OAKSHIRE
ENVIRONMENTAL

Report type	Phase 1 Preliminary Risk Assessment
Company	Quantum Intelligent Trading Ltd t/a Oakshire Environmental
Client	SGI Projects Limited
Site address	41 Snelsins Road, Cleckheaton, BD19 3UE
Report date	4th September 2020
Report prepared by	Louis Turner BSc (Hons) - Chief Technical Officer
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ENVIRONMENTAL

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Phase 1 Preliminary Risk Assessment

Contents

1. Introduction

The following document is a Phase 1 Preliminary Risk Assessment carried out by Oakshire Environmental commissioned by SGI Projects Limited. It includes a description of the site location and site history as well as the ground composition and environmental setting of the site. This information has been used to develop an initial conceptual site model of potential sources, pathways and receptors of contamination. A brief overview of the proposed development is also included below.

1.1 Project Overview

The client's proposed project involves the erection of a single storey rear extension at 41 Snelsins Road, Cleckheaton, BD19 3UE. A Desk Study has been requested by Kirklees Council through the attachment of conditions on planning application 2019/62/93600/E. Oakshire Environmental will carry out a Phase 1 Preliminary Risk Assessment, as described below.

1.2 Purpose of Investigation

The objectives of the Phase 1 Preliminary Risk Assessment were:

- To develop a detailed assessment of the site.
- To assess the potential for contamination at the site.
- To assess the likelihood of unacceptable risks from contamination.
- To assess the need for further investigation or remediation.

1.3 Scope of Work

- To develop an assessment of the site, desk studies were carried out to collate information on the site's history, expected ground conditions and environmental setting.
- This information was used to develop a Conceptual Site Model that identifies potential pollutant linkages at the site in order to determine the need for further investigation.
- Desk studies were carried out in accordance with the Environment Agency's Land Contamination: Risk Management (LCRM) guidelines as updated from Environment Agency's Model Procedures for the Management of Land Contamination (CLR11) framework.
- The client has provided information and images of the site in lieu of a site walkover.

1.4 Limitations

Quantum Intelligent Trading Ltd, previously and hereafter referred to as Oakshire Environmental. This report has been prepared with reasonable skill, care and diligence following the guidance contained within the Environment Agency's Land Contamination: Risk Management (LCRM) guidelines as updated from Environment Agency's Model Procedures for the Management of Land Contamination (CLR11) framework. This report is only valid when used in its entirety and any information or advice contained within the report should not be relied upon until considered in the context of the whole report. Oakshire Environmental disclaims any responsibility to the client and others in respect of any matters outside the scope of this work. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate. This report is confidential and has been prepared solely for the benefit of the client. Oakshire Environmental accepts no responsibility or liability for the contents of this report being used for any purpose or project for which it was not commissioned. Oakshire Environmental does not accept any liability whatsoever for the consequences of any legislative changes or the release of subsequent guidance documentation and following delivery of the report has no obligation to advise the client or any other party of such changes or their repercussions.

Oakshire Environmental does not warrant or guarantee that the site is free of hazardous or potentially hazardous materials or conditions.

2. Site

The following section describes the site using information obtained from publically available sources and from the client.

2.1 Site Description and Location

The site is located at 41 Snelsins Road, Cleckheaton (Figure 1). The site is approximately 150m^2 and includes a detached stone dwelling at the north east fronting Snelsins Road with a drive and soft landscaped area at the front of the dwelling, an attached garage to the south, a conservatory to the rear and the south west of the site is a residential garden (Figure 2). The site is bordered by other residential properties and the surrounding area is mostly residential with some commercial premises to the east. There are no crops, woodland, ecological systems, archaeological sites or ancient monuments within 250m of the site.

National Grid Reference: SE 18253 26202

2.2 Site History

Table 1: Description of the site and surrounding area over time, according to historical maps

Year	Site Description	Surrounding Area
1854	'Snelsins' farm	Lathe Hall to the north west Railway 100m south west Chemical works 250m south west
1894		'Fieldhead' most likely a farm Chemical works 200m south and 400m south east Gasometer 250m south east School 250m east
1944		Development of various industrial works to the south east and some residential development Chemical works 100m south
1957	Appears to be part of chemical works	Residential development along Bradford Road to the east
1983		M62 motorway 200m north west
1993		Railway redeveloped into footpath

Off-Site

The earliest available historic maps of the site, from the mid 19th century, show that the surrounding area was mostly open fields and agricultural land with a railway and a chemical works to the south west. There was a lot of industrial development throughout the late 19th and early 20th century and a large amount of the nearby agricultural land was developed into chemical works. These chemical works, along with various other industrial works existed until around the early 21st century where most of it was redeveloped into housing. The railway was present until the late 20th century until it was redeveloped into a footpath after the construction of the M62 motorway.

On-Site

Historical map data show that there has been development on the site since at least 1854, where the site was part of a farm. The site then appears to have become part of the nearby chemical works around the mid 20th century and after which is was redeveloped into a residential dwelling, in 2004, that is present on the site now.

2.3 Planning History

A search of Kirklees Council's planning portal showed the following applications at and nearby the site.

