EARTH ENVIRONMENTAL & GEOTECHNICAL

Coal Mining Risk Assessment

Stairfoot

Barnsley

June 2020

On behalf of

NORIKER POWER

Earth Environmental & Geotechnical Ltd
Houldsworth Mill Business Centre
Houldsworth Street
Stockport
SK5 6DA

Tel : 01619756088

Email
headoffice@earthenvironmental.co.uk

www.earthenvironmental.co.uk

COAL MINING RISK ASSESSMENT

STAIRFOOT

BARNSLEY

FOR

NORIKER POWER

Earth Environmental & Geotechnical Ltd
Houldsworth Mill Business & Arts Centre
Houldsworth Street
Stockport
SK5 6DA

www.earthenvironmental.co.uk

Tel 0161 9756088

Report No. A3520/20 **JUNE 2020**

Report Title:	**Stairfoot, Barnsley**	
Report Reference:	**A3520-20**	
Client:	**Noriker Power**	
Issue Date:	**7th June 2020**	
Drafted By:	**E Czarnecki**	
Reviewed By:	**A Czarnecki BSc (Hons) CGeol**	A Czarnecki
Authorised By:	**A Czarnecki BSc (Hons) CGeol**	A Czarnecki

This document has been prepared for the titled project (or named part thereof) and should not be relied upon or used for any other project without an independent check being carried out as to its suitability and prior written authorisation being obtained from Earth Environmental & Geotechnical. Earth Environmental & Geotechnical accepts no responsibility or liability for the consequences of the use of this document, wholly or in part, for any other purpose than that for which it was commissioned. Any persons so using or relying upon this document for such other purpose do so at their own risk.

This report was prepared for the sole use of the Client and shall not be relied upon or transferred to any other party without the express written authorisation of Earth Environmental & Geotechnical. It may contain material subject to copyright or obtained subject to license; unauthorised copying of this report will be in breach of copyright/license.

The findings and opinions provided in this document are given in good faith and are subject to the limitations imposed by employing site assessment methods and techniques, appropriate to the time of investigation and within the limitations and constraints defined within this document. The findings and opinions are relevant to the dates when the assessment was undertaken but should not necessarily be relied upon to represent conditions at a substantially later date.

The findings and opinions conveyed in this report are based on information obtained from a variety of sources as detailed and which Earth Environmental & Geotechnical assumes to be reliable but have not been independently confirmed. Therefore, Earth Environmental & Geotechnical cannot and does not guarantee the authenticity or reliability of third-party information it has relied upon.

Where opinions expressed in this report are based on current available guidelines and legislation, no liability can be accepted by Earth Environmental & Geotechnical for the effects of any future changes to such guidelines and legislation.

The limitations of liability of Earth Environmental & Geotechnical for the contents of this document have been agreed with the Client, as set out in the terms and conditions of offer and related contract documentation.

EARTH ENVIRONMENTAL & GEOTECHNICAL

CONTENTS

1.0 INTRODUCTION 1
Appointment 1
Objective 1
Sources of Information 2
2.0 SITE LOCATION AND DESCRIPTION 3
3.0 ASSESSMENT OF DATA 4
Geological Information 4
Coal Authority Records 5
4.0 COAL MINING RISK ASSESSMENT 7
Scope of Coal Mining Risk Assessment 7
Data Limitations 7
Coal Mining Risks 7
Conclusions 8
Proposed Mitigation Strategy 8

APPENDICES

Appendix 1 Coal Authority Consultants Mining Report
Appendix 2 Report Limitations

FIGURES

Figure 1 Development Layout Plan
Figure 2 Site Location Plan
Figure 3 Site Photograph
Figure 4 Geological Map Extract
Figure 5 Coal Authority Map Extract
Figure 6 1892 Map Extract

1.0 INTRODUCTION

Appointment

1.1 Earth Environmental & Geotechnical Ltd have been commissioned by Noriker Power (the Client), to undertake a Coal Mining Risk Assessment for a proposed site near Barnsley.

1.2 It is understood that the Client intends to build a battery storage facility including substations, transformers and engines alongside other energy features and welfare facilities.

1.3 A proposed development plan has been provided and is shown as Figure 1 below.

Figure 1 Site Location Plan

1.4 This Coal Mining Risk Assessment is required to accompany a future planning application to Barnsley Metropolitan Borough Council.

