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Our ref: GH/GM13775/001 *Date*: 20 August 2025
Your ref:

John Scoble
Challenger Building Services Limited
140 Lee Lane
Horwich
Bolton
BL6 7AF

Dear John,

Greenwood Road, Wythenshawe – Validation of Cover System Soils

Wardell Armstrong LLP (WA) were commissioned by Challenger Building Services Limited (CBSL) to undertake the validation of the cover system soils (CSS) brought onto your site off Greenwood Road, Wythenshawe. The following letter presents validation information for the importation and placement of hardcore and topsoil within soft landscaping areas. The aim of this letter is to assist in discharging condition No. 6 of Decision Notice 125993/FO/2020, which states the following:
"6) Prior to the occupation of the development hereby approved, a Contaminated Land Verification Report, confirming the implementation of the remediation strategy within the Phase 1 and Phase Report prepared by STL, stamped as received on 24 January 2020, shall be submitted to the City Council as local planning authority."

The general arrangement of the site is shown on Layer Drawing 189-LYR-XX-ZZ-DWG-L-1001 attached at Appendix A.

The validation has been undertaken via the following scope:

- Examination of site photographs to confirm the depth of the installation of the CSS;
- Review testing results to confirm that the topsoil is chemically suitable for use and compliant with the STL Consulting Structural Engineers report entitled 'Phase 1 and Phase 2 Report for: ECS Capital Ltd', (reference: MSR 19-3704) dated 23 September 2019 (attached at Appendix B);
- Review testing results to confirm that the hardcore is suitable for use and compliant with the STL report.

Wardell Armstrong is the trading name of Wardell Armstrong LLP, Registered in England No. OC307138.
Registered office: Sir Henry Doulton House, Forge Lane, Etruria, Stoke-on-Trent, ST1 5BD, United Kingdom
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ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES
WASTE RESOURCE MANAGEMENT

Design

The STL report states the following recommendation regarding the proposed landscaping around the site in Chapter 10, page 23:
"remaining areas of landscaping around the site should include site strip of 400mm, installation of a geotextile demarcation layer and installation of a capping layer comprising clean inert hardcore and topsoil."

Notwithstanding the above quote, throughout the STL report both "clean inert hardcore" and "clean inert capping layer" are used interchangeably.

Due to concerns on site of the topsoil "washing into" the hardcore layer, CBSL opted to install a geotextile demarcation layer both below and above the clean inert hardcore, therefore providing a betterment to the originally proposed design.

Limitations of the Works

Throughout the preparation of this letter, the following limitations apply:

- The validation was undertaken via photographs and testing reports provided to WA. WA did not attend site or obtain samples first-hand.
- The topsoil has been assessed based on its chemical suitability and the potential risk posed to human health. It has not been assessed its suitability as a topsoil under *BS 3882-2015 - Specification for Topsoil*.
- The testing provided for the topsoil is only the solid testing and not leachate.

Any conclusions within this report should be read bearing the above in mind.

Validation Works

Depth of Installation
Photographs of the installation of the CSSs and geotextile were taken across the site by CBSL. The recorded thickness of either topsoil or clean inert hardcore are summarised in Table 1.

Table 1: CSS Thickness

Photo Number	Thickness of Topsoil (mm)	Thickness of Clean Inert Hardcore Subsoil (mm)
1	270	
2	210	

Table 1: CSS Thickness		
Photo Number	**Thickness of Topsoil (mm)**	**Thickness of Clean Inert Hardcore Subsoil (mm)**
3	200	
4	240	
5	290	
6	300	
7	220	
8		200
9		200
10		200
11		210

Photographs of the inspection pits recording the nature and thickness of the CSSs are attached at Appendix C.

Suitability of Topsoil

Topsoil testing certificates from Tim O'Hare Associates TOHA/24/1535/SS dated 17 September 2024 (attached at Appendix C) were provided by CBSL to WA for review. The testing results have been compared against the following generic assessment criteria (GAC) for a public open space (POS) end-use:

- Land Quality Management (LQM)/CIEH Suitable 4 Use Levels (S4ULs) for Human Health Risk Assessment 2014;
- Category 4 Screening Levels (C4SLs) published by DEFRA;
- Guidance values produced by the Environmental Industries Commission (EIC), the Association of Geotechnical and Geoenvironmental Specialists (AGS) and Contaminated Land: Application in Real Environments (CL:AIRE) in December 2009;
- SoBRA Development of Acute Generic Assessment Criteria (AGAC) for Assessing Risks to Human Health from Contaminants in Soil. April 2009.

Following the comparison of the topsoil testing results against the aforementioned GACs, no exceedances were highlighted. As noted previously, only the solid testing has been provided and therefore no comment can be provided on the leachability of any contaminants present.

Suitability of Hardcore

No chemical testing data was provided for the hardcore and instead grading analysis reports (attached at Appendix E) were provided to show that the proposed aggregate is compliant with the 'hardcore' detailed in the STL report. Based upon the testing results and the photographs received from site, the stone appears to be a 40 – 80mm virgin quarry stone from Tunstead

Quarry. In addition, the stone has an acceptable Los Angles Coefficient which demonstrates the stones resistance to degradation and no signs of contamination are observed in the photographs provided.

Conclusion

The landscape design backfill has not been constructed in accordance with the original STL report, however, the design alterations undertaken by CBSL is considered to be a betterment to the originally proposed STL design as it provides a lesser chance of being "washed out" into the underlying hardcore due to the placement of geotextile above and below the hardcore. The thicknesses of topsoil and hardcore recorded in the provided photographs are assumed to be consistent across the site and therefore when combined are greater than or equal to the required thickness of 400mm. We recommend the building warranty provider and Local Authority are notified of this change and the rationale behind it.

The topsoil testing has proven no exceedances against the GACs for POS. As noted previously, only the solid testing has been provided and therefore no comment can be provided on the leachability of any contaminants present.

No chemical data was provided for the hardcore however it is assumed to be clean inert quarried materials and no signs of contamination or presence of deleterious materials were observed from the provided photographs. The grading analysis reports provided proved that the grading of the imported material does classify as hardcore.

We understand that CBSL will forward the validation letter report on to all relevant parties for approval. It is recommended that confirmation is obtained from all relevant parties confirming that the CSSs validation information submitted in this report is satisfactory.

We trust that this validation report is clear, however if you have any queries, please do not hesitate to contact us.

Yours sincerely
Wardell Armstrong LLP

[redacted]

[redacted]

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Enc.

Appendix A	Layer Drawing ‘General Arrangement’
Appendix B	STL Consulting Structural Engineers report entitled ‘Phase 1 and Phase 2 Report for: ECS Capital Ltd’
Appendix C	Inspection Pit Photographs
Appendix D	Topsoil Laboratory Testing Results
Appendix E	Hardcore Laboratory Testing Results

Appendix A

Layer Drawing ‘General Arrangement’



