	544.79
	Mudstone silty , laminated , occasional ironstone bands , and rare lenses , diffuse ferruginised layer at base ; passage	3.04	660.12	547.83
	Mudstone , laminated , occasional ironstone bands , ironstone 0.08 at base ; passage	0.97	661.09	548.80

Section of :- FISHPONDS borehole from Surface

SK72SW101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Mudstone , laminated , dark grey to black , occasional ferruginous lenses ,occasional oblique joints , common listric planes and inclined surfaces , ferruginous band from 662.83 to 663.93 , finely laminated ferruginised ash from 662.94 to 662.97 ;			
	passage	2.01	663.10	550.81
	Mudstone , carbonaceous , laminated , shelly ironstones , common ferruginised non-marine lamellibranchs ;			
		0.47	663.57	551.28
	Mudstone , carbonaceous , laminated , common ferruginised non-marine lamellibranchs to 664.70 ;			
	sharp	3.18	666.75	554.46
	Mudstone , laminated , dark grey ;			
	sharp	0.35	667.10	554.81
	Ash , finely laminated ;			
	passage	0.51	667.61	555.32
	Mudstone laminated , occasional ironstone bands , dark at base ;			
		1.95	669.56	557.27
Kilburn	Coal , mostly bright			
		0.15	669.71	557.42
	Seatearth Mudstone , grey , common carbonaceous horizons ;			
		0.12	669.83	557.54
	Seatearth Mudstone , brown ;			
		0.76	670.59	558.30
	Seatearth Siltstone , grey , abundant sphaerosiderite , sandy at base ;			
		1.01	671.60	559.31
	Mudstone silty , roots at top ;			
		0.48	672.08	559.79
	Siltstone with Sandstone , 70 : 30 , grey , interlaminated , occasional ferruginised bands ;			
		2.18	674.26	561.97

Section of :- FISHPONDS borehole from Surface

SK 72 SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Sandstone and Siltstone , 50 : 50 , common locally abundant burrows , common micaceous carbonaceous planes , occasional poorly developed ripples , occasional sandstone bands up to 0.12 ;			
	sharp	2.23	676.49	564.20
	Mudstone silty , laminated , occasional sub-vertical listric joints , occasional diffuse ferruginous horizons , finely laminated ash from 690.27 to 680.38 ;			
		5.65	682.14	569.85
	Seatearth Mudstone , abundant listric surfaces , carbonaceous with coal laminae in top 0.02 ;			
		0.14	682.28	569.99
	Coal and Dirt			
		0.05	682.33	570.04
	Seatearth Mudstone silty , grey , common listric planes ;			
	sharp	0.20	682.53	570.24
	Seatearth Siltstone fine , grey , occasional listric surfaces ;			
	sharp	0.21	682.74	570.45
	Seatearth Siltstone and Sandstone , vague lamination root disturbed , common ironstone nodules ;			
	sharp	0.53	683.27	570.98
	Siltstone medium , roots , occasional ironstone nodules , rare sandy wisps towards base ;			
		0.69	683.96	571.67
	Siltstone medium , rare roots , rare sandy wisps ;			
	passage	0.43	684.39	572.10
	Siltstone medium with Sandstone , 70 : 30 , interlaminated , locally common ripples and diastems , occasional train drift ;			
	sharp	1.35	685.74	573.45
	Sandstone , common fine silty laminae at top and towards base , common ripples and diastems ;			
	erosive	1.49	687.23	574.94

Section of :- FISHPONDS borehole from Surface

SK 72 SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Mudstone , slightly silty , moderately bedded with rare sandstone fine discontinuous laminae occasional small burrows , occasional ironstone nodules and ferruginous patches ;			
	passage	0.28	687.51	575.22
	Mudstone , colour laminated , common coal streaks , abundant listrics ;			
	sharp	0.18	687.69	575.40
	Seatearth Mudstone , unlaminated , common listrics , occasional small ironstones ;			
		0.20	687.89	575.60
	Sandstone fine , rare disturbed siltstone fine laminae , occasional roots ;			
	passage	0.46	688.35	576.06
	Siltstone fine with Sandstone , 50 : 50 , locally 90 : 10 , laminae , thin layers and lenses , locally slumped , occasional micaceous planty planes , common burrows / roots ? in top 0.30 becoming rarer down , occasional ironstone nodules ;			
	sharp	1.59	689.94	577.65
	Sandstone fine , rare discontinuous micaceous carbonaceous planes ;			
	sharp	0.31	690.25	577.96
	Siltstone fine with Sandstone , rare becoming 50 : 50 to base , laminae and thin layers , some thin slumped horizons , some rippling near base ;			
	sharp	0.84	691.09	578.80
	Siltstone fine , locally muddy , occasional ironstone bands , very rare sandstone fine microfaulted layers ;			
	sharp	0.27	691.36	579.07
	Sandstone fine , rare siltstone laminae in basal 0.05 ;			
	passage	0.32	691.68	579.39

Section of :- FISHPONDS borehole from Surface

SK72SW101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Siltstone fine to medium and Sandstone , 50 : 50 , becoming 90 : 10 down , laminae and thin layers , totally slumped in top 0.30 , occasional ripple drift below , occasional diastems ;	1.08	692.76	580.47
	Siltstone fine , fine sandy ripples in top 0.10 , some bioturbation , occasional large sand filled burrows , occasional discrete more sandy bands up to 0.05 , occasional load and pouch structures in basal 0.12 ;			
	sharp	0.50	693.26	580.9
	Sandstone fine , abundant finely disseminated plant fragments throughout , discrete silt/sand 0.10 with truncated ripples and load structures at 693.36 , generally more massive below with vague silty laminae ;			
	loaded	0.69	693.95	581.66
	Sandstone and Siltstone , 80 : 20 , fine grained , ripples in parts sometimes truncated ;			
	sharp , loaded , irregular	0.21	694.16	581.87
	Siltstone fine , generally massive , occasional silt / sand burrowed horizons (loaded in parts) , occasional ferruginous bands , large vague irregular loaded horizon from 695.05 to 695.15 ;			
	sharp	1.09	695.25	582.96
	Siltstone fine with Sandstone , 80 : 20 , locally 90 : 10 , occasional discrete sandstone bands up to 0.03 , ripples often bioturbated throughout , rare plant debris ;			
	sharp	0.70	695.95	583.66
	Siltstone fine , rare fine sandy laminae and wisps , common bioturbation in top 0.20 , well bedded , dip 2-5 degrees ;			
	passage	0.65	696.60	584.31
	Siltstone fine , with silty mudstone horizons , rare fine sandy wisps and laminae , well bedded , dip 2-5 degrees ;			
	sharp	1.16	697.76	585.47

