Land off High Street, Shafton

Geo-Environmental Desk Study Report

A090070-332

Homes England
March 2018
WYG Environment Planning Transport Limited

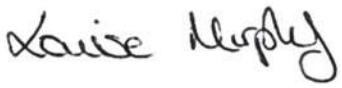


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1.0 Executive Summary

Current Site Status	The site is rectangular in shape and accessed via High Street on the western boundary. Most of the site comprises gently undulating open grassland with scrub vegetation, hedges and several mature trees encountered around the site boundary. Further mature trees and scrub vegetation were encountered within the centre of the site. Areas of hardstanding demolished building footprints and several piles of demolition arisings / household waste were encountered in the north-western portion of the site.
Proposed Development	The Indicative Masterplan suggests that the site will be developed with up to 43 two-storey residential properties with associated driveways and car parks. The Indicative Masterplan also suggests that a pumping station and attenuation pond will situated on site.
Site History	Historical Ordnance Survey (OS) mapping indicates that the site was undeveloped agricultural land from c.1854 (earliest available OS map) to c.1933 when the northern half was developed as allotment gardens. A number of structures associated with the allotment gardens are recorded on the 1962 OS map. The largest structure approached the footprint area of a small house, up to 10m x 4m, which is more substantial than typical allotment holder's sheds. Most structures were subsequently removed in the 2010's. Shafton Colliery, a former small-scale coal mine disused by 1894, was located 400m east. Residential development encroached toward the site from the northwest (Shafton) and southeast (Shafton Two Gates) between the 1960s and 1980s. Residential properties adjoined the northern boundary by 1981. No other significant development was shown in the vicinity.
Geology	Made Ground is not mapped on site; however, localised areas of Made Ground may be present from historical burning of waste or beneath former walkways.
Mining	A Coal Authority Mining Report indicates that the site is underlain by worked coal strata at a minimum depth of 330m, last worked in 1963. The site is not considered to be within the zone of influence of any ground stability concerns. A shaft was recorded to the north of the site. No details of treatment of the mine entry are available. It is not considered likely that the presence of the shaft would represent any constraint to development. No BGS recorded mineral sites are located on site or within a 250m radius.
Hydrogeology	The Bedrock strata is classified as a Secondary A Aquifer. Groundwater is not abstracted on site or within 250m. The site is not located on a SPZ.
Hydrology	No surface waterbodies are located on site or in the surrounding area. Surface water is not abstracted on site or within 250m

Initial Ground Contamination Assessment	There is a low potential for ground contamination from Made Ground, historical building demolition and the storage and usage of pesticide/ herbicide and fertiliser. There is also a potential for migration of ground gas to the site from a neighbouring historical landfill; although this risk is considered to be very low. Ground disturbance is anticipated during the proposed development. Potential source-pathway-receptor linkages are identified; however intrusive site investigations are required to determine the viability of identified linkages. Risks posed to identified receptors are considered to be **Very Low**, with the potential for a higher risk if asbestos is identified in soils.
Geotechnical Issues	The site is not considered to be within the zone of influence of any ground stability concerns. It is not considered likely that the presence of a mine shaft 20m north of the boundary would represent any constraint to development. Residual below-ground structures from the early allotment structures may remain. It is unlikely that these would be substantial, although they should be removed before redevelopment.
Recommendations	Intrusive site investigations including geotechnical and limited contamination testing and gas monitoring are recommended within the development area to investigate ground conditions, determine the extent and properties of Made Ground, to determine gas risk and to inform foundation / structure design.
This sheet is intended as a summary of the assessment of the site in relation to ground contamination and geotechnical conditions. It does not provide a definitive engineering analysis. Further works have been recommended.	

2.0 Introduction

2.1 Instruction

WYG Environment (WYG) were commissioned by Homes England to produce a Phase I Geo-Environmental Desk Top Study (DTS) for the land off High Street, Shafton, Barnsley (the site) to comply with Condition 16 of Consent No. 2015/0456 for the residential development of the site.

2.2 Scope of Services

This report aims to identify any potential geo-environmental development constraints and to devise a preliminary Conceptual Site Model (CSM) with regard to the risk of contamination.