Table 2: Previous planning applications on and near the site

Application Number	Year	Address	Proposal	Decision	Details
90/62/04073/A1	1990	Metrotect PLC, Whitechapel Road	Erection of sand silo	Conditional Full Permission	No documents available
93/05831	1993	Metrotect PLC, Whitechapel Road	Extension and conversion of existing premises to form office accommodation	Conditional Full Permission	No documents available
94/62/90189/E3	1994	Metrotect PLC, Whitechapel Road	Installation of 2 no. Slate silos	Conditional Full Permission	No documents available
94/62/91026/E3	1994	Metrotect PLC, Whitechapel Road	Installation of Bitumen bending still	Conditional Full Permission	No documents available
2004/62/95600/E1	2004	Spen Valley footpath/ cycleway, Whitechapel Road, Snelsins Road	Erection of 136 town houses & apartments and formation of public open space	Conditional Full Permission	Ground investigation identified remediation was required due to elevated TPH, PAH, arsenic and methane Remediation was carried out including a minimum of 1m clean cover (0.6m topsoil and 0.4m subsoil)
2016/62/90314/E	2016	41 Snelsins Road	Erection of side extension	Conditional Full Permission	No conditions applied relating to contaminated land
2019/44/93743/E	2019	Land adj. 4 Snelsins Road	Discharge conditions 3 (materials), 7 (ecological design strategy), 9-11 (site investigation report) on previous permission 2017/94032 for erection of 5 detached dwellings	Split Decision	Phase 2 report carried out and identified need for some remediation work

Consultation with Kirklees Council revealed that ground investigations were undertaken by Carl Bro Group in 2004. These investigations determined remediation was required due to elevated total petroleum hydrocarbons, polycyclic aromatic hydrocarbons, arsenic and methane and a site-wide phased approach to remediation and validation was undertaken. The site is identified as Plot 120 in the Whitechapel Road Development for application no. 2004/95600. Eastwood & Partners Consulting Engineers were contracted to implement the proposed remediation. The presence of standard 1200-gauge ground gas protection membrane and a minimum 1000mm clean cover system (600mm of top soil plus 400mm of subsoil) has been validated, however, email correspondence suggests that on 5th April 2012 there was still outstanding conditions relevant to the whole site (including Plot 120) as no complete validation/closure report had been submitted to the Kirklees Council.

3. Environmental Setting

The following section provides information on the environmental setting of the site based on data from the British Geological Survey (BGS), UK Soil Observatory (UKSO), the Department for Environment, Food and Rural Affairs (DEFRA), the Coal Authority and Public Health England (PHE).

Table 3: Summary of the site's environmental setting

Environmental Factor			Details
Geology	Made Ground[1]		Map data shows made ground south west of the site but none on site
	Soil Type[2]		Clayey Loam to Sandy Loam
	Superficial Deposits[1]		No deposits on site
	Bedrock Geology[1]		Pennine Lower Coal Measure Formation with Falhouse Rock Sandstone interbedded
	Borehole Records[1]		Nearest borehole records 100m south from 1935 shows made ground and soil in the top 1m, becoming clay and flagstones down to ~9m. Shallowest coal is ~11.5m. No groundwater level shown.
Hydrology	Surface Water		Small culverted water course 230m south east most likely from the Spen River further south east
	Groundwater[3]		Medium vulnerability
Hydrogeology	Aquifer Designation	Superficial[3]	Unproductive
		Bedrock[1]	Secondary A
Mining	Coal Mining Development High Risk Area[4]		Within development high risk area due to probable past shallow coal mining
Radon	PHE UKradon Map[5]		<1% probability of being above action level

Data sources: 1 - British Geology Survey (BGS), 2 - UK Soil Observatory (UKSO), 3 - Department for Environment, Food and Rural Affairs (DEFRA), 4 - Coal Authority, 5 - Public Health England (PHE)

4. Initial Conceptual Site Model

The following section outlines potential contamination sources, pathways and receptors based on the information gathered in the previous sections to develop an initial conceptual site model.

4.1 Potential Contamination Sources

Historical map data and information obtained from the client suggest that there are potential sources of contamination from the historical chemical works the site is built on.

- There is a potential risk of heavy metal and hydrocarbon contamination from the historical chemical works.
- There is a potential risk of heavy metal and hydrocarbon contamination from probable past shallow coal mining.
- There is a potential risk of ground gas generation from the historical chemical works.

4.2 Potential Contamination Receptors

The possible receptors, given the proposed use of the site, include:

- Future residents
- Incoming services
- Controlled waters

It can be assumed that contamination issues during construction will be managed by general health and safety procedures so construction workers are not considered as receptors for this assessment.

4.3 Potential Contamination Pathways

Given that the proposed development is located in a residential garden, relevant pathways for human receptors include:

- Ingestion/inhalation of contaminated soil dusts
- Dermal contact with contaminated soil
- Inhalation of soil vapours in indoor airspace
- Ingestion of homegrown produce
- Gas migration into buildings

Relevant pathways for controlled waters include:

- Leaching through soil

Pathways between off-site sources and off-site receptors is beyond the scope of this assessment.

4.4 Conceptual Site Model

The information in this section has been compiled to produce an initial conceptual site model outlining the potential sources, pathways and receptors to consider at the site. The level of risk was categorised by considering the severity of their potential impact and the probability of them being present and thus resulting in a significant pollutant linkage.

Table 4: Conceptual site model

Potential Sources	Potential Pathways	Potential Receptors	Severity	Probability	Potential Level of Risk	
There is a potential risk of heavy metal and hydrocarbon contamination from the historical chemical works and shallow coal mining	Ingestion/inhalation of contaminated soil dusts Dermal contact with contaminated soil Inhalation of vapours in indoor airspace Ingestion of homegrown produce	Future residents	**Moderate**	**Low**	**Low**	Previous site investigations have identified heavy metal and hydrocarbon contamination at the site. However, the remediation carried out as a result of this finding, in the form of a minimum 1m clean cover and a gas membrane, is considered sufficient to mitigate the risk to human health. Further to this, the minor development proposed on the site is not likely to involve groundworks to depth beyond this clean cover layer so the integrity of the remediation measures is likely to be maintained.
	Leaching through soil	Incoming services	**Moderate**	**Low**	**Low**	Services installed for the proposed development are not likely to be deeper than 1m so they should be protected by the clean cover soil at the site.
		Groundwater	**Low**	**Low**	**Low**	Groundwater at the site is not considered to be particularly vulnerable. Groundwater was not shown to be encountered in nearby boreholes dug to >11m and the underlying bedrock is not very permeable.
There is a potential risk of ground gas generation from the historical chemical works	Gas migration into buildings	Future residents	**Moderate**	**Low**	**Low**	Previous site investigations have identified a risk from methane production. However, the remediation carried out as a result of this finding, in the form of a minimum 1m clean cover and a gas membrane, is considered sufficient to mitigate the risk to human health. Further to this, the minor development proposed on the site is not likely to involve groundworks to depth beyond this clean cover layer so the integrity of the remediation measures is likely to be maintained.

5. Conclusions

5.1 Risk Evaluation

The initial conceptual site model suggests that there are pollutant linkages present at the site. Therefore, the following conclusions have been drawn:

- There is a low risk to the health of future residents from the ingestion/inhalation of contaminated soil dusts, dermal contact with contaminated soil, inhalation of vapours in indoor airspace and ingestion of homegrown produce from soil contaminated by heavy metals and hydrocarbons from the historical chemical works and shallow coal mining.

- There is a low risk to incoming services from leaching of contaminants through soil from the historical chemical works and shallow coal mining.

- There is a low risk to groundwater from the leaching of contaminants through soil from the historical chemical works and shallow coal mining.

- There is a low risk to the health of future residents from the migration of gases into buildings from the historical chemical works.

Based on the findings of this Phase 1 Preliminary Risk Assessment, the risk to human health and groundwater is considered to be low. It can be assumed that the risk to surface waters, crops, woodland, ecological systems, archaeological sites and ancient monuments is negligible.

5.2 Further Investigation

The risk to human health from contamination at the site is considered to be low due to the remediation measures put in place, as part of the original development. To ensure existing remediation measures are unaffected, all groundworks undertaken as part of the client's proposed project must not exceed a depth of 1m, in order to maintain the integrity of the clean cover and gas membrane currently in place. Taking into account this condition, no additional remediation work is considered necessary as the existing remediation measures in place are considered sufficient to mitigate the risk to human health at the site.

Kirklees Council have stated that a remediation validation report Phase 2 was submitted by Carl Bro Group Ltd in June 2007 but no complete validation/ closure report had been submitted for the whole site. In the absence of a complete validation/closure report, it would be prudent to carry out a validation report for the site, to include sampling of the clean cover soil, prior to any groundworks being carried out, in order to confirm the absence of any contamination. However, to avoid unnecessary cost to the client, Kirklees Council should first be consulted to ensure a complete validation/closure report has not been submitted prior to allowing work to commence on the original development.

6. References

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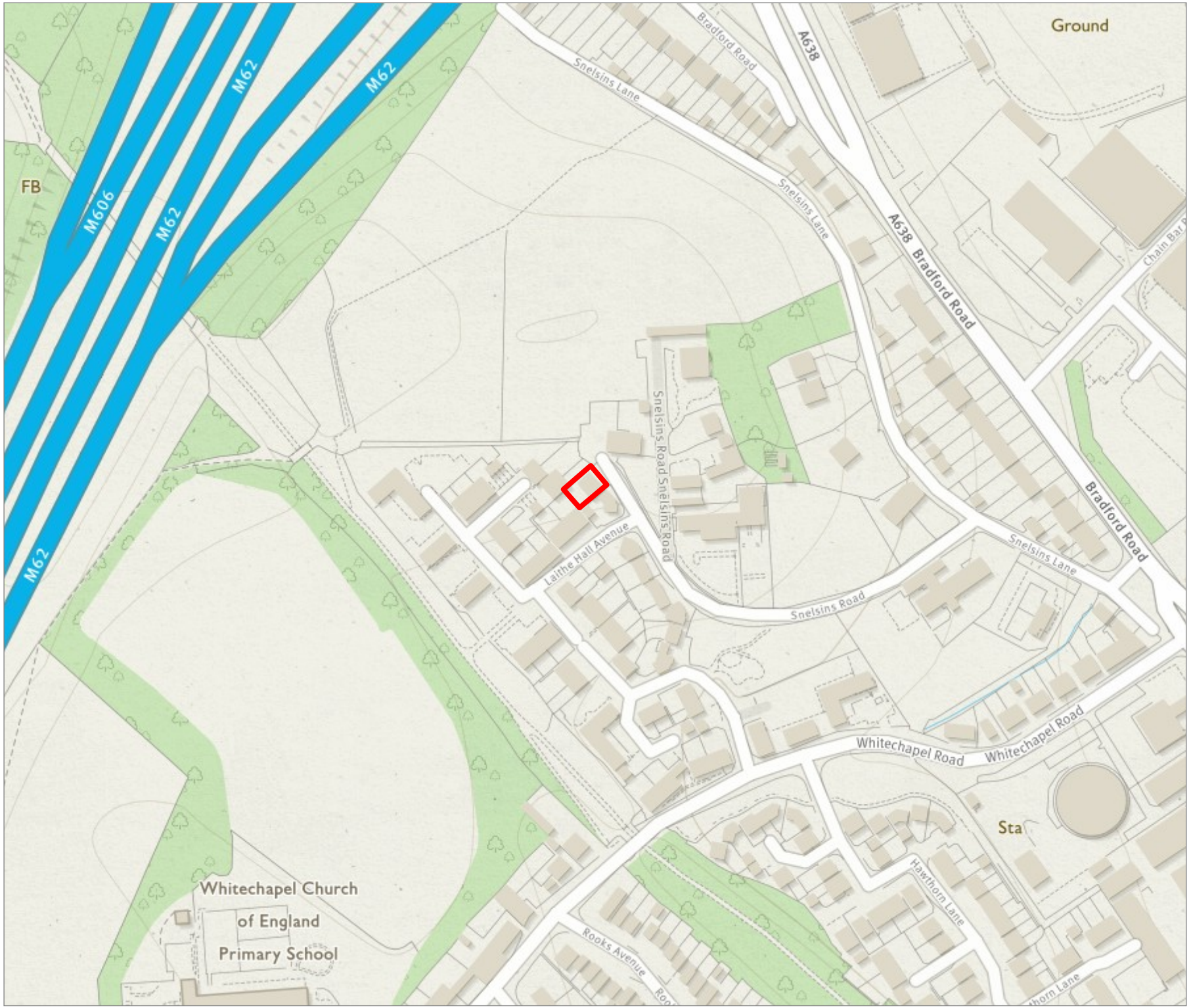


Appendix A - Site Location Maps

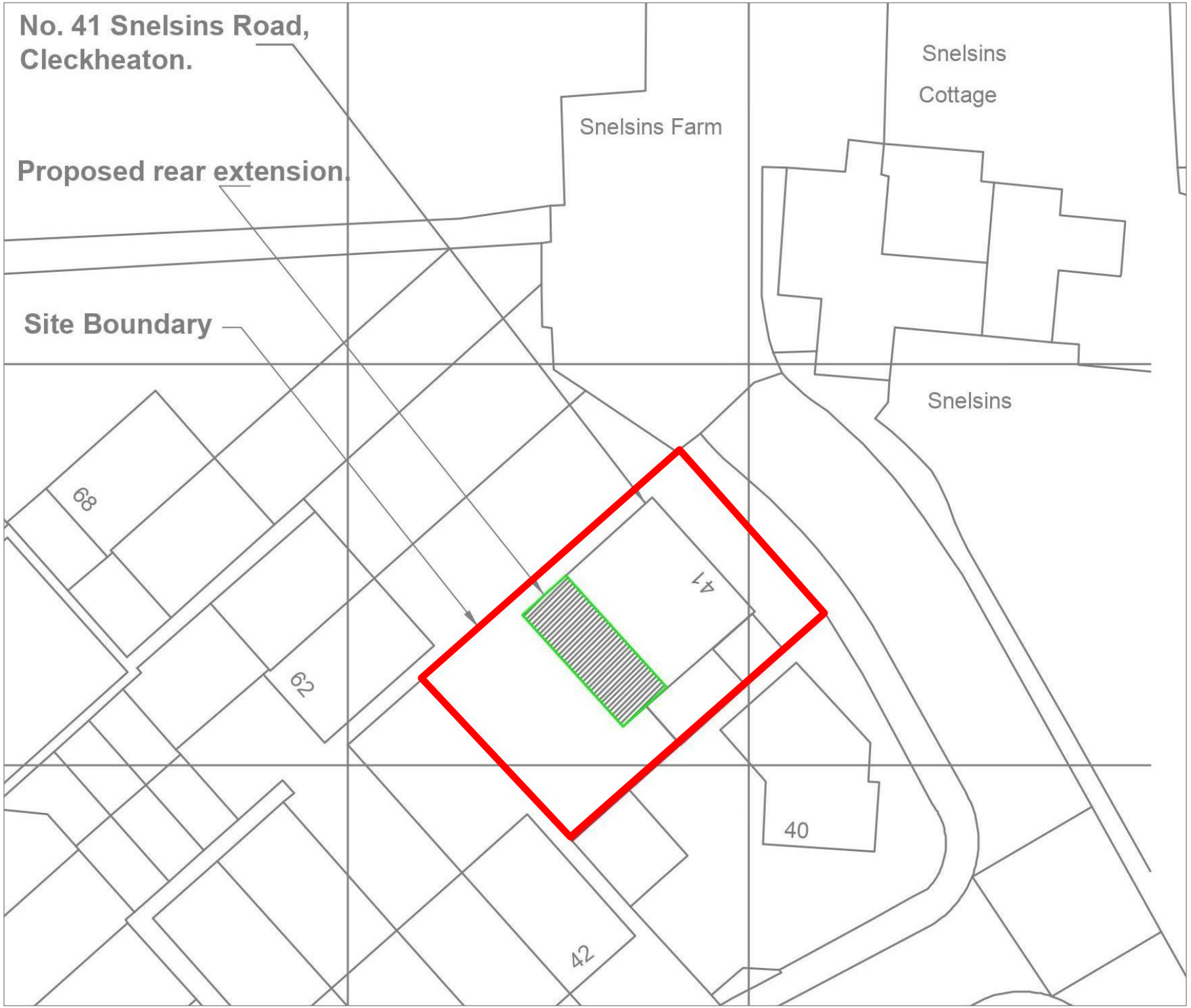
Description
OS map showing site location in red

Sources
Contains OS data © Crown copyright and database rights 2020

Key	
	Site boundary

Name	Figure 1

N



Appendix A - Site Location Maps

Description
Proposed site plans

Sources
Client's plans

Key	
	Site boundary

Name	Figure 2

Appendix B - Site Photos

Description
Photo of rear of dwelling

Sources
Dunster Consulting

Key	

Name	Figure 3

Appendix B - Site Photos

Description
Photo of rear of dwelling showing conservatory and decking

Sources
Dunster Consulting

Key	

Name	Figure 4

Appendix B - Site Photos

Description
Photo of rear of dwelling showing attached garage building

Sources
Dunster Consulting

Key	

Name	Figure 5

Appendix C - Historic Maps

Description
Historic map published in 1854

Sources
Reproduced with the permission of the National Library of Scotland - maps.nls.uk

Key	
	Site Location

Name	Figure 6

Appendix C - Historic Maps

Description
Historic map published in 1894

Sources
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Key	
	Site Location

Name	Figure 7

Appendix C - Historic Maps

Description
Historic map published in 1944

Sources
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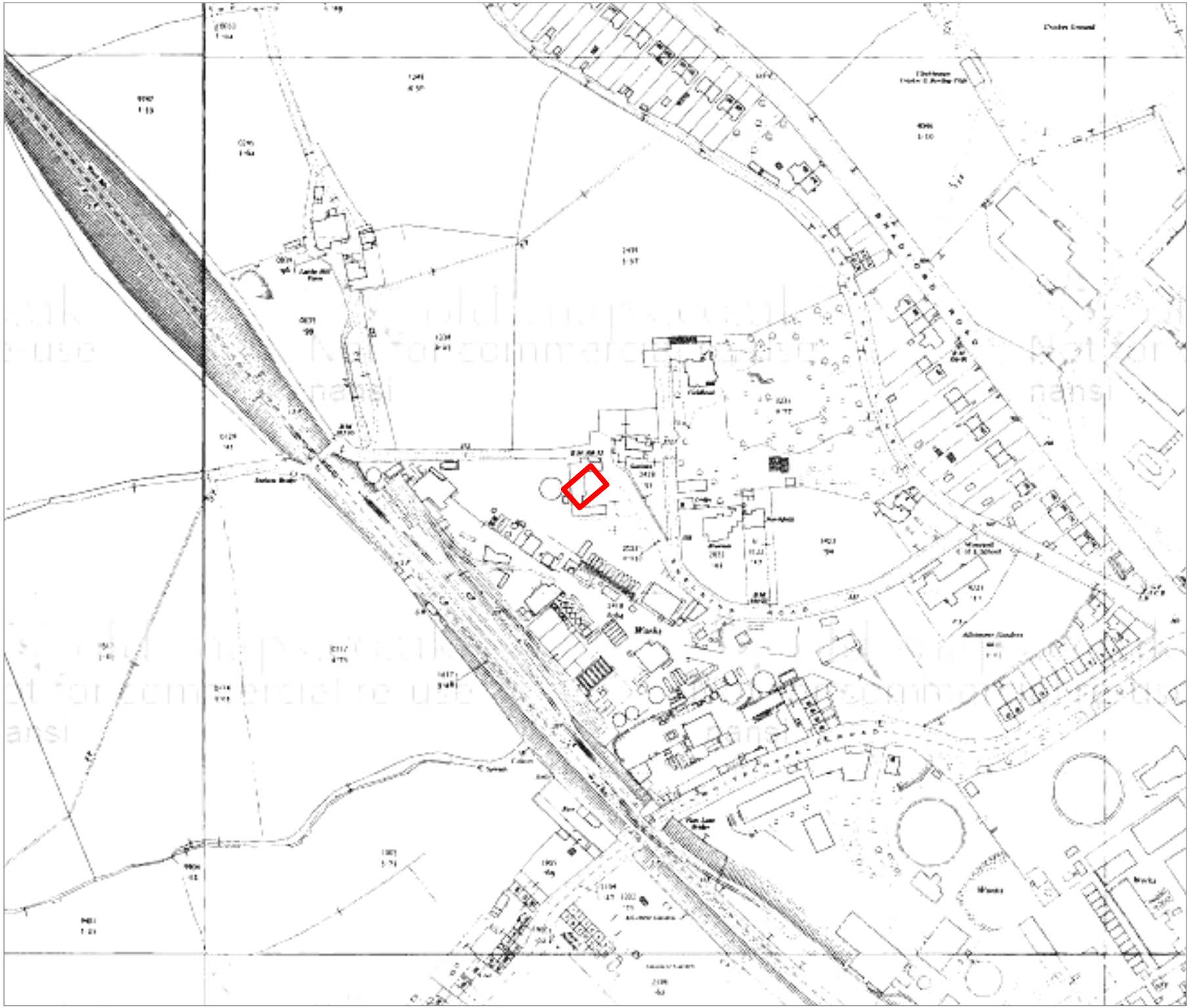
Key	
	Site Location

Name	Figure 8



Appendix C - Historic Maps

Description
Historic map published in 1957

Sources
Historical Mapping © Crown Copyright and database rights Ordinance Survey and Landmark Information Group Ltd 2020. All rights reserved.

Key	
	Site Location

Name	Figure 9

Appendix C - Historic Maps

Description
Historic map published in 1983

Sources
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Key	
	Site Location

Name	Figure 10

Appendix C - Historic Maps

Description
Historic map published in 1993

Sources
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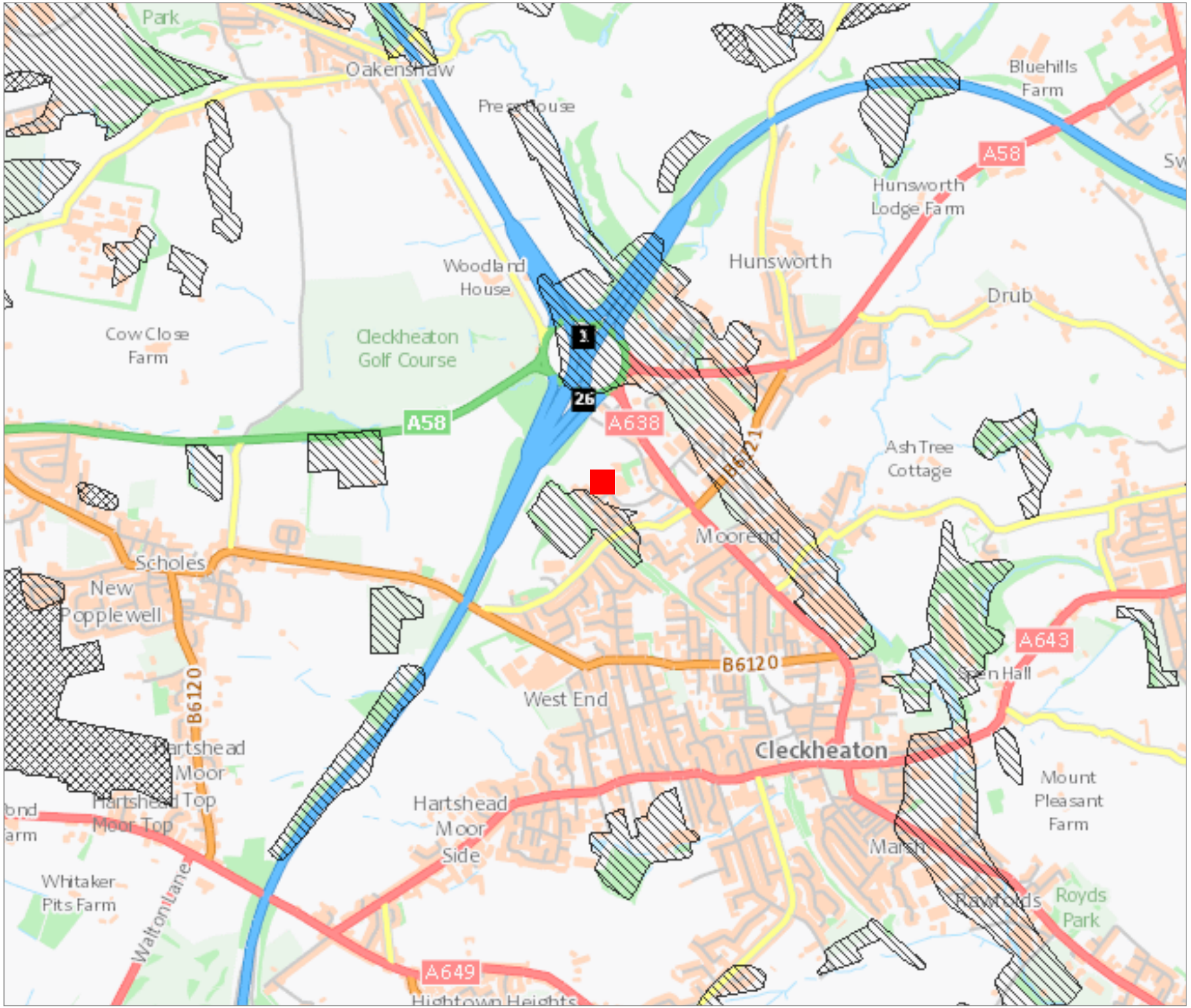
Key	
	Site Location

Name	Figure 11



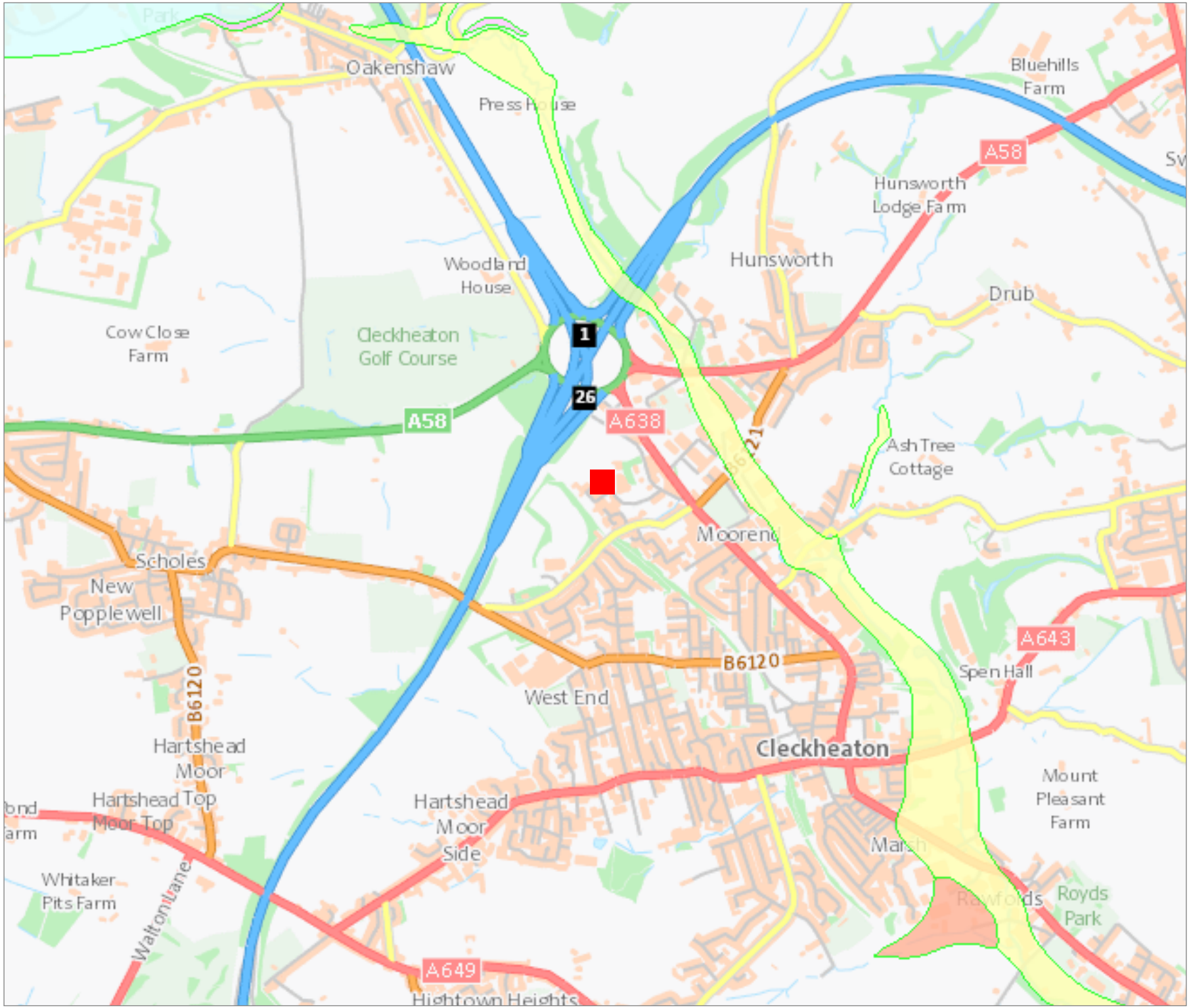
Appendix D - Geological Maps

Description
BGS map showing artificial ground near the site

Sources
British Geological Society (2020)

Key	
	Site Location
	Made Ground (undivided)
	Infilled Ground

Name	Figure 12



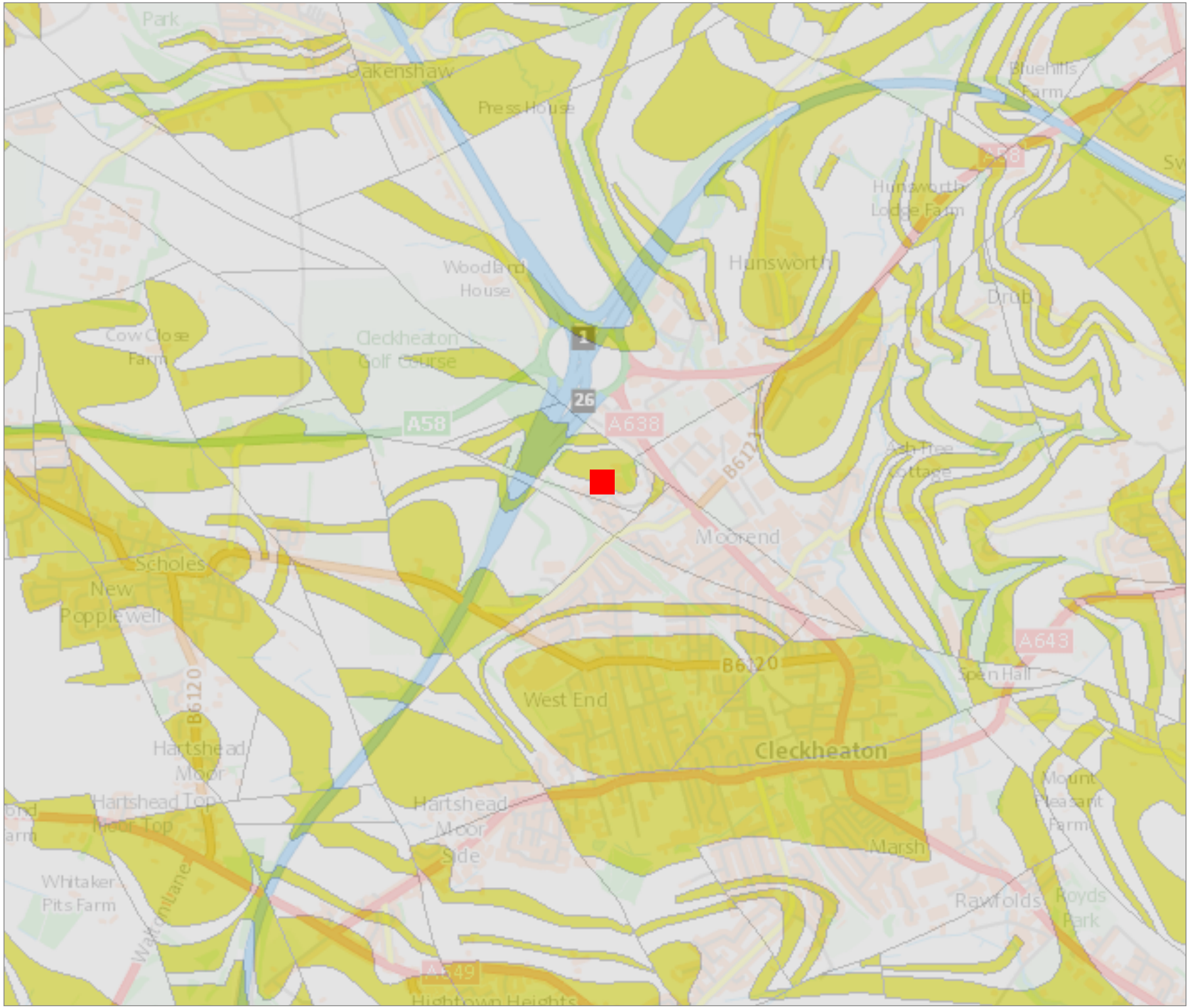
Appendix D - Geological Maps

Description
BGS map showing superficial deposits on site

Sources
British Geological Society (2020)

Key	
	Site Location
	Alluvium
	Till, Devensian

Name	Figure 13



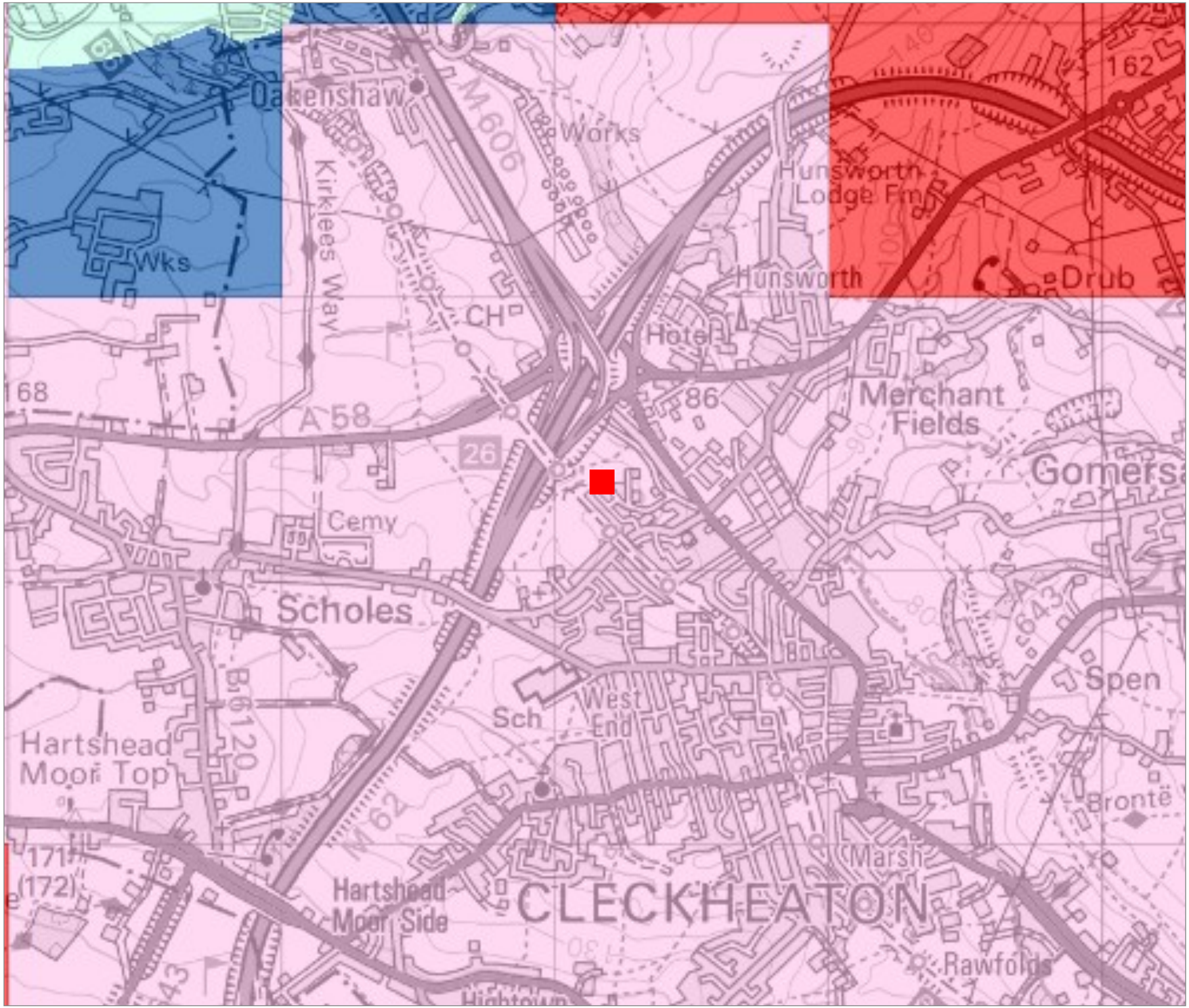
Appendix D - Geological Maps

Description
BGS map showing bedrock geology on site

Sources
British Geological Society (2020)

Key	
	Site Location
	Sandstone
	Pennine Lower Coal Measures

Name	Figure 14



Appendix D - Geological Maps

Description
DEFRA Groundwater Vulnerability Map

Sources
Department for Environment, Food and Rural Affairs (2020)

Key	
	Site Location
	High
	Medium - High
	Medium
	Medium - Low
	Low
	Unproductive

Name	Figure 15