Objective

1.5 The purpose of the Coal Mining Risk Assessment is to collate available geological, mining and historical data in order to assess the potential for the site to be affected by underground mining. This report has been drafted in accordance with the Coal Authority (CA) Coal Mining Risk Assessment Template, January 2011.

Sources of Information

1.6 The Coal Mining Risk Assessment compiles a review of the following information sources:

- British Geological Survey of England, SE30NE, 1/10,000, 1981 edition.
- British Geological Survey of England, Barnsley Sheet 87, 1/50,000, 2008 edition.
- Coal Authority Interactive Map Viewer.
- Coal Authority Mining Report.
- British Geological Survey online borehole records.
- Google Earth imagery.
- Online Historical Ordnance Survey maps.
- Site Investigations in Areas of Mining Subsidence, FG Bell, 1975.
- The threat of abandoned mines on the stability of urban areas, Barry Clarke, IAEG2006 Paper Number 379, The Geological Society of London, 2006.
- The collapse of shallow coal mine workings, Durham theses, Durham University, Garrard, 1981.
- Construction over abandoned mineworking's, CIRIA Special Publication 32, 2002.
- Abandoned Mineworking's Manual, CIRIA 2019.
- The Pennine Lower and Middle Coal Measures formations of the Barnsley district, Geology & Landscape Southern Britain Programme Internal Report British Geological Survey IR/06/135, 2006.
- Rogers Geotechnical Services, Coal Mining Risk Assessment, 125 Butterthwaite Lane Sheffield, June 2017.
- Planning Application 2107/0117 for erection of battery storage facility, Hopewell Street, Barnsley.

2.0 SITE LOCATION AND DESCRIPTION

2.1 The site is located 1.18km north west of Stairfoot on Oaks Lane, Cundy Cross. The approximate National Grid Reference for the centre of the site is SE36641 06107 with the closest postcode being S70 3ES.