In order to achieve the aims and objectives, the following scope of works has been undertaken:

- A discussion of the current site status and associated environmental influences;
- A historical site and area review, primarily referring to past issues of Ordnance Survey maps obtained from a previous Arc Environmental report;
- Site walkover inspection and photographic record;
- Appraisal of environmental regulatory data as obtained from a previous Arc Environmental report;
- A discussion of the general expected ground and groundwater conditions referring to published geological and hydrogeological maps;
- Assessment of potential for ground contamination;
- Assessment of potential geotechnical constraints;
- A qualitative contamination risk assessment and formulation of a preliminary Conceptual Site Model.

2.3 Terms and Conditions

Attention is drawn to the report conditions, included in Appendix A, and to the terms and conditions of the engagement.

3.0 Site Details

3.1 General

A site location is included as Figure 1.

3.2 Site Location

The site is bounded to the southwest by High Street and to the northwest by residential properties off Poplar Avenue. The site occupies an area of approximately 1.26 hectares. Site location details are summarised in Table 1.

Table 1: Site Location

Site Address	Land off High Street Shafton Barnsley S72 8NG
NGR (Centre of Site)	439370mE, 410870mN

3.3 Site Description

A site walkover inspection was undertaken by WYG Environment on 7 March 2018. Key site photographs are included in Appendix B and key site features are identified in Figure 1.

The site is rectangular in shape and accessed via High Street on the western boundary. Most of the site comprises gently undulating open grassland with scrub vegetation, hedges and several mature trees encountered around the site boundary (Photograph 1-3). Further mature trees and scrub vegetation were encountered within the centre of the site. Areas of hardstanding demolished building footprints (Photograph 4-5) and several piles of demolition arisings / household waste were encountered in the north-western portion of the site (Photographs 6-8).

3.4 Surrounding Land Uses

The site is located in the town of Shafton. Uses of the surrounding land are discussed in the Table 2.

Table 2: Surrounding Land Uses

Boundary	Description
North	Residential
East	Residential and agricultural land beyond.
South	Shafton Primary School and residential beyond.
West	Residential and agricultural land beyond.

3.5 Proposed development

The Indicative Masterplan suggests that the site will be developed with up to 43 two-storey residential properties with associated driveways and car parks. The Indicative Masterplan also suggests that a pumping station and attenuation pond will situated on site.

4.0 Environmental Regulatory Setting

4.1 Information Sources

Details of the Environmental Regulatory Setting for the site have been obtained from the Envirocheck Report [1] included in a Phase 1 Desk Top Study Report prepared by Arc Environmental (2015) [2].

4.2 Waste Management

No historical landfills or waste management facilities were recorded on site.

The following historical landfills or waste management facilities were recorded within 250m radius:

- An historical landfill, licensed by British Gas, for inert and commercial waste was located 207m east;
- A Local Authority Recorded Landfill is located c.167m east.

4.3 Industrial Land Use

4.3.1 Contemporary Trade Directory Entries

Contemporary trade directory entries are not listed within the site boundary.

Two contemporary trade directory entries were noted within a 250m radius of the site: an inactive wrought ironworks and inactive bus/ coach operators and station.

4.3.2 Fuel Stations

Commercial fuel stations are not located on site or within a 250m radius.

4.4 Enforcements and Controls

None of the following enforcements and controls were identified on site or within a 250m radius:

- Enforcement and Prohibition Notices;
- Integrated Pollution Control authorities;
- Integrated Pollution Prevention and Control authorities;
- Local Authority Integrated Pollution Prevention and Control authorisations;
- Local Authority Pollution Prevention and Control authorisations;
- Local Authority Pollution Prevention and Control Enforcements.

4.5 Health and Safety

None of the following health and safety consents and registrations were identified on site or within a 250m radius:

- Registered Radioactive Substances;
- Control of Major Accident Hazards Site (COMAH);
- Explosive Sites;
- Notification of Installations Handling Hazardous Substances (NIHHS);
- Planning Hazardous Substance Consents;
- Planning Hazardous Substance Enforcements.

4.6 Contaminated Land

Contaminated land register entries and notices were not listed on site or within 250m.

4.7 Areas of Sensitive Land Use

The site is located within a Nitrate Vulnerable Zone.