PLANTING SCHEDULE

Abr.	Species	Size	Height	Pot Size	Density	%
	TREE					
Ac	*Acer campestre*	20-25cm girth	400-450	-	As Shown	As Shown
Bp	*Betula pendula (Multi steam)*	-	200-250	-	As Shown	As Shown
Al	*Amelanchier lamarckii (Multi steam)*	-	200-250	-	As Shown	As Shown
	ORNAMENTAL SHRUB & GRASSES					
	Aruncus dioicus	-	40-60cm height	5L PG	6/m2	
	Arbutus unedo		40-60cm height	5L PG	6/m2	
	Rudbeckia fulgida		40-60cm height	5L PG	6/m2	
	Sanguisorba 'Tanna'	-	20-40cm height	3L PG	6/m2	
	Verbena bonariensis	-	20-40cm height	3L PG	6/m2	
	Lavandula angustifoliaLavandula angustifolia	-	40-60cm height	5L PG	6/m2	
	Eupatorium maculatum 'Riesenschirm	-	20-40cm height	3L PG	6/m2	
	Persicaria amplexicaulis 'Speciosa'	-	20-40cm height	3L PG	6/m2	
	Veronicastrum virginicum 'Fascination'	-	40-60cm height	5L PG	6/m2	
	Eragrostis spectabilis	-	20-40cm height	3L PG	8/m2	
	Schizachyrium scoparium	-	20-40cm height	3L PG	8/m2	
	Calamagrostis varia	-	20-40cm height	3L PG	8/m2	
	Deschampsia cespitosa	-	20-40cm height	3L PG	8/m2	
	Carex pensylvanica	-	20-40cm height	3L PG	8/m2	
	Calluna vulgaris sp		20-40cm height	3L PG	8/m2	
	Calluna vulgaris 'Wickwar Flame'	-	20-40cm height	3L PG	8/m2	
	Sedum spectabile Crystal Pink		20-40cm height	3L PG	8/m2	

NOTES:

1. DO NOT SCALE FROM THIS DRAWING. ALWAYS WORK TO NOTED DIMENSIONS.
2. ALL SETTING OUT, LEVELS AND DIMENSIONS TO BE CHECKED ON SITE PRIOR TO THE INSTALLATION OF MATERIALS AND ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE CONTRACT ADMINISTRATOR IMMEDIATELY.
3. THIS DRAWING MUST BE READ WITH THE RELEVANT SPECIFICATION DOCUMENTS AND DETAIL DRAWINGS. ANY DISCREPANCIES MUST BROUGHT TO THE ATTENTION OF THE CONTRACT ADMINISTRATOR IMMEDIATELY.
4. THIS DRAWING IS COPYRIGHT PROTECTED AND MAY NOT BE REPRODUCED IN WHOLE OR PART WITHOUT WRITTEN AUTHORITY.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

THIS DRAWING WAS PLOTTED ON:
21/11/19

REVISION HISTORY

DATE	REV	ZONE	DESCRIPTION	CHK

GENERAL INFORMATION

APPLICATION SITE BOUNDARY

HARDWORKS

PAVING TYPE A
BLOCK PAVING
SUBJECT TO FUTURE DETAIL

PAVING TYPE B
TO TERRACES
SUBJECT TO FUTURE DETAIL

PAVING TYPE C
SUBJECT TO FUTURE DETAIL

MACADAM
TO VEHICULAR AREAS
TO ENGINEER'S DETAIL & SPECIFICATION

FURNITURE

FEATURE SEAT
TO COURTYARD AREA
SUBJECT TO FUTURE DETAIL

TIMBER FENCE
SUBJECT TO FUTURE DETAIL

SOFTWORKS

CLEAR-STEM TREE PLANTING
REFER TO PLANTING SCHEDULE

MULTI-STEM TREE PLANTING
REFER TO PLANTING SCHEDULE

ORNAMENTAL SHRUB & GRASSES
REFER TO PLANTING SCHEDULE

LAWN

LOCATION PLAN

ORIGINATOR
LAYER LANDSCAPE ARCHITECTURE
E hello@layer-ing.com
W www.layer-ing.com
T +44 (0)1625 523 157

CLIENT
SATPLAN

PROJECT
GREENWOOD ROAD
WYTHENSHAWE

DRAWING TITLE
GENERAL ARRANGEMENT

DRAWING NUMBER	REV	STATUS
189-LYR-XX-ZZ-DWG-L-1001	0	PLN

SCALE	CREATED BY	CHECKED BY
1:150@ A1	T HERRERO	S TUGBY

Appendix B

STL Consulting Structural Engineers report entitled ‘Phase 1 and Phase 2 Report for: ECS Capital Ltd’

Our ref: *MSR 19-3704*
Your ref:

STL
CONSULTING STRUCTURAL ENGINEERS

Phase 1 and Phase 2 Report for:
ECS Capital Ltd

Regarding:
Land at Greenwood Road
Wythenshawe
Manchester
M22 9RA

Date of report: 23rd September 2019

The Institution of Structural Engineers

1 Barkers Lane Sale Cheshire M33 6RP
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Registered Address: 1 Barkers Lane Sale Cheshire M33 6RP Company Reg No. 07280496
Directors: Jonathan Hayes Belinda Hayes Associate: Mohammed Rawat

Executive Summary

The project involves the development of the site at the corner of Greenwood Road and Gladeside Road in Wythenshawe. The site was formerly occupied by the Greenwood Tree Public House which was constructed in the 1950s and was demolished in circa 2010. The site is currently vacant and open on two sides with housing along the south and east sides.

No evidence of any previous use of the site is noted. The site is relatively level with underlying Till, Devensian/ Diamicton over Bollin Mudstone bedrock and Solid Geology, with no records of made ground on site. The superficial deposits are classed as a Secondary Undifferentiated aquifer.

A review of the desk top study information, site investigation results and chemical analysis has confirmed the presence of localised raised levels of Chromium and Benzo(a)Pyrene (Hydrocarbons) which indicates the potential contamination sources are present in site, these ate at shallow depths and mainly fall below the footprint of the new building. It is recommended that landscaped areas be stripped back, and a clean inert capping layer installed over a geotextile topped off with topsoil.

The contaminants found in the investigations and chemical analysis should be handled with care and appropriate health and safety procedures should be implemented during construction works to protect site operatives and public.

There is a significant risk of surface water flooding along the west elevation (Greenwood Rd), the area of flooding will only affect the car parking at basement level, however we recommend that and appropriate protection measures need to be implemented accordingly. The desk top study confirmed that the site has not been flooded in the past.

The desk top Geological Reports and site investigations confirm varying depths of made ground over glacial till and sandstone. We recommend that the building be founded on the clay subsoils at a depth which is suitable to support proposed foundation loads. If high concentrations of load are present, then the foundations could be extended onto the sandstone layer at a depth of 3m. The basement/ carpark floor of the proposed can be ground bearing concrete constructions as the basement will extend below the depth of the made ground.

We have therefore concluded that the site is suitable for the proposed development although precautions need to be taken with regards contaminants Chromium and Benzo(a)Pyrene (Hydrocarbons) within the upper subsoils and potential surface water flooding along the west elevation.

Contents

Executive Summary
Contents

1.0 **Brief**
2.0 **Scope of work**

2.1 Aims
2.2 Objectives
3.0 Site details

3.1 Site description
3.2 Surrounding Features
3.3 Proposed development
4.0 **Historic maps summary**
5.0 **Desk Top Study**

5.1 **Enviro-Insight Report (GS 5767274);**
5.2 Historic Industrial Sites summary
5.3 Environmental Permits, Incidents and Registers Map summary
5.4 Environmental Landfill and Other Waste Sites
5.5 Current Land Use Map
5.6 Geology
5.7 Hydrogeology and Hydrology
5.8 Hydrogeology – Source Protection Zones and Potable Water Abstraction Licences
5.9 Hydrogeology – Source Protection Zones within confined aquifer
5.10 Hydrology – Watercourse Network and River Quality
5.11 Hydrogeology and Hydrology
5.12 Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)
5.13 Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map
5.14 Flooding
5.15 Designated Environmentally Sensitive Sites Map
5.16 Natural Hazards Findings
5.17 Mining

5.18 **Flood Insight report (GS 5767275);**
5.19 Environment Agency/Natural Resources Wales Historic Flooding Events Map
5.20 JBA Surface Water (Pluvial) Flood Map
5.21 Surface Water Features
5.22 BGS Groundwater Flooding Map
5.23 BGS Geological Indicators of Flooding
5.24 JBA Canal Break map