2.2 A location plan is shown below as Figure 2 together with a site photograph as Figure 3 (overleaf).

Figure 2 Site Location Plan

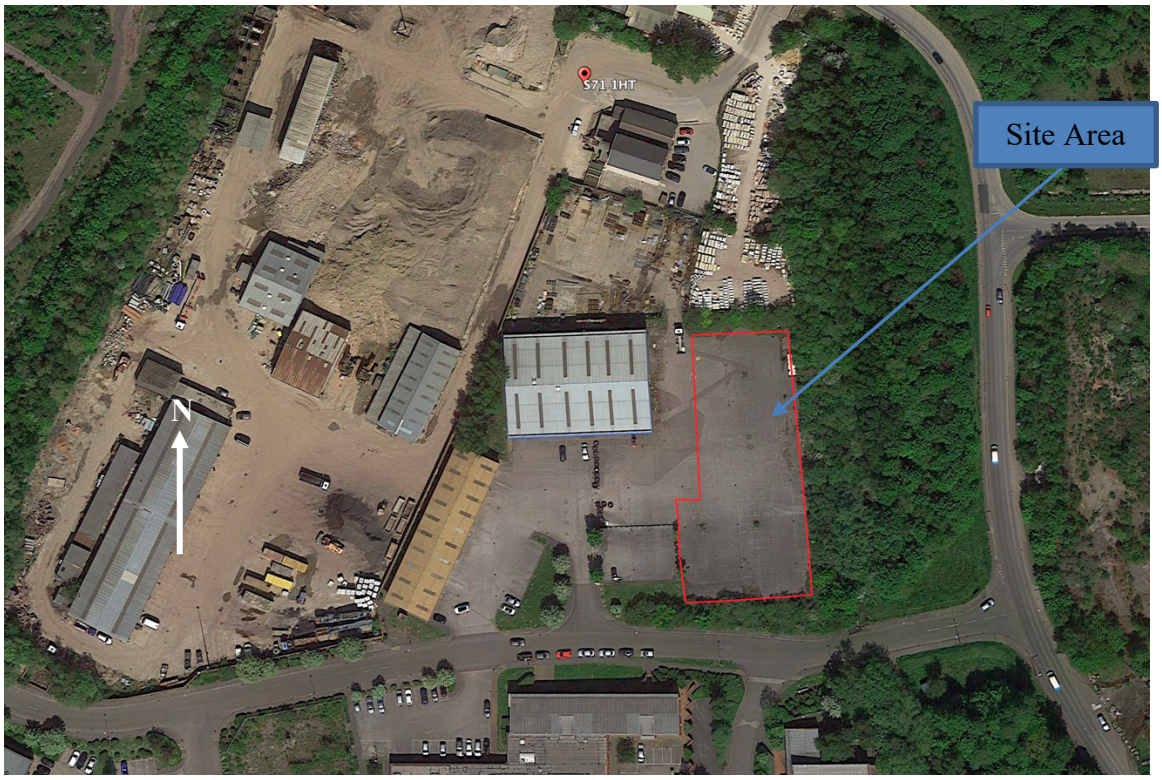


Figure 3 Site Photograph

3.0 ASSESSMENT OF DATA

Geological Information

3.1 The geology of the site has been determined from geological maps for the area and examination of Coal Authority (CA) records.

British Geological Survey Published Data Assessment

3.2 The site is not underlain by superficial deposits.

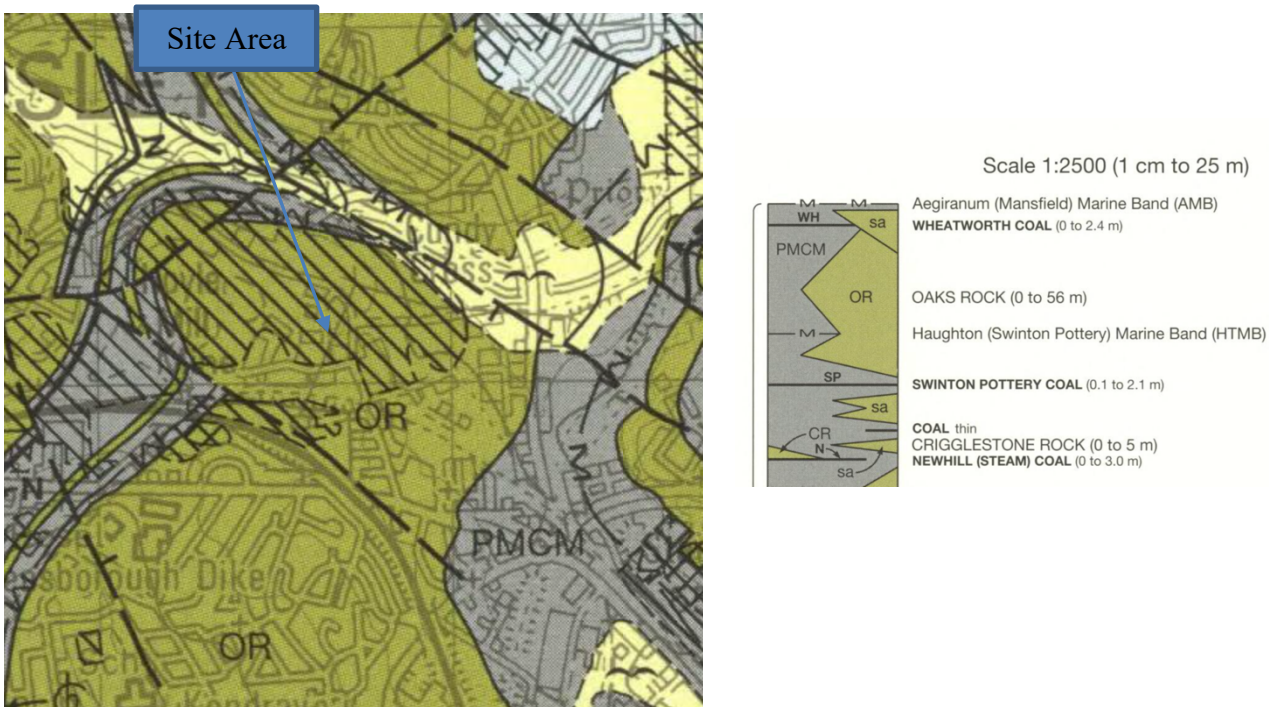
3.3 The solid geology beneath the site is shown to be the Oaks Rock Sandstone.

3.4 There are no BGS borehole records that allow for further assessment of the local geology or shallow coal mining regime.

3.5 An extract from the most recently published geological map showing the approximate site location and key local geological features are presented below in Figure 4.