5.0 Site History

Historical Ordnance Survey (OS) plans included in the Arc Environmental (2015) Phase 1 Desk Top Study Report [2] were reviewed. It is not the intention to discuss all plans in detail, but rather to present the salient points. The distance between identified features is approximate.

Historical Ordnance Survey (OS) mapping indicates that the site was undeveloped agricultural land from c.1854 (earliest available OS map) to c.1933 when the northern half was developed as allotment gardens. A number of structures associated with the allotment gardens are recorded on the 1962 OS map. The largest structure approached the footprint area of a small house, up to 10m x 4m, which is more substantial than typical allotment holder's sheds. Most structures were subsequently removed in the 2010's.

Shafton Colliery, a former small-scale coal mine disused by 1894, was located 400m east. Residential development encroached toward the site from the northwest (Shafton) and southeast (Shafton Two Gates) between the 1960s and 1980s. Residential properties adjoined the northern boundary by 1981. No other significant development was shown in the vicinity.

6.0 Geology, Hydrogeology and Hydrology

6.1 Information Sources

Details of the geology, hydrogeology and hydrology of the site have been obtained from the Envirocheck Report [1] included in the Arc Environmental (2015) Phase 1 Desk Top Study Report [2]. Radon information has been obtained from Public Health England [3].

6.2 Geology

6.2.1 Artificial Ground

Artificial Ground (Made Ground and Infilled Ground) is not mapped on site or in the immediate surrounds.

6.2.2 Superficial Geology

Superficial deposits are not mapped on site or in the immediate surrounds.

6.2.3 Bedrock Geology

The 1:50,000 scale geological plan indicates the bedrock underlying the site is the Pennine Middle Coal Measures Formation and South Wales Middle Coal Measures Formation.

6.2.4 BGS Historical Borehole Information

No BGS recorded boreholes are located on site or within a 250m radius.

6.2.5 Potential for Natural Ground Movement

BGS information summarised in the Envirocheck report indicates the following potential for natural ground movement within the site boundary:

- 'Very Low Hazard' potential for collapsible ground stability hazards;
- 'No Hazard' potential for compressible ground stability hazards;
- 'No Hazard' potential for ground dissolution ground stability hazards;
- 'Very Low Hazard' potential for landslide ground stability hazards;
- 'No Hazard' potential for running sand ground stability hazards;
- 'No Hazard to Very Low Hazard' potential for shrinking or swelling clay ground stability hazards.

6.2.6 Radon

The site is located within an intermediate probability radon area: between 5% and 10% of homes are above the action level. Basic radon protective measures are necessary in the construction of new dwellings or extensions.

Guidance on protection of new buildings from the ingress of radon is provided in BRE report BR211 [4]. The requirements of the local Building Control department should be confirmed.

6.3 Hydrogeology

6.3.1 Groundwater Vulnerability

All groundwaters are Controlled Waters with statutory protection from pollution.

Bedrock deposits comprising the Pennine Middle Coal Measures Formation and South Wales Middle Coal Measures Formation are classified as a Secondary A Aquifer. The Environment Agency defines Secondary A Aquifers as *"permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.".*

Soils across the site are classified as being of High Leaching Potential (U). The Environment Agency defines Soils of High Leaching Potential (U) as "*soil information for restored mineral workings and urban areas is based on fewer observations then elsewhere. A worst case vulnerability classification (H) assumed, until proved otherwise".*

6.3.2 Groundwater Abstractions

Licensed groundwater abstraction wells were not identified on site or within a 250m radius.

6.3.3 Discharge Consents (Groundwater)

Discharge consents to groundwater or land were not identified on site or within a 250m radius.

6.3.4 Groundwater protection

Source Protection Zones (SPZ) are defined by the Environment Agency as the area around major groundwater abstractions (principally those used for drinking water), where ground contamination may result in the contamination of the source.

The site is not located within a SPZ.

6.4 Hydrology

6.4.1 Watercourses

Open channel watercourses are not present on site or within 250m radius.

6.4.2 Surface Water Abstractions

Surface water abstractions were not identified on site or in the immediate surrounding area.

6.4.3 Discharge Consents (Surface Water)

Discharge consents to surface water were not identified on site or within a 250m radius.

6.4.4 Pollution Incidents to Controlled Waters

Pollution Incidents to Controlled Waters are not listed on site or within a 250m radius.

7.0 Mining

7.1 Coal Mining

A Coal Authority Mining Report [5] included in the Arc Environmental (2015) Phase 1 Desk Top Study Report [2] indicates that the site is underlain by worked coal strata at a minimum depth of 330m, last worked in 1963. The site is not considered to be within the zone of influence of any ground stability concerns. A shaft was recorded by the Coal Authority 20m outside the site boundary to the north, within the area of recent housing development. No details of treatment of the shaft are available. It is not considered likely that the presence of the shaft would represent any constraint to development.

7.2 BGS Recorded Mineral Sites

No BGS recorded mineral sites are located on site or within a 250m radius.

8.0 Environmental Assessment

8.1 Legislation and Assessment Criteria

Part IIA of the Environmental Protection Act (EPA) 1990, which came into force in England on 1 April 2000, introduced a new regulatory regime for the identification of and remediation of contaminated land. The regime provides a statutory definition of contaminated land based on the risk of significant harm to human health or the environment, or pollution of Controlled Waters. By adopting the principles of risk assessment and risk management the intention is to ensure that contaminated land is managed effectively based on its current use and environmental setting.

Part IIA of EPA 1990 was inserted by Section 57 of the Environment Act (EA) 1995. Statutory guidance on the regime is now detailed in DEFRA 'Contaminated Land Statutory Guidance' (April 2012) which includes a description of the objectives of the Part IIA regime; local authority duties with regard to the inspection of land; the definition of contaminated land with regard to human health, controlled waters and other receptors; the Determination process, remediation and cost recovery. The Contaminated Land (England) Regulations 2000 deal with particular aspects of the regime including Special Sites, remediation notices, appeals and registers.

Under the regime, land is only defined as contaminated land if there is a significant "pollutant linkage". This requires the presence of a contaminant source; a pathway(s), i.e. a route or means by which a receptor is or could be exposed to the contaminant; and a receptor that could be harmed by the contaminant. In addition, the type of harm must meet the descriptions of significant harm given in the Statutory Guidance. A site where a contaminant is causing or is likely to cause significant pollution of surface water or groundwater (Controlled Waters) also constitutes contaminated land.

Local Authorities have a responsibility to inspect their areas for the purpose of identifying contaminated land. Where a site is determined as statutory Contaminated Land, the Authority (or in the case of Special Sites, the Environment Agency) may require remediation to be undertaken.

In addition to the liabilities associated with determination of a site as statutory Contaminated Land under the Part IIA regime, the presence of contamination may also impose other constraints on redevelopment. In particular, action under Part IIA relates only to the current use of a site. When redevelopment of site is proposed, it is possible that new receptors and/or pathways may be introduced. In this case, the requirements for remediation are typically dealt with by the imposition of Planning Conditions, which may require ground investigation and remediation as necessary.

Regulatory action due to pollution of Controlled Waters may also be taken by the Environment Agency under the Water Resources Act 1991.

Contamination may also impose other constraints and liabilities with regard to the use and development of land which are not subject to regulatory action, including abnormal development costs associated with soil disposal or treatment; requirements for protective measures in building design; limitations on redevelopment options; constraints on landscape and other planting, etc.

This section of the report provides a qualitative assessment of environmental risks and liabilities and presents a preliminary conceptual site model.

This assessment is based upon residential redevelopment of the site. Should any alternative proposals be considered, a revision of this assessment will be required.

8.2 Contamination Sources

8.2.1 Current On Site Potential Contamination Sources

No current off site potential contamination sources have been identified.

8.2.2 Historical On Site Potential Contamination Sources

Allotments – Allotments have been present on the northern half of the site from c.1963. There is a potential for contamination of shallow soils within the north from historical pesticide/ herbicide and fertiliser usage; however, given that the allotments were likely used for domestic purposes, the likelihood of contaminants concentrations posing a risk to human health is considered to be very low. There may be localised areas of higher contaminant concentrations due to former storage of pesticide/ herbicide and fertiliser. The potential that organic wastes were disposed on site, which may be a source of ground gas, cannot be ruled out.