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Siltstone fine , occasional bioturbated sandy laminae in top 0.05 , irregular sand/silt load structures below ;			
	passage	0.34	698.10	585.81
	Siltstone fine , occasional silty mudstone horizons , vague sandy wisps in parts , bioturbation common in parts , rare sandy load structures at 699.50 , dip 2-5 deg. locally 5-7 deg . ;			
		2.70	700.80	588.51
	Siltstone fine , sometimes medium , finely disseminated plant debris throughout , generally massive , becoming finer down , dip generally 2 - 5 degrees ;			
	passage	2.10	702.90	590.61
	Siltstone fine , silty mudstone in parts , rare fine sandy laminae , well bedded , dip 0-2 degrees , sandy laminae increasing in basal 0.12 with some bioturbation ;			
	sharp	1.10	704.00	591.71
	Siltstone fine with Sandstone , 80 : 20 , occasional sandstone horizons up to 0.08 , truncated ripples in parts , rare load structures , generally finely interlayered and interlaminated ;			
	passage	0.95	704.95	592.66
	Siltstone with Sandstone , 80 : 20 , locally 90 : 10 , generally finely interlaminated , occasional sandy horizons up to 0.02 , some bioturbation , dip 2-5 degrees ;			
	passage	0.95	705.90	593.61
	Siltstone fine , occasional fine sandy laminae , occasional silty mudstone partings , some bioturbation , subvertical fracture across core from 707.08 to 707.36 , approx 0.01 movement on fracture , dip 2-5 degrees , locally common burrows ;			
	sharp	2.20	708.10	595.81
	Sandstone fine , occasional bioturbated silty laminae , some bioturbation , some vague micaceous carbonaceous planes ;			
	passage	0.30	708.40	596.11

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Sandstone with Siltstone , fine grained , 80 : 20 in top 0.15 , becoming 50 : 50 below , truncated ripples often bioturbated common , common burrows ; sharp	0.36	708.76	596.47
	Siltstone fine , with silty mudstone , occasional ferruginous burrows , dip 2-5 degrees ;	0.25	709.01	596.72
	Siltstone fine , medium to pale grey , mudstone silty in top 0.15 , massive , common fine silt/sand laminae and layers in parts , strong ; passage	2.20	711.21	598.92
	Siltstone fine , medium grey , strong to very strong , massive , more argillaceous in basal 0.12 with associated poorly developed burrows ; passage	0.43	711.64	599.35
	Mudstone silty , medium to dark grey , massive , strong , becoming more argillaceous to base , common burrows ; passage	0.23	711.87	599.58
	Mudstone , slightly silty , massive , strong , locally dark , common burrows ;	0.29	712.16	599.87
	Mudstone , smooth , firm to strong , massive , barren , occasional poorly developed burrows , few ironstone bands in top 0.50 , rare listricated surfaces below 713.40 , iron rich from 715.48 to 715.76 ; passage	5.45	717.61	605.32
	Mudstone , smooth , dark grey , fairly strong , slightly fissile , some well developed subvertical listrications , non-marine lamellibranchs at 717.99 , common small guillemites	1.30	718.91	606.62
	Mudstone , smooth , fissile but strong , common tracks and horizontal burrows , occasional pyritic debris , rare high angle listrics , rare plant debris ; passage	1.01	719.92	607.63

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Mudstone , smooth , strong to very strong , fissile , some vertical / subvertical joints and poorly developed listrics , rare subhorizontal to subvertical listrics , barren , some pyrite mineralisation on joints below 721.50 ; passage	2.78	722.70	610.41
	Norton Marine Band ? Mudstone , carbonaceous , strong , less carbonaceous in top 0.30 , common pyritic specks throughout abundant from 723.43 to 723.60 with abundant fish debris including scales and spines , very common well developed high angle listrics below 723.60 , possible dwarf lingula towards base ;	1.30	724.00	611.71
	Mudstone , slightly silty , abundant poorly developed listric surfaces , ? immature seatearth ;	0.18	724.18	611.89
	Lost Core	0.42	724.60	612.31
	Mudstone , smooth , dark grey , massive , mostly iron rich , dense , locally common pyrite specks , locally common poorly developed listrics especially in top 0.45 , common irregular pale ironstone nodules / layers below 725.49 with porcellanous texture , 0.06 irregular band at base ; sharp	1.10	725.70	613.41
	Mudstone , carbonaceous , moderate , common well developed listrics horizontal to 40 degrees becoming more common and more well developed to base , irregular 0.02 to 0.04 green / grey arenaceous tuff at 726.80 ; sharp , highly listric	1.30	727.00	614.71
Sill Margin ?	Dolerite / Tuff ? / " White Trap " , pale greenish / grey , abundant mineralised veinlets , rare trapped mudstone fragments , black mudstone inclusion with steep dip and listric surfaces from 727.64 to 727.70 , and at base ; End of Cores.			
	BOREHOLE DEEPENED TO 746.40 DURING GEOPHONE REAMING DETAILS FROM SCHLUMBERGER FMS.	1.08	728.08	615.79

Section of :- FISHPONDS borehole from Surface

SK72SW 101

Classification	Nature of Strata	Thickness (m)	Depth (m)	Level (m)
	Dolerite ;			
	Mixture of dolerite and country rock ;			
		3.92	732.00	619.71
	Dolerite , chilled margin below 735.00 ;			
		5.50	737.50	625.21
	Siltstone / Mudstone ;			
		1.70	739.20	626.91
	Sandstone ;			
		0.15	739.35	627.06
	Siltstone / Mudstone ;			
		1.65	741.00	628.71
	Sandstone ;			
		0.20	741.20	628.91
	Mudstone / Siltstone ;			
		0.30	741.50	629.21
	Siltstone and Sandstone ;			
		4.90	746.40	634.11
	Base of Borehole ;			

APPENDIX 1 a

S/K 72 SW 101

BOREHOLE DATA & HISTORY - FISH PONDS

NATIONAL GRID REFERENCE : E.470183 ; N. 321859

LEVEL OF ORIGIN : 112.29m A.O.D.

SIX INCH ORDNANCE SURVEY SHEET : SK 72SW Borehole Reference No.

DATES DRILLED :

COMMENCED

COMPLETED

28/11/89

18/12/89

CONTRACTOR :

B.D. + F. LTD.

BOREMASTER :

P. SHIRT + J. HARRISON

CORE AND HOLE SIZES :

<u>Depth</u>	<u>Diameter of Core (mm)</u>	<u>Diameter of Hole (mm)</u>
0 - 37.00 ✓	II th	279 11"
37.00 - 410.00		171 6 $\frac{3}{4}$ "
410.00 - 746.40 728.76	83 mm	138 5 $\frac{7}{16}$ " reamed out to 6 $\frac{3}{4}$ "
728.76 - 746.40 -		121 6 $\frac{3}{4}$ "

DRILLING HISTORY :

FLUID LOSS / GAIN : 372.00 loss. 720 barrels from 372.00 - 516.00

METHOD OF SEALING :

29.8 tonnes.

PURPOSE OF BOREHOLE :



APPENDIX II
to PI/1977/9

REPORT ON THE SEALING OF A BOREHOLE

SK 72 SW 101

- Area Date of Report 20-12-89.....
- ASFORDBY Colliery/Prospect
1. Name/Number of Borehole FISH POND.....
2. Site - ~~Underground~~/Surface *
3. Type - Downhole/Uphole/Level/In-seam *
4. Grid Reference and Location
-
5. Drilled By: Outside Contractor B.D.F. LTD.....
- Area Boring Team
- Colliery Personnel
6. Date of Sealing 20-12-89.....
7. If sealed by outside contractor, state contractor HALBURY.....
-
8. Has any casing, drill pipe, drill bits, core barrel, etc. been left in the bore?
If Yes, give details and location 8 3/4" OD CASING TO A DEPTH OF
37.30m.....
9. Was the borehole sealed in accordance with the procedure in Appendix 1 to
PI/1977/9? NO
- If No, give reasons for and details of variation
- GEOPHONE IN PLANT AT 545.55.....
-
10. Comments where necessary concerning the effective treatment of this borehole
together with details of any tests carried out
-
11. I certify that the above borehole has been effectively sealed in accordance
with PI/1977/9.
- Signature P. S. A......
- Designation TOPographer.....
- Date 21-12-89.....
- Counter Signature [Signature].....
- Designation GEOLOGIST.....
- Date