3.6 The site is located in an area of made ground associated with colliery spoil and landfill.

Figure 4 Geology Map Extract



Coal Authority Records

3.7 Reference to the Coal Authority Online Interactive viewer shows the site to be located in a Development High Risk Area and area of Probable Shallow Coal Mineworkings.

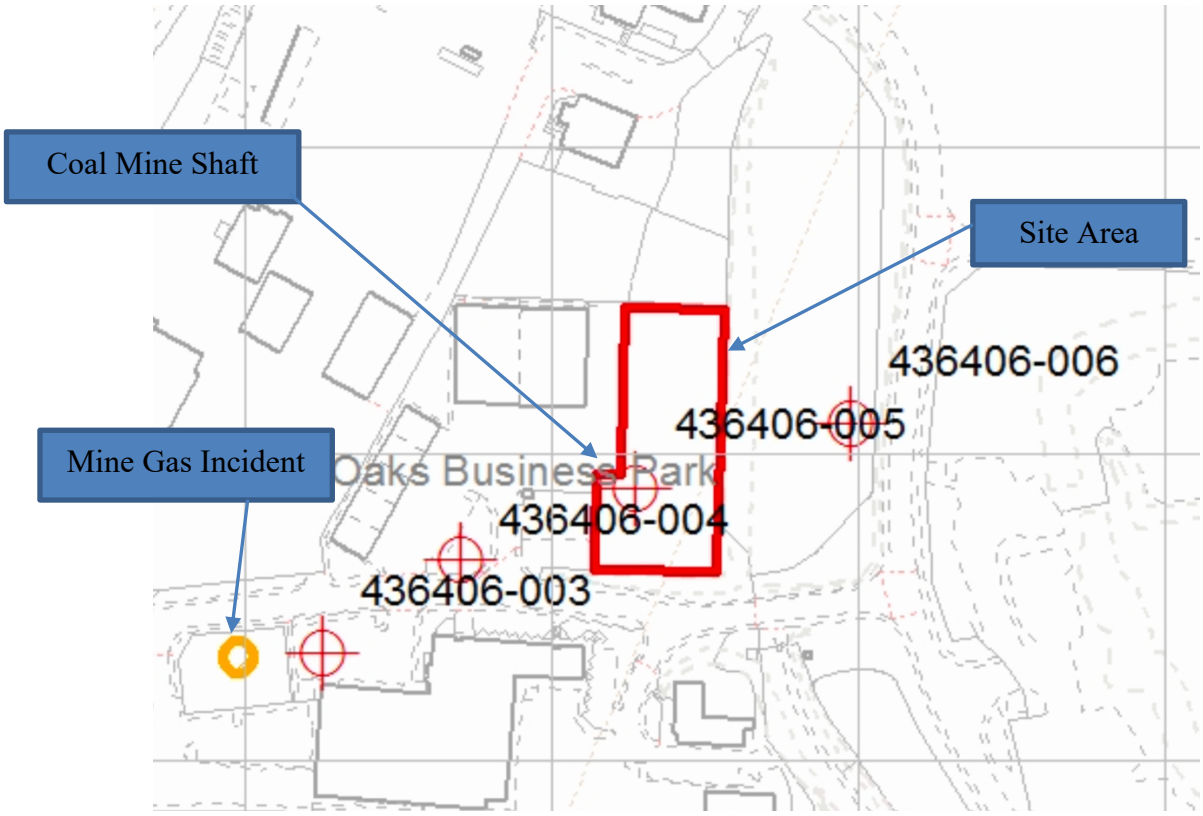
3.8 A Coal Authority Mining Report (extract shown as Figure 5) has been acquired for the site and reveals that there are proven records of past underground mine workings beneath the site, with the shallowest seam beneath the site being the Barnsley Main. The 0.91m thick coal seam was last mined in 1897 at a depth of 147m.

3.9 The report states that probable unrecorded shallow workings are also present associated with a coal mine shaft on the site. The coal mine shaft (43606-005) is an air shaft and has not been treated. The record has a departure (accuracy) of 5m with the centre of the shaft at grid reference 436628 406089.

3.10 A mine gas incident is located 114.4m to the west of the site.

3.11 There are no records of any outcrops, managed tips, site investigations, remediated sites, areas of coal mining subsidence within 50m of the site.