Made Ground: Made Ground containing ash and clinker may be present in localised areas from burning of waste and using the burnt residue as a soil enhancer. Made Ground may also have been imported for the creation of walkways.

Building demolition: There is a potential for asbestos and lead contamination in localised areas within the site from the historical demolition of structures. The risk of encountering asbestos or lead contamination will depend on the structures construction materials and the demolition process.

8.2.3 Current Off Site Potential Contamination Sources

No current off site potential contamination sources have been identified.

8.2.4 Historical Off Site Potential Contamination Sources

Landfill – A landfill formerly licensed by British Gas, for the disposal of inert and commercial wastes, was located approximately 207m to the east. Whilst guidance suggests that gas risk can arise up to

250m from landfill, the likelihood of any significant impact is considered very low, particularly as an area of housing development took place to the east of the site during the 1990s.

8.2.5 Summary of Potential Contamination Sources

There is a low potential for ground contamination from Made Ground, historical building demolition and the storage and usage of pesticide/ herbicide and fertiliser. There is also a potential for migration of ground gas to the site from a neighbouring historical landfill; although this risk is considered to be very low.

8.3 Contamination pathways

Residential development is proposed. The potential pathways listed below may be significant:

- Dermal contact with contaminated soils and/or dust;
- Ingestion of contaminated soils;
- Inhalation of gases, vapours, fibres and/or dusts;
- Leaching to surface watercourses or groundwater;
- Migration of gases or contaminated water through the ground;
- Exposure of plants to soil contaminants via root contact.

8.4 Contamination Receptors

The potential receptors listed below may be significant;

- Groundworks/ construction contractors and their staff working on site;
- Future site users (residents);
- Groundwater;
- Surface waters;
- Building materials and surface;
- Vegetation.

8.5 Ground Contamination Risk Assessment/Preliminary Conceptual Site Model

Risks posed to each of the identified potential receptors are discussed separately, and are assessed based on the risk matrices included as Appendix C.

8.5.1 Groundworks Contractors

During groundworks, contractors are more likely to be directly exposed to potentially contaminated soils than other site users. The exposure by dermal contact, inhalation and ingestion of soil, is likely to be of relatively short direction and exposure can be mitigated by the use of appropriate Personal Protective Equipment, if required. The risk to contractors is considered to be **Very Low**. However, if asbestos present in site soils, the risk to contractors may be **High**.

8.5.2 Future site users

Residential occupiers may be potentially exposed to underlying site soils in gardens and landscaped areas via dermal contact, inhalation and ingestion. Sufficient resources of topsoil are likely to be available on site (subject to assessment of quality) for the use in residential gardens and landscaped area, which should break all pollutant linkages.

The presence of an historical landfill neighbouring the site may also pose a risk of ground gas ingress to future buildings; however, this is considered to be unlikely. Subject to the assessment of ground conditions, including the potential for the migration of landfill gas, the risk to site users is considered to be **Very Low**.

8.5.3 Groundwater

Superficial deposits are not mapped on site. Bedrock deposits are classified as a Secondary A Aquifer. Groundwater is not abstracted on site or within a 250m radius. The site is not located within a Source Protection Zone.

The risk to groundwater is considered to be **Very Low** as the likelihood of contaminants representing a hazard to groundwater is considered to be low.

8.5.4 Surface waters

Open waterways are not present on site or in the immediate surrounding area. Surface water abstractions were not identified on site or within a 250m radius. The risk posed by the site to surface water quality is considered to be **Very Low**.

8.5.5 Building Materials and Services

Building materials and plastic water supply pipes may be attacked by contaminants in Made Ground, for example sulphates may attack cement-based materials. The risk to building materials and services is considered to be **Very Low** as Made Ground (if present), is likely to be localised.

8.5.6 Vegetation

The risk to future vegetation is considered to be **Very Low** provided the layer of topsoil overlying the potentially contaminated site soils is of sufficient thickness.

8.6 Summary of Significant Pollution Linkages

There is a low potential for ground contamination from Made Ground, historical building demolition and the storage and usage of pesticide/ herbicide and fertiliser. There is also a potential for migration of ground gas to the site from a neighbouring historical landfill; although this risk is considered to be very low.