* Delete entry that does not apply

Section of Cant's Thorns No 1 Surface Borehole

Purpose To prove base of Permo-Trias and strata down to Fourth Waterloo Seam and to provide a monitoring facility for measuring micro-seismic activity, aquifer water level and subsidence

Exact Site National Metric Grid Coordinates

E 470760 metres

N 321855 metres

Level at which bore commenced relative to OD +121.45 m

Date of boring April 1995

Borer British Drilling and Freezing Co Ltd

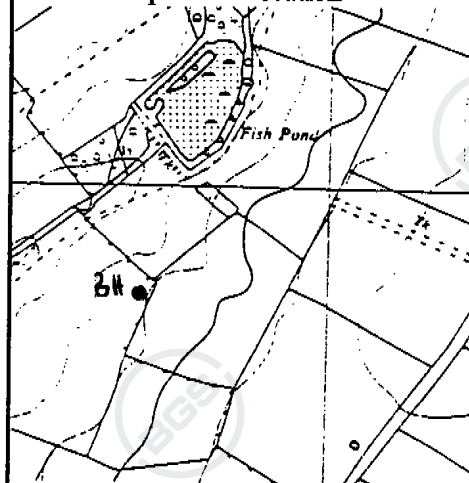
NMG Qtr Sheet

SK 72 SW 110

BH Regd No

110

Sketch map of BH location



Location: Asfordby, Leicestershire

Holes Sizes:

Depth (m)

Nominal Diameter of Hole (ins)

0-30.4

12 ¼

30.4-505

8 ½

Drilling History:

No difficulties encountered in drilling. Openhole surface to Total Depth.

Deviations recorded at 100 m 0°20', 200 m 0°28', 350 m 0°27', 400 m 0°33'.

Surface casing cemented in the borehole from surface to 30 m.

Method of Sealing:

Totally filled with API Class B, shallow oil well cement (except for short gravel pack and bentonite seal - see Sealing Report).

Deviation Surveys: by drilling company

Geophysical Surveys: BPB Wireline Services Ltd

		NMG Qtr Sheet	BH Regd No
		SK 72 SW	110
Section of Cant's Thoms No 1 Surface Borehole			
Geological Classification	Nature of Strata	Thickness (m)	Depth (m)
Mudstone	Rock bit samples every 3 m grey to dark grey, common white chalky fragments to 12 m, occasional below. Brownish tinge below 48 m	51	51
Mudstone	grey to dark grey with pale brown and dark brown ferruginous fragments. Ammonite fragment. Abundant rounded reddish and white quartzitic pebbles at 54 m	4	55
Mudstone	dark grey	110	165
Limestone	pale grey	6	171
Mudstone	dark grey	6	177
Siltstone	pale grey, calcareous	6	183
Mudstone	pale and dark grey, occasional dull red-brown fragments	3	186
Mudstone	greenish-grey, occasional dull red-brown fragments	3	189
Mudstone	dull red-brown, silty in part, occasional greenish-grey mudstone and gypsum fragments. Some mottled dark brown/pale green mudstone. Sandstone at 255 m, occasional dark greenish-grey siltstone below	204	393
Sandstone	pale brown with greenish and red-brown mudstone gypsum fragments, dark grey siltstone fragments, predominantly red-brown mudstone below 420 m	36	429
Dolerite	greenish-grey with brownish and pale green/grey mudstone to 435 m, dark grey below	12	441
Mudstone	brownish-grey, some igneous fragments, becoming red-brown below 444 m	12	453
Sandstone	purplish grey	6	459
Siltstone/Mudstone	red-brown, some grey igneous fragments	6	465



SK72SW110

Geological Classification	Nature of Station	Thickness (m)	Depth (m)
Mudstone	grey with red-brown siltstone and sandstone	6	471
Mudstone	greenish-grey, with <u>coal</u> fragments	9	480
Mudstone	pale grey	24	504
		Total Depth	505

Section of Cant's Thorns No 2 Surface Borehole

Purpose To prove base of Permo-Trias and strata down to Fourth Waterloo Seam and to provide a monitoring facility for measuring micro-seismic activity, aquifer water level and subsidence

Exact Site National Metric Grid Coordinates
E 471244 metres
N 322002 metres

Level at which bore commenced relative to OD +141.1 m

Date of boring April-May 1995

Borer British Drilling and Freezing Co Ltd

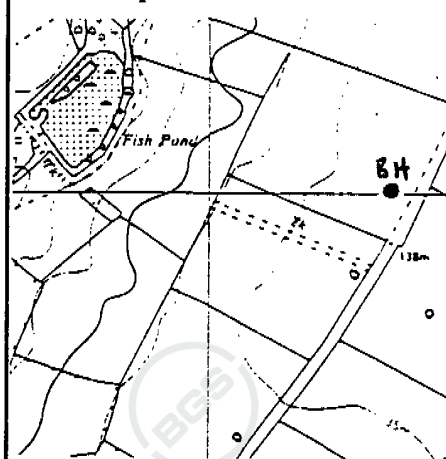
NMG Qtr Sheet

SK 72 SW

BH Regd No

111

Sketch map of BH location



Location: Asfordby, Leicestershire

Holes Sizes:

Depth (m)

Nominal Diameter of Hole (ins)

0-74.4
74.4-515.0

12¼
8½

Drilling History:

No difficulties encountered in drilling. Openhole surface to Total Depth.

Deviations recorded at 150 m 0°45', 450 m 0°8'.

Surface casing cemented in the borehole from surface to 73.94 m.

Method of Sealing:

Totally filled with API Class B, shallow oil well cement (except for short gravel pack and bentonite seal - see Sealing Report).

Deviation Surveys: by drilling company

Geophysical Surveys: BPB Wireline Services Ltd

		NMG Qtr Sheet	BH Regd No
		SK 72 SW	111
Section of Cant's Thorns No 2 Surface Borehole			
Geological Classification	Nature of Strata	Thickness (m)	Depth (m)
	Rock bit samples every 3 m		
Mudstone	brownish-grey with chalk fragments	48	48
Mudstone	grey clayey (very fine samples)	21	69
Sandstone	yellow-brown with grey mudstone, occasional ironstone fragments.	3	72
Mudstone	brownish-grey and grey, occasional quartz pebbles (white, red-brown and yellow brown)	15	87
Mudstone	dark grey (no samples 147 - 174)	108	195
Mudstone	pale greenish-grey	9	204
Mudstone	dull red-brown, occasional grey siltstone, common gypsum fragments	30	234
Mudstone	red-brown, occasional sandy fragments, sandier in basal 12 m	179	413
Sandstone	pale red-brown, occasional red-brown mudstone and grey silty mudstone fragments. Muddier in basal 9 m	25	438
Mudstone	red-brown with common dark red-grey fragments (weathered igneous?)	6	444
Dolerite	dark grey	6	450
Mudstone	dark grey/black coaly fragments	3	453
Mudstone	pale red-brown, some sand in basal 3 m	22	475
Mudstone	dark brown & grey, some carbonaceous fragments	6	481
Mudstone	grey, red-brown and greenish grey	6	487