Figure 5 Coal Authority Map Extract

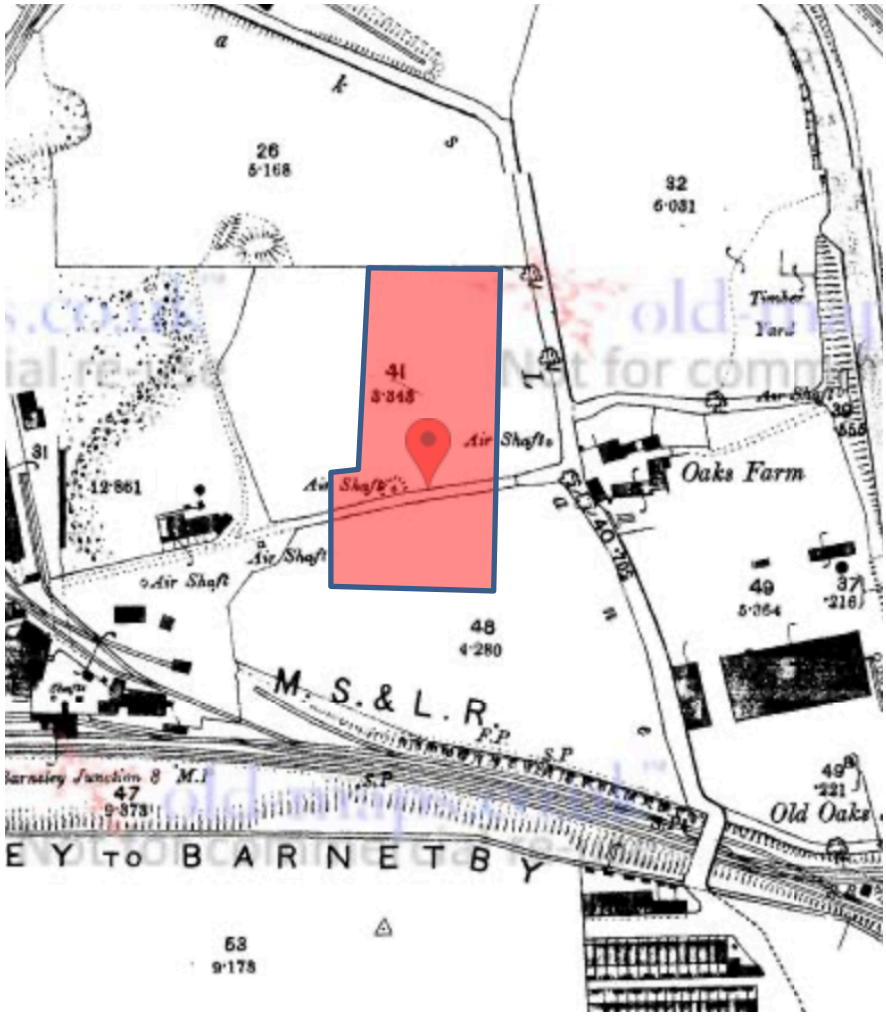


Historical information

3.12 The available historical plans dating back to 1854 show coal mining features on the site. On the 1892 edition (Figure 6) an air shaft is shown associated with the nearby Oaks Colliery.

3.13 In 1931 the map shows extensive colliery spoil on the site associated with Barnsley Main Colliery. This colliery spoil masks the air shaft on the site.

Figure 6 1892 Map Extract



4.0 COAL MINING RISK ASSESSMENT

Scope of Coal Mining Risk Assessment

4.1 Objectives of the coal mining risk assessment are to provide a desk-based assessment of available geological and mining information relating to the site (and wider area) and to use this information so as to identify risks present to the development from the legacy of mining.

4.2 As part of the risk assessment, potential mitigation measures (if required) should be considered, including any necessary remedial works.

4.3 The outcome of the risk assessment should demonstrate to the Local Authority that the proposed development is or can be made safe (and stable) to meet the requirements of the National Planning Policy Framework (NPPF).

Data Limitations

4.4 It should be appreciated that it did not become a legal requirement to deposit coal mining abandonment plans until the 1870's and that this requirement was not rigorously enforced for some time after. Many shallow coal seams were worked prior to the introduction of first edition Ordnance Survey Maps and information on these workings is often not available. Therefore, if coal seams were accessible then there is the potential that they could have been worked by formal or informal means.

4.5 It is also possible that if unrecorded workings are present then unrecorded mine entries may be present.

Coal Mining Risks

4.6 The risks associated with coal mining are as follows:

- Collapse of relict workings beneath buildings causing damage to the building fabric and infrastructure.
- Migration of mine gases from old mine workings and mine entries resulting in accumulation of flammable and asphyxiating gases in confined areas.
- Consolidation of relict workings and overlying strata causing structural defects in building fabric and infrastructure.
- Failure of mine entries causing loss of ground beneath building and external areas.
- Spontaneous combustion of old mine workings.

Conclusions

4.7 The development area lies within a Coal Authority Development High Risk Area and Probable Shallow Coal Mineworkings associated with an abandoned coal mine shaft on the site. The shaft probably extended to workings at a depth of 147m below ground level.

4.8 The site is located close to a former mine gas incident.

Proposed Mitigation Strategy

4.9 It would be prudent to prove and investigate the location and depth of the abandoned coal mine shaft on the site. Due to the thickness of the anticipated colliery spoil the proving of the shaft location will need to be by rotary open hole drilling.

4.10 Depending on the development layout the shaft may need to be fully grouted or capped.

4.11 The site investigation will require a permit from the Coal Authority with the submission of a method statement and risk assessment.

4.12 As part of the site investigation it would be prudent to emplace ground gas monitoring installations.

4.13 This report should allow for planning permission to be granted with relevant conditions.

APPENDIX 1

COAL AUTHORITY MINING REPORT

APPENDIX 2

REPORT LIMITATIONS

REPORT LIMITATIONS

This contract was completed by Earth Environmental & Geotechnical Ltd on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with all reasonable skill, and care, bearing in mind the project objectives, the agreed scope of works, the prevailing site conditions, the budget and staff resources allocated to the project.

Other than that, expressly contained in the above paragraph, Earth Environmental & Geotechnical Ltd provides no other representation or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Earth Environmental & Geotechnical Ltd.

If a third party relies on this report, it does so wholly at its own and sole risk and Earth Environmental & Geotechnical Ltd disclaims any liability to such parties.

It is Earth Environmental & Geotechnical Ltd understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was an important factor in determining the scope and level of the services. Should the purpose for which the report is used, or the proposed use of the site change, this report will no longer be valid and any further use of, or reliance upon the report in those circumstances by the client without Earth Environmental & Geotechnical Ltd review and advice shall be at the client's sole and own risk.

The report was written in 2020 and should be read in light of any subsequent changes in legislation, statutory requirements and industry best practices. Ground conditions can also change over time and further investigations or assessment should be made if there is any significant delay in acting on the findings of this report. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of Earth Environmental & Geotechnical Ltd. In the absence of such written advice of Earth Environmental & Geotechnical Ltd, reliance on the report in the future shall be at the client's own and sole risk. Should Earth Environmental & Geotechnical Ltd be requested to review the report in the future, Earth Environmental & Geotechnical Ltd shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between Earth Environmental & Geotechnical Ltd and the client.

The observations and conclusions described in this report are based solely upon the services that were provided pursuant to the agreement between the client and Earth Environmental & Geotechnical Ltd. Earth Environmental & Geotechnical Ltd has not performed any observations, investigations, studies or testing not specifically set out or mentioned within this report.

Earth Environmental & Geotechnical Ltd is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, Earth Environmental & Geotechnical Ltd did not seek to evaluate the presence on or off the site of electromagnetic fields, lead paint, radon gas or other radioactive materials.

The services are based upon Earth Environmental & Geotechnical Ltd observations of existing physical conditions at the site gained from a walkover survey of the site together with Earth Environmental & Geotechnical Ltd interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and whilst Earth Environmental & Geotechnical Ltd have no reason to doubt the accuracy and that it has been provided in full from those it was requested from, the items relied on have not been verified.

No responsibility can be accepted for errors within third party items presented in this report. Further Earth Environmental & Geotechnical Ltd was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Earth Environmental & Geotechnical Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to Earth Environmental & Geotechnical Ltd and including the doing of any independent investigation of the information provided to Earth Environmental & Geotechnical Ltd save as otherwise provided in the terms of the contract between the client and Earth Environmental & Geotechnical Ltd.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable and as investigation excavations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and Earth Environmental & Geotechnical Ltd] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The normal speed of investigation usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site.