5.25 **Geo-Insight report (GS 5767276);**
5.26 Geology (1:10,000 scale)
5.27 Geology (1:50,000 Scale)
5.28 Superficial Deposits and Landslips map (1:50,000 scale)
5.29 Superficial Deposits and Landslips map (1:50,000 scale)
5.30 Bedrock, Solid Geology & linear features
5.31 Radon Data
5.32 Ground Workings map
5.33 Mining, Extraction & Natural Cavities map
5.34 Natural Ground Subsidence
5.35 Borehole Records map
5.36 Estimated Background Soil Chemistry
5.37 Railways and Tunnels map
6.0 **Phase two- Site investigations**
7.0 **Boreholes and geotechnical assessment**
8.0 **Contamination testing**
9.0 **Site risk assessment**
10.0 **Conclusion**
11.0 **Recommendation**
12.0 **References**

1 Brief.

To undertake a Phase One desk top study and Phase Two- Geo Environmental investigations for the site at the junction of Greenwood Road and Gladeside Rd, Wythenshawe, M22 9RA for the development of residential accommodation for our clients ECS Capital Ltd.

The development site is situated on the corner of Greenwood Road and Gladeside Road and is currently vacant with the original buildings demolished and the site cleared.

The residential development comprises a 3 storey block of apartment with 30 carparking spaces at basement level. The development is to be constructed with reinforced concrete basement walls and foundations with a steel frame over supporting the ground floor and traditional loadbearing masonry walls, with precast concrete upper floors and a metal deck or single ply flat roof.

2 Scope of Work.

The report is to assess the historic land use of the site based on available information in order to determine potential ground and contamination issues that may affect the structure and human health, respectively.

This report is based on a desk top review of the available Geo-Environmental information and historic maps for the site and site investigations and chemical analysis carried out on soil samples. Copies of the Geo Environmental Reports and site investigations are appended to this report.

2.1 Aims

The aim is to provide a summary of the geology and ground conditions with a provisional conceptual site model and recommendations for any remedial works that may be required based on the findings of the chemical analysis.

2.2 Objectives:

This assessment is to:

- Undertake a review of the environmental settings of the site and surrounding area, including its history,
- Carry out a review of the site geology and ground conditions,
- Prepare a preliminary conceptual model highlighting any potential contamination sources,
- Review the Site Investigations report findings and make recommendations for foundations and any remedial actions that may be required based on the chemical analysis.
- Produce a combined Phase One and Phase Two report for the client in connection with the planning application.

The methodology of this assessment applied in the production of this report is in accordance with the current industry standards and supplementary guidance as appropriate, including CLR11, Model procedures by DEFRA and the EA, and British standards BS10175:2011.

3 Site Details

3.1 Site description

The site is located at south side of the junction between Greenwood Road and Gladeside Road Wythenshawe and was formerly the site of the Greenwood Tree Public House. The Greenwood tree Public House was constructed in the 1950s and was demolished in circa 2010. The site is currently vacant and open on two sides with housing along the south and east sides.

The site is set back from the road with a grass verge along both Greenwood Road and Gladeside Road and the site rises gently towards the north east corner. The car park and entrance to the site is tarmacked with hardcore and concrete slabs denoting the approximate outline of the original building.

The size of the site is approximately 0.19ha.

The National Grid Reference for the site is on 381959,387746.

3.2 Surrounding Features

The site is bounded on two side by Greenwood Road to the west and Gladeside Road to the north with the houses and gardens along the south and east boundary.



Extracted from Geo Insight GS-5767274

3.3 Proposed Development

The proposed development comprises a 3-storey apartment block with basement carparking. The development is to be constructed with a reinforced concrete basement and steel frame supporting concrete ground floor with loadbearing masonry walls and precast concrete upper floors and a metal deck or single ply flat roof over. Part of the basement will have ground level garden space over.

4 Historic maps summary

The historic maps indicate that the site was vacant till the 1960s at which time the housing estate and public house was constructed. The development of the site and the surrounding areas covering the time period between 1876 and 1995 are summarised as follows,

- 1876: The earliest map dated 1876 shows the site as a field with Havaleyhey farm buildings approximately 100mm to the east, with truck lane 30m to the south of the site and re-aligned Baugley Brook 30m to the west.
- 1897 to 1910: The maps between 1897 to 1910 still indicate an open field and there is no significant change to the surrounding area.
- 1938: The 1938 maps indicated the development of the housing estate around the site with the houses to the north and east of the site added. Shops are present 100m to the east of the site. A school is present on these maps at 400m to the east of the site.
- 1954: The 1954 maps indicate a continuation of the development of the housing estate to the north and east of the site. Housing developments appear approximately 200m to the west.
- 1960: the 1960 map shows the outline of the Public House on the site.
- 1967: the 1967 maps indicate further development of housing estate to the south and west of the site, with the full length of Greenwood Road now indicated map. The open space is visible following the proposed line of the M56 motorway.
- 1974- 1978: The 1974-1978 maps indicate the presence of the M56 motorway approximately 130m to the west of the site with further development of the housing estate to the west of the motorway. Infill developments have occurred on including a school on Mill House School on Nathens Road approximately 20m from the south east corner of the site and Gladeside Court apartments to the rear of housing on Gladeside Road approximately 150m to the south east of the site.
- 1985 to 2010: There appears to be no significant change on site or the surrounding area between 1985 and 2010, however the site has been designated a school on the 2010 OS plans.
- 2014: The 2014 maps indicate that the site is vacant and there is no further development around the site, the school site to the east has been cleared and the apartment to the rear of the housing on Gladeside Road has been redeveloped with a small estate of bungalows at Glade Brook Gardens.

5 Desk Top Study

The desk top review of the site is summarised below based on the findings of the following:
Enviro-Insight Report (GS 5767274);
Flood Insight report (GS 5767275);
Geo-Insight report (GS 5767276);
Historical Ordnance Survey Maps;
Copies of the reports and Maps are attached in the Appendices.

5.1 Enviro-Insight Report (GS 5767274);

5.2 Historic Industrial Sites summary

Below is a summary of potential contaminative past land use within 500m radius of the site, which was extracted from Enviro Insight report and 1:10,000 Historic Site Maps;
There are 10 records of sites with a potentially contaminative past land use within 500m of the search boundary:

- cuttings for the motorway between 139m and 142m to the west,
- unspecified Heaps between 337m and 408m to the north,
- an unspecified pit at 417m to the north
- cuttings between at 450m to the south west.

There are no records of historical tanks within 500m of the search boundary
There are 8 records of historical energy features indicate within 500m of the search boundary:

- Electric substations are situated at 147m to the east, 360m to the south, 490m to the east and 426m to the north east

There are no records of historical petrol stations and fuel sites within 500m of the search boundary.
There are no records of historical garage and motor vehicle repair sites within 500m of the search boundary.
There are no records of historical military sites within 500m of the search boundary.
There are 42 records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site:

- Cuttings at 130m to 142m to the west, with numerous ponds between 252m and 493m and unspecified heaps and pits between 337m and 417m, most of these features relate to the line of the M56 Motorway.

5.3 Environmental Permits, Incidents and Registers Map summary

There are no records of historic IPC Authorisations within 500m of the study site.
There are no records of Part A (1) and IPPC Authorised Activities within 500m of the study site.
There are no records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within500m of the study site.
There are no records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:
There are no records of List 2 Dangerous Substance Inventory Sites within 500m of the study site.
There are no records of Part A (2) and Part B Activities and Enforcements within 500m of the study site.
There are no records of Category 3 or 4 Radioactive Substances Authorisations:
There are no records of Licensed Discharge Consents within 500m of the study site:
There are no records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:
There are no records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

There are no records of COMAH & NIHHS sites within 500m of the study site:

- There are no 2 records of National Incidents Recording System, List 2 within 500m of the study site: 463m North of the site- Pollutants sewage material.