SK72SW111

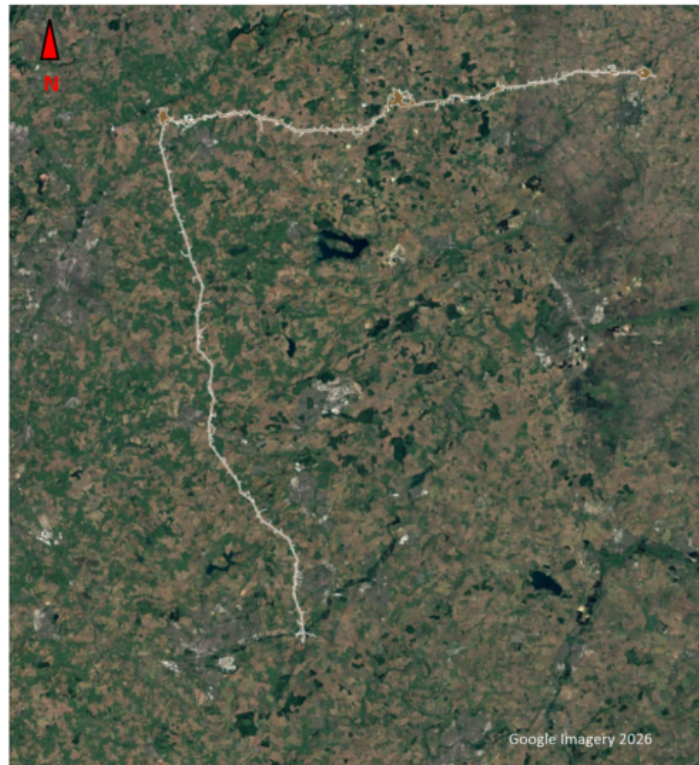
Geological Classification	Nature of Strata	Thickness (m)	Depth (m)
Mudstone	pale greenish grey, soft, clayey	12	499
Mudstone	pale grey, clayey	15	514
		Total Depth	515

Appendix C

Preliminary UXO

Risk Assessment

Appendix C Preliminary UXO Risk Assessment



Preliminary UXO Risk Assessment

FIG Reference: 4363R

Client: AECOM

Project: Surfleet

Site Location: Surfleet

Date: 23 June 2026

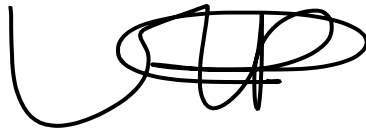
Document Control

Version Date	Version	Author	Reviewer	Comments
23 Jun. 26	1.0	Mark Khan AIEspE	Vicky Harper	Original

Quality Check

Version Date	Version	Approved by	Comments
23 Jun. 26	1.0	Carl Parnell MIEspE	QC / format check

Document Approval

	Reviewed by	Approved by
Signature		
Print Name	Vicky Harper	Carl Parnell MIEspE
Date	23 June 2026	23 June 2026

Distribution

Date	Copy No.	Recipient	Format
23 Jun. 26	1	AECOM	PDF
23 Jun. 26	2	Fellows International Group Ltd	PDF

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5. Identified Potential UXO Risk at this Site.....	5
6. Risk Mitigation Options.....	7

1. References

- A. CIRIA Report C681 – UXO – A guide for the construction industry (2009)
- B. CIRIA Report C785 – UXO risk management guide for land projects (2019)

2. Site Location

The site comprises an electric cable route with associated infrastructure running from Northamptonshire in the south, north through Leicestershire and east through Lincolnshire.

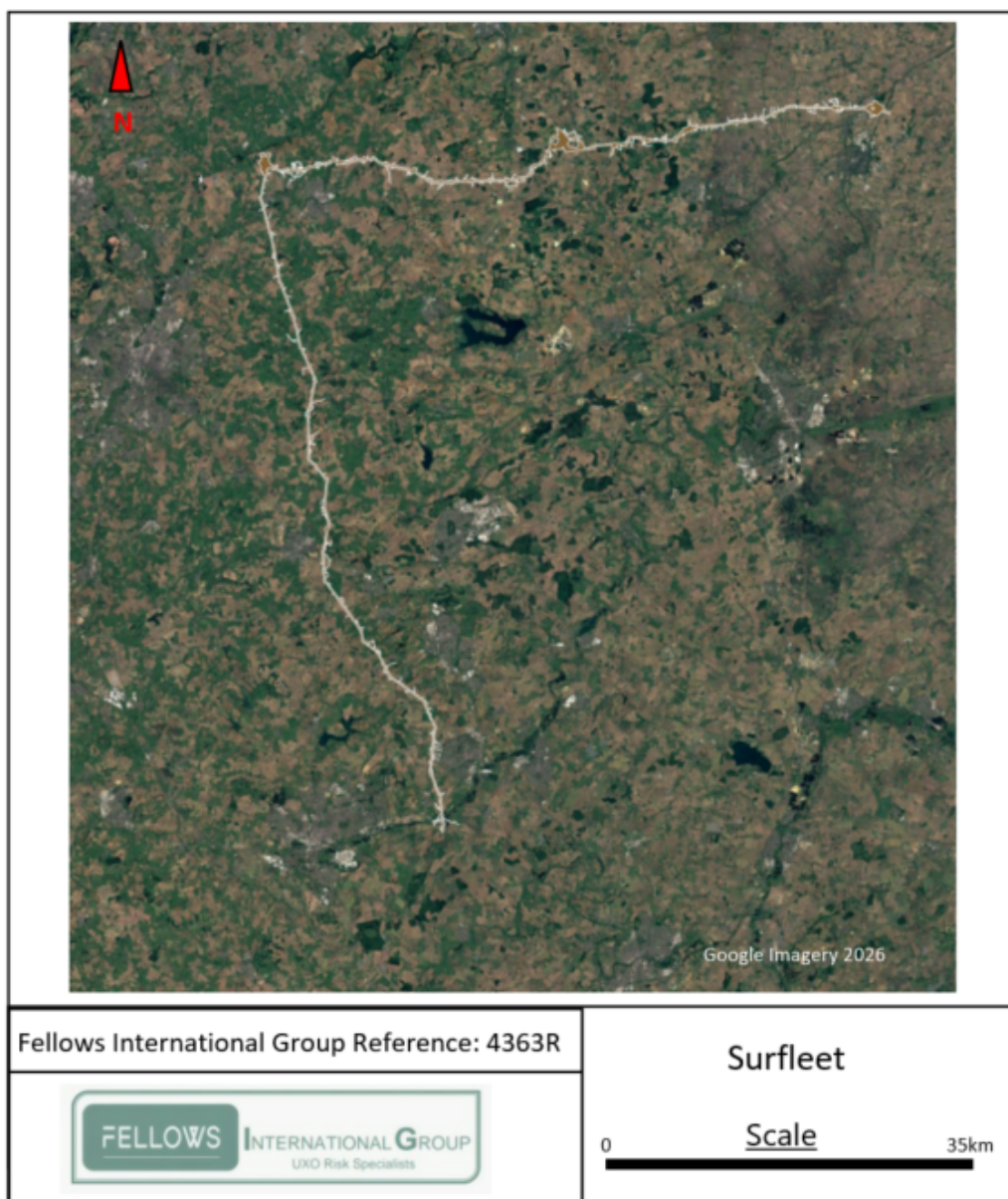


Figure 1. Showing the site area. (Google Earth).

3. Introduction

The purpose of this Preliminary UXO Risk Assessment is to establish the likelihood of encountering ~Unexploded Ordnance (UXO) on this site. If a UXO risk is identified, risk mitigation recommendations will be provided to allow the client to make an informed decision as to future procedures which will reduce the UXO risk to as low as reasonably practicable (ALARP).

4. UXO Risk Analysis

Fellows International Group Ltd utilises a research methodology using extensive archival (internal and public domain) content as well as a wide range of other available resources.

This includes the use of:

- Satellite imagery
- Historic Mapping
- Air Photography
- Historical Resources
- Archival Materiel
- Specialist Publications
- First world War UK Bombing Data
- Second World War UK Bombing Data.

This methodology identifies military or other potential UXO related activity that may influence risk of encounter with UXO. What are deemed to be potential UXO influences that may directly affect the site are identified within a 5km buffer of the site.

FIG does not use any form of artificial intelligence (AI) in relation to research carried out to produce this report.

5. Identified Potential UXO Risk at this Site

Potential UXO Source	Remarks
WW2 Aerial Bombing	Bombing activity gives rise to the potential existence of undiscovered unexploded bombs. Initial research has identified WW2 bombing in proximity to the site.
Military Training Areas/Firing Ranges	Military Training Areas/Firing Ranges are used for various types of military training and practice with various types of weapons systems. Initial research has identified WW2 firing range in proximity to the site.
Military Airfields	Military airfields were sometimes subjected to attack and are also related to military activity. This can result in potential encounter with UXO in areas located in proximity to an airfield site. Four military airfields have been identified in proximity to the site.
Bombing Decoy Sites	RAF and Royal Navy decoy sites were constructed in the vicinity of legitimate targets to deceive and decoy enemy bombers. For obvious reasons, such sites were often built in remote and uninhabited areas. Some were more successful than others and received relatively high bombing rates. Three decoy sites have been identified in proximity to the site.
Explosive Ordnance Clearance (EOC) Tasks & Reports	EOC tasks are potential indicators of the existence of legacy munitions. There are records of five post-war explosive ordnance clearance tasks and in proximity to the site.
Ordnance Factory/Ordnance Storage Facilities	Ordnance factories were responsible for the manufacture of arms and ammunition, and ordnance storage facilities were used for storing of live munitions. An ordnance factory and an ordnance storage facility have been identified in proximity to the site.

Table 1. Summary of potential UXO risk Identified.

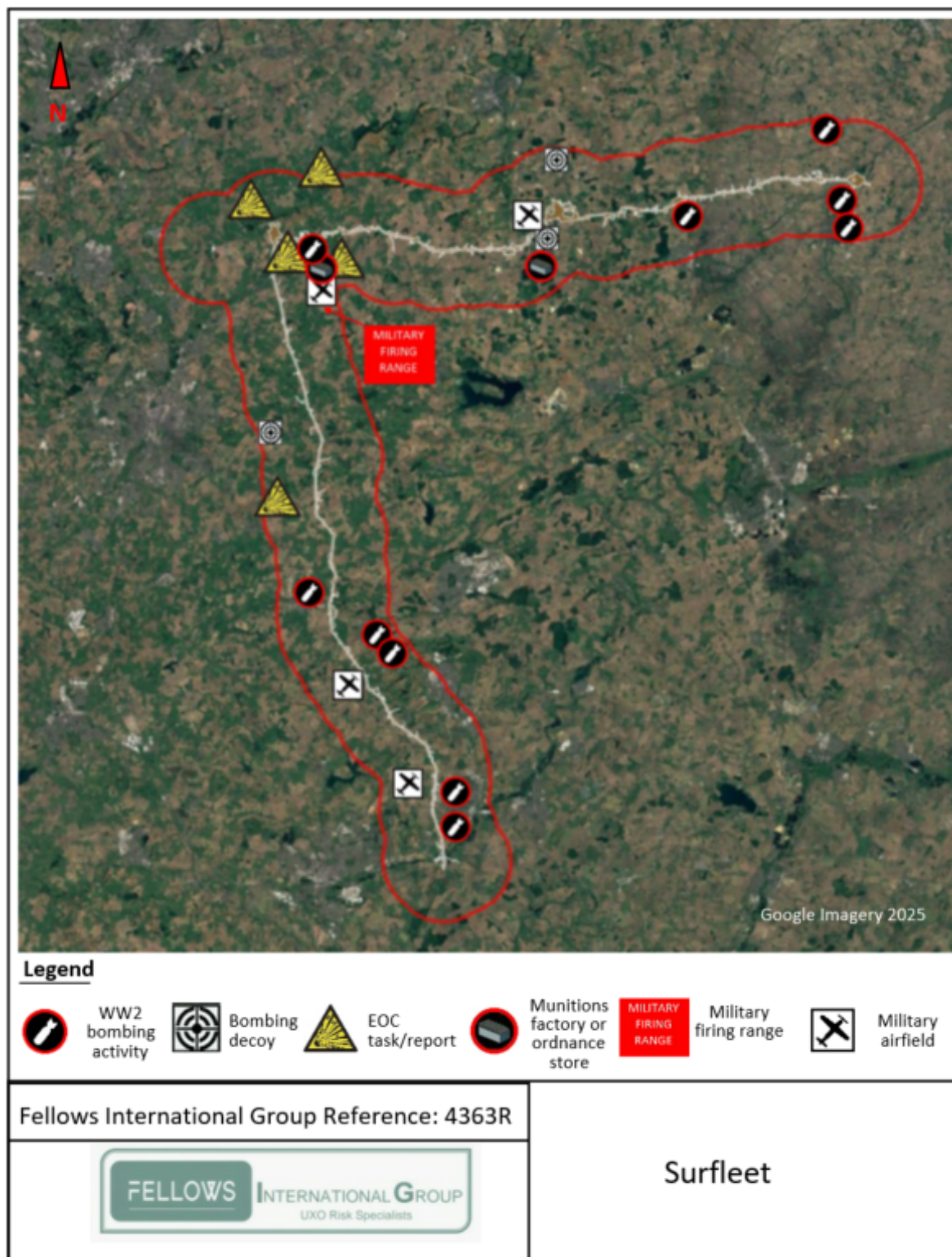


Figure 2. Showing the location of potential UXO risk Identified in proximity to the site. The 5km buffer is shown in red.

6. Risk Mitigation Options

It is assessed that there is a potential risk of encountering UXO at this site.

We recommend that a Detailed UXO Risk Assessment be produced for this site. Fellows International Group Ltd. would be pleased to offer a proposal with quotation to undertake these works and any further UXO risk mitigation processes required for this project.

This assessment has been produced for AECOM and has been completed without the benefit of knowing the exact intentions of third parties and should therefore not be used by such organisations without prior consultation with Fellows International Group Ltd.

Our assessment relies upon the accuracy of the information contained in the documents and resources consulted on the date of production. Fellows International Group can in no way be held responsible for the accuracy of such information or data supplied or for any hazard encountered at the site due to import of materials after this date.

Fellows International Group is recognised as one of the leading UXO Risk Management companies specialising in UXO Risk Assessments, Site Survey, Ground Investigation Support and UXO Awareness Training.

Conducting these operations requires not only the most experienced field staff, but also dedicated and experienced project management. Careful planning and co-ordination are needed from start to finish, backed up by detailed operational procedures. With many years' experience, Fellows International Group has built up a reputation for reliability, whatever the risk. In recognition of our commitment to the quality of our work and the health and safety of our workforce.

Appendix D

Walkover Record

Appendix D Walkover Record

Not available at the time of issue of the document

Appendix E

Approach to Geo- environmental Reporting

Appendix E Approach to Geo-environmental Reporting

Legislative Context and Guidance

Where this report relates to existing or proposed planning application, it considers the contents of the Town and Country Planning Act 1990 (as amended), the National Planning Policy Framework (2012, updated in December 2024) and considers the potential implications of Part 2A of the Environmental Protection Act 1990 (Part 2A) and the associated Contaminated Land (England) Regulations 2006 and Contaminated Land Statutory Guidance (2012).

This report has been prepared in general accordance with the technical guidance and procedures described in the UK Government guidance Land Contamination: Risk Management (2019) and its predecessor, Model Procedures for the Management of Land Contamination, Contaminated Land Report (CLR) 11 (Department of Food and Rural Affairs (Defra)/Environment Agency, 2004), British Standard (BS) 5930:2015 (as amended) Code of Practice for Site Investigations (BSI), BS:EN 1997 Eurocode 7 – Geotechnical Design (BSI) and BS 10175:2026 Investigation of Potentially Contaminated Sites – Code of Practice (BSI).

Historical Map Review

AAJV notes that only indicative map scales are provided. Where dates are stated, these refer to the dates of maps on which the features are present, have changed use or are no longer annotated, and do not necessarily refer to the exact dates of existence of a particular feature. Development that may have occurred between map editions is recorded as occurring on the latter published map, hence there are some limitations to the accuracy to the date of development unless supplementary evidence is available.

Conceptual Site Model Derivation

The CSM is aimed at identifying possible risks, if any, arising from substances used or deposited on-site, or from other sources of land contamination. Both past and current potentially contaminative land uses have been considered. It is based on the proposed site redevelopment described in Section 1 of this report.

Assessment Framework

The site, in terms of potential land contamination, will be regulated by the Local Authority under the Town and Country Planning Act 1990 (as amended), taking account of the National Planning Policy Framework (2012, updated in December 2024), with the Environment Agency, Natural England and English Heritage acting as potential statutory consultees.

Environmental liabilities can arise through provisions contained within statutory legislation including Part 2A of the EPA 1990, the Environmental Damage (Prevention and Remediation) Regulations 2009, the Water Resources Act 1991, the Groundwater Regulations 2009 and the Water Act 2003.

Current best practice recommends that the determination of health hazards due to contaminated land is based on the principle of risk assessment, as outlined in the Statutory Guidance to Part 2A (2012) and Land Contamination: Risk Management (LCRM).

The “suitable for use” approach is adopted (as outlined in the Contaminated Land Statutory Guidance) for the assessment of contaminated land where remedial measures are undertaken where unacceptable risks to human health or the environment are realised taking into account the use (or proposed use) of the land in question and the environmental setting.

The risk assessment process for environmental contaminants is based on a source-pathway-receptor analysis. These terms can be defined as follows:

- Source: hazardous substance that has the potential to cause adverse impacts;
- Pathway: route whereby a hazardous substance may come into contact with the receptor: examples include ingestion of contaminated soil and leaching of contaminants from soil into watercourses; and
- Receptor: target that may be affected by contamination: examples include human occupants/ users of site, water resources (surface waters or groundwater), or structures.

For a risk to be present, there must be a relevant / viable contaminant linkage; i.e. a mechanism whereby a source impacts on a sensitive receptor via a pathway.

AAJV have determined the potential sources, pathways and receptors to assess potential risks/liabilities and constraints associated with the Site in its current condition prior to any proposed redevelopment. Risks associated with the proposed redevelopment have also been assessed based on the future land use scenario specified, including any potential sources of contamination, potential receptors and potential contaminant pathways identified during this desk based assessment.

Approach to Risk Assessment

Current best practice recommends that the determination of hazards due to contaminated land is based on the principle of risk assessment, as outlined in the Environment Agency guidance on LCRM.

For a risk to be present, there must be a viable contaminant linkage; i.e. a mechanism whereby a source impacts on a sensitive receptor via a pathway.

Assessments of risks associated with each of these contaminant linkages are discussed in the following Sections.

Using criteria broadly based on those presented in the CIRIA C552, the magnitude of the risk associated with potential contamination at the Site has been assessed. To do this an estimate is made of:

- The magnitude of the potential consequence (i.e. severity);
- The magnitude of probability (i.e. likelihood).

The severity of the risk is classified according to the criteria in Table E.1.

Table E.1 Description of Severity of Risk

Severity	Definition	Examples (as defined by C552)
Severe	Short-term (acute) risk to human health likely to result in "significant harm" as defined by Environmental Protection Act 1990, Part IIA. Short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Catastrophic damage to buildings \ property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem (note: the definitions of ecological systems Within the Draft Circular on Contaminated Land, DETR, 2000).	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health ("significant harm" as defined in DETR 2000). Pollution of sensitive water resources (note: Water Resources Act contains no for considering significance of pollution). A significant change in a particular ecosystem, or organism forming part of such ecosystem. (note: the definitions of ecological systems within Draft Circular on Contaminated Land, DETR, 2000).	Concentrations of a contaminant from site exceed the generic, or site-specific assessment criteria. Leaching of contaminants from a site to a major or minor aquifer. Death of a species within a designated nature reserve.
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ("significant harm" as defined in the Draft Circular on Contaminated Land, DETR, 2000). Damage to sensitive buildings / structures / services or the environment.	Pollution of non-classified groundwater. Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).

Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc). Easily repairable effects of damage to buildings, Structures and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discoloration of concrete.
-------	---	---

The probability of the risk occurring is classified according to the criteria in Table E.2.

Table E.2 Likelihood of Risk Occurrence

Likelihood	Definition	Example
High	There is a pollutant linkage and an event that either appears very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.	The contaminant linkage exists or is very likely to exist in the short term, and / or may also be linked to visual / olfactory evidence of that linkage being present and active in some cases. The conditions are such that there is no foreseeable reason to suggest that a source-pathway-receptor linkage is not occurring and required mediums for a contamination source to pass through / within to reach a receptor are all present.
Likely	There is pollutant 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.	The conditions are such that there are very few foreseeable reasons to suggest that a source-pathway-receptor linkage is not occurring, and that all or most of the required mediums for a contamination source to pass through / within to each a receptor are present.
Low Likelihood	There is pollutant linkage and circumstances are possible under which an event could occur.	The source, pathway and receptor linkage may exist and it is possible that contamination could reach a receptor in

	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.	certain circumstances. The site conditions indicate that there are limiting factors in the pathway mediums / generation potential of the source / or presence of the receptor.
Unlikely	There is pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.	The source, pathway and receptor may exist in certain circumstances, but the contaminant linkage is improbable in the short term and in the long term.

An overall evaluation of the level of risk is gained from a comparison of the severity and probability, as shown in Table E.3.

Table E.3 Risk based on Comparison of Likelihood and Severity

Severity					
		SEVERE	MEDIUM	MILD	MINOR
Likelihood	HIGH	Very High	High	Moderate	Moderate/Low
	LIKELY	High	Moderate	Moderate/Low	Low
	LOW	Moderate	Moderate/Low	Low	Very Low
	UNLIKELY	Moderate/Low	Low	Very Low	Very Low

Further description of the classified risks as defined by CIRIA C552 is provided below.

Very high risk

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 risk

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 risk

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 risk

It is possible that harm could arise to a designated receptor from 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 risk

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.

Discussion of Acute Risk to Construction Workers

AAJV understands that the proposed development works will be undertaken in compliance with Construction Design and Management (CDM) 2015 regulations.

Prior to work commencing, a health and safety risk assessment should be carried out by the appointed Principal Contractor / developed in accordance with current health and safety regulations. This assessment should cover potential risks to construction staff, permanent site staff and the local population. Based on the findings of this risk assessment, appropriate mitigation measures should be implemented during the construction period.

The greatest potential for generation of dust will be during the Site works and therefore dust generation should be kept to a minimum in accordance with general best practice, as outlined in, for example, 'Environmental Good Practice on Site', CIRIA Publication C692 to reduce this risk.

The risk to construction workers during the excavation and construction phases in terms of potential exposure to high concentrations of contaminants is considered to be low given the historic and current land uses identified at the Site. Should gross contamination be identified during the construction phase, then this may pose a potential acute risk to construction works. It is likely to be able to be effectively managed through good health and safety practices and protocols. Adoption of appropriate dust suppression techniques would also mitigate the degree of potential particulate migration off-site.

Appendix F

Geotechnical

Risk Register

Appendix F Geotechnical Risk Register

A Geotechnical Risk Register has been compiled to show the degree of risk attached to various ground related aspects of the proposed scheme. The purpose of the register is to produce an assessment of the risk to the project posed by site specific ground related problems and identify suitable mitigation measures to control the risk to an acceptable level. The risk register should be developed and refined as the geotechnical design and assessment progresses such that the register will allow management of the geotechnical risks.

The degree of risk (R) is determined by combining an assessment of the likelihood (L) of the hazard with an assessment of the severity (S) of the hazard. The scale against which the likelihood and severity are measured, and the resulting degree of risk determined is presented below. Table F.4 presents the risk register for the proposed scheme.

Table F.1 Classification of Probability and Impact

Likelihood (L)		Severity (S)	
Very Likely	5	Very High	5
Likely	4	High	4
Probable	3	Medium	3
Unlikely	2	Low	2
Negligible	1	Very Low	1

Table F.2 Risk Matrix

Likelihood	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
		Severity				

Table F.3 Classification of Risk Rating

Risk rating	Response
Intolerable	Unacceptable
Substantial	Early Attention

Risk rating	Response
Tolerable	Regular Attention
Trivial	Monitor

Table F.4 Geotechnical Risk Register

Identified Geotechnical Hazard	Location	Cause	Risk before Control			Consequence	Mitigation Measures	Risk after Control		
			L	S	RR (LxS)			L	S	RR (LxS)
Excessive total and differential settlement due to placement of mass fill	Areas of Alluvial soils, areas underlying of proposed mass fill.	Highly compressible deposits and Alluvial Superficial Deposits, prone to significant settlements. Cohesive soils with low permeability and long duration consolidation settlement	5	4	20	Differential settlements induced by variation in load/geotechnical properties of the material Unacceptable degrees of total and settlement, including differential settlement resulting in damage to infrastructure.	Ground investigations to identify underlying ground conditions and assess risk. Designs to account for settlement e.g., through: Laying new utilities with increased falls and flexible service connections. Consideration of ground improvement. Excavation and replacement of settlement prone soils prior to loading with fill Consideration of locating infrastructure outside of areas anticipated to be prone to settlement or at greater depths within more homogenous cohesive material. Appropriate design parameters to be incorporated into designs and settlement assessments carried out.	2	4	8

Identified Geotechnical Hazard	Location	Cause	Risk before Control			Consequence	Mitigation Measures	Risk after Control		
			L	S	RR (LxS)			L	S	RR (LxS)
							Hold period between completion of the earthworks fill platform and construction of structures to allow for consolidation settlement. Consolidation periods could potentially be accelerated through the use of surcharge loading (pre-loading) and vertical band drains, subject to detailed settlement analysis. Monitoring post earthworks completion to ensure that settlements remain within tolerable limits.			
Existing Underground and Overhead Services at proposed site of works	Scheme Wide – Overhead line entering site from southeast corner. Other underground utilities.	Ground Investigation Works; Site construction works, site clearance and site set-up (compound, haul roads etc.)	4	4	16	Increased cost and delay to divert or lower services; H&S impact during any excavations during Ground Investigation or construction; Relocation of ground investigation or site area to avoid overhead services;	Obtain up to date service plans and records; Undertake safe digging procedures in accordance with HSG47 and PAS128; Undertake GPR surveys and mark out services prior to any investigations; Contact asset owners to agree standoff requirements; Plan Ground Investigation to avoid buried services;	2	4	8

Identified Geotechnical Hazard	Location	Cause	Risk before Control			Consequence	Mitigation Measures	Risk after Control		
			L	S	RR (LxS)			L	S	RR (LxS)
						Scheme design alterations to avoid overhead/underground services.	Design proposed scheme to minimise impact on existing services.			
Shallow Groundwater	Scheme Wide, likely most significant in lower lying topographies and areas near existing / historical surface water features e.g. gully	The presence of shallow groundwater. Existing surface water features	4	4	16	Worsening of issues with excavation instabilities (including scour and running sands) and if present, issues with slope instabilities, posing risk to life, alongside damage and potential failure of proposed infrastructure. Uplift/buoyancy effect on infrastructure. Risk of flooding. Existing water courses beneath proposed earthworks may result in increased weathering of the founding strata.	Ground investigations to identify underlying ground conditions, including for groundwater monitoring, and assess risk. Consider groundwater regime during construction and investigations and need for mitigation measures e.g., dewatering. Suitably account for groundwater in designs including flotation checks. Redirection or culverting of existing watercourses away from critical site areas. Inclusion of land drainage to manage groundwater.	2	4	8
Aggressive Ground Chemistry	Scheme Wide	Till and Charmouth Mudstone are	4	3	12	Deleterious effects on buried concrete/piles;	Analyse BRE test results and design concrete mix and the additional protective measures	1	3	3

Identified Geotechnical Hazard	Location	Cause	Risk before Control			Consequence	Mitigation Measures	Risk after Control		
			L	S	RR (LxS)			L	S	RR (LxS)
		potentially sulphide/sulphate bearing stratum;				Heave of stabilised soils / oxidised soils.	during detailed design in accordance with BRE guidance. Assess potential for stabilisation techniques and sulphates before implementing to confirm suitability of use. Assess risk of heave before using as fill material.			
Suitability of material for re-use	Scheme Wide	Site-won material will largely be Silt and Clay which may be unsuitable for reuse unless properly controlled.	4	3	12	Settlement, heave, damage to structures, difficult earthworks, export of material for disposal	Ground investigations to obtain samples to undertaken lab testing for materials classification. Undertake earthworks in accordance with an appropriate earthworks specification Adjust design to reduce the amount of fill required, or to bias towards cut in areas of more suitable materials for re-use.	2	3	6
Lateral and vertical variabilities in ground conditions.	Scheme Wide, anticipated to be most significant around watercourses and at the	Variability in the lateral extents and vertical thickness of composition of superficial deposits and	4	3	12	Differential settlement due to variable ground conditions at similar depths, resulting in damage to proposed infrastructure. Changes in ground	Ground investigations to identify underlying ground conditions and assess risk, including quarrying highwalls. Designs to account for variations e.g., through increasing construction depths	3	2	6

Identified Geotechnical Hazard	Location	Cause	Risk before Control			Consequence	Mitigation Measures	Risk after Control		
			L	S	RR (LxS)			L	S	RR (LxS)
	north portion of the Site.	composition of in-situ bedrock.				conditions (including groundwater conditions) resulting in construction difficulties and delays.	to account for variations in ground conditions. Appropriate design parameters to be incorporated into designs. Undertake settlement assessment based on site specific ground information. Selecting suitable excavation methodologies / equipment / plant during construction, consideration of potential for changes in ground / groundwater conditions and impact of such.			
Slope instability, including potential for scour.	Embankments / cuttings / changes in level locally present across the study area.	Existing gully features and proposed cutting slopes potentially formed of low strength superficial deposits, possibly also susceptible to scour.	3	4	12	Slope failure, resulting in subsidence and subsequent damage to the proposed infrastructure, alongside existing structures / features both in and outside of the study area.	Ground investigations to identify underlying ground conditions and assess risk, considering any constraints / restrictions associated with slopes. Topographical surveys to confirm the topography of any slopes along proposed network. Undertaken slope stability assessments using parameters	2	2	4

Identified Geotechnical Hazard	Location	Cause	Risk before Control			Consequence	Mitigation Measures	Risk after Control		
			L	S	RR (LxS)			L	S	RR (LxS)
							derived from a site specific investigation. Investigation and construction work to take into account risk of slope failures e.g. through safe working distances from slopes as deemed required. Designs to account for slope instability as necessary e.g.: Avoiding unsuitably loading slopes or locating loads a sufficient distance from the crest of slopes. Ensuring slopes are not undermined in a way that would preclude stability. Incorporation of mitigation measures if required. Appropriate design parameters to be incorporated into designs. Avoid removing vegetation from slopes, which could be providing stabilising effects. Consideration of locating infrastructure outside of areas where slopes are present.			

Identified Geotechnical Hazard	Location	Cause	Risk before Control			Consequence	Mitigation Measures	Risk after Control		
			L	S	RR (LxS)			L	S	RR (LxS)
							Incorporation of slope stability assessments in future works, including designs, as appropriate. Consideration of ongoing monitoring post construction and maintenance plan, as appropriate.			
Unexploded ordnance (UXO)	Scheme Wide	Preliminary UXO Risk Assessment with identification of potential for encountering UXO on Site. WW2 bombing activity recorded adjacent to the Site increasing likelihood of UXO. Greenfield site, reducing likelihood for	3	4	12	Potential for loss of life if struck. Delays / increased costs if encountered.	Obtaining Detailed UXO Risk Assessment to further inform risk and mitigation measures. Mitigation measures implemented based on UXO assessments prior to any breaking ground works. If further assessment not undertaken prior to ground investigation works, full UXO supervision / mitigation measures to be incorporated throughout works.	2	4	8

Identified Geotechnical Hazard	Location	Cause	Risk before Control			Consequence	Mitigation Measures	Risk after Control		
			L	S	RR (LxS)			L	S	RR (LxS)
		UXO to have uncovered in past and increasing likelihood to unrecorded UXO.								
Shrink and swell of clay soils	Scheme wide, locally elevated around where clay soils are present at shallow depths.	The presence of clay soils with potential for shrinking and swelling on changes in moisture content, magnified by the presence of trees and possibly dense vegetation. Potential of soils to heave in response to unloading.	3	3	9	Shrinking and swelling of soils, resulting in damage to proposed infrastructure. Including construction issues and subsidence during HDD / trenchless drilling.	Ground investigations to identify underlying ground conditions, including plasticity index of soils, and assess risk. Designs to account for risks associated with shrink/ swell of clays e.g., deepening infrastructure, flexible utility connections etc. Replace unsuitable shallow soils with engineered fill.	3	2	6
Frost susceptible soils	Scheme Wide	Construction of pavement;	2	3	6	Pavement Damage or alternative design; Frost heave.	Ground Investigation to identify underlying ground conditions and assess risk;	1	3	3

Identified Geotechnical Hazard	Location	Cause	Risk before Control			Consequence	Mitigation Measures	Risk after Control		
			L	S	RR (LxS)			L	S	RR (LxS)
		Silt-rich soils present at site.					Increase pavement thickness to incorporate risk.			
Instability of excavations	Locally within lenses of granular till and more likely to be mapped to the Alluvium.	Granular deposits are likely to run with this effect being enhanced by the presence of shallow groundwater.	3	2	6	Health and safety risks and damage within excavation as well as potential loss of support to adjacent infrastructure/assets	Develop proposals for and undertake project specific ground investigation to provide information in ground conditions in areas of proposed excavations. Where possible minimise requirements for excavations and/or unsupported excavations in areas of high potentially unstable ground. Assess stability of excavations as part of temporary works. Relevant geotechnical reports to be made available to contractors.	2	2	4
Presence of highly compressible deposits	Local to the Alluvium / associated soils generally around natural surface water courses. Local	Alluvial soils formed of unconsolidated low strength soils, prone to compression and subsequent	4	3	12	Unacceptable degrees of settlement, including differential settlement resulting in damage to proposed developments.	Ground investigations to identify underlying ground conditions and assess risk, including targeted investigations around mapped Alluvium and Infilled ground to confirm extent of deposits.	3	2	6

Identified Geotechnical Hazard	Location	Cause	Risk before Control			Consequence	Mitigation Measures	Risk after Control		
			L	S	RR (LxS)			L	S	RR (LxS)
	to the Artificial Ground.	significant settlements under load. High compressibility associated with infilled ground is caused due to the potential for voids within the ground.					Designs to account for settlement e.g., through: Consideration of locating proposed developments outside of areas anticipated to be prone to settlement. Deepening foundations to competent underlying stratum. Laying new utilities with increased falls and flexible service connections. Ground improvement. Incorporate appropriate ground model and engineering parameters into designs. Consider ongoing monitoring post construction and maintenance plan, as appropriate.			
Historical surface mineral extraction	Identified to be associated with the Marlstone Rock Formation in the northeast	Surface mineral extraction, including area of opencast ironstone worked ground and local	4	3	12	Differential settlement from un-engineered fill and potential for collapse settlement, resulting in significant subsidence at surface, causing damage to or	Ground investigations based on location specific development proposals to identify underlying ground conditions and assess risk, including confirmation of extent / nature of any fill materials.	2	2	4

Identified Geotechnical Hazard	Location	Cause	Risk before Control			Consequence	Mitigation Measures	Risk after Control		
			L	S	RR (LxS)			L	S	RR (LxS)
	of the Site and locally to features north of the Site redline boundary.	recorded / suspected pits, and likely un-engineered infill prone to settlement when loaded.				failure of proposed developments. Potentially backfilled with hazardous material.	Geophysical survey to identify the presence of any unrecorded backfilled features. Avoid infilled ground when designing layout of proposed developments. If encountered, designs to suitably remediate / mitigate the risk e.g. through deep foundations extending through fill, excavation and replacement of fill with engineered fill, ground improvement etc.			
Historical Deep Coal Mining	Identified to cross the Site trending from the southeast to the northwest of the Site.	Mining activities for coal extraction can leave voids within strata.	4	2	8	Loading/excavating the ground can result in potential for collapse of mining shafts, resulting in significant subsidence and differential settlement.	Abandonment plans show historical deep mining show that the mining was undertaken as a depth between 410 and 445m bgl. At this depth it is considered unlikely historical mining features will be impacted by construction at the surface. Geophysical survey to identify the presence of any unrecorded mining related voids	2	2	4

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