

LCRM: Stage 1 Risk Assessment

LAND OFF BURY OLD ROAD, DARN HILL, HEYWOOD

Project Ref: GUK-0224-05

For: Built Developments Limited



GROUNDSMITHS
GEOTECHNICAL ENGINEERS



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PROJECT:
Residential Development

SITE REFERENCE:
Land off Bury Old Road
Darn Hill
Heywood

REPORT REFERENCE:
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CONTENTS

SUMMARY & RECOMMENDATIONS

1	INTRODUCTION	7
1.1	Appointment.....	7
1.2	Report Context and Status	7
1.3	Objectives	7
1.4	Scope of Works	8
1.5	Previous Ground Investigation Reports.....	8
1.6	Limitations of Study	8
2	SITE SETTING	9
2.1	Details & Description	9
2.2	Anticipated Geology & Hydrogeology	9
2.3	Designations	12
2.4	Environmental Records	13
2.5	Site History.....	14
3	PRELIMINARY ENGINEERING APPRAISAL	15
3.1	Soils.....	15
3.2	Landslip (Mass Movement Deposits)	15
3.3	Foundations	16
3.4	Floor Construction	16
3.5	Heave Precautions.....	17
3.6	Slope Stability	17
3.7	Superstructure Precautions.....	17
3.8	Excavation.....	17
3.9	Natural Ground Subsidence.....	17
3.10	Obstructions	18
3.11	Concrete	18
3.12	Stress Relief	18
3.13	Pavement.....	18
3.14	Site Drainage.....	18
4	PRELIMINARY ENVIRONMENTAL APPRAISAL	19
4.1	Introduction	19
4.2	Potential Sources of Contamination.....	19
4.3	Potential Migration Pathways	20
4.4	Potential Receptors	20
4.5	Environmental Risk Assessment	21
5	FURTHER WORKS	27
5.1	Introduction	27
5.2	Objectives of Investigation	27
5.3	Proposed Methods of Investigation	28
5.4	Testing	28
5.5	Outline Remediation Requirements.....	29
6	REGULATORY APPROVAL	31



7	INFORMATION SOURCES.....	32
8	REPORTING LIMITS	34

TABLES

Table 2.1 - General Site Details	9
Table 2.2 - Published Geological Conditions	9
Table 2.3 - Summary of Designations & Other Potential Actions	12
Table 2.4 - Environmental Data.....	13
Table 2.5 - Summary of Principal Historical Ordnance Survey Features	14
Table 4.1 - Summary of Potential Sources and Contaminants	20
Table 4.2 - Summary of Plausible Pathways.....	20
Table 4.3 - Summary of Potential Receptors.....	21
Table 4.4 - Risk Categorisation	22
Table 4.5 - Summary of Environmental Risk (Current Site Condition without Mitigation).....	24
Table 5.1 - Phase 2 Investigation Recommendations	28

PLATES

1 – 6	GENERAL SITE PHOTOGRAPHIC LAYOUT
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APPENDICES

APPENDIX A:	ENVIRO+GEOINSIGHT REPORT
APPENDIX B:	HISTORICAL ORDNANCE SURVEY PLANS
APPENDIX C:	COAL AUTHORITY CONSULTANTS COAL MINING REPORT



SUMMARY & RECOMMENDATIONS

This summary presents the salient points of the report but should not be referred to in isolation of the body text. There will be other information contained within the report which puts into context the findings of the Executive Summary. No reliance should therefore be placed on the Executive Summary until the report has been read in full. The recommendations given are considered reasonable based on available information and the assessment of the Site as carried out by Groundsmiths (UK) Ltd at this time.

1 ENVIRONMENTAL CONSTRAINTS

Ground Investigation: A general environmental ground investigation is considered necessary given the current status and proposed end use of the development in relation to the identified levels of risk.

Biogenic Ground Gases: Risk from carbon dioxide and/or methane is currently anticipated based on the Site's environmental setting, although this should be confirmed through Site-specific monitoring. A BS8485 Characteristic Situation 2 determination for the Site is therefore postulated at this time.

Radon: No radon precautions are indicated to be required in construction, although this should be confirmed with Building Control in relation to any specific requirements they may have.

General Soil Contamination: A general check on contaminant levels should be undertaken within the remit of an intrusive ground investigation.

Asbestos in Soil: The presence of any asbestos fibres within the general on-Site made ground soils should be confirmed as part of an intrusive ground investigation.

Remediation Requirements: An LCRM Stage 3 Remedial Strategy incorporating current YALPAG guidelines would need to be issued to the Local Planning Authority to address any soils and/or ground gas remediation requirements. Validation reporting would also be needed on a separate basis, once the remedial works had been completed.

Risk to Construction Workers: All works to be undertaken should be specifically assessed as part of a health and safety evaluation to mitigate the exposure of workers to any dusts and fibres as may be generated during development.

Controlled Waters Receptors: Risk from the off-site discharge of any leachable contaminants is considered to be very low. Further assessment is considered unlikely to be required.

Invasive Plants Species: Risk from invasive plant species is not expected, but should be independently confirmed as required.

2 GEOTECHNICAL & GENERAL DEVELOPMENT CONSTRAINTS

Ground Investigation: A formal geotechnical assessment will need to be carried out to confirm any made ground presence, in addition to assessing the nature of the underlying natural strata given the potential for variation with spatial extent and depth.

Buried Concrete: Protection to buried concrete products will be required where they come into contact with soils that exhibit levels of sulphate above DS1, although final design parameters should be discussed with the Designing Engineer following completion of laboratory testing.

Anticipated Foundation Type: A traditional spread foundation solution is anticipated at this time. However, consultation should be made with the Designing Engineer with respect to foundation design once ground investigation works have been completed.

General Ground Stability: Global slope stability problems are not expected, although due consideration should always be given to how other off-Site land could impact on the Site.



The instability of loose and/or weathered strata should be anticipated, particularly during prolonged periods of wet weather, where excavations are deep, or are left open for protracted periods of time.

Where there is the possibility of weak/unstable ground being present or passing across any boundary, a geotechnical risk assessment of the integrity/stability should be undertaken prior to excavation works being carried out. Designed and engineered temporary or permanent works should be deployed to ensure their continued stability, as necessary.

Heave Precautions: To mitigate against heave, foundations would need to be constructed in accordance with current guidelines where they are found to lie within influencing distance of removed, existing, or proposed planting when in cohesive soils.

Excavation Obstructions: Existing foundations would need to be grubbed-out accordingly where they impact upon new development.

Potable Water Supplies: Protection consistent with brownfield development (e.g. Protecta-Line) could potentially be required. This is to be confirmed.

Surface Water Drainage: The drainage proposals are not currently known. Should soakaways be proposed, infiltration testing in accordance with BRE365 would need to be completed. It should be noted, however, that it would not be appropriate for unstable, potentially unstable, or any contaminated soils to receive point-source flows of water from dedicated soakaways.

Pavement: The minimum permitted design CBR is 2.5%. It is recommended at this stage that this conservative value for subgrade be used. In situ field or laboratory testing should be completed as required. Frost susceptibility should be assumed.

Archaeology: The need for archaeological monitoring has not been identified within the remit of this assessment.

3 MINING LEGACY CONSTRAINTS

Coal Authority data indicates that there are no records of past underground mining within the zone of likely physical influence, no probable unrecorded shallow workings at <30m below ground level, no mine entries within 100m, no on-Site coal outcrops, or any records of coal mining subsidence. Risk from shallow coal mining would not therefore be expected on this basis.



1 INTRODUCTION

1.1 Appointment

Groundsmiths (UK) Ltd ('Groundsmiths') were appointed by Built Developments Limited (the 'Client') to provide professional services in relation to the preliminary geotechnical and geo-environmental assessment of land located off Bury Old Road, Darn Hill, Heywood (herein referred to as the 'Site').

Groundsmiths have prepared this report for the sole use of the Client that commissioned it in accordance with the agreement under which our services are performed. No other warranty, expressed or implied, is made as to the professional advice included in this report. Any unauthorised third parties using the information presented in this report do so entirely at their own risk and are duly excluded from any warranty, duty of care or skill.

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1.2 Report Context and Status

It is understood that it is the Client's intention to redevelop the Site for residential end use, with this comprising residential housing with associated parking and private garden curtilage. The aim of this report, therefore, is to present a preliminary assessment of the geotechnical and land contamination status of the Site in relation to its proposed redevelopment.

The assessment given herein follows a technical review of currently available published geological, hydrogeological, mining legacy, and geo-environmental records, with works being completed in accordance with the general requirements of BS10175 ^[1], BS5930 ^[2] and Land Contamination Risk Management ('LCRM') guidance ^[3] (which replaced CLR11 in October 2020).

Notwithstanding the provision of discourse on any general construction matters that may apply, the assessment includes potential sources of historic ground contamination, anticipated impacts on sensitive receptors, and identifies where any further risk assessment and/or other works are required to facilitate development within the framework of a generic residential with home-grown produce exposure scenario as defined by the Environment Agency ^[4].

Interpretation and recommendations given in this report should not be assumed valid for adjacent areas of land, or for alternate land use. Should the proposed Site usage change, the recommendations and conclusions presented in this report will need to be re-assessed in accordance with all current guidance.

1.3 Objectives

The primary objectives of this assessment were to:

- Obtain current information from published sources with respect to any environmental designations, SSSI, visual and cultural designations, and agricultural and/or habitat



designations as may exist on Site or within the immediate area of development.

- Obtain current information from published sources about the likely soil and groundwater conditions within the area of development.
- Identify and assess the potential for any ground related environmental hazards, including the potential for where any ground gas regime may represent constraints to the proposed development.
- Identify and assess the potential for any ground related geotechnical hazards to exist, including any mining legacy.
- Define a preliminary Conceptual Site Model ('CSM') of plausible source-pathway-receptor linkages and undertake a qualitative assessment to evaluate the level of risk associated with each linkage in accordance with the proposed development end use scenario.
- Outline preliminary development recommendations, and
- Provide advice on any additional stages of LCRM assessment that may need to be completed to satisfy the concerns of the regulatory authorities, this including Stage 1 generic or detailed quantitative risk assessment with ground investigation, Stage 2 options appraisal ^[5], and/or Stage 3 remedial actions ^[6].

1.4 Scope of Works

Assessment undertaken within the context of this report comprised a review of the following sources of information:

- British Geological Survey ('BGS') 1:50,000 scale series geological mapsheets ^[7,8]
- British Geological Survey Onshore GeoIndex records database ^[9]
- Emapsite - Enviro+GeoInsight Data Report (Appendix A) ^[10]
- Emapsite - Historical Ordnance Survey ('OS') Plans (Appendix B) ^[11]
- Coal Authority Consultant's Coal Mining Report (Appendix C) ^[12]

1.5 Previous Ground Investigation Reports

Groundsmiths are not aware of any historically issued ground investigation data that relates to the Site.

1.6 Limitations of Study

This appraisal has been undertaken subject to the limitations detailed in Section 8 and any other limitations stated specifically in the report text. Where further works are identified, these shall be completed within the framework of LCRM and/or any other current regulatory requirements.

No intrusive ground investigation works have been completed at this time.



2 SITE SETTING

2.1 Details & Description

A general summary of the Site's setting is given in Table 2.1, below. A general record of the Site area is indicated in Plates 1 to 6, as appended.

Table 2.1 - General Site Details

National Grid Reference	The National Grid Reference (NGR) for the Site is indicated to be 383473mE 410396mN.
Area of Development	The indicated area of development is approximately 0.5ha.
Ground Elevations	General topographic data indicates that the Site lies broadly at 135m AOD. Some localised variation should be assumed.
General Boundary Development	The Site lies within an established and predominantly residential area on the far western outskirts of Heywood. To the immediate south of the Site are the ground associated with the Our Lady & St. Paul's RC Primary School, whilst to the east, at a higher elevation by about 5m, is an open area of [former] sports playing field. Sutherland Road marks the western boundary, and Bury Old Road (and a strip of grass verge with various trees), the north. The wider area to the south of Bury Old Road comprises housing, whilst to the north is open undeveloped land that falls down towards the A58.
Invasive Species	Access to the Site was limited. No invasive plant species were observed, although further assessment should be completed by a specialist ecologist as required.

2.2 Anticipated Geology & Hydrogeology

A summary of the salient geological data for the Site is given in Table 2.2, below and overleaf.

Table 2.2 - Published Geological Conditions

Radon	Third party data indicates that between 1% and 3% of properties exceed the Radon Action Level in the area. No radon protective measures are indicated to be required in construction on this basis. This should be confirmed with Building Control as they may have different requirements.
Bedrock Faults	The nearest recorded fault line lies 49m to the north-east.
Coal	Salient information obtained from the Coal Authority indicates that there are no records of past underground mining within the zone of likely physical influence, no probable unrecorded shallow workings at <30m below ground level, no mine entries within 100m, no on-Site coal outcrops, or any records of coal mining subsidence. Risk from shallow coal mining would not therefore be expected on this basis.

Table Contd./

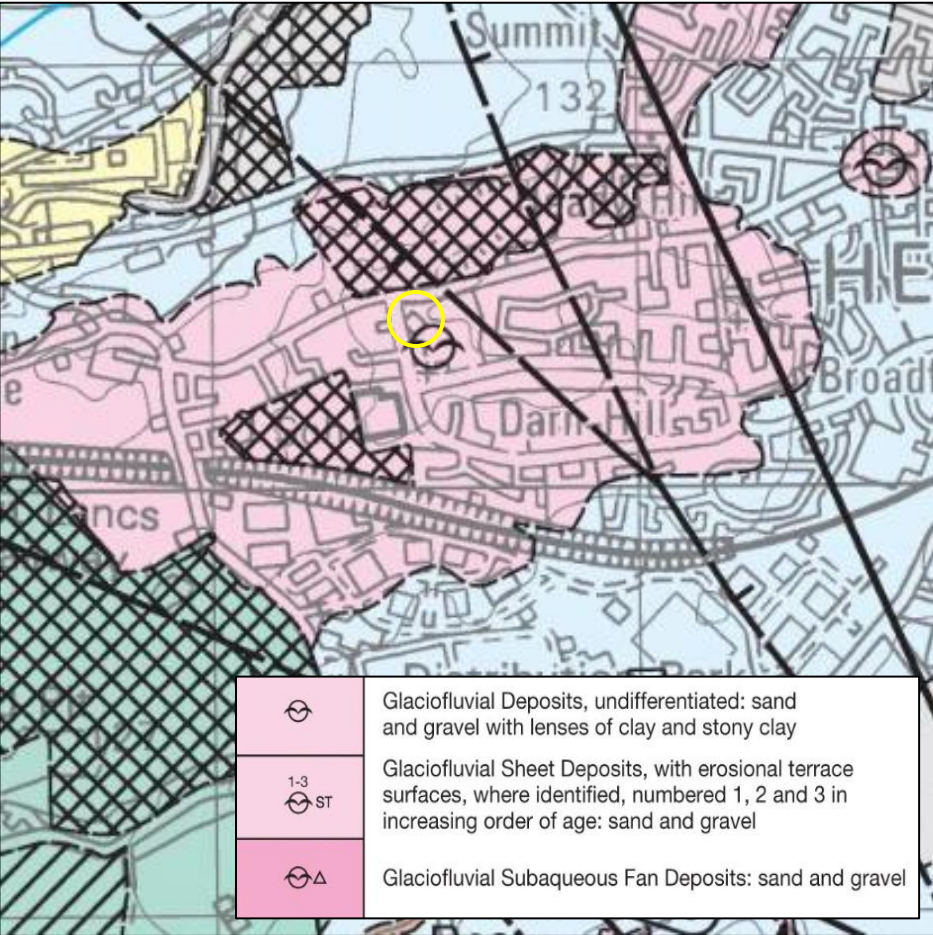


Infilled or Made
Ground Deposits

Third party information records the presence of made ground both on and immediately adjacent to the Site, with the presence of infilled ground (associated with former aggregates working) being situated to the north of Bury Old Road.

Superficial Geology

Data obtained from the BGS states that the Site is underlain by glaciofluvial deposits (sand and gravel) of the Devensian. These soils typically comprise coarse grained sediments with some localised finer-grained layers and horizons of clay, silt, and organic (peat) material. The thickness of these deposits, either on or within the immediate vicinity to the Site, is currently unknown and will need to be confirmed through ground investigation.



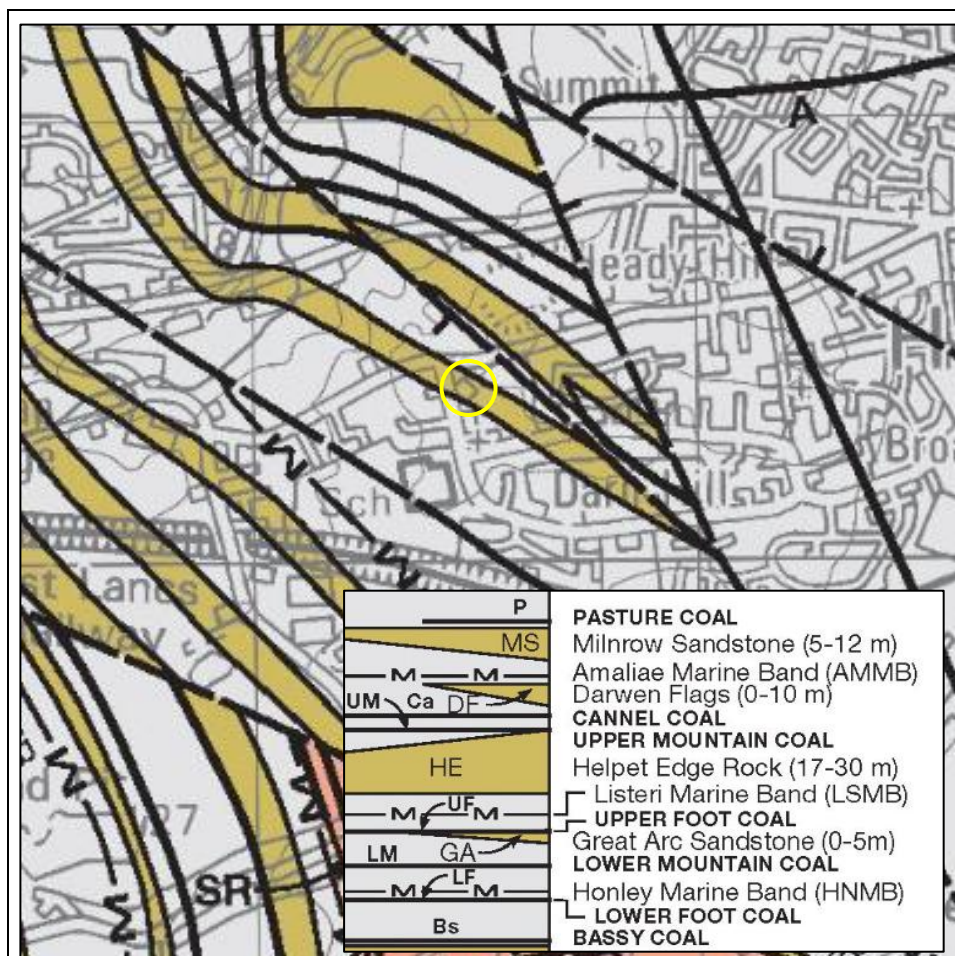
Source: BGS Map Sheet 85. Manchester (1:50,000 scale) (2011). Bedrock & Superficial Deposits.

Bedrock Geology

The solid geology underlying the majority of the Site is indicated to be sandstone of the Helpet Edge Rock (previously referred to as the Warmden Sandstone). Although variation across its field should be acknowledged, general records suggest this unit of rock to be grey-brown, fine- to coarse-grained, and large-scale cross bedded or massive. The north-eastern and south-western corners of the Site appear to be underlain by general Coal Measures mudstone deposits.

BGS data suggests that the dip of the bedrock is broadly towards the south-west, although some variation to this should be assumed given the presence of various faults within the local area.

Table Contd./



Source: BGS Map Sheet 85. Manchester (1:50,000 scale) (2010). Bedrock.

Hydrogeology

Aquifer within Superficial Deposits on Site: Secondary A (soils with permeable layers capable of supporting local water supplies, and potentially forming an important source of river base-flow. Previously classified as minor aquifers).

Aquifer within Bedrock on Site: Secondary A.

Source Protection Zones: The Site does not lie within a source protection zone.

Source Protection Zones within Confined Aquifers: There are no source protection zones within confined aquifers within at least 500m.

Groundwater Vulnerability Zones: The soil/surface leaching potential is classed as being low (<40% infiltration with >550mm/year dilution). Furthermore, the vulnerability of both the surficial geology and the bedrock geology is indicated to be low, too. Groundwater flow through the bedrock would be expected to be via secondary porosity.

Groundwater Vulnerability – Soluble Rock Risk: No soluble rocks are identified as being present beneath the Site.

Table Contd./



Hydrology

There are no recorded surface water features within at least 250m.

The Site is indicated to lie within a Water Framework Directive Surface Water Body catchment, this being associated with:

- River Roch (Spodden to Irwell) (Ref. GB112069064600).

Furthermore, the Site is indicated to lie within a Water Framework Directive Groundwater Body Catchment. Data provided by the Environment Agency^[13] indicates that the groundwater body associated with the 'Northern Manchester Carboniferous Aquifers' achieved an overall classification of 'Poor' in 2019.

2.3 Designations

The Enviro+GeoInsight report provides details on property-specific environmental designations in addition to other potential actions associated with non-environmental search returns such as planning constraints. The following salient information is presented in Table 2.3, below.

Table 2.3 - Summary of Designations & Other Potential Actions

SSSI	There are no statutory protection sites within at least 2km.
Ramsar	There are no records relating to conserved wetland areas under the Convention of Wetlands of International Importance within 2km.
SAC	There are no records of Special Areas of Conservation having been designated under the EC Habitats Directive within 2km.
SPA	There are no records of sites having been classified by the UK Government under the EC Birds Directive within 2km.
NNR	There are no records relating to important natural or semi-natural terrestrial ecosystems within 2km.
Nature Reserves	There are no local nature reserves within 2km.
Designated Woodland	There are no recorded areas of ancient woodland within at least 1.1km.
Green Belt	The nearest area of greenbelt lies 27m to the north of Bury Old Road.
Nitrate Sensitivity	There are no records relating to nitrate sensitive areas within at least 2km.
Nitrate Vulnerability Zones	There are no records relating to nitrate vulnerable zones within at least 2km.
Visual & Cultural Designations	There are no world heritage sites, areas of outstanding natural beauty, national parks, listed buildings, conservation areas, scheduled ancient monuments, or registered parks and gardens within at least 250m.
Habitat Networks	The nearest recorded priority habitat inventory (deciduous woodland) is located 216m to the north, whilst the nearest habitat network (Enhancement Zone 2) lies 70m south-west. There are no open mosaic habitats or limestone pavement orders within at least 250m.



Table Contd./

Archaeology

The potential for below-ground archaeology has not been identified within the remit of this study. Other assessments should be completed as required, if such studies are identified by the Local Planning Authority.

2.4 Environmental Records

A summary of salient published environmental data is presented in Table 2.4, below and overleaf.

Table 2.4 - Environmental Data

Landfill	Records indicate the presence of former landfill activity within 250m of the Site at the following: - From 38m north-east: Boo-Hole Sand Quarry Extension, Bury Old Road. Licensed wastes comprise inert, industrial, commercial, household, and special. Date of surrender was 18 th January 1991.
Flooding	Assessment of risk against flooding events is not within the remit of this study, so specialist advice should be sought as required, with all necessary studies and reports being completed to obtain regulatory sign-off. <u>River & Coastal Flooding:</u> There are no recorded Flood Zone 2 or Flood Zone 3 areas within 50m. <u>Surface Water & Groundwater Flooding:</u> The highest risk from on-Site surface water flooding and within 50m is indicated to be negligible. For groundwater flooding, risk for both on-Site and within 50m is indicated to be moderate.
Potable, Surface, and Groundwater Abstractions	There are no potable water, surface water, or groundwater abstractions within at least 625m.
Public Register of Contaminated Land	Within 500m there is one site determined as being Contaminated Land under Part 2A of the Environmental Protection Act (1990). This record relates to the former Boo-Hole Landfill situated to the north of Bury Old Road. It is understood that the landfill was remediated in 2009. Specific details about the remediation are unknown at this time.
Dangerous or Hazardous Sites	There are no historical COMAH recorded sites within 500m.
Radioactive Substances	There are no live radioactive substance authorisations within 500m.
Historical Fuel Sites	There are no records of historical petrol stations within 500m.
Garages/Workshops	There are no records of historical garage sites within 500m.

Table Contd./



National Grid	There are no records relating to National Grid high pressure gas transmission pipelines or high voltage underground electricity transmission cables within 500m.
Mine Gases	Mine gas emission requiring action by the Coal Authority is not anticipated. This does not preclude, however, the presence of any other biogenic ground gases that may be derived from other sources. Further assessment should be undertaken where indicated within the context of this report.

2.5 Site History

It is not the intention of this report to reproduce or describe in detail all of the changes that may have occurred on, or within a radius of 250m to the Site, although a general review of available historical OS maps has been undertaken to identify any potentially contaminative former land-uses that may significantly impact upon the proposed development. It should be noted that defined boundary on some of the maps may not fully align with the Site's position. Furthermore, some of the OS map editions may not be fully complete. It is possible, therefore, that additional land uses to those presented on the plans could have occurred in the past. A summary of the historical land use at the Site and within its surrounding area is presented in Table 2.5, below.

Table 2.5 - Summary of Principal Historical Ordnance Survey Features

Year	Principal On-Site Features	Principal Off-Site Features
1851-1891	The Site is shown to be open undeveloped farmland.	Surrounding land on the first edition OS plans is principally mapped as being open undeveloped farmland. The 1851 OS map indicates the presence of the Boohole Sand Pit to the far north, at a distance of about 300m.
1909-1938	The Site is shown to be open undeveloped farmland.	The 1909 OS plan indicates little change, although the Boohole Sand Pit is shown to have expanded. By c.1938 it had encroached into most of the fields to the north of Bury Old Road, whilst an adjoining pit to the west (Prettywood Sand Pit) had opened.
1956-1974	No change to the Site's use was recorded until c.1966. From this time, the Site is occupied by part of the Our Lady & St Paul School.	The 1957 OS plan shows the Prettywood Sand Pit to be disused. It is assumed that the Boohole Sand Pit was still operational. Housing is mapped as having been built to the far west of the Site at this time. The 1966 OS plan shows the rapid expansion of housing and infrastructure to the east, west and south of the Site. School playing fields lie to the immediate east, at a higher elevation.
1982-2001 2003-2024	No change to the Site's use is mapped until the most recent 2024 OS plan, which shows the Site to be disused. Other third party information suggests that the school closed in 2020.	No significant changes are mapped.



3 PRELIMINARY ENGINEERING APPRAISAL

3.1 Soils

Made Ground

Prior to the construction of the former school buildings, the Site was undeveloped and in use as farmland. It is assumed that construction of the school in the 1960's was such that foundations were on undisturbed natural ground, with excavation into these soils being undertaken to achieve a flat development plateau (the sports pitch to the immediate east, which sits higher than Site, is thought likely to be more indicative of the original ground level). On this basis, it is considered reasonable to assume, at this stage, that significant quantities of made ground are unlikely to be present within the Site's boundary.

The presence and nature of any made ground that could affect the proposed development is currently unknown, however, so the thickness, composition, and environmental condition of any such soil to be encountered should be assessed as part of a limited phase of intrusive ground investigation.

Natural Strata

BGS mapping indicates that the Site is underlain by glaciofluvial deposits. As indicated herein, these soils typically comprise coarse grained sediments with some localised finer-grained layers and horizons of clay, silt, and organic (peat) material. It could be, however, that this surficial material was largely removed at the time the Site was redeveloped for use as a school, in which case such material may not be present extensively. On this basis, it is possible that the underlying Helpet Edge Rock¹ could be encountered from shallow depth.

As with the made ground, it would be necessary to confirm the nature and strength profile of the natural strata as part of a general ground investigation as this information will facilitate construction of the most appropriate foundation solution for the proposed development.

Groundwater

On the basis of the Site's setting it is considered at this time that the underlying soils should be relatively well drained.

3.2 Landslip (Mass Movement Deposits)

In providing a preliminary assessment of risk associated with potential landslip, consultation was made with the data presented by GroundSure at the 1:10,000 and 1:50,000 scales.

Information presented in the report indicates that there are no records of mass movement deposits within 500m, whilst the hazard rating for slope instability (landslide potential) on-Site

¹ The sandstone may present as solid intact rock, or it may have a weathered upper horizon whereby it would likely be encountered as a highly fractured medium dense gravelly/cobbly sand or sand and gravel overlying more competent and flaggy rock.



and within 50m is very low. The GroundSure data also indicates that there are no records of landslip permeability (i.e. the estimated rate of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposit) within 50m.

3.3 Foundations

Made Ground

The uncertain nature and variability (in addition to typically low strength and high compressibility) of any made ground soils that may be encountered across the development area means that these would not be suitable founding stratum. A nil allowable bearing capacity value would therefore need to be applied to these, where present

Natural Strata

It is anticipated at this stage that traditional spread footings (e.g. strip or trench fill) could potentially be suitable, with these being founded on the underlying natural strata from shallow depth. The nature of the founding soils will need to be confirmed, as they may comprise glaciofluvial deposits, sandstone, or a combination of both.

All foundations will need to be taken down through any loose, weathered, disturbed, soft, or otherwise unsuitable material to be founded in competent natural strata of sufficient load carrying capacity. Further consultation with respect to foundation design should be sought with the Designing Engineer once ground conditions have been assessed. It would also be advisable for a bearing capacity assessment to be completed by the Designing Engineer to ensure that the serviceability limit state of the proposed structures is not compromised. This should also take account of the amount of total and/or differential settlement that could potentially occur.

3.4 Floor Construction

Allowance should be made at this stage for the provision of a suspended ground floor (e.g. reinforced suspended, precast concrete, beam and block...) with this having a corresponding underlying ventilated void.

If ground conditions allow, the use of ground bearing floors may be possible. It should be noted, however, that ground bearing slabs cannot be used where the nature and load carrying capacity of the formation varies across its footprint, where any infill is greater than 600mm at any point in a self-contained area, where the ground is waterlogged, where there is the need for heave precautions, and/or where otherwise unstable or desiccated soil is present. Furthermore, load bearing partitions should have proper foundations and not be supported off a ground bearing slab, if this type can be used.

Given the proximity of the former Boo-Hole Sand Quarry Extension and its apparent use as a landfill, the allowance for the inclusion of ground gas precautions to Characteristic Situation 2 ('CS2') of BS8485^[14] should be made at this time, until confirmed otherwise.



3.5 Heave Precautions

The combination of shrinkable soils and trees, hedgerows, and shrubs represent a potential hazard to foundations and supported structures due to the effects of volume change and ground movement.

All foundations would need to be provided in accordance with current heave precautionary guidelines ^[15] if they lie within the zone of influence of removed, existing, or proposed planting when in cohesive soils. Information with respect to the plasticity indices and worst-case volume change potential of any proven or suspected cohesive soils will need to be obtained to assist with foundation design.

The need for precautions in construction and how these interact with the foundation solution(s) should be discussed further with the Designing Engineer once ground investigation and all necessary laboratory analytical works have been completed. Precautions would not be needed, however, where foundations are cast onto non-shrinkable soils.

3.6 Slope Stability

Global slope stability problems are not expected. However, due consideration to potential problems associated with adjacent land impacting on the Site should always be made.

3.7 Superstructure Precautions

The need for superstructure precautions is considered unlikely to be required, although this should be discussed further with the Designing Engineer once all ground investigation works have been completed.

3.8 Excavation

All made ground soils shall be assumed to be unstable. Furthermore, the instability of loose and/or weathered natural strata will likely be encountered in excavation, particularly during periods of wet weather, where excavations are deep, where they are left open for protracted periods of time, and/or if shallow groundwater exists. Excavations may unduly widen if material collapse is encountered under these conditions.

All excavation works should be carried out in accordance with current HSE guidance, 'Structural Stability During Excavation' ^[16].

Where there is the possibility of weak/unstable ground being present or passing across any boundary, a geotechnical risk assessment of the integrity/stability should be undertaken prior to excavation works being carried out. Designed and engineered temporary or permanent measures should be deployed to ensure their continued stability as necessary.

3.9 Natural Ground Subsidence

With respect to natural ground subsidence, the Site has been classified as follows:



- 'Moderate' risk rating for compressible deposits hazards;
- 'Very Low' risk rating for running sands, collapsible deposits, and landslides hazards, and a
- 'Negligible' risk rating for shrink swell clay soils hazards and the ground dissolution of soluble rocks.

3.10 Obstructions

It appears that the existing foundations to the school remain in situ. This substructure will need to be grubbed-out, either in their entirety, or at least where they interact with new foundation construction so as not to create 'hard spots'.

Due consideration shall also be given to the potential presence of shallow competent bedrock as this could cause excavation problems for new foundations and/or where deep service connections or soakaways need to be provided. Excavation/breaking machinery of sufficient size and strength (along with any shoring required for any unstable soils) will need to be allowed for.

3.11 Concrete

Protection would be required in accordance with current guidance ^[17] where buried concrete products are to be in contact with soils that exhibit elevated concentrations of sulphate. Specialist advice should be sought to confirm the ACEC and Design Chemical class of concrete to be adopted at the design stage to the build once representative samples of the underlying soils have been tested. The Designing Engineer should refer to BS8500-1 ^[18] as necessary.

3.12 Stress Relief

Risk associated with stress relief is not anticipated.

3.13 Pavement

The design of future trafficable areas would need to be such that it allows for the effects of any soft underlying or variable materials and for the potential reduction in the strength of any replacement material to its long-term CBR value. It is expected that the excavation and replacement of unsuitable material with suitably compacted engineered fill would be needed in development prior to finished surfacing being laid. Since the minimum permitted design CBR is 2.5%, it is recommended at this stage that this conservative value for subgrade be used. In situ testing should be undertaken as required. Frost susceptibility should also be assumed.

3.14 Site Drainage

For surface water, where soakaways are proposed, infiltration testing in accordance with BRE365 ^[19] should be completed as required. It should be noted, however, that it would be inappropriate for unstable, potentially unstable, and/or contaminated strata to receive point-source flows of water from dedicated soakaways. It should be noted that soakaways should not be used where they lie within at least 5m of roads, foundations, and/or other sensitive development. All drainage proposals will be subject to obtaining the necessary approvals.



4 PRELIMINARY ENVIRONMENTAL APPRAISAL

4.1 Introduction

Current UK legislation on contaminated land is set out in Part 2A of the Environmental Protection Act 1990 ^[20], which was retrospectively inserted by Section 57 of the Environment Act 1995 ^[21]. The Contaminated Land Regulations 2000 ^[22] were amended in 2005. The Environmental Protection Act 1990: Part 2A Contaminated Land, Statutory Guidance, Edition 2 (2006) promulgates the revised statutory guidance with respect to the operation of the Contaminated Land Regime following the implementation of the Contaminated Land Regulations, 2005. The definition of contaminated land is central to the operation of Part 2A.

Legislation adopts the principle of a 'suitable for use' approach for the assessment of contaminated land, the rationale being reflected in the site-specific risk assessment and determination of remedial strategy; action is only required if unacceptable risks are posed to human health or to the environment, considering the site's land use and geo-environmental setting.

The legislation places a responsibility on the Local Planning Authority to determine whether the land under its jurisdiction is contaminated by consideration of whether:

- The presence of substances (potential contaminants) are present at concentrations that are causing significant harm or have the significant possibility of causing significant harm;
- There are receptors which may be harmed (e.g. the water environment, human health, buildings, fauna and flora), and
- There is in existence a pathway between the identified sources and receptors.

To qualitatively assess the level of risk at the Site, the above rationale has been applied. This approach is consistent with the preliminary risk assessment procedure defined in LCRM. The following section summarises the preliminary CSM which has been produced following the review of available pertinent third party information. The CSM summarises Groundsmiths' current understanding of surface and sub-surface features, the potential sources of contamination, transport pathways and receptors in order to support the identification and assessment of plausible potential contaminant linkages.

4.2 Potential Sources of Contamination

A potential source is defined as 'a contaminant which is in, or under the land and has the potential to cause harm to human health or to cause contamination of controlled waters receptors'.

In reviewing the Site's history it is evident that it has had limited use, although some of that could have potentially been more contaminative than others; there is also the potential for off-Site landfilling to have an impact upon the Site, notably with respect to elevated ground gases. On this basis, the following potential source-pathway-receptor linkages that may be associated with the Site have been considered. These are summarised in Table 4.1, overleaf.



Table 4.1 - Summary of Potential Sources and Contaminants

Potential Sources	Potential Contaminants (not limited to)
Any potentially contaminated made ground and/or shallow-depth natural strata	Metals, metalloids, inorganic contaminants, phytotoxic contaminants, sulphate, PAHs (e.g. Benzo(a)pyrene) and asbestos
Sources of ground gas (e.g. off-Site landfilling)	CO ₂ and CH ₄

4.3 Potential Migration Pathways

Migration pathways are routes by which contaminant sources may come into contact with receptors. Potential pathways for different types of contaminants vary depending on the properties of the contaminant, the mechanism of its release and the nature of the receptor.

The principal potential contaminant pathways by which receptors might become exposed to potential contamination at the Site are summarised as follows in Table 4.2, below.

Table 4.2 - Summary of Plausible Pathways

Potential Sources	Pathways
Any potentially contaminated made ground and/or shallow-depth natural strata	Direct ingestion, dermal contact, dust and/or vapour inhalation
	Direct ingestion and/or dermal contact with liquid contaminants
	Leaching and direct contact with potable water supply pipes
	Leachable contaminants via surface run-off, vertical and lateral migration via any permeable strata with the potential to impact controlled waters receptors
	Soft landscaping
Sources of ground gas (e.g. off-Site landfilling)	Migration of gases and/or accumulation in void spaces via transport through service conduit, any permeable made ground and/or any permeable underlying natural strata

4.4 Potential Receptors

A receptor is the potential target of the source contaminant, to which either significant harm or deterioration in quality may be caused. The potential sensitive receptors with respect to the potential contamination hazards identified above are considered in Table 4.3, overleaf.



Table 4.3 - Summary of Potential Receptors

Potential Receptor	Comment
Human Health	Site end-users in the residential with home-grown produce end use scenario Site operatives (during construction phase only) Future workers involved with any in-ground maintenance works
Construction	Potable water supply pipes Foundations and service conduit
Controlled Waters	'Secondary A' aquifer soils

4.5 Environmental Risk Assessment

Risk assessment and the procedure of identifying sources, pathways and receptors is recognised as an approach to determine the extent and significance of contamination either within the context of Part 2A (when assessing current site status or when considering the acquisition of an existing development) or the planning process (for the redevelopment of an existing site, or when considering the acquisition of a site for redevelopment purposes). Either way, the 'suitable for use' approach is adopted when assessing risk and the source-pathway-receptor assessment defines the conceptual model for the site.

The statutory guidance describes a risk assessment methodology in terms of 'significant contaminants' and 'contaminant linkages', using the 'source-pathway-receptor' scenarios for the site. Contaminant linkages are formed when there is a linkage between a contaminant source and a receptor by means of a pathway. The existence of a contaminant linkage is dependent on site use, as well as environmental conditions. If no contaminant linkages can be proven, then the risks may be discounted. However, it is not to say that remediation is required if contamination is proven.

The identified potential contaminants and receptors have been considered in relation to the pathways that may link them. The risk classification has been estimated in accordance with those methods prescribed in CIRIA C552 ^[23]. Risk is regarded as a combination of the likelihood of an 'event' occurring and its severity: both elements must be considered when assessing risk. The method for risk assessment, or evaluation, is purely qualitative. As defined in CIRIA C552, the magnitude of the potential 'severity' of risk occurring may be assessed against:

- **Severe (acute):** short term risk to human health likely to result in significant harm as defined under Environmental Protection Act 1990, Part 2A. Short term risk of pollution to sensitive water receptor (may result in death).
- **Medium (chronic):** long term risk and significant harm to human health, contamination of sensitive water resource or significant change to an ecosystem or specific organism (may result in death).
- **Mild (chronic, but applicable to less sensitive receptors):** contamination of non-sensitive water resource but significant damage to crops, buildings, structures and



services or the environment.

- **Minor (not significant):** harm, which may result in financial loss, or expenditure to resolve. Non-permanent effects to human health. Easily repairable effects of damage to buildings, structures, and services.

Similarly, the classification of the magnitude of the 'probability' of the risk occurring may be assessed against:

- **High Likelihood:** a contaminant linkage exists and an event appears very likely in the short term, or almost inevitable in the long term, or contamination is causing harm at the receptor. Urgent action is required.
- **Likely:** a contaminant linkage exists and it is probable that an event will occur. An event may not occur, but it is possible in the short term and likely over the long term.
- **Low Likelihood:** a contaminant linkage exists and it is possible that an event will occur. It is not certain that an event will occur over time, but it is less likely in the short term.
- **Unlikely:** a contaminant linkage exists but it is not possible to say if an event will occur even over a very long time.

Following completion of the severity and probability assessment, classifications can be compared to indicate the actual risk each contaminant linkage presents: this can only be undertaken where there is a possibility of there being an active linkage. The risk categories which can be assigned are presented in Table 4.4, below, and range between 'very high' to 'very low' (NB - it is not possible to classify an identified risk as 'no-risk').

Table 4.4 - Risk Categorisation

		Consequence			
		Severe	Medium	Mild	Minor
Probability	Highly Likely	Very High	High	Moderate	Moderate / Low
	Likely	High	Moderate	Moderate / Low	Low
	Low Likelihood	Moderate	Moderate / Low	Low	Very Low
	Unlikely	Moderate / Low	Low	Very Low	Very Low

Source: Table 6.5, C552 (2001).

- **Very High** – there is a high probability that severe harm could arise or that severe harm is occurring. Urgent investigation and remediation are likely to be required.
- **High** – harm is likely to occur, and that urgent investigation and remediation may be needed in the short term, but are likely over the longer term.
- **Moderate** – harm could occur. It is unlikely to be severe, most probably relatively mild. Investigation is normally required to clarify the risk with some remedial works being required in the longer term.
- **Low** – it is possible that harm could occur, but if it did, at worst it would be mild.
- **Very Low** – low possibility of harm arising, and that if it does it is not likely to be severe.



The identified potential contaminants and receptors have been considered in relation to the potential pathways that may link them. The resulting contaminant linkages are presented in Table 4.5, overleaf.



Table 4.5 - Summary of Environmental Risk (Current Site Condition without Mitigation)

Potential Sources	Potential Receptors	Plausible Pathways	Probability	Severity	Risk Rating	Comment
Any potentially contaminated made ground and/or shallow-depth natural strata	<u>Human Health</u> Site end-users, inc. maintenance and site workers (short term risk during redevelopment)	Direct ingestion, dermal contact with soil or inhalation of dust and/or vapour (Site end user)	Low Likelihood	Mild	Low	A low risk is anticipated with respect to contamination within the underlying soils for Site end users, and construction/other in-ground workers. A formal environmental investigation should be undertaken to check on contaminant levels. For asbestos, the level of risk is based to some extent on the severity rating of the contaminant and the risk profile that can be assigned at this time. Risk to Site end users would ultimately be low to very low, as the contaminant linkage would be broken by development, although a greater potential risk would remain for those involved with in-ground works. Again, confirmation of presence would need to be established before a final risk determination can be given.
		Inhalation of asbestos fibres in made ground soils (Site end user)	Low Likelihood	Severe	Moderate	
		Direct ingestion, dermal contact with soil or inhalation of dust and/or vapour (In-ground worker)	Low Likelihood	Mild	Low	
		Inhalation of asbestos fibres in made ground soils (In-ground worker)	Low Likelihood	Severe	Moderate	
		Direct ingestion and/or dermal contact with liquid contaminants (Site and user / In-ground worker)	Unlikely	Mild	Very Low	
	Potable Water Supply Pipes	Direct contact/leaching (tainting)	Low Likelihood	Mild	Low	The need for precautions in construction will need to be confirmed.
	Vegetation	Uptake via root system in soft landscaping	Low Likelihood	Mild	Low	Capping to 600mm could be needed in soft landscaped areas.
	Foundations	Direct contact/leaching	Low Likelihood	Mild	Low	The need for sulphate precautions for new buried concrete products will need to be confirmed.
	Controlled Waters	Vertical and/or lateral migration	Unlikely	Mild	Very Low	No particular risk anticipated.
Ground gas sources	Site End Users	Inhalation (via ingress and accumulation into buildings)	Likely	Medium	Moderate	Allow for Characteristic Situation 2 precautions in accordance with BS8485 until confirmed otherwise.



General Soil Contaminants

It is anticipated at this stage, on the basis of available information and the preliminary risk assessment presented herein, that some of the on-Site soils could present an unacceptable level of risk in relation to the potential for elevated concentrations of inorganic and organic contaminants of concern to be present at levels above residential with home-grown produce GAC threshold values, these being DEFRA's Category 4 Screening Levels ^[24], the LQM/CIEH Human Health Values ^[25] and/or other in-house derived GAC's calculated by Groundsmiths for organic contaminants ^[26].

Whilst the nature of the development suggests that the overall risk to Site end users will be low, there currently remains the possibility for elevated levels of contamination to be present. At this stage, therefore, it is considered that a general check on contaminant levels should be made within the remit of an intrusive ground investigation so that the levels to which any contamination may be present to in excess of relevant residential GAC values may be quantified.

Asbestos Containing Materials (ACM)

A moderate risk is currently perceived in relation to the potential for asbestos containing materials, although the level of risk postulated is, however, elevated to some extent by the consequence (severity) of the contaminant and the risk assessment framework that may be adopted at this time.

It would be expected for there to be no particular asbestos fibres present within the on-Site soils, although as with general soil contamination it is considered that a check on the presence of any fibres should be made within the remit of an intrusive ground investigation.

Unforeseen Soil Contamination

As with any development site, there is the potential for contamination to be present that has not been identified at this stage. This is unavoidable so allowance for additional assessment should be made.

Ground Gases

There is a perceived moderate risk associated with potential fugitive ground gases at the Site, although this level of risk is determined to some extent by the consequence (severity) of the contaminants, rather than whether elevated concentrations are present, or not. As such, it is possible that concentrations of carbon dioxide and/or methane could be lower than currently anticipated, but the proximity of former landfill workings remains a concern until determined otherwise.

Ground gas concentrations will need to be checked via a relevant period of monitoring, with this being in accordance with BS8485. The need for any remedial measures to be implemented in construction will be dependent on the outcome of those works. Allowance for Characteristic Situation 2 precautions in construction should be made until confirmed otherwise.



Controlled Waters Receptors

A very low risk is anticipated in relation to the potential for any mobile contaminants of concern to enter into controlled waters receptors. No further assessment is considered necessary unless areas of currently unforeseen gross contamination is encountered.

Potable Water

Water providers are required to maintain the safety of staff, contractors, and customers. On this basis, water providers work with a range of trigger values when laying mains pipes or services in contaminated ground, in the same way that assessment is made by contaminated land practitioners.

Testing in full accordance with UK Water Industry Research ('UKWIR')^[27] published guidance may not be required, although an appropriate and robust level of testing based on the history of the Site should be completed within the remit of a ground investigation so that informed decisions may be made. It is recommended that additional testing for corrosiveness (electrical conductivity and redox potential) is also completed.

Soils Disposal (Waste Acceptance Criteria)

Where any arisings are generated during redevelopment works, and they are intended for disposal to landfill, there is a requirement to determine if they would be classified as inert, non-hazardous or hazardous.

Technical Guidance WM3^[28], which was introduced on the 1st July 2015 and is adapted from the third edition of Technical Guidance WM2², sets out the requirement for classification. The classification assesses the composition of the material and determines the concentrations of hazardous substances within it, in relation to particular thresholds.

Given that it is a statutory requirement to ensure that wastes are characterised to meet specific acceptance criteria if disposal to landfill is to be undertaken, Waste Acceptance Criteria (WAC) testing would need to be completed in parallel with standard soils analysis. This testing would need to be undertaken on representative samples of any soils that are to be disposed of (e.g. from foundation excavations), prior to being removed from Site.

² Environment Agency (2011). Technical Guidance (WM2). Hazardous Waste: Interpretation of the Definition and Classification of Hazardous Waste (2nd Edition, Version 2.3).



5 FURTHER WORKS

5.1 Introduction

The overall objective of this preliminary assessment was to contribute towards the understanding of the ground conditions underlying the proposed development site located off Bury Old Road, Darn Hill, Heywood. Research into the history and evolution of the Site up to the present day has been undertaken, which allows a fair assessment of the risks posed to development to be made at this stage.

It is considered that the study has provided sufficient background data in terms of the historical land use to the Site and its surroundings, together with details of the general geology, hydrogeology, mining legacy, and anticipated sources of soil and ground gas contamination.

The preliminary environmental risk assessment, when considered within the context of proposed end-use, indicates that some potential contaminant linkages may present an unacceptable level of risk to human health in relation to the identified source-pathway-receptor linkages for the Site. On this basis, it is considered that further works are warranted prior to the Site's redevelopment so that Site-specific data can be obtained.

5.2 Objectives of Investigation

In relation to the proposed development, the objectives of an intrusive (geotechnical and environmental) ground investigation would be to:

- a. Investigate the general nature of the underlying soils, the thickness of any made ground and the depth to, condition and nature of the shallow underlying natural strata.
- b. Determine the geotechnical parameters of the underlying natural strata via in situ and laboratory based testing to refusal.
- c. Report the presence of any buried obstructions and/or other excavation difficulties encountered during the works.
- d. Investigate the shallow-depth hydrogeological regime beneath the Site.
- e. Identify the nature and concentration of any contamination within individual soil matrices, including sulphate analysis to assist with buried concrete design, and undertake Waste Acceptance Criteria testing for soils disposal purposes.
- f. Investigate the general level of risk associated with any fugitive ground gases, and
- g. Provide general advice in relation to any environmental or geotechnical issues associated with the Site and/or any other recommendations needed to facilitate the proposed development, including, where necessary, identifying any additional phases of investigation, assessment, or remediation that may need to be carried out.



5.3 Proposed Methods of Investigation

It is recommended that the following works given in Table 5.1, below, be completed. The positioning of exploratory locations would be subject to any access constraints and the presence of any underground utilities which would need to be confirmed beforehand.

Table 5.1 - Phase 2 Investigation Recommendations

	Anticipated Scope	Likely Investigation Method	Potential Contaminants of Concern
<i>Environmental Investigation</i>			
1	Determine overall soil types and general contaminant levels (including sulphates for substructure concrete design)	Mechanical excavation and/or boring with sample recovery for environmental testing	A range of metals / metalloids, general inorganics, PAH and asbestos
2	WAC testing for any waste soils disposal that is to be undertaken		Full WAC Single Stage
3	Ground gas monitoring by bi-weekly return visits	Mechanical boring with piezometer installation	CO ₂ , CH ₄
<i>Geotechnical Investigation</i>			
4	Investigation into the thickness and strength profile of the underlying natural soils through in-situ testing	Mechanical excavation and/or boring (with sample recovery)	-
5	Determination of plasticity indices (i.e. Atterberg, Water Content etc) and any other associated works required to facilitate development	Geotechnical laboratory testing	-

5.4 Testing

Geotechnical

With respect to geotechnical works, the nature, thickness, and integrity of any on-Site made ground soils should be investigated. Similarly, the nature of the underlying natural strata would need to be confirmed. Representative soil samples should be taken for a suite of geotechnical laboratory testing, with in situ strength testing (e.g. SPT) also being undertaken throughout the vertical soils profile to refusal (SPT N = 50) at selected positions across the Site so that bearing capacities and the depth to competent strata for foundation design may be established.

These works will need to be undertaken in general accordance with the requirements of BS5930, BS10175, BS EN 1997-1 (2004+A1:2013) ^[29] and BS EN 1997-2 (2007) ^[30]. All works will



need to be logged on-site by a competent engineer, with standard strata descriptions of the soils encountered being in general compliance with BS EN ISO 14688-1 (2002+A1:2013) ^[31], BS EN ISO 14688-2 (2004+A1:2014) ^[32] and BS EN ISO 14689 (2003) ^[33].

Environmental

All sampling undertaken as part of the ground investigation works would need to be in general accordance with those guidelines prescribed in BS10175 and any specific requirements of the testing laboratory. All environmental soil samples would need to be collected in a combination of 500ml plastic tubs with sealable lids, 250ml glass amber jars and 60ml glass amber vials (this being subject to analytical requirements). This would also be the case for where WAC samples were taken for soils disposal purposes.

Care would need to be taken to minimise cross contamination between sampling. All of the environmental samples would need to be packed into cool boxes and transported to an MCERTS and UKAS ^[34] accredited laboratory of Groundsmiths' choosing for analysis and subsequent storage / disposal. Standard retention times would apply.

The analytical strategy adopted for the environmental investigation would be designed to provide an overall assessment of potential contaminants thought likely to be present within the on-Site soils as encountered.

5.5 Outline Remediation Requirements

Soil

It is currently unknown if soil remedial activities for contamination will be required within the context of the proposed development. Any remediation works to be completed would need to be undertaken in accordance with the requirements of guidance prescribed by YALPAG ^[35].

Where remediation is to be completed, LCRM Stage 3 proposals and verification methodology would need to be submitted to the Local Planning Authority in the form of a standalone Remedial Strategy.

Ground Gas

For ground gas, it would be considered prudent to allow for Characteristic Situation 2 gas precautions in construction until proven otherwise.

For information at this time, and in accordance with BS8485, the structures proposed would likely be determined as 'Type A (High Risk)' as they will have small volume internal spaces that will be generally poorly ventilated. As with soil contamination, specific remediation proposals and verification methodology for any gas protection measures that were found to be required would need to be submitted to the Local Planning Authority in the form of an LCRM Stage 3 Remedial Strategy.

The installation of all gas membranes and associated components to be used would need to be carried out in accordance with manufacturer requirements and / or any other guidance given ^[36,37]. Independent inspection of the membrane and componentry installation would also be



required at the time, with relevant documentary and photographic evidence being provided to the Local Planning Authority in a final post-installation Validation Report.

Coal Mining

Risk from mining legacy would not be expected. Further works have not been identified.



6 REGULATORY APPROVAL

This preliminary risk assessment report has been compiled in accordance with good practice guidance for the assessment and management of land that may be affected by land contamination and stability hazards.

The recommendations presented are considered reasonable on the basis of available information and the assessment of the Site as carried out by Groundsmiths. However, it remains the responsibility of the Client to ensure that the Site poses no significant risk to any sensitive receptor(s) and that it remains aligned with the proposed end-use and assessment framework adopted in this report and any accompanying reports.

If at any time in the future, additional information comes to light that puts into doubt the accuracy of the professional opinion or third party information presented herein, then it would be necessary to revisit the assessment.

Works undertaken cannot be guaranteed to gain approval by the regulatory authorities and / or your Warranty provider, so copies of this report should be made available to the relevant organisations for comment and approval, prior to undertaking any irrecoverable works associated with the Site.



7 INFORMATION SOURCES

The following references have been cited in the production of this report:

- 1 BS10175 (2011+A2:2017). Investigation of Potentially Contaminated Sites. Code of practice.
- 2 BS5930 (2015+A1:2020). Code of Practice for Ground Investigations.
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- 20 Environmental Protection Act 1990: Part 2A Contaminated Land, Statutory Guidance, Edition 2, 2006.
- 21 Environment Act (1995).
- 22 The Contaminated Land Regulations (2000, amended 2005).
- 23 CIRIA C552 (2001). Contaminated Land Risk Assessment – A Guide to Good Practice. D. J. Rudland, R. M. Lancefield & P. N. Mayel.



- 24 Department for Environment, Food & Rural Affairs (2014). SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document.
- 25 LQM / CIEH: The LQM / CIEH S4UL's for Human Health Risk Assessment. Land Quality Press, Nottingham, 2015. Publication Number S4UL3339.
- 26 Environment Agency. Contaminated Land Exposure Assessment (CLEA) software version 1.071. <https://www.gov.uk/government/publications/contaminated-land-exposure-assessment-clea-tool>.
- 27 UKWIR (2011). Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites. Ref. 10/WM/03/21).
- 28 Environment Agency (2018). Technical Guidance (WM3). Waste Classification, Guidance on the Classification and Assessment of Waste (1st Edition, Version 1.1).
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- 30 BS EN 1997-2 (2007). Eurocode 7. Geotechnical Design. Ground Investigation and Testing.
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8 REPORTING LIMITS

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The findings and opinions provided in this document are given in good faith and are subject to the limitations and constraints imposed by the methods and information sources described. Factual information including, where stated, a visual inspection of the site, has been obtained from a variety of sources. Groundsmiths assumes that third party data is reliable but cannot independently confirm this as the validity and accuracy of this information is outside our control. No guarantee can therefore be given as to the completeness of the information gathered during the study and no responsibility is accepted for errors or omissions in the third party information used. Groundsmiths' professional judgement and experience is however used to ensure that uncertainties are reduced to a level appropriate to the Site's conditions, the purpose of the investigation and the resources devoted to it by the Client.

Whilst every effort has been made to carry out a qualitative Stage 1 LCRM assessment that enables a realistic preliminary characterisation of the parameters to be identified, the possibility of variation in actual ground and groundwater conditions existing cannot be discounted. The findings and opinions presented in this report are relevant to the time this assessment was undertaken but should not necessarily be relied upon to represent conditions at a substantially later date. Further information, ground investigation, construction activities, change of site use, or the passage of time may reveal conditions that were not indicated in the data presented and therefore could not have been considered in the preparation of this report. Where such information might impact upon stated opinions, Groundsmiths reserve the right to modify the opinions expressed in this report. Where opinions expressed in this report are based on current available LCRM guidelines and/or other legislation, no liability can be accepted for the effects of any future changes to such guidelines and legislation. New information or improved practices and changes in legislation may require reinterpretation of the report as a whole, or in part.

The conclusions and recommendations presented in this report are based on the Site-specific assessment but utilising third party documentary information as appropriate. They are, however, limited to those that could be reasonably made at the time the assessment was undertaken. Where assessments of site areas affected in particular ways are given, these are approximate.

This report does not constitute an archaeological, ecological, arboriculturalist / invasive plant species, or UXO survey. Any comment given in relation to these is for information only. Further assessments to assess these may be required as part of any planning condition and should therefore be undertaken by suitably qualified experts as required.

Groundsmiths reserve the right to edit and / or retract any conclusion or recommendation made in this report should any further information, with respect to the Site, become available.

Groundsmiths disclaim any obligation to update the report for events taking place after the time during which the assessment was carried out.

Groundsmiths do not provide or purport to provide legal advice. Should the Client require such advice then that of lawyers should be sought.

Groundsmiths accept no responsibility if any findings given in this report are not implemented by the Client or their agents.

Groundsmiths accept no responsibility if any further works, as requested by the Local Planning Authority in the discharge of their duty of care, are not implemented by the Client or their agents.

This report could be reassigned to a third party if they require reliance on it in the event that the Site is sold at any time in the future. An administrative fee would be applicable in such instances, payable prior to transfer.



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