There are no records of National Incidents Recording System, List 1 within 500m of the study site:
There are no records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site

5.4 Environmental Landfill and Other Waste Sites

There are no records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:
There are no records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:
There are no records of BGS/DoE non-operational landfill sites within 1500m of the study site:
There are no records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:
There is one record of waste treatment, transfer or disposal sites within 500m of the study site:

- 186m to the north of the site- waste transfer Facility.

There is one records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

- 1248m west of the site- Clinical waste transfer station at South Manchester University Hospital.

5.5 Current Land Use Map

There are 3 records of potentially contaminative industrial sites within 250m of the study site:

- 139m to the west- Industrial Features, 150m to the east- infrastructure and facilities, 187m to the west- industrial features.

There are no records of petrol or fuel sites within 500m of the study site:
There are no records of National Grid high voltage underground electricity transmission cables within 500m of the study site.
There are no records of National Grid high pressure gas transmission pipelines within 500m of the study site.

5.6 Geology

The database has been searched on site, including a 50m buffer from the BGS 1:50,000 maps.
The Superficial Ground and Drift Geology comprises Till, Devensian/ Diamicton.
The Bedrock and Solid Geology comprises Bollin Mudstone

5.7 Hydrogeology and Hydrology

The site is over a Secondary Aquifer Within Superficial Geology
The site is over a Secondary (B) Aquifer lower Permeability Layers, Within Bedrock Geology and there are no groundwater or surface water Abstraction Licences within 500m

5.8 Hydrogeology – Source Protection Zones and Potable Water Abstraction Licences

There are no source protection zones within 500m of the site
There are no Potable water abstraction licences within 500m of the site

5.9 Hydrogeology – Source Protection Zones within confined aquifer

There are no Source protection zones Zone 1/ Zone 2C/ Zone 3C within 500m of the site
There are no Potable water abstraction licences within 500m of the site

5.10 Hydrology – Watercourse Network and River Quality

There is an inland river approximately 500m to the north of the site (to the west of the M60 motorway), this relates to the position/ line of the culverted Baugley Brook approximately 30m to the west of the site.

5.11 Hydrogeology and Hydrology

There are records of a Secondary Aquafer (undifferentiated) strata classification within the superficial geology below the site
There are records of a Secondary Aquafer A at 487m west from the study site.
There are records of a Secondary B Aquifer within Bedrock geology below the subject site.
There are 2 Groundwater Abstraction Licences within 2000m for the site

- Both sites are at 1957m north-east of the site

There are no identified Surface Water Abstraction Licences within 2000m of the study site
There are no identified Potable Water Abstraction Licences within 2000m of the study site
There are no identified Source Protection Zones within 500m of the study site
There are no identified Source Protection Zones within the Confined Aquifer within 500m of the study site
There is one site identified from Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site

- 216m west of the site

There are no sites identified from the Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site
The following locations are identified on the Ordnance Survey Master-Map Water Network records

- Baguley Brook 41m west of the site
- Baguley Brook 463m north of the site

There are no Surface water features identified within 250m of the study site

5.12 Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)

The site is outside the zones of flooding from rivers and he sea

5.13 Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map

The site is outside the zones of flooding and is outside the RoFRaS Rating zone.

5.14 Flooding

There are no sites identified on the Environment Agency/Natural Resources Wales Zone 2 floodplain within 250m
There are no sites identified on the Environment Agency/Natural Resources Wales Zone 3 floodplain within 250m
The Highest risk of flooding onsite is Very Low
There are no Flood Defences within 250m of the study site
There are no Areas benefiting from Flood Defences within 250m of the study site
There are no Areas used for Flood Storage within 250m of the study site
The British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site have identified Clearwater Flooding or Superficial Deposits Flooding on site. With Highest susceptibility to groundwater flooding in the search area based on the underlying geological Conditions, potentially at surface level.
The British Geological Survey confidence rating in the above results is Moderate

5.15 Designated Environmentally Sensitive Sites Map

There are no Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study Site.
There are no Records of National Nature Reserves (NNR) within 2000m of the study site.
There are no Records of Special Areas of Conservation (SAC) within 2000m of the study site.
There are no Records of Special Protection Areas (SPA) within 2000m of the study site.
There are no Records of Ramsar sites within 2000m of the study site.
There are no Records of Ancient Woodland within 2000m of the study site.
There is one record of Local Nature Reserves (LNR) within 2000m of the study site.

- Wythenshawe Park is situated 1558m north of the site

There are no Records of World Heritage Sites within 2000m of the study site.
There are no Records of Environmentally Sensitive Areas within 2000m of the study site.
There are no Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site.
There are no Records of National Parks (NP) within 2000m of the study site.
There are no Records of Nitrate Sensitive Areas within 2000m of the study site.
There are no Records of Nitrate Vulnerable Zones within 2000m of the study site.
There are 4 Records of Green Belt land within 2000m of the study site.

- 1151m to the west of the site- Manchester and district
- 1442m to the south-west of the site- Trafford District
- 1936m to the west of the site- Trafford District
- 1952m to the east of the site- Stockport District

5.16 Natural Hazards Findings

Maximum Shrink-Swell- hazard rating identified on the study site is very low
Maximum Landslide hazard rating identified on the study site is very low
Maximum Soluble Rocks* hazard rating identified on the study site is negligible
Maximum Compressible Ground hazard rating identified on the study site is negligible
Maximum Collapsible Rocks* hazard rating identified on the study site is very low
Maximum Running Sand* * hazard rating identified on the study site is very low
The property is not in an area where Radon Protection measures are required, as described in publication BR211 by the Building Research Establishment.

5.17 Mining

There are no identified Coal mining areas within 75m of the study site
There are no identified Non-Coal Mining areas within 50m of the study site boundary
There are no Brine affected areas within 75m of the study site

5.18 Flood Insight report (GS 5767275);

See sections 5.11, 5.12, 5.13 above for summary of Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea), Environment Agency/Natural Resources Wales Flood Zones, Environment Agency/Natural Resources Wales RoFRaS Flooding Map

5.19 Environment Agency/Natural Resources Wales Historic Flooding Events Map

The site or any area within 250m been has not been subject to historic flooding as recorded by the Environment Agency/Natural Resources Wales?

5.20 JBA Surface Water (Pluvial) FloodMap

Surface Water (pluvial) flooding is defined as flooding caused by rainfall-generated overland flow before the runoff enters a watercourse or sewer. In such events, sewerage and drainage systems and surface watercourses may be entirely overwhelmed.
Surface Water (pluvial) flooding will usually be a result of extreme rainfall events, though may also occur when lesser amounts of rain falls on land which has low permeability and/or is already saturated, frozen or developed. In such cases overland flow and 'ponding' in topographical depressions may occur.
There is a significant risk of pluvial flooding at the study site.
The JBA surface Water (Pluvial) Floor map indicates that the west side of the site has low to significant risk of surface water flooding.
Guidance: The site or an area in close proximity has been assessed to be at Significant Risk of surface water (pluvial) flooding. This indicates that this area would be expected to be affected by surface water flooding in a 1 in 75-year rainfall event to a depth of between 0.3m to 1m.

JBA Consulting surface water flood map identifies areas likely to flood following extreme rainfall events, i.e. land naturally vulnerable to surface water or “pluvial” flooding. This data set was produced by simulating 1 in 75 year, 1 in 200 year and 1 in 1000-year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though older ones may even flood in a 1 in 5-year rainstorm event.
The model provides the maximum depth of flooding in each 5m “cell” of topographical mapping coverage. The maps include 7 bands indicating areas of increasing natural vulnerability to surface water flooding. These are: -

- Less than 0.1m in a 1 in 1000-year rainfall event - Negligible
- Greater than 0.1m in a 1 in 1000-year rainfall event - Low
- Between 0.1m and 0.3m in a 1 in 200-year rainfall event – Low to Moderate
- Between 0.3m and 1m in a 1 in 200-year rainfall event – Moderate
- Greater than 1m in a 1 in 200-year rainfall event – Moderate to High
- Between 0.1m and 0.3m in a 1 in 75-year rainfall event – High
- **Between 0.3m to 1m in a 1 in 75-year rainfall event - Significant**
- Greater than 1m in a 1 in 75-year rainfall event – Highly Significant

5.21 Surface Water Features

There are no surface water features within 250m of the study site.

5.22 BGS Groundwater Flooding Map

There are British Geological Survey groundwater flooding susceptibility flood areas within 50m of the boundary of the study site (see 5.19 above)
The British Geological Survey confidence rating in the above result is moderate.

5.23 BGS Geological Indicators of Flooding

There are no geological indicators of flooding within 250m of the study site.

5.24 JBA Canal Break map

The property is not located in an area identified as being at potential risk in the event of a reservoir failure.
The property is not located within 500m of an area identified as being at potential risk in the event of a canal break.

5.25 Geo-Insight report (GS 5767276);

5.26 Geology (1:10,000 scale)

There are no records of Artificial/ Made Ground within 500m of the study site boundary at 1:10,000 scale.
The records of Superficial Deposits/ Drift Geology within 500m of the study site boundary at 1:10,000 scale confirm Till- Devensian- Diamicton.
There are no records of Landslip within 500m of the study site boundary at 1:10,000 scale.
The records of Bedrock/Solid Geology within 500m of the study site boundary at 1:10,000 scale confirm Bollin Mudstone members.
There are no records of linear features within 500m of the study site boundary at 1:10,000 scale.

5.27 Geology (1:50,000 Scale)

Are there any records of Artificial/ Made Ground within 500m of the study site boundary? No
Are there any records relating to permeability of artificial ground within the study site boundary? No

5.28 Superficial Deposits and Landslips map (1:50,000 scale)

There are no records of Artificial/ Made Ground within 500m of the study site boundary.
There are no records relating to permeability of artificial ground within the study site boundary.

5.29 Superficial Deposits and Landslips map (1:50,000 scale)

Records indicate Superficial Deposits/ Drift Geology within 500m of the study site boundary

- On site- Till- Devensian- Diamicton.
- 487m west – Glaciofluveal Deposits- Devensian – sands and gravels.

There are records relating to permeability of superficial ground within the study site boundary which confirm mixed permeability of the strata on site.
There are no records of Landslip within 500m of the study site boundary.
There are no records relating to permeability of landslips within the study site boundary?

5.30 Bedrock, Solid Geology & linear features

The records of Bedrock/Solid Geology within 500m of the study site boundary confirm Bollin Mudstone members.
The records relating to permeability of bedrock ground within the study site boundary confirm Fracture flow type and low permeability strata below the site.
There are no records of linear features within 500m of the study site boundary

5.31 Radon Data

The property in not in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment and no Radon protective measures are necessary.

5.32 Ground Workings map

There are records of Historical Surface Ground Working Features within 250m of the study site boundary. These features relate to the line of the M56 Motorway.

- Cuttings at 139m to the west of the site- 1975
- Cuttings at 142m to the west of the site- 1995
- Cuttings at 142m to the west of the site- 1989

There are no Historical Underground Working Features within 1000m of the study site boundary.
The are no BGS Current Ground Workings within 1000m of the study site boundary

5.33 Mining, Extraction & Natural Cavities map

There are no Historical Mining areas within 1000m of the study site boundary.
There are no Coal Mining areas within 1000m of the study site boundary.
There are no JPB Mining areas within 1000m of the study site boundary.
There are no Non-Coal Mining extraction areas within 1000m of the study site boundary
There are no Non-Coal Mining cavities within 1000m of the study site boundary.
There are no Natural Cavities within 1000m of the study site boundary.
There are no Brine Extraction areas within 1000m of the study site boundary.
There are no Gypsum Extraction areas within 1000m of the study site boundary.
There are no Tin Mining areas within 1000m of the study site boundary.
There are no Clay Mining areas within 1000m of the study site boundary

5.34 Natural Ground Subsidence

The maximum hazard rating of natural subsidence within the study site boundary is Very Low
The risk of Landslides based on the information provided by the British Geological Survey is very Low.
The risk of Ground Dissolution based on the information provided by the British Geological Survey: is negligible.
The risk of Compressible Deposits based on the information provided by the British Geological Survey is negligible.
The risk of Collapsible Rocks based on the information provided by the British Geological Survey is very low.
The risk of encountering Running Sands based on the information provided by the British Geological Survey is very low

5.35 Borehole Records map

There are Records of boreholes within 250m of the study site boundary:
147m to the west – 14.8m deep- M56 Widening
208m to the west – 20m deep- M56 Widening
243m to the west – 11.85m deep- M56 Widening
We have undertaken site investigations which confirm ground conditions underlying the site see details below.

5.36 Estimated Background Soil Chemistry

There are 2 Records of background estimated soil chemistry within 250m of the study site boundary.

Dist (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
8.0	East	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg

5.37 Railways and Tunnels map

There are no underground railway lines been identified within the study site boundary.
There are no underground railway lines been identified within 250m of the study site boundary.
There are no other railway tunnels been identified within the site boundary.
There are no other railway tunnels been identified within 250m of the site boundary.
There are no historical railway or tunnel features been identified within the study site boundary.
There are no historical railway or tunnel features been identified within 250m of the study site boundary.

There are no historical railway lines been identified within the study site boundary.
There are no historical railway lines been identified within 250m of the study site boundary.
There are no active railway lines been identified within the study site boundary.
There are no active railway lines been identified within 250m of the study site boundary.
The study site within 5km of the route of the High Speed 2 rail project.
The study site is not within 500m of the route of the Crossrail 1 rail project.

6 Phase two- Site investigations

The phase two investigation is to determine the actual ground conditions on site for the foundation design of the proposed structure and to assess the risks reported in phase one assessment, with regards to potential geo-hazards and potential contamination on site.

The report includes include, existing and proposed site plan, borehole logs, contamination test results, together, with any remediation and foundation recommendation to guide the design engineer.

This report is based on the results obtained through intrusive investigation undertaken by Mini-Solis Surveys Ltd and laboratory contamination testing undertaken DETS Ltd. The data is appended to this report.

The site investigations include for 3 number boreholes across the site to supplement historic data from site investigations undertaken by Curtins Consulting in 2006. Soil samples were taken in paved/ car park areas outside of the footprint of the original building, between ground level and 600mm below ground level, which have been tested. Contamination assessment carried out for samples from each borehole together with recommendations for foundation design and any remediation measures that may be needed to reduce the risks of possible hazards.

The methodology of this assessment applied in the production of this report is in accordance with the current industry standards and supplementary guidance as appropriate including CLR11, Model procedures by DEFRA and the EA, and British Standards BS10175:2011.

7 Boreholes and geotechnical assessment

The site investigations proved Made ground in all three boreholes varying from 700mm to 1700mm below ground level comprising loose gravelly topsoil with fragmented brick and becoming clayey with depth.

Soft to firm brown clay was encountered in Borehole 1, to the south of the site, between 1.7m and 2.5m with underlying dense grey slightly clayey shale between 2.5m and the end of the borehole at 3.0m. Shear Vane readings of 95kN/m2 and SPT N value of 44 were recorded at 2.4m below ground level.
Firm to stiff brown clay becoming slightly silty from 1.4m was encountered in Borehole 2, to the north west corner of the site, between 0.70m and 2.5m with underlying stiff brown slightly shaley clay between 2.5m and the end of the borehole at 3.0m. Shear Vane readings of 120kN/m2 and SPT N value of 28 were recorded at 2.4m below ground level. No standing water as encountered in any of the boreholes.
Firm becoming stiff brown clay was encountered in Borehole 2, to the east of the site, between 0.80m and 1.9m with underlying stiff brown slightly shaley clay becoming shaley with depth between 1.9m and the end of the borehole at 3.0m. Shear Vane readings of 120kN/m2 and SPT N value of 27 were recorded at 2.4m below ground level.

Based on the site investigation the made ground appears to be inert and we consider that no gas monitoring or protection will be required. Previous investigations and gas monitoring proved no significant gassing of the site and therefore no protection measures were recommended.

The upper made grounds comprising loose gravelly topsoil with fragmented brick and clay are not considered to be suitable to support foundations from the proposed development due to potential consolidation of the loose subsoils and differential settlement of the foundations.

Traditional Spread and reinforced spread foundations can be used within the upper clay layers, at depths varying from 1.2m to 1.7m, however the allowable bearing pressure would have to be limited to 100kN/m2. Greater allowable bearing pressures can be achieved at a depth of 2.4m by setting the foundations within the firm to stiff clay layer. Allowable bearing pressure of 200kN/m2 can be achieved at a depth of 2.4m with trench fill type foundations up to 1m wide. If higher bearing pressures are required, then foundations need to be extended down through the stiff clay and shaley clay and onto the sandstone which was proved at a depth of 3m in the original investigations. An allowable bearing pressure of up to 250kN/m2 can be used for foundations set onto the sandstone. If foundations are to be set onto the sandstone, the rockhead should be exposed and all foundations placed onto the sandstone to avoid any risk of differential settlement.

The proposed development comprises a basement level car park and so we envisage foundations and possibly a reinforced concrete rafts slab to be set at an approximate depth of 3m below ground levels onto the sandstone rockhead. The basement floor slab will therefore be a reinforced concrete ground bearing raft slab.

8 Contamination testing

Considering the previous historic uses of the land we consider that any contamination highlighted within the Chemical Analysis relates to the construction of the previous public house building. Samples were taken within the upper top-soils and made grounds and anticipated low to Negligible concentrations of chemicals as no industrial uses/ industrial processes were recorded within the desk top study. The analysis results appear to be in line with and slightly above the background estimated soil chemistry levels highlighted within the desk top study.

Elevated levels of Arsenic may originate from industrial processes, for example mineral smelting, agricultural preparations and waste disposal. Arsenic may also be associated with the ceramic, electronic, metallurgic, timber treatment, textile and tanning industries.

Arsenic is toxic and is Carcinogenic, Arsenic is a Risk through dermal contact, ingestion and inhalation. The threshold value of 35mg/kg is not exceeded in all three boreholes with values recorded at 22 mg/kg, 12 mg/kg, 12mg/kg.

The concentrations of Arsenic are less than the threshold levels and so the risk to human health from associated with Arsenic is negligible.

Elevated levels of chromium may originate for industrial processes, while naturally high levels may be associated with ultrabasic rocks. Chromium exists in several oxidation states, of which Cr III and Cr VI are the most stable. At soil pH of less than 5.5, CrVI is generally reduced to Cr III precipitating insoluble oxides and hydroxides. In the context of protection of human health Cr VI is the most significant state

Chromium Cr III has low toxicity and is Low risk of allergic reaction through dermal contact. While Chromium Cr VI is toxic and carcinogenic. There is a greater Risk through dermal contact, inhalation and ingestion.

The chromium level in all three samples exceeds the permitted level of 14 mg/kg slightly 17 mg/kg, 20 mg/kg, 18mg/kg, the breakdown of chromium is not provided and therefore it cannot be assumed that all the chromium is Cr(VI). It is likely some Cr(III) may be present and this would lower any potential risk. Exposure by ingestion through contaminated soil, food, and water is highly unlikely considering the nature of the development. The ingested chromium (VI) is then reduced to chromium (III), a dietary nutrient and therefore acute exposure to chromium is negligible. Furthermore, the soil sample was taken at 0.5m depth and with the new topsoil layer, it would reduce the levels and break linkages to any potential chromium contaminates. The majority of the site is to be developed with basement carparking with very little landscaping around the site. The proposal is to excavate and replace upper subsoil for landscaped areas with a capping layer and topsoil which will eliminate any pathways to the soil.

The points made above indicate that although the levels of chromium are above the threshold values the proposals noted above will reduce the risks associated with chromium to negligible.

Elevated levels of cadmium may originate from a range of industrial processes and may occur naturally as a result of mineralisation, particularly of rocks bearing lead, zinc and copper minerals.

Cadmiun is Toxic and is Suspected to be a carcinogen. There is a Risk to humans through inhalation and ingestion.

The threshold value of 17mg/kg for Cadmium is not exceeded in all three boreholes with values recorded at 0.4 mg/kg, 0.3 mg/kg, 1.3mg/kg.

The concentrations of Cadmium are less than the threshold levels and so the risk to human health from associated with Cadmium is negligible.

Elevated levels of lead may originate from industrial land uses and from exhaust emissions from petrol vehicles. Elevated levels of lead may be encountered through natural mineralisation processes. Lead is Toxic and there is a Risk to humans through inhalation and ingestion.

The threshold value of 300mg/kg for Lead is not exceeded in all three boreholes with values recorded at 110 mg/kg, 61 mg/kg, 220mg/kg.

The concentrations of Lead are less than the threshold levels and so the risk to human health from associated with Lead is negligible.

Elevated levels of mercury may be present from industrial processes. Elevated levels may also be found in association with black shales and from binding in organic soils.

Mercury is Toxic and an Irritant, and there is a risk to humans through Risk through dermal contact, ingestion and inhalation.

The threshold value of 238mg/kg for Mercury is not exceeded in all three boreholes with values recorded at 0.11 mg/kg, 0.12 mg/kg, 0.12mg/kg.

The concentrations of Mercury are less than the threshold levels and so the risk to human health from associated with Mercury is negligible.

Elevated levels of nickel may originate from industrial processes. Elevated levels of nickel may be found naturally, particularly in association with ultra-basic rocks.

Nickel is Toxic at elevated levels and is an Irritant. There is a Risk to humans through dermal contact, inhalation and ingestion.

The threshold value of 130mg/kg for Mercury is not exceeded in all three boreholes with values recorded at 24 mg/kg, 21 mg/kg, 19mg/kg.

The concentrations of Nickel are less than the threshold levels and so the risk to human health from associated with Nickel is negligible.

All industrial sites have the potential to be contaminated by hydrocarbons such as mineral oils, diesel fuel and petroleum spirits etc. Typically, these substances are found on airports, dockyards, engineering works, gas works, oil refineries, bulk storage facilities and vehicle fuelling, servicing and repairing facilities. Elevated levels can also be present within made ground where tarmac, cinders and ash fill are present. Elevated levels of hydrocarbons may be associated with the natural geology, especially from oil source rocks such as oil shales, algal and black limestones, black shales and coals.

Hydrocarbons (PAH) Benzo(a)Pyrene are Toxic to humans. There is a risk to humans through dermal contact, ingestion and inhalation.

The threshold value of 1.0mg/kg for Hydrocarbons (PAH) Benzo(a)Pyrene is exceeded in one of the three boreholes with values recorded at 0.8 mg/kg, 2.1mg/kg, 0.7mg/kg. These results are similar to the findings of the previous Phase 2 report.

We consider that the petrol Hydrocarbons are present within the upper made ground and hardstanding, these results are most likely associated with and influenced by the tarmac surfacing materials over the car park areas and backfill below the car park.

The concentrations of Hydrocarbons (PAH) Benzo(a)Pyrene is above threshold values within one sample and so there is a potential risk to human health from associated with Hydrocarbons (PAH) Benzo(a)Pyrene. However, the upper surfacing and made ground is to be removed and will fall within the foot print of the new Building therefore reducing the risk to end users to negligible.

We consider that appropriate measures need to be implemented to protect the site operatives when working on site to reduce the risk of contamination while handling excavated materials during the initial stages of the constructions phase.

Since the exposure to contaminants is low, and the site investigation proved the presence of a clay subsoil we consider that a leachate test will not need to be carried out. The pathway between source and receptor is broken and therefore the mobility of contaminants is eliminated.

9 Site risk assessment

Land can be contaminated if significant pollutant linkages, comprising a source, pathway and receptor are present. The potential hazards have been assessed and the potential pollutant linkages between these and receptors are examined within this section.

Sources, pathways and receptors can be identified as follows:

- ***Source*** (contaminant/pollutant): A substance or range of substances that are contained within or under the land and which has the potential to cause harm to human health or pollution of controlled waters.

  The analysis data suggest a potential source of the contaminants are from metals and hydrocarbons. The elements reported over threshold values are Chromium and Benzo(a)Pyrene (Hydrocarbons).

- ***Pathways***: One or more routes by which a receptor can be exposed to or affected by a contaminant.

  The following potential migration pathways have been identified with regards to the site and future development:

  - Direct contact with contaminated soils in gardens and soft landscaping,
  - Ingestion of possible contaminated soil, soil dust and vegetable produce,
  - Inhalation of contaminated soil dust,
  - Potential leaching and migration of contaminants to groundwater or surface water,
  - Uptake by plants.

- ***Receptor*** (target): Humans, living organisms, ecological systems, buildings or controlled waters.

  The following future receptors have been identified:

  - Construction workers,
  - sub-surface concrete,
  - Future planting.

Source/Pathway/Receptor (SPR) linkages are given in the table below, together with the assessed risk. This risk assessment was produced for the proposed use of the site as a residential development without home grown produce uptake. Changes to the intended use will require amendments to the risk assessment.

Table 9-1: Source/pathway/Receptor linkages.

Source	Pathway	Receptor	Risk*
General soil quality associated with construction and demolition activities, fill material and previous usage, including PAH's and hydrocarbons	Direct contact with soils, soil dust or contaminated vegetable produce	Future residents	Negligible
		Neighbours	Negligible
		Construction workers	Low
	Migration and leaching	Secondary Aquifers	Negligible
	Direct contact with building materials	Sub-surface concrete and buried services	Low
	Direct contact with soils/uptake by plants	Future gardening	Negligible (no private garden spaces for residents)
Spillages of fuels/oils on site	Direct contact with soils, soil dust or contaminated vegetable produce	Future residents	Negligible
		Neighbours	Negligible
		Construction workers	Negligible
	Migration and leaching	Secondary Aquifers	Negligible

Metals	Direct contact with contaminated soils in gardens and soft landscaping	Residents, Neighbours	Negligible
	Ingestion of possible contaminated soil, soil dust and vegetable produce	Residents, Neighbours	Negligible Negligible
	Inhalation of contaminated soil dust	Residents, Neighbours, Construction workers	Negligible
	Potential leaching and migration of contaminants to groundwater or surface water,	Secondary Aquifers	Negligible
	Uptake by plants.	Future gardening	Negligible

We recommend that samples be taken from the fill material/ demolition material present within the basement area of the original public house building and analysed for Asbestos content. The results of the tests need to be assessed and appropriate measures implemented accordingly.

* **Definition of Risk**

Negligible: Contaminants that might have an unacceptable impact on key receptors, are unlikely to be present or no pathway is envisaged.

Low: Contaminants may be present but are unlikely to be at levels that would have an unacceptable impact on key receptors or where pathways are likely to be minimal.

Medium: Contaminants are likely to be present and might have an unacceptable impact on key receptors. Pathways may also be present and remedial measures may be necessary to reduce the risks.

High: Contaminants probably or certainly present and pathways are probably also present. Contaminants are likely to have an unacceptable impact on key receptors and remedial measures are likely to reduce risks to acceptable levels.

10 Conclusion

Historically, development of the site and surrounding area has taken place since circa 1938 with the Greenwood Tree Public House being constructed in the late 1950s. The majority of the area comprises residential properties with schools and local shops within a short distance from the site.

The desk top study confirmed there are no significant natural of features or industrial sites which would affect the development of the site. There are no significant landfill sites or waste sites within influencing distance of the site. There are no surface water features or water bodies which can affect the development.

There are secondary aquifers below the site, however due to the presence of the clay subsoil over the whole site there is no risk of any potential leaching of contaminants from site.

The desk top study has confirmed that there is a significant risk of Surface water (pluvial) flooding along Greenwood Road. This indicates that this area would be expected to be affected by surface water flooding in a 1 in 75-year rainfall event to a depth of between 0.3m to 1m. However, the desk top study confirmed that there are no records of the site being flooded.

The proposed residential development comprises a 3 storey block of apartment with 30 carparking spaces at basement level. The residential development is to be constructed with reinforced concrete basement walls and foundations with a steel frame over supporting the ground floor and traditional loadbearing masonry walls, with precast concrete upper floors and a metal deck or single ply flat roof.

We consider that the basement level car park could be affected by surface water (pluvial) flooding and so appropriate design measures need to be implemented to protect the building. The proposed ground floor level is approximately 1200mm above the average road level along Greenwood Road and so we consider that the tanking and waterproofing of the basement structure should be adequate to protect the basement car park from surface water (pluvial) flooding. The basement should be constructed with durable and water-resistant materials where the building is at risk of surface water flooding. Services should be appropriately protected or raised at least 300mm above the potential flood level where possible. Drainage should be installed within the basement with non-return valves to reduce the risk of flooding within the car park.

The desk top Geological Reports and site investigations confirm varying depths of made ground over glacial till and sandstone. There is no risk of ground subsidence, instances from compressible or collapsible deposits, however we recommend that the building foundations be extended onto the sandstone layer at a depth of 3m. The proposed development comprises a basement level car park and so foundations and possibly a reinforced concrete rafts slab would be set at an approximate depth of 3m below ground levels onto the sandstone rockhead. The basement floor slab will therefore be a reinforced concrete ground bearing raft slab.

The preliminary Conceptual Site Model (CSM) has been produced for the site and this has identified no significant contamination linkages. However, due to the presence of Chromium and Benzo(a)Pyrene (Hydrocarbons) within the soil samples from site, appropriate protections measures need to be implemented during construction phase to protect the site operatives. Asbestos testing will have to be carried out on the made ground within the basement area of the original pub to determine any potentials hazards and appropriate actions should be implemented. The desk top study confirms that the site is not in an area affected by Radon and therefore no Radon Protection measures are required.

The proposed building covers the majority of the site and so we recommend that the remaining areas of landscaping around the site should include site strip of 400mm, installation of a geotextile demarcation layer and installation of a capping layer comprising clean inert hardcore and topsoil. All imported material should be tested, certified and approved prior to delivery on site.

We consider that the immediate previous usage of the site is unlikely to have caused or resulted in any significant sources of contamination.

The risk assessment is provisional as it based on the phase one desk study and Phase 2 site investigations and soil sample analysis. The risk will need to be re-examined depending on the results of the samples and asbestos testing of the made ground within the basement area of the pub.

11 Recommendation

From our study of the information available for the site and surrounding area, we are satisfied that the site is suitable for the proposed residential development, with very little potential risk to human health or water courses.

The proposed residential development comprises a 3 storey block of apartment with 30 carparking spaces at basement level. The residential development is to be constructed with reinforced concrete basement walls and foundations with a steel frame over supporting the ground floor and traditional loadbearing masonry walls, with precast concrete upper floors and a metal deck or single ply flat roof. We therefore anticipate concentrations of load from the columns at basement level and we consider that foundations will have to extend down to the sandstone/ rockhead level at 3m below ground level.

Due to the presence of Chromium and Benzo(a)Pyrene (Hydrocarbons) within the soil samples from site, appropriate protections measures need to be implemented during construction phase to protect the site operatives and public. Landscaping around the site should include a site strip of 400mm and installation of a geotextile demarcation layer with a capping layer over. All imported material should be tested, certified and approved prior to delivery on site.

There is a significant risk of flooding along the west of the site (Greenwood Rd), however the desk top study confirms that there are no records of flooding on site. We recommend that the building be designed to resist localised flooding along the west elevation and that measures are taken to utilise appropriate building materials with due consideration for the position of services with regards potential flood level. The proposed ground floor level is approximately 1200mm above the average road level along Greenwood Road and so we consider that the tanking and waterproofing of the basement structure should be adequate to protect the basement car park from surface water (pluvial) flooding.

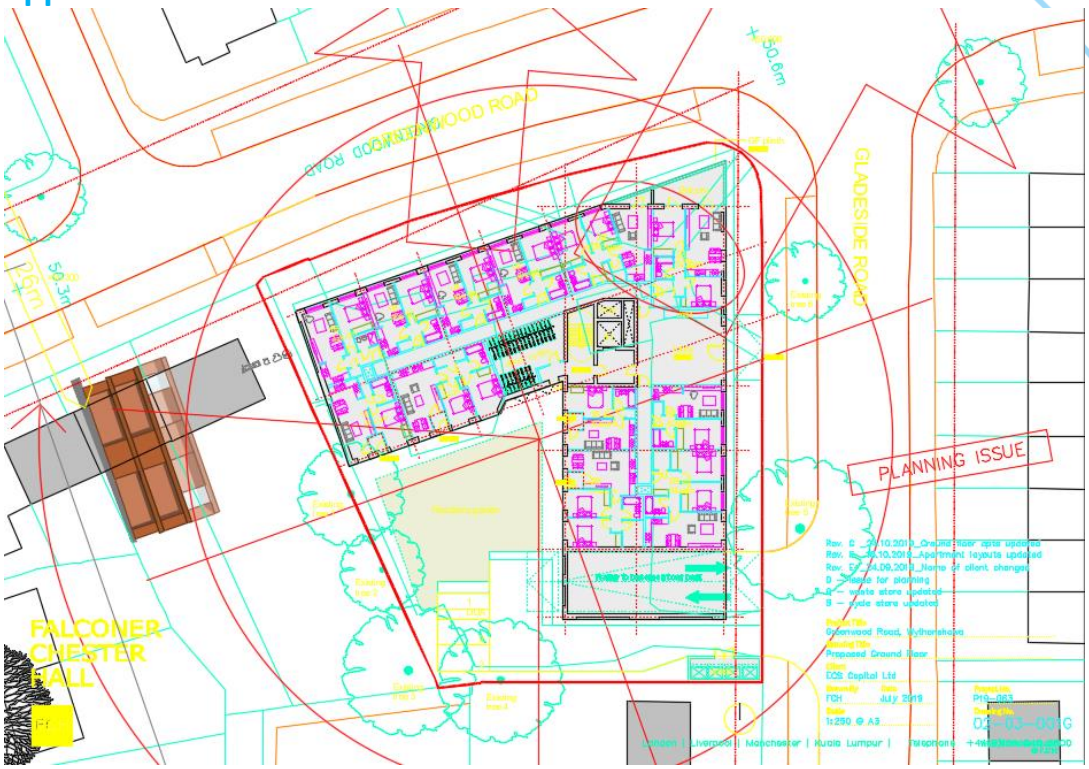


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12 References

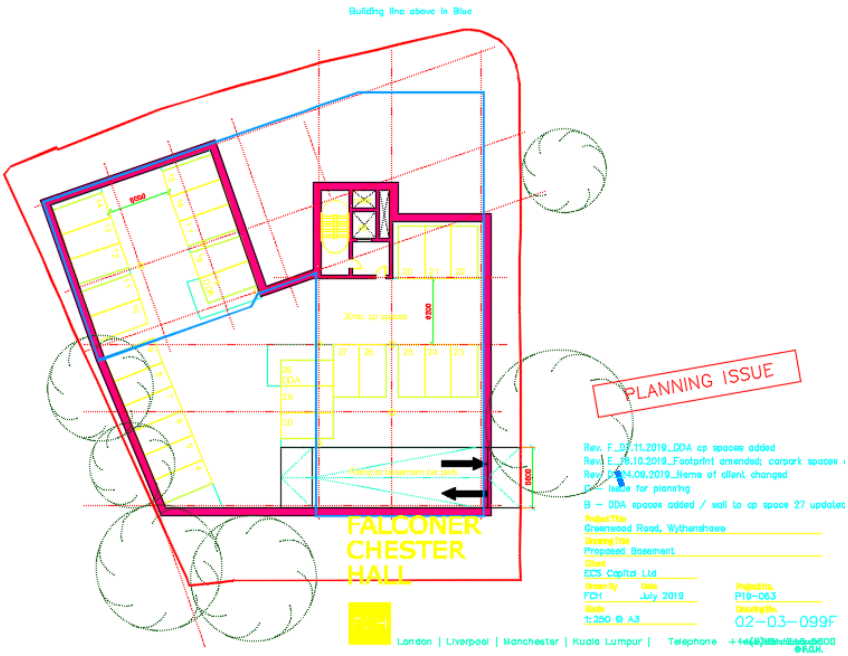
Ground Sure Report -	Enviro-Insight Report (GS 5767274); Flood Insight report (GS 5767275); Geo-Insight report (GS 5767276); Historical Ordnance Survey Maps;
Mini Soils Surveys Ltd	Site Investigation Boreholes logs (MIN50706)
DETS Ltd	Analysis Certificate and data ref 19-02333 (18/02/19)

13 Appendix A






PLANNING ISSUE
FALCONER
CHESTER
HALL
Greenwood Road, Wythenshawe
Proposed Second Floor
ECS Capital Ltd
July 2019
1:250 @ A3
P19-083
02-03-003E
London | Liverpool | Manchester | Kuala Lumpur | Telephone


Building line above in Blue
PLANNING ISSUE
FALCONER
CHESTER
HALL
Greenwood Road, Wythenshawe
Proposed Basement
ECS Capital Ltd
July 2019
1:250 @ A3
P19-083
02-03-099F
London | Liverpool | Manchester | Kuala Lumpur | Telephone

STL Projects Ltd

1, Barkers Lane,
Sale, M33 6RP

Groundsure Reference:	GS-5767274
Your Reference:	18-3262
Report Date	22 Jan 2019
Report Delivery Method:	Email - pdf

Enