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Renewable Energy Systems Limited
Coltsdene
Kibblesworth, Gateshead
Phase 1 Geo-Environmental Assessment

www.bwbconsulting.com

Renewable Energy Systems Limited
Coltsdene
Kibblesworth, Gateshead
Phase 1 Geo-Environmental Assessment

Birmingham
Livery Place, 35 Livery Street, Colmore Business District, Birmingham, B3 2PB
T: 0121 233 3322

Leeds
Whitehall Waterfront, 2 Riverside Way, Leeds, LS1 4EH
T: 0113 233 8000

London
11 Borough High Street, London, SE1 9SE
T: 0207 407 3879

Manchester
11, Portland Street, Manchester M1 3HU
T: 0161 233 4260

Nottingham
Waterfront House, Station Street, Nottingham NG2 3DQ
T: 0115 924 1100

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Author:	Sean Fells BSc, MSc	Senior Geo-Environmental Consultant	
Reviewer:	Chris Rhodes BSc MSc (Hons)	Associate Director	
Approver:	Catherine Riley CEng, CEnv, MCIWEM	Principal Geo-Environmental Consultant	

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Notice

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This report details the findings of work carried out between the date of our appointment and the date of this report. The report has been prepared by BWB on the basis of available information obtained during the study period.

Although every reasonable effort has been made to gather all relevant information, not all potential environmental constraints or liabilities associated with the site may have been revealed. BWB has used reasonable skill, care and diligence in undertaking this work.

Information provided by third parties has been used in good faith and is taken at face value; however, BWB cannot guarantee its accuracy or completeness.

Should additional information or records be provided following the issue of this report, or are not identified in the References section of this report, which are considered to be relevant to the study area and for which reliance can be provided, BWB should be informed in order that the content of the document can be reviewed and revised accordingly.

The work has been carried out in general accordance with recognised best practices.

Unless otherwise stated, no assessment has been made concerning soil or groundwater known or suspected to be contaminated or impacted with radioactive substances or unexploded ordnance.

Any site boundary line depicted on plans does not imply legal ownership of land.

Recommendations provided in this report are preliminary and are subject to further investigation, assessment and geotechnical/geo-environmental design.

EXECUTIVE SUMMARY

Executive Summary	
Site Address	Kibblesworth, Gateshead NE11 0XS.
Proposed Development	The subject site is being considered for the development of a solar farm.
Current Site Use	The site currently comprises undeveloped agricultural land. A groundwater treatment pump is located adjacent to the southern boundary with the village of Kibblesworth to the north.
Site History	Since the earliest available mapping dated 1855 Kibblesworth Colliery is indicated to have been present within the central portion of the Site and the Pon and Jarrow Railway line has been present adjacent to the northern boundary of the western, central and eastern portions with associated lines on-Site connecting to Kibblesworth Colliery. Since at least 1895 Kibblesworth Colliery was indicated to have included associated reservoirs, railways lines and sidings, shafts and a spoil heap and by at least 1938 Glamis Pit is shown to have been present partially on-Site. By 1982 the former Kibblesworth Colliery was shown to be disused, and by 1988 the eastern and central portions of the Site, including the location of the former colliery were shown to comprise opencast workings. A pumping station was shown to be present at the location of the former Glamis Pit since at least 1988. The northern and western portions of the Site are generally indicated to have comprised undeveloped agricultural land since the earliest available historical mapping dated 1855.
Ground Conditions	BGS mapping indicates that Made Ground is present in central/eastern areas associated with a former colliery and opencast mine. Made Ground is also mapped in the north and west associated with former opencast workings. Superficial deposits predominantly comprise Till, with Glaciofluvial and Glaciolacustrine Deposits in the west and east respectively. Underlying bedrock comprises the Pennine Middle Coal Measures Formation, with three coal seams sub-cropping in the eastern half of the site.
Geotechnical Review	Shallow "spread" foundations or mini piles are likely to be viable options within areas of natural soils for panels or ancillary buildings. Deeper foundations may be required where Glaciolacustrine Deposits are mapped. In areas of Made Ground associated with the historical mine workings, a raft foundation may be viable for solar panels, subject to a comprehensive understanding of the conceptual ground model, site investigation, and in line with approval from the Mining Remediation Authority. Exclusion zones around mine shafts and adits have been recommended, however, this should be revisited considering the subsequent opencast workings.
Environmental Review	The proposed development is considered to pose a moderate risk to human health with the main driver for the risk rating for human health relating to the potential for elevated ground gasses associated with the Made Ground and underground coal workings. The risk posed to controlled waters is predominantly considered to be low based on the reduced quality of the underling aquifer which is being remediated by the Mining Remediation Authority.
Recommendations	A ground investigation should be undertaken at the site to confirm ground conditions at the site, determine the ground gas regime, allow for in-situ and laboratory testing to quantify contaminant linkages and inform foundation design.

	Ground investigation will be required to inform the risk associated with underground and shallow coal mining. It would be prudent to obtain a UXO Report prior to intrusive investigations.
This summary should be read in conjunction with BWB's full report (ref. 244990-BWB-EGT-XX-RP-G-0001_Ph1) and reflects an assessment of the site based on information received by BWB at the time of production.	

CONTENTS

EXECUTIVE SUMMARY iv
1. INTRODUCTION 1
Instruction 1
Objectives 1
Scope of Work 1
2. THE SITE 3
Site Location 3
Site Description 3
Site Walkover 4
Potential Constraints to Ground Investigation 5
Site Surroundings 6
3. ANTICIPATED GROUND CONDITIONS 7
4. SITE HISTORY 10
Historical Aerial Photography and Imagery 11
Operational / Company Records 11
Planning History 12
Internet Search / Anecdotal Information 12
Summary of Site History 12
5. PREVIOUS REPORTS 13
Available Information 13
6. REGULATORY SETTING 14
Environmental Health Officers Consultation 14
Permits Consents and Authorisations 14
Landfilling and Waste Management 14
7. GEOTECHNICAL OVERVIEW 16
8. PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT 18
Introduction 18
Conceptual Site Model 18
9. CONCLUSION AND RECOMMENDATIONS 23
Conclusions 23
Recommendations 24
10. REFERENCES 25

FIGURES

Figure 2:1: Site Location Plan
Figure 2:2: Site Layout Plan
Figure 6:1: Historical Landfill Location Plan

TABLES

Table 2:1: Surrounding Land Use
Table 3:1: Summary of Anticipated Ground Conditions
Table 4:1: Key Points of Development History
Table 4:2: Summary of Aerial Photography
Table 4:3: Summary of Online Information
Table 6:1 Active or Recent Landfill Sites
Table 6:2: Historical Landfill Sites
Table 7:1: Ground Related Constraints & Opportunities
Table 8:1: Potential Sources of Contamination
Table 8:2: Relevant Potential Pathways and Receptors
Table 8:3: Preliminary Conceptual Site Model

APPENDICES

Appendix 1: Site Location
Appendix 2: Site Photographs
Appendix 3: Groundsure Report
Appendix 4: Historical Mapping
Appendix 5: Classification of Risk

1. INTRODUCTION

Instruction

1.1 BWB Consulting Ltd (BWB) was instructed by Renewable Energy Systems Limited (RES) (the Client) to carry out a Phase 1 Geo-Environmental Assessment for the Site at Kibblesworth, Gateshead.

1.2 The subject Site is being considered for the development of a solar farm. The Site Location Map is provided as **Appendix 1**.

Objectives

1.3 This report has been completed to present pertinent information into the environmental risks and liabilities associated with the site. It has been completed to fulfil the requirements of a preliminary risk assessment in accordance with BS 10175:2026 *'Investigation of potentially contaminated sites, code of practice'* and EA Guidance on Risk Management of Land Contamination[1].

1.4 The report has also been prepared with reference to land contamination technical guidance published by the Environment Agency[2].

1.5 The objectives of this report are to:

- Assess historical activities at the site with respect to their potential impact on the site environment;
- Characterise the environmental setting of the site, identify migration pathways and vulnerable receptors for contamination originating at the site, focusing on potential soil and groundwater liabilities;
- Assess historical and current surrounding land use in relation to known or potential off-site contamination issues that may impact the site;
- Review existing site investigation and remediation information for the site, where available;
- Have due regard of geotechnical considerations, changes or requirements that may be needed to accommodate the proposed development;
- Develop a preliminary Conceptual Site Model (CSM); and
- Assess potential environmental liabilities associated with the site and the proposed development.

Scope of Work

1.6 The scope of work included:

[1] https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm
[2] https://www.gov.uk/government/collections/land-contamination-technical-guidance

- A site visit to inspect the current site and immediate surroundings, identify potential hazards associated with ground conditions or contamination and to determine potential constraints with regards to ground investigation (photographs presented as **Appendix 2**);
- A review of the following information:
    - Groundsure report, reference GS-JJH-3GC-4X7-MLR (**Appendix 3**);
    - Historical Ordnance Survey Mapping (**Appendix 4**);
    - Historical aerial photographs (Google Earth) and other aerial imagery (Groundsure);
    - British Geological Survey (BGS) 1:50,000 Scale, 'Newcastle upon Tyne', Sheet 20, Solid (1989) and Drift (1992);
    - British Geological Survey (BGS) 1:10,560 Scale, 'Durham', Sheet NZ25NW, Solid and Drift (1982);
    - BGS online geological maps and exploratory hole records[3];
    - MAGIC website[4];
    - Mining Remediation Authority Interactive Map Viewer[5]; and
    - Regional unexploded bomb risk maps.
- A summary of the key hazards or uncertainties that require additional investigation in order to further characterise the associated risks; and
- Production of a Geo-Environmental Assessment (this report), concluding in a qualitative assessment of the risks from contamination and ground-related constraints which may impact on the site.

1.7 The following third-party report has been made available to BWB and is reviewed below in Section 5.0:

- *Coal Mining Risk Assessment*, Kibblesworth Solar, Kibblesworth, Birtley, Gateshead NE11 0JB by Geoinvestigate Limited (ref: G24261) dated October 2024.

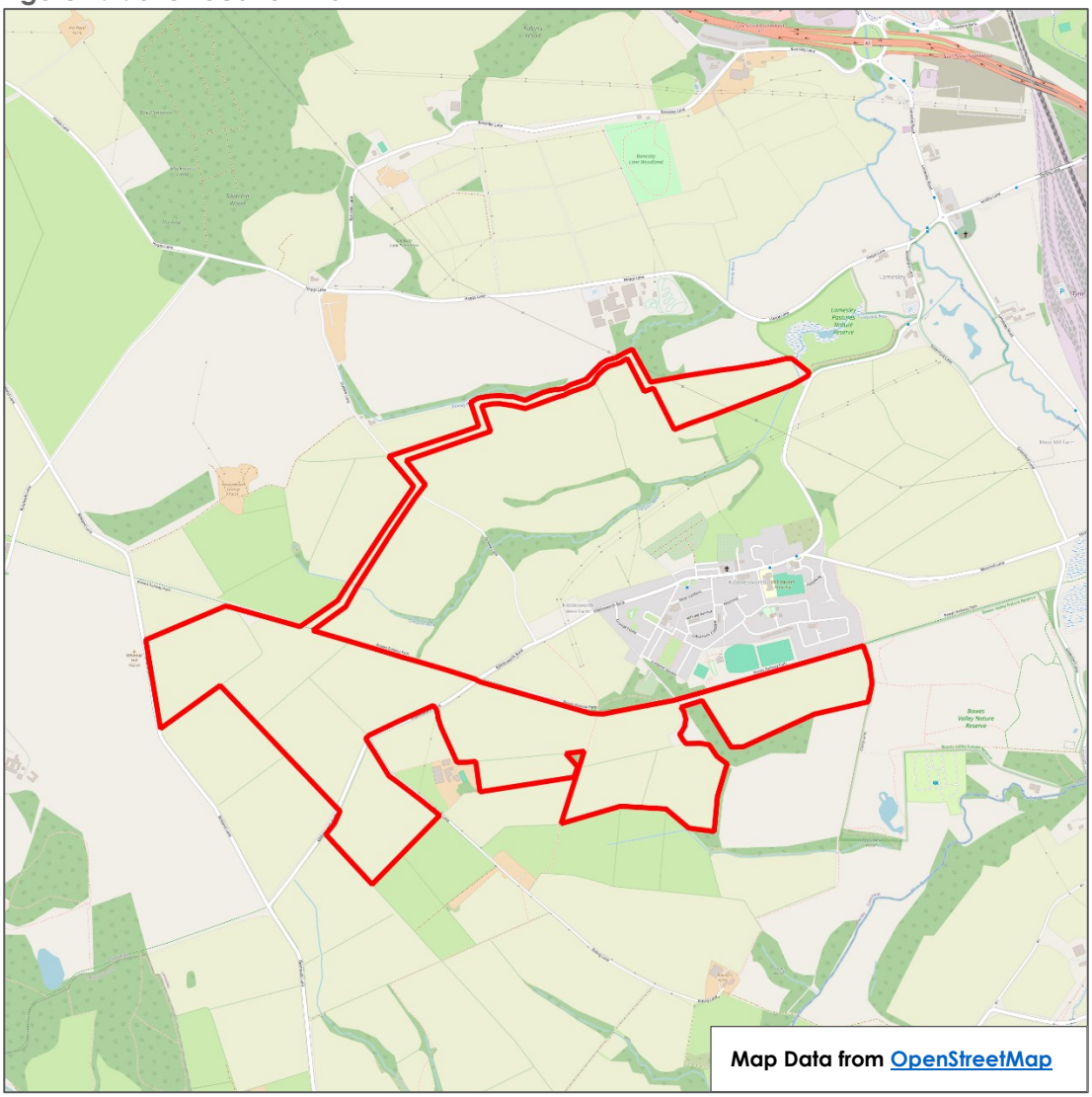
[3] www.bgs.ac.uk
[4] https://magic.defra.gov.uk/MagicMap.html
[5] https://datamine-cauk.hub.arcgis.com/

2. THE SITE

Site Location

2.1 The majority of the site is located to the south of Kibblesworth, Gateshead, with the grid connection located to the north. The Site is centred at National Grid reference 423687, 556385. The approximate location of the site is shown below in **Figure 2:1**, with a definitive boundary presented in **Appendix 1.**

Figure 2:1: Site Location Plan



Site Description

2.2 The Site comprises an irregularly shaped parcel of land covering an area of approximately 93 hectares (Ha), and slopes from approximately 161 m above ordnance datum (AOD) in the west to 37 m AOD in the south-east and 19 m AOD in the north-east.

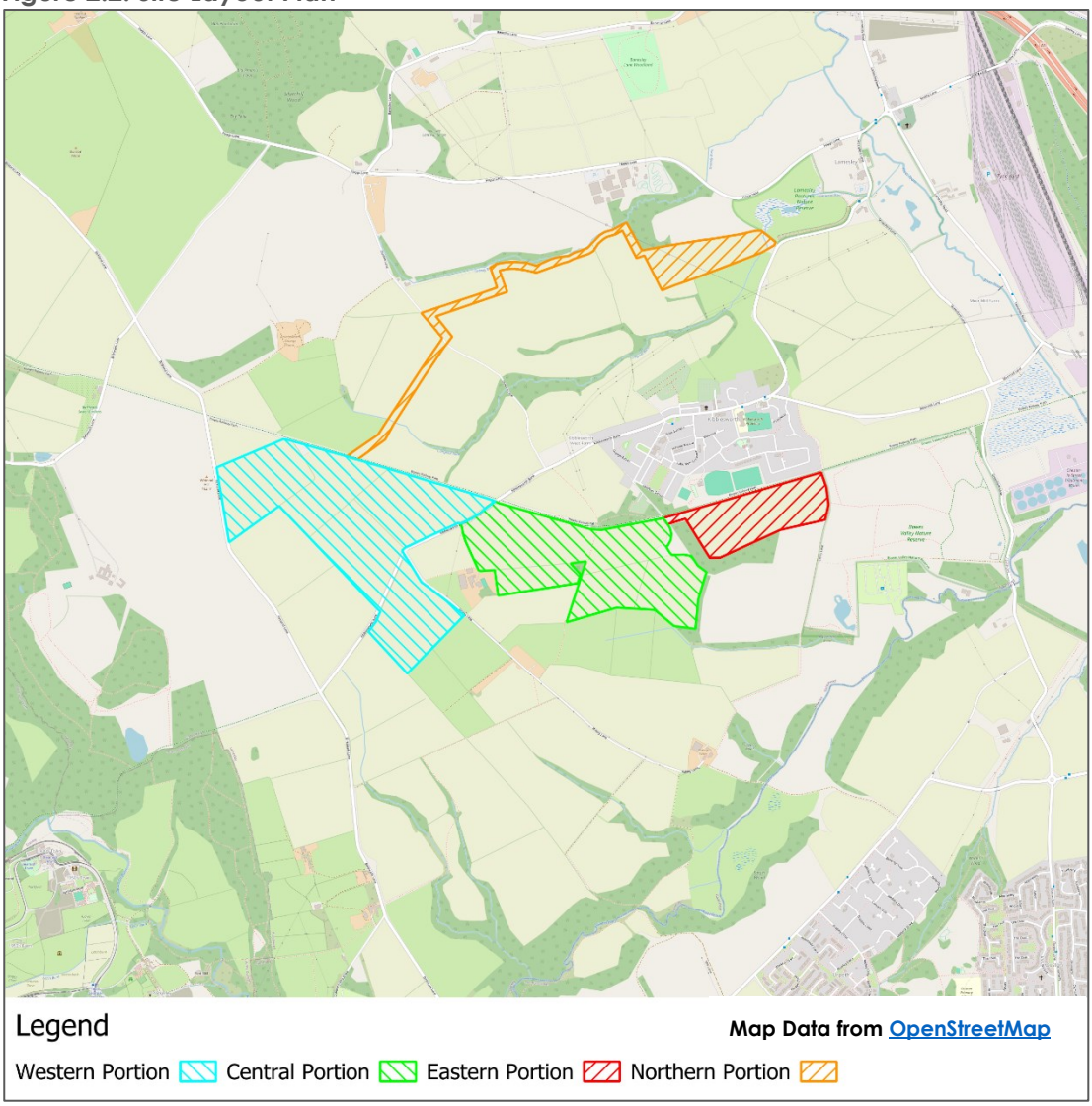
2.3 The Site can be accessed via several public roads including Grange Estate in the east, Ouslaw Lane in the north-west and Kibblesworth Bank in the west and north-east.

Site Walkover

2.4 A site walkover was completed on 24/03/2026 by a representative of BWB. Photographs from the walkover are presented in **Appendix 2**

2.5 At the time of the walkover, the Site comprised multiple fields of undeveloped agricultural land with associated hedgerows, mature trees and drainage ditches. Given the size and number of fields that the Site comprises, the walkover description is separated into four sections, the northern, western, central and eastern portions. The layout of Site portions are shown below in **Figure 2:2**.

Figure 2:2: Site Layout Plan



Northern Portion

2.6 The northern portion of the Site comprised a strip of land across four fields of undeveloped agricultural land, and the majority of a single field of undeveloped agricultural land in the north-east.

2.7 A metal electricity pylon with associated overhead power lines was present in the north-eastern field of the Site.

2.8 The surface water feature of the Coltspool Burn was culverted under an access route in the north-eastern field located adjacent to the eastern boundary. This surface water feature was indicated to flow from south to north in this portion of the Site. The Coltspool Burn was also present in the western area and was indicated to flow from west to east along a field boundary.

Western Portion

2.9 The western portion of the Site comprised five fields of undeveloped agricultural land, with associated hedgerows and mature trees along the field boundaries.

2.10 This portion of the Site represented the highest elevation topographically, known as Whinnel Hill, with the Site sloping down from west to east across the central and eastern portions.

2.11 A small drainage ditch flowed along the northern boundary of the northern, central and eastern portions of the Site and was culverted at several points.

Central Portion

2.12 The central portion of the Site comprised five fields of undeveloped agricultural land with associated hedgerows and mature trees along the field boundaries.

2.13 An enclave of woodland comprising mature trees was present in the middle of this portion of the Site.

Eastern Portion

2.14 The eastern portion of the Site comprised two fields of undeveloped agricultural land with associated hedgerows and mature trees along the field boundaries.

Potential Constraints to Ground Investigation

2.15 Overhead power lines are present in the north-eastern field. Consideration of the required easement should be given when planning the location of any proposed intrusive locations.

2.16 Access to the central, eastern and western portions of the Site may be restricted with vehicles and plant required to pass through one or more adjoining fields of undeveloped agricultural land to gain access to proposed intrusive locations

2.17 Access to the northern portion of the Site will be restricted with vehicles and plant required to pass through off-Site fields of undeveloped agricultural land to gain access to proposed intrusive locations.

2.18 It is noted that access to several on-Site and off-Site fields may be restricted due to the presence of boulders placed at the field entrance to prevent unauthorised access. Confirmation should be sought regarding the presence of any potential features placed which may restrict access to areas of the Site and a suitable method of removing these features implemented.

Site Surroundings

2.19 The surrounding land uses at the time of the walkover survey are summarised in **Table 2:1**.

Table 2:1: Surrounding Land Use

Surrounding Land Use	
North	The village of Kibblesworth is located to the north of the eastern portion, to the north-east of the central portion and to the south-east of the northern portion respectively. The wider surrounding area to the north of the various portion of the Site generally comprised multiple fields of undeveloped agricultural land. The northern, central and eastern portions were bound to the north by the Bower Railway Path, which comprised an embanked former railway line and was up to 5 m to 6 m topographically elevated at various points. A telecommunications tower and associated infrastructure was present approximately 30 m to the north of the western portion within a field of undeveloped agricultural land on the far side of the Bower Railway Path.
East	The land to the east of the Site included Bowes Valley Nature Reserve to the east and south-east, with a sewage treatment works present beyond, and multiple fields of undeveloped agricultural land to the north-east.
South	The land to the south of the Site comprised multiple fields of undeveloped agricultural land. Several residential and farm buildings present to the south of the Site included Kibblesworth Grange to the immediate south of the central portion, and Cooper House Farm located approximately 200 m to the south of the central portion. The Kibblesworth mine water treatment scheme pumping station, operated by the Mining Remediation Authority was present within an area of land forming a cut-out area of the central portion, and approximately 50 m to the west of the eastern portion.
West	The land to the west of the Site comprised several fields of undeveloped agricultural land with the National Forest of Hedley Hall Woods present beyond.

3. ANTICIPATED GROUND CONDITIONS

3.1 The anticipated ground conditions for the site and controlled waters vulnerability is discussed within **Table 3:1**.

Table 3:1: Summary of Anticipated Ground Conditions

Anticipated Ground Conditions	
Geology	The Site is indicated by the British Geological Survey (BGS) to be partially underlain by artificial deposits of Made Ground in the eastern portion and partially underlain by Infilled Land in the northern portion and western edge of the Site. The BGS Lexicon defines the artificial deposits as follows: • Made Ground: an area where the pre-existing land surface is raised; • Infilled Ground: an area where the pre-existing land surface has been excavated and subsequently partially or wholly backfilled. The BGS 1:10,000 plans indicate that this deposit relates to historical opencast mining. The artificial deposits and the remainder of the Site are indicated by the BGS to be underlain by superficial deposits of Devensian Till (diamicton) across the majority of the Site, Glaciolacustrine Deposits (silt and clay) in the eastern portion, and Glaciofluvial Deposits (sand and gravel) at the western edge. In addition, the Glaciolacustrine and Glaciofluvial Deposits may be further underlain by Devensian Till. The underlying bedrock across the Site is indicated to be the Pennine Middle Coal Measures Formation (PMCM) comprising mudstone, siltstone and sandstone, with the north-eastern portion indicated to comprise sandstone. The BGS lexicon defines the bedrock as interbedded grey mudstone, siltstone, pale grey sandstone and commonly coal seams. The BGS1:10,560 plan indicates rockhead to be at depths from c. 30m AOD in the east, <15m AOD in the north east, increasing to 165m AOD in the west of site where ground levels increase. In addition, several coal seams and faults are mapped within the Site boundary as summarised below: • Two faults are shown to transgress the northern, central and eastern portions of the Site from north to south dipping to the east and to the west respectively; • A third fault is shown to be partially present in the western portion of the Site transgressing from east to west and dipping to the north; • The Maudlin Coal Seam is mapped as sub-cropping in the north-eastern portion of the Site dipping to the west, with the remainder of the coal seam shown to be off-Site to the east; • The Main Coal Seam is sub-cropping in the eastern portion of the Site dipping to the west and transgressing the Site from north to south; • The Five-Quarter Coal Seam is shown to be present in the eastern portion of the Site dipping to the west and transgressing the Site from north to south; • The High Main coal seam is mapped sub-cropping in the central portion of the site, transgressing the Site from north to south and dipping to the west. All five seams also cross the northern arm of the site. There are twenty-one publicly available BGS borehole records present within the Site boundary, most within the areas associated with the former colliery/opencast in the east and west of site. Boreholes in the east of the site appear to pre-date the opencast workings, recording c. 10-13 m of superficial deposits (cohesive and granular Till) overlying coal measures with various

Anticipated Ground Conditions	
	named seams proven at depth. Made Ground was recorded in one location to 3.8 m below ground level (bgl). Towards the central area of the site, ground conditions comprise localised Made Ground around the former colliery to depths of 1.9 m – 3.4 m bgl over Till proven to depths of between 3.25 m and 6.80 m bgl, over the coal measures. In the west of site, ground conditions comprised residual soil over the coal measures at c. 0.6 m bgl.
Hydrogeology	The Environment Agency (EA) classifies the underlying superficial deposits and bedrock as follows: • Devensian Till: Undifferentiated Secondary Aquifer; • Glaciolacustrine Deposits: Unproductive Strata; • Glaciofluvial Deposits: Secondary A Aquifer; and • Pennine Middle Coal Measures Formation: Secondary A Aquifer. The Site is not indicated to be within, or within close proximity to, a currently defined EA groundwater Source Protection Zone. According to the Groundsure Report there is one currently active abstraction from groundwater within 1 km of the Site. The listing relates to the abstraction of groundwater at Kibblesworth Pumping Station by The Coal Authority for pollution remediation purposes active since April 2018. It is considered that this listing relates to the identified Kibblesworth mine water treatment scheme plant. There are no licence discharges to groundwater and no pollution incident to groundwater records within 500 m of the Site. Significant pollution incidents are listed 95 m, 114 m and 172 m north of site indicated to have impacted on the land. No pollutant type is given BGS boreholes in the east of the site either made no comment on groundwater or did not encounter any. In the central area, groundwater was encountered sporadically within the Till and Made Ground.
Surface Waters	There are several surface water features indicated to be present within or adjacent to the Site boundary as summarised below: • The Strandy Burn is located adjacent to the northern boundary of the northern portion; • The Coltspool Burn is present in the north-eastern field along the eastern boundary and transgresses across the northern portion at two locations; and • Two unnamed drainage streams are present adjacent to the central and southern portions of the Site respectively. The surface water features at the Site and in the surrounding area are indicated to likely flow to the east and into the River Team located approximately 500 m to the east of the Site. There are five licenced discharges to surface water within 500 m of the Site. The closest two listings relate to the release of trade discharges – mineral workings to the Coltspool Burn located approximately 190 m to the north-west and 225m to the south of the northern portion at their closest points. Both these listings are recorded as revoked with a revocation date of December 2003. The remaining listings are located in excess of 400 m from the Site and relate to various effluents including trade discharges – mineral workings, and sewage discharges – final/treated effluent. Only one of these listings is indicated to currently be active. There are no active licenced abstractions from surface water within 1 km and no significant pollution incidents to surface water within 500 m of the Site. The Site is indicated by the Environmental Agency Flood Map for Planning to be entirely located within a Flood Zone 1 (low probability) and by the Long-

Anticipated Ground Conditions	
	Term Flood Risk Map to be at a very low risk of flooding from rivers or the sea (less than 0.1% chance of a flood each year).
Ground Gas & Radon	The Site is indicated to be located within an area where less than 1% of properties are above the UK Health Security Agency (UKHSA) 'Action Level' for radon and within an area where radon protective measures are not required in buildings or extensions. Several significant potential sources of hazardous ground gas have been identified at the Site and in the surrounding area associated with the historical Kibblesworth Colliery and several landfills in the surrounding area.
Mining and Mineral Extraction	The Site is indicated by the Mining Remediation Authority to be entirely located within a Coal Mining Reporting Area, and the majority of the Site to be partially within a Development High Risk Area. In addition, there are multiple mine entries recorded to be present within the Site boundary. A Coal Mining Risk Assessment Report by GeoInvestigate Limited has been provided to BWB and is reviewed below in **Section 5.0**. There are multiple BGS British Pit (BritPit) records within 500 m of the Site. The status of all the records are listed as ceased. Listings within 250 m of the Site boundary are summarised below: • Kibblesworth Colliery is located immediately north of site, but expanding over the central and eastern site areas and relates to the commodity of deep coal. • Kibblesworth OCCS is located in the same location as the aforementioned colliery and relates to the commodity of surface mined coal. • Mitchesons Gill OCCS is located approximately 20 m to the north and relates to the commodity of surface mined coal. • Whinnel Hill is at the western boundary and relates to the commodity of sandstone. • Ravensworth OCCS is located approximately 145 m to the north and relates to the commodity of surface mined coal. • Cooper House Farm OCCS is located approximately 190 m to the south and relates to the commodity of surface mined coal. • Hedley OCCS is located approximately 195 m to the south and relates to the commodity of surface mined coal. • Ravensworth Grange OCCS is located approximately 250 m to the west and relates to the commodity of surface mined coal.
Environmental Sensitivity	According to the Groundsure Report there are two designed Sites of Special Scientific Interest (SSSI) located within 1.0 km of the Site. The listings relate to the Pockerley Farm Pond SSSI located approximately 795 m to the south-west and to Ridley Gill SSSI located approximately 920 m to the west. There are eight areas of Designated Ancient Woodland within 1.0 km of the Site. The closest listing relates to the area of ancient and semi-natural woodland of Greenburn Howl located approximately 370 m to the south-west. The remaining listings are located in excess of 500 m from the Site and relate to various areas of ancient and semi-natural woodland and areas of ancient replanted woodland. The Site is indicated to be located within an area of Green Belt and within a Nitrate Vulnerable Zone.

4. SITE HISTORY

4.1 Historical Ordnance Survey (OS) mapping for the site area has been reviewed. These maps and plans date from 1855 to 2025. The historical plans reviewed are provided in **Appendix 4**. The key points of the historical development of the site and surrounding area are summarised in **Table 4:1**. All distances quoted are approximate.

Table 4:1: Key Points of Development History

Dates	On Site	Off-Site
1855 to 1857	Since the earliest available mapping the northern, western and eastern portions of the Site were shown generally to comprise undeveloped agricultural land separated into fields The **KIBBLESWORTH COLLIERY** was present in the central portion of the Site adjacent to the northern boundary with associated **RAILWAY LINES AND SIDINGS** of the **PONTOP AND JARROW RAILWAY LINE** present connecting to the colliery. In addition, this **RAILWAY LINE** also transgresses across the northern portion.	**KIBBLESWORTH COLLIERY** was shown to extend off-Site to the north with associated **RAILWAY LINES AND SIDINGS** and two **SPOIL HEAPS** approximately 15 m and 40 m to the north respectively. **RAILWAY LINES AND SIDINGS** of the **PONTOP AND JARROW RAILWAY LINE** were present running adjacent to the northern boundary of the eastern, central and western portions. An **OLD QUARRY** was present approximately 75 m to the west. A **POND** was present approximately 75 m to the south adjacent to Kibblesworth Grange and a second **POND** was present approximately 225 m to the south adjacent to Cooper House.
1895 to 1896	The **KIBBLESWORTH COLLIERY** was shown to have remained present and then included **RESERVOIRS**, additional **RAILWAY LINES AND SIDINGS**, a **SHAFT** and a **SPOIL HEAP.**	A **SHAFT** associated with the **KIBBLESWORTH COLLIERY** was present to the north. The **OLD QUARRY** was no longer present. A **RESERVOIR** was present approximately 220 m to the south-east.
1919 to 1921	**KIBBLESWORTH COLLIERY (ROBERT PIT)** was shown to have expanded further with the **SPOIL HEAP** shown to have expanded in size and **RAILWAY LINES AND SIDINGS** shown to have been present in the eastern portion of the Site labelled as **KIBBLESWORTH GRANGE COAL DRIFT**.	An **AIR SHAFT** was present approximately 200 m to the north of the northern portion and a **COAL SHAFT** was present approximately 245 m to the north of the northern portion.
1938 to 1952	**KIBBLESWORTH COLLIERY** was shown to have expanded further with an additional **SPOIL HEAL, GLAMIS PIT, TRAMWAY LINES,** an additional **RESERVOIUR** in the central portion, and the spoil heap of **KIBBLESWORTH GRANGE DRIFT** in the eastern portion.	**GLAMIS PIT** of **KIBBLESWORTH COLLIERY** and associated **RAILWAY AND TRAMWAY LINES AND SIDINGS**, and **SPOIL HEAPS** were shown to extend off-Site to the south between the central and eastern portions. The **RESERVOIR** to the south-east is no longer present.
1959 to 1979	**KIBBLESWORTH COLLIERY** remains present with multiple **ASSOCIATED BUILDINGS**, **SPOIL HEAPS**, **RAILWAY** and **TRAMWAY LINES AND SIDINGS, RESERVOIRS/PONDS, TANKS** present	The **POND** to the south adjacent to Copper House was no longer present and by 1975 the **POND** to the south adjacent to Kibblesworth Grange is was no longer present.

Dates	On Site	Off-Site
	across the central and eastern portions of the Site and an **ELECTRICAL SUBSTATION** in the eastern portion.	The **KIBBLESWORTH COLLIERY** and associated **SPOIL HEAPS** were shown to extend further off-Site to the south of the eastern portion. The **AIR SHAFT** and a **COAL SHAFT** were no longer present. An **ELECTRICAL SUBSTATION** was present approximately 50 m to the north of the central portion. A **BRICK WORKS** was present approximately 225 m to the east of the eastern portion
1982 to 1993	**KIBBLESWORTH COLLIERY** was indicated to be disused with the majority of the buildings, railway and tramway lines and sidings, reservoirs/ponds, tanks and electrical substation no longer present and the **PONTOP AND JARROW RAILWAY LINE** is shown to have been dismantled. 1988 -1993 plans show a **PUMPING STATION** to be present partially on-Site located at the former **GLAMIS PIT.** The central and eastern portion of the Site shown to comprise **OPENCAST WORKINGS**	The **OPENCAST WORKINGS** were shown to have extended off-Site to the south of the central and eastern portions. The **PUMPING STATION** extends partially off-Site into the land between central and eastern portions with a **TANK** shown to be present approximately 20 m to the east of the central portion. An **ELECTRICAL SUBSTATION** is present approximately 240 m to the south-east within the off-Site **BRICK WORKS.**
1994 to 2025	The **PUMPING STATION** was shown to remain present, and the central and eastern portions of the Site were shown to comprise fields of undeveloped agricultural land.	The **PUMPING STATION** and **TANK** were shown to remain present.

Historical Aerial Photography and Imagery

4.2 Aerial photographs/imagery available through Google Earth and included within the Groundsure report are summarised in **Table 4:2**.

Table 4:2: Summary of Aerial Photography

Date (Source)	Description
2001 to 2025 (Google Earth) 1991 to 2022(Groundsure)	Since the earliest available aerial imagery dated 1999 the Site was shown to have generally represented the present-day layout of multiple fields of undeveloped agricultural land. No significant changes are evident on the aerial imagery until the present-day.

Operational / Company Records

4.3 No operational records have been made available for review as part of this assessment.

Planning History

4.4 The Gateshead Metropolitan Borough Council (the Local Authority) Planning Portal was accessed on 25/03/2026 and indicated that one planning application has been submitted for the site within the publicly available online records. This planning application is summarised below:

- Determination of Prior Approval: Fertiliser storage tank - Land North of Kibblesworth Bank, Riding Farm, Kibblesworth. This application was decided as 'Prior Approval Not Requested' August 2021. No pertinent geo-environmental documents were submitted to the Local Authority, and a decision notice is not available for this planning application.

Internet Search / Anecdotal Information

4.5 An online search for background/historical information relating to the current / historical site use was undertaken, with pertinent information detailed in **Table 4:3**.

Table 4:3: Summary of Online Information

Source	Description
The National Archives (accessed 25/03/2026)	The National Archives indicates that Kibblesworth Colliery was in existence since at least the 1830's with Roberts Pit sunk in 1842 to begin work on the Low Main and Hutton coal seams. The colliery is recorded to have closed in October 1974.
Bowes Railway (accessed 25/03/2026)	The Pontop & Jarrow Railway Line is indicated to have been opened in January 1926 and was extended to Kibblesworth in 1942. The website also indicates that the closure of the Kibblesworth Colliery brought an end to the majority of operations and the line was closed in November 1974.

Summary of Site History

4.6 Since the earliest available mapping dated 1855 Kibblesworth Colliery is indicated to have been present within the central portion of the Site and the Pon and Jarrow Railway line has been present adjacent to the northern boundary of the western, central and eastern portions with associated lines on-Site connecting to Kibblesworth Colliery. Since at least 1895 additional Kibblesworth Colliery was indicated to have included associated reservoirs, railways lines and sidings, shafts and a spoil heap and by at least 1938 Glamis Pit is shown to have been present partially on-Site.

4.7 By 1982 the former Kibblesworth Colliery was shown to be disused, and by 1988 the eastern and central portions of the Site, including the location of the former colliery were shown to comprise opencast workings. A pumping station was shown to be present at the location of the former Glamis Pit since at least 1988.

4.8 The northern and western portions of the Site are generally indicated to have comprised undeveloped agricultural land since the earliest available historical mapping dated 1855.

5. PREVIOUS REPORTS

5.1 The following information provides a summary of information reviewed in relation to previous reports relating to the site that have been made available to BWB.

Available Information

5.2 The following third-party report has been made available to BWB for review:

- Coal Mining Risk Assessment, Kibblesworth Solar, Kibblesworth, Birtley, Gateshead NE11 0JB by Geoinvestigate Limited (ref: G24261) dated October 2024.

5.3 A summary of the key information contained within the report reviewed is provided below:

- It is noted that the Site boundary of the CMRA is of a greater extent than the boundary of the current subject Site and includes several additional fields of undeveloped agricultural land to the south of the central and eastern portions and to the south of the northern portion.
- The CMRA identified 33 mine entries (21 shafts and 12 adits) within or close to the Site boundary that were considered to pose localised ground stability concerns. The report recommended excluding these from the masterplan.
- Five areas comprising an area of approximately 88 ha were identified to be underlain by recorded very shallow and shallow mine working across the Site which were considered to pose a significant and extensive ground stability hazard to the proposed development.
- The report also recommended that ground gas monitoring at selected locations within the Site should be completed to assess the risk from mine gas associated with the opencast site and shallow mine workings.
- The CMRA considered there to be a medium to high risk of past underground coal mining, a low to medium risk of probable unrecorded shallow workings, outcrops and mine gas.

5.4 BWB notes that the CMRA does not identify the Site to be located within the "North-East Mining and Groundwater Constraints Area". The Site is indicated by the Mining Remediation Authority to be within a Category B & C1 area, where a pre-application consultation with the Coal Authority is required prior to major development and deep ground works or deep drainage boreholes.

5.5 The report states that the opencast workings around Kibbleworth Colliery never occurred, therefore the shallow mine working risk in this area is retained. Historical mapping contradicts this, indicating widespread opencast workings across the area in the late 1980s. Based on the opencast workings post-dating the shallow workings, it is likely that large areas of shallow workings and adits have been subsequently excavated and infilled, reducing the ground stability risk. Obtaining mine abandonment plans would assist with providing a more comprehensive understanding of the ground model.

6. REGULATORY SETTING

Environmental Health Officers Consultation

6.1 The Environmental Health Officer (EHO) for Gateshead Metropolitan Borough Council (the Local Authority) was contacted on 25/03/2026. At the time of writing, a formal response is pending and will be forwarded upon receipt.

6.2 The Local Authority not does identify the Site as contaminated land within the contaminated land public register presented on the online webpage for contaminated land (Contaminated land - Gateshead Council).

Permits Consents and Authorisations

6.3 A full listing of permits, consents and authorisations including discharge consents, pollution incidences and other environmental information, is included in the Groundsure report, presented in **Appendix 3**. The following pertinent features have been identified which have the potential to have a detrimental impact on site:

- There are two active Part A1 permits listed near to the site, all listed 120m north for recycling purposes

Landfilling and Waste Management

6.4 A full listing of EA, BGS and Local Authority recorded landfills are provided in the Groundsure report presented in **Appendix 3**. The following facilities have been identified which have the potential to have a detrimental impact on site.

6.5 There are four licensed waste site listings within 500 m of the Site.

6.6 One active or recent landfill site and three historical landfill sites have been identified within 500m of the site, as detailed below in **Table 6:1** & **Table 6:2**.

Table 6:1 Active or Recent Landfill Sites

Name	Distance from Site	Details
Tyne Waste Ltd, Greenford Lane, Lamesley, Gateshead	c. 5 m to the East	EPR No.: EA/EPR/YP3797ZR Landfill type: A04 Household, Commercial & Industrial Waste Landfill Status: Closure

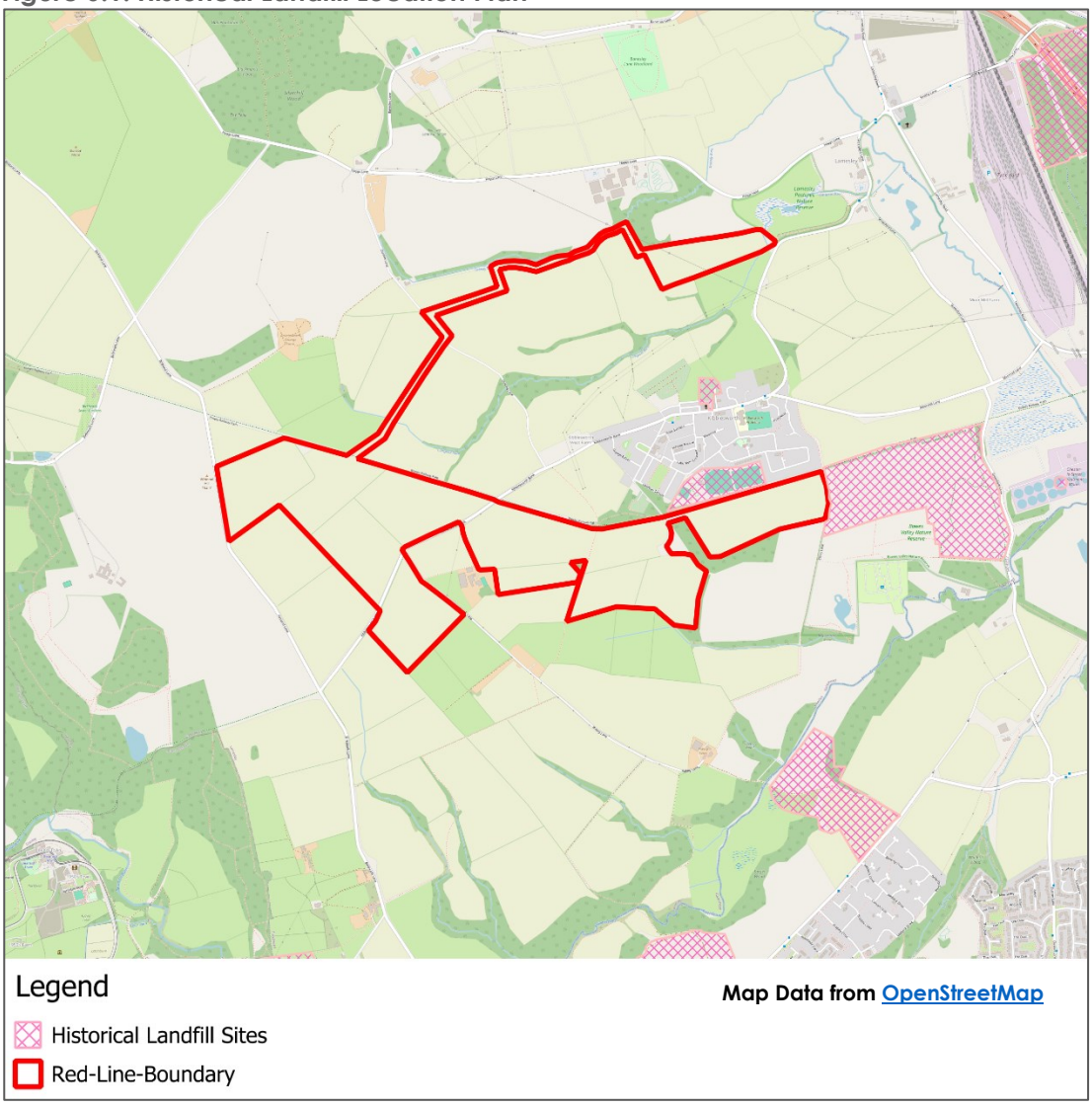
Table 6:2: Historical Landfill Sites

Name	Distance from Site	Details
Kibblesworth Quarry	c. 5 m to the east	Accepted inert, industrial, commercial and household waste between 1984 to 1989.
Kibblesworth Village	c. 10 m to the north	Accepted waste type and dates are not recorded for this entry.

Name	Distance from Site	Details
Kibblesworth Post Office	c. 355 m to the north	Accepted waste type and dates are not recorded for this entry.

6.7 The approximate locations of the historical landfills in relation to the Site boundary are shown below on **Figure6:1.**

Figure 6:1: Historical Landfill Location Plan



7. GEOTECHNICAL OVERVIEW

7.1 The Groundsure report, site history, current site setting and geological information have all been considered in order to gain an understanding of the likely ground conditions and ground model at the site. These have been further considered, with reference to the proposed development, in order to provide an indication of the potential ground related risks/constraints and opportunities, as summarised out in Error! Reference source n ot found., which can be considered a Provisional Ground-related Risk Register.

Table 7:1: Ground Related Constraints & Opportunities

Potential Constraint / Opportunity	Explanation	Commentary
Topsoil and Made Ground	Topsoil is expected to be present across the majority of the site. Made Ground is expected to be present in areas associated with former colliery and opencast workings.	Topsoil may be suitable for reuse as such, in landscaping areas, site, subject to confirmation of chemical status and compliance with BS3882. Made Ground may be suitable for reuse as bulk general (engineered) fill, subject to; chemical status, earthworks' suitability and classification. This would need to be determined via ground investigation, testing, assessment and confirmation of potential restrictions on reuse associated with waste management licencing and/or materials management.
Mining	The site has a significant historical legacy associated with coal mining. A separate Coal Mining Risk Assessment has been produced to assess the risks and implications associated with these historical workings.	The CMRA has provided recommendation on easements around mine shafts/adits and highlighted the potential need for treatment of shallow mine workings prior to development.
Indicative Foundation Options	In consideration of the indicative ground conditions and foregoing commentary, several foundation options may be appropriate	Shallow "spread" foundations or mini piles are likely to be viable options within areas of natural soils for panels or ancillary buildings. Deeper foundations may be required where Glaciolacustrine Deposits are mapped. In areas of Made Ground associated with the historical mine workings, it is likely that a raft foundation may be viable for solar panels, subject to a comprehensive understanding of the conceptual ground model, site investigation, and in line with approval from the Mining Remediation Authority. Exclusion zones around mine shafts and adits have been recommended, however, this recommendation should be revisited considering the subsequent opencast workings. The foregoing preliminary advice is provided subject to sufficiently detailed and comprehensive ground investigation, sampling and testing, subsequent geotechnical assessment and design in accordance with Eurocode 7.
Buried Obstructions	Given the historical uses of the site there is limited potential for buried obstructions such as underground utilities and	Buried obstructions may require delineation, breaking out and removal from the ground within areas of proposed development. Subject to chemical suitability, it may be feasible to

Potential Constraint / Opportunity	Explanation	Commentary
	former foundations, however these may be present in the areas associated with the former colliery.	crush such material to appropriate gradings for re-use in the development.
Trees	Mature trees were noted on site, along the site boundaries and scattered around the site.	Foundations in close proximity to new or existing trees may need to be locally deepened beyond the zone of influence of tree roots and/or heave precautions adopted.
Concrete Classification	Ground conditions are expected to be pyritic based on the geology and may be aggressive to buried concrete.	As part of ground investigation works, appropriate sampling, testing and assessment should be undertaken in accordance with BRE Special Digest 1, Concrete in Aggressive Ground.
Ground Subsidence Risks	The Groundsure Report indicates a low to negligible risk on site associated with shrink/swell clays, running sands, collapsible deposits, landslides and dissolution of soluble rocks. A moderate compressibility risk is reported where Made Ground and Glaciolacustrine Deposits are mapped.	Ground investigation should include determination of the plasticity (and therefore volume change potential) of cohesive soils.
Drainage and Soakaways	Soakaways are unlikely to be viable at the site based on the underlying geology.	Should soakaways be considered as part of the drainage strategy, it is recommended that infiltration testing is undertaken in accordance with current guidance. Liaison with the Mining Remediation Authority would be required given the site location within the North-East Mining and Groundwater Constraints Area
UXO	A review of the unexploded ordnance risk maps available online indicates the site to be in an area at low risk from UXO. However, a decoy site was located near to the western boundary.	It would be prudent to obtain a UXO Report prior to intrusive investigations.

8. PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT

Introduction

8.1 The risk posed by any contaminants in soil or groundwater will depend on the nature of the hazard, the probability of exposure, the pathway by which exposure occurs, and the likely effects on the receptors. A contaminant is defined as a substance that has the potential to cause harm, while a risk is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance.

8.2 Three impact potentials exist for any given site, all of which need to be considered in a risk assessment, which are:

- The site impacting upon itself;
- The site impacting on its surroundings; and
- The surroundings impacting on the site.

8.3 The following sections discuss all the identified potential on and off-site sources, pathways and receptors in the context of the proposed development and plausible contaminant linkages which may represent a risk to identified receptors such as human health and/or controlled waters from the data gained from the desk study.

8.4 The assessment is qualitative and aimed to determine all likely contaminant linkages, with consideration of significance and allowing for uncertainties.

8.5 **Sources (S):** These are potential or known sources of contamination that may relate to a former land use or present site feature or process (e.g. fuel storage tanks).

8.6 **Pathways (P):** A pathway is defined as a mechanism or route by which a contaminant comes into contact with, or otherwise affects a receptor. Pathways by which the identified receptors may be impacted upon in the context of the proposed development.

8.7 **Receptors (R):** Receptors are defined as people, living organisms, ecological systems, controlled waters, atmosphere, structures and utilities that could be adversely affected by contaminant(s).

Conceptual Site Model

8.8 Consideration has been given to the likely sources, pathways and receptors which may be present, based on the information in the previous sections. These are presented in **Table 8:1** and **Table 8:2** and further information about the risk classification scheme is included within **Appendix 5**, with reference to CIRIA C552 '*Contaminated land risk assessment - a guide to good practice*'.

8.9 A tabulated version of the Preliminary CSM based on the desk study and site observations is presented in **Table 8:3.**

Table 8:1: Potential Sources of Contamination

Location	Potential Source	Contaminants of Potential Concern (CoPC)
On-site	**MADE GROUND** associated with the historical Kibblesworth Colliery, and opencast workings	• Heavy metals • Inorganics, such as cyanides, sulphates and nitrates • pH • Asbestos Containing Materials (ACMs) • Polycyclic aromatic hydrocarbons (PAHs) • Petroleum hydrocarbons • Methane, carbon dioxide
	ELECTRICITY SUB-STATION associated with the historical Kibblesworth Colliery	• Polychlorinated biphenyls (PCBs)
Off-site	**MADE GROUND** associated with the historical Kibblesworth Colliery, opencast workings, brick works and landfills.	• Heavy metals • Inorganics, such as cyanides, sulphates and nitrates • VOCs • SVOCs • PAHs • Petroleum hydrocarbons • Methane, carbon dioxide
	ELECTRICITY SUB-STATIONS in the surrounding area potentially associated with Kibblesworth Colliery	• Polychlorinated biphenyls (PCBs)

Table 8:2: Relevant Potential Pathways and Receptors

Receptors	Pathways
Human Health: • Future site users • Neighbouring public • Intrusive maintenance workers	• Dermal contact with soil or dust • Incidental ingestion of soil and/or dust • Inhalation of dust and/or fibres • Inhalation of vapours • Migration and accumulation of ground gas in enclosed spaces leading to inhalation or explosion
Controlled Waters: • Groundwater (Secondary Aquifers) • Surface waters (Strandy Burn, Coltspool Burn, unnamed drainage ditches & River Team)	• Leaching of soil contaminants • Vertical and lateral migration • Surface run-off
Property: • Underground utilities • Building structures	• Direct Contact • Accumulation and explosion of gas

8.10 A number of potential sources of contamination, identified during the review, are not considered likely to impact on the site. These are detailed below, along with the appropriate justification for not being included within the preliminary CSM:

- Several areas of potentially infilled land associated with an old quarry, ponds and reservoirs have been identified in the surrounding area. Given the age of these potentially infilled features, they are considered unlikely to have a significant ground gas generating potential and are not considered further within the CSM.

Table 8:3: Preliminary Conceptual Site Model

Source	Pathway	Receptor	Con	Prob	Risk	Potential Mitigation/Investigation Requirements
On-site sources as detailed in **Table 8:1**.	Dermal contact with, and incidental ingestion of soil and/or dust. Inhalation of dust and/or fibres.	Future site users	Md	Lw	M/L	The presence of Made Ground across the site represents a potential risk to human health, however, given the limited exposure pathways to the end users, the probability remains low. Where hardstanding will be present across the site this will limit the potential for direct contact with, and minimise dust generation from potentially contaminated soils at the site post construction. In areas of soft landscaping the provision of a clean capping layer would restrict direct access to potentially contaminated soils. It is recommended that an intrusive ground investigation be completed in order to assess the extent of any potential contamination at the site.
		Intrusive maintenance workers	Md	Lw	M/L	The exposure of intrusive maintenance workers can be mitigated by the adoption of suitable working methods, utilising appropriate personal protective equipment (PPE) and maintaining good hygiene. If significant asbestos is recorded, the requirements of the Control of Asbestos Regulations (CAR) 2012 should be complied with.
	Migration and accumulation of ground gases in enclosed spaces leading to asphyxiation (carbon dioxide) or explosion (methane).	Future site users	Md	Li	M	The presence of Made Ground and underground coal workings represents a potential source of ground gas. Considering the nature of the development, there are limited proposed enclosed spaces where ground gasses could accumulate and represent a risk to human health. Ground investigation should include the installation of ground gas monitoring wells in order to determine the risk posed from ground gases where enclosed spaces are proposed near to Made Ground and/or underground coal workings.
	Leaching and permeation through soil profile. Vertical and lateral migration of contaminants.	Groundwater: Underlying Secondary Aquifers	Md	Ul	L	The presence of Made Ground represents a potential risk to controlled water receptors. Additionally, the Mining Remediation Authority are actively remediating the groundwater under the site, which indicates that the aquifer is of reduced quality. However, based on the underlying soils comprising predominantly cohesive soils, contaminant migration towards receptors is reduced. A ground investigation should be undertaken to quantify the risk to controlled waters.
	Lateral migration of contaminated groundwater.	Surface water receptors	Md	Ul	L	

Source	Pathway	Receptor	Con	Prob	Risk	Potential Mitigation/Investigation Requirements
	Direct contact.	Water utility pipes	Md	Lw	M/L	Organic compounds in the shallow soils could taint the water supply. A ground investigation and subsequent laboratory analysis should be undertaken to inform the design of new services.
		Buried structures/ foundations.	Md	Lw	M/L	Sulphates and low pH in the ground could accelerate the degradation of buried concrete structures (e.g. foundations). Ground investigation should include an assessment of the concrete design class.
Off-site sources as detailed in **Table 8:1**.	Inhalation of vapours.	Future site users	Md	Ul	L	It is unlikely that an off site source of vapours exists which could impact upon human health receptors on site. This should be confirmed through ground investigation at boundary locations adjacent to the off site landfills.
	Migration and accumulation of ground gases in enclosed spaces leading to asphyxiation (carbon dioxide) or explosion (methane).	Future site users	Md	Li	M	Ground gas monitoring should be completed as part of an intrusive ground investigation in order to characterise the ground gas regime at the site. Where possible, monitoring wells should be located along the site boundaries in order to delineate any potential contamination.
	Lateral migration of contaminated groundwater.	Groundwater: Underlying Secondary Aquifers	Md	Lw	M/L	It is possible that contaminated groundwater could migrate from the adjacent landfill onto the site. Where possible, groundwater monitoring wells should be located along the site boundaries in order to delineate any potential contamination.

VH = Very High, H = High, M = Moderate, M/L = Moderate/Low, L = Low, VL = Very Low

KEY: Sv = Severe, Md = Medium, Mi = Mild, Mr = Minor, Hi = High, Li = Likely, Lw = Low Likelihood, Ul = Unlikely

Contaminant linkage Assessment Summary

When considered in the context of the conceptual site model and the historical activities that have taken place (former colliery and opencast workings), the proposed development is considered to pose a **MODERATE** risk to human health. It is considered that the main driver for the risk rating for human health is the potential for elevated ground gasses associated with the Made Ground and underground coal workings.

The risk posed to controlled waters is predominantly considered to be **LOW** based on the reduced quality of the underling aquifer which is being remediated by the Mining Remediation Authority.

It is recommended that a ground investigation be undertaken to quantify the identified contaminant linkages and assess likely mitigation measures.

9. CONCLUSION AND RECOMMENDATIONS

Conclusions

9.1 The site currently comprises undeveloped agricultural land. A groundwater treatment pump is located adjacent to the southern boundary with the village of Kibblesworth to the north.

9.2 Since the earliest available mapping dated 1855 Kibblesworth Colliery is indicated to have been present within the central portion of the Site and the Pon and Jarrow Railway line has been present adjacent to the northern boundary of the western, central and eastern portions with associated lines on-Site connecting to Kibblesworth Colliery. Since at least 1895 Kibblesworth Colliery was indicated to have included associated reservoirs, railways lines and sidings, shafts and a spoil heap and by at least 1938 Glamis Pit is shown to have been present partially on-Site. By 1982 the former Kibblesworth Colliery was shown to be disused, and by 1988 the eastern and central portions of the Site, including the location of the former colliery were shown to comprise opencast workings. A pumping station was shown to be present at the location of the former Glamis Pit since at least 1988.

9.3 The northern and western portions of the Site are generally indicated to have comprised undeveloped agricultural land since the earliest available historical mapping dated 1855.

9.4 BGS mapping indicates that Made Ground is present in central/eastern areas associated with a former colliery and opencast mine. Made Ground is also mapped in the north and west associated with former opencast workings. Superficial deposits predominantly comprise Till, with Glaciofluvial and Glaciolacustrine Deposits in the west and east respectively. Underlying bedrock comprises the Pennine Middle Coal Measures Formation, with three coal seams sub-cropping in the eastern half of the site.

9.5 Shallow "spread" foundations or mini piles are likely to be viable options within areas of natural soils for panels or ancillary buildings. Deeper foundations may be required where Glaciolacustrine Deposits are mapped. In areas of Made Ground associated with the historical mine workings, a raft foundation may be viable for solar panels, subject to a comprehensive understanding of the conceptual ground model, site investigation, and in line with approval from the Mining Remediation Authority. Exclusion zones around mine shafts and adits have been recommended, however, this recommendation should be revisited considering the subsequent opencast workings.

9.6 The proposed development is considered to pose a moderate risk to human health with the main driver for the risk rating for human health relating to the potential for elevated ground gasses associated with the Made Ground and underground coal workings.

9.7 The risk posed to controlled waters is predominantly considered to be low based on the reduced quality of the underling aquifer which is being remediated by the Mining Remediation Authority.

Recommendations

9.8 A ground investigation should be undertaken at the site to confirm ground conditions at the site, determine the ground gas regime, allow for in-situ and laboratory testing to quantify contaminant linkages and inform foundation design.

9.9 Ground investigation will be required to inform the risk associated with underground and shallow coal mining.

9.10 It would be prudent to obtain a UXO Report prior to intrusive investigations.

10. REFERENCES

1. BS 10175:2026 Investigation of potentially contaminated sites. Code of practice. British Standards Institution, 2017.

2. CIRIA C552 *Contaminated land risk assessment. A guide to good practice*. Rudland, D J, Lancefield, R M, Mayell, P N, 2001.

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6. The Control of Asbestos Regulations. Health and Safety Executive, 2012.