Ground disturbance is anticipated during the proposed development. Potential source-pathway-receptor linkages are identified; however intrusive site investigations are required to determine the viability of identified linkages. Risks posed to identified receptors are considered to be **Very Low**, with the potential for a higher risk if asbestos is identified in soils.

9.0 Geotechnical Issues

The site is underlain by worked coal strata at a minimum depth of 330m, last worked in 1963. The site is not considered to be within the zone of influence of any ground stability concerns. A shaft was recorded by the Coal Authority outside the site boundary to the north, within the area of recent housing development. No details of treatment of the mine entry are available. It is not considered likely that the presence of the shaft would represent any constraint to development.

Residual below-ground structures from the early allotment structures may remain. It is unlikely that these would be substantial, though they should be removed before redevelopment.

10.0 Summary and Conclusions

The site occupies an area of approximately 1.26ha and comprises a vegetated area with mature trees in the east and north.

Historical OS mapping indicates that the site was undeveloped agricultural land from c.1854 to c.1933 when the northern half was developed as allotment gardens. A number of structures associated with the allotment gardens are recorded on the 1962 OS map. The largest structure approached the footprint area of a small house, up to 10m x 4m, which is more substantial than typical allotment holder's sheds. Most structures were subsequently removed in the 2010's.

Shafton Colliery, a former small-scale coal mine disused by 1894, was located 400m east. Residential development encroached toward the site from the northwest (Shafton) and southeast (Shafton Two Gates) between the 1960s and 1980s. Residential properties adjoined the northern boundary by 1981. No other significant development was shown in the vicinity.

Superficial deposits are not mapped on the site. Bedrock strata comprises Pennine Middle Coal Measures Formation and South Wales Middle Coal Measures Formation and is classified as a Secondary A Aquifer. Groundwater is not abstracted on site or within a 250m radius. The site is not located within a Source Protection Zone.

Open channel watercourses are not present on site or in the surrounding area.

There is a low potential for ground contamination from Made Ground, historical building demolition and the storage and usage of pesticide/ herbicide and fertiliser. There is also a potential for migration of ground gas to the site from a neighbouring historical landfill; although this risk is considered to be very low.

Ground disturbance is anticipated during the proposed development. Potential source-pathway-receptor linkages are identified; however intrusive site investigations are required to determine the viability of identified linkages. Risks posed to identified receptors are considered to be **Very Low**, with the potential for a higher risk if asbestos is identified in soils.

The site is underlain by worked coal strata at a minimum depth of 330m, last worked in 1963. The site is not considered to be within the zone of influence of any ground stability concerns. A shaft was recorded by the Coal Authority outside the site boundary to the north, within the area of recent housing development. No details of treatment of the mine entry are available. It is not considered likely that the presence of the shaft would represent any constraint to development.

Residual below-ground structures from the early allotment structures may remain. It is unlikely that these would be substantial, though they should be removed before redevelopment.

11.0 Recommendations

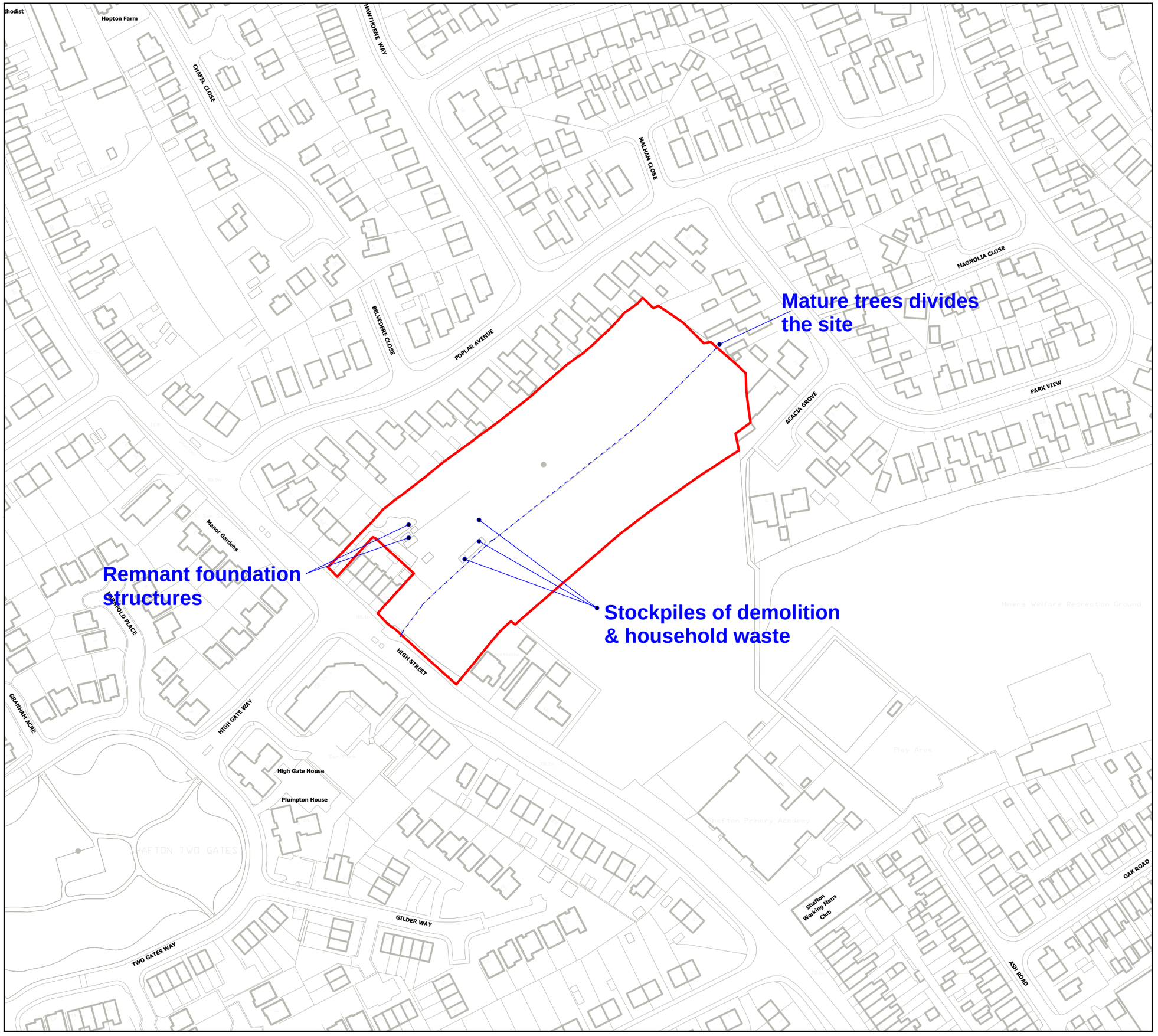
Intrusive site investigations including geotechnical and limited contamination testing and gas monitoring are recommended within the development area to investigate ground conditions, determine the extent and properties of Made Ground, to determine gas risk and to inform foundation / structure design.

12.0 References

1. Envirocheck Report – Order Number 67788698_1_1 - dated 21 May 2015.
2. Arc Environmental (2015). Phase 1 Desk Study and Coal Mining Risk Assessment Report: Oldham Access Services, Land off High Street, Shafton, Barnsley, S72 8NG.
3. Public Health England Website – www.ukradon.org/information/radonsearches
4. BRE Report BH211 (2015).
5. The Coal Authority (2015). Non-Residential Coal Authority Mining Report: Land at High Street, Shafton, Barnsley, South Yorkshire, S72 8NG.

13.0 Figures

Figure 1 – Site Layout Plan



Rev	Date	Notes
A	05/10/17	Initial map production

Legend

Site Boundary

0 12.5 25 50 75 100 Metres

Site Location Plan

Land at Shafton, Barnsley
Homes and Communities Agency

Scale at A3:	Project No:	Drawing No:	Revision:
1:3750	A090070-332	Figure 1	A

Drawn by:	Drawn date:	Approved by:
Jonathan Siberry	05/10/2017	Luke Verrall

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14.0 Appendices

Appendix A – Report Conditions

Report Conditions

GROUND INVESTIGATION

This report is produced solely for the benefit of Homes England and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise.

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

This report is based on a visual site inspection, reference to accessible referenced historical records, information supplied by those parties referenced in the text and preliminary discussions with local and Statutory Authorities. Some of the opinions are based on unconfirmed data and information and are presented as the best that can be obtained without further extensive research. Where ground contamination is suspected but no physical site test results are available to confirm this, the report must be regarded as initial advice only, and further assessment should be undertaken prior to activities related to the site. Where test results undertaken by others have been made available these can only be regarded as a limited sample. The possibility of the presence of contaminants, perhaps in higher concentrations, elsewhere on the site cannot be discounted.

Whilst confident in the findings detailed within this report because there are no exact UK definitions of these matters, being subject to risk analysis, we are unable to give categoric assurances that they will be accepted by Authorities or Funds etc. without question as such bodies often have unpublished, more stringent objectives. This report is prepared for the proposed uses stated in the report and should not be used in a different context without reference to WYGE. In time improved practices or amended legislation may necessitate a re-assessment.

The assessment of ground conditions within this report is based upon the findings of the study undertaken. We have interpreted the ground conditions in between locations on the assumption that conditions do not vary significantly. However, no investigation can inspect each and every part of the site and therefore changes or variances in the physical and chemical site conditions as described in this report cannot be discounted.

The report is limited to those aspects of land contamination specifically reported on and is necessarily restricted and no liability is accepted for any other aspect especially concerning gradual or sudden pollution incidents. The opinions expressed cannot be absolute due to the limitations of time and resources imposed by the agreed brief and the possibility of unrecorded previous use and abuse of the site and adjacent sites. The report concentrates on the site as defined in the report and provides an opinion on surrounding sites. If migrating pollution or contamination (past or present) exits further extensive research will be required before the effects can be better determined.

Appendix B – Site Photographs



Photograph 1



Photograph 2



Photograph 3



Photograph 4



Photograph 5



Photograph 6



Photograph 7



Photograph 8

Appendix C – Risk Assessment Matrices

Qualitative Risk Assessment

By considering the sources, pathways and receptors, an assessment of the environmental risks is made with reference to the significance and degree of the risk. This assessment is based on consideration of whether the source contamination can reach a receptor and hence whether it is of major or minor significance. The exposure risk assessment below is considered applicable to both current informal site use and proposed future path development.

The qualitative risk assessment has been undertaken in accordance with BS10175:2011 and CIRIA Document C552: Contaminated Land Risk assessment, A Guide to Good Practice. The source – pathway – receptor linkages are developed around the information presented above.

The risk assessment has been carried out by assessing the severity of the potential consequence, taking into account both the potential severity of the hazard and the sensitivity of the target, based on the categories given below.

Table A1: Potential Hazard Severity Definition

Category	Definition
Severe	Acute risks to human health, catastrophic damage to buildings/property, major pollution of controlled waters
Medium	Chronic risk to human health, pollution of sensitive controlled waters, significant effects on sensitive ecosystems or species, significant damage to buildings or structures
Mild	Pollution of non sensitive waters, minor damage to buildings or structures
Minor	Requirement for protective equipment during site works to mitigate health effects, damage to non sensitive ecosystems or species

The likelihood of an event (probability) takes into account both the presence of the hazard and target and the integrity of the pathway and has been assessed based on the categories given below.

Table A2: Probability of Risk Definition

Category	Definition
High likelihood	Pollutant linkage may be present, and risk is almost certain to occur in long term, or there is evidence of harm to the receptor
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term
Low likelihood	Pollutant linkage may be present, and there is a possibility of the risk occurring, although there is no certainty that it will do so
Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are improbable

The potential severity of the risk and the probability of the risk occurring have been combined in accordance with the following matrix in order to give a level of risk for each potential hazard.

Table A3: Level of Risk for Potential Hazard Definition

		Potential Severity			
		Severe	**Medium**	**Mild**	**Minor**
Probability of Risk	**High Likelihood**	Very High	High	Moderate	Low/Moderate
	Likely	High	Moderate	Low/Moderate	Low
	Low Likelihood	Moderate	Low/Moderate	Low	Very Low
	Unlikely	Low/Moderate	Low	Very Low	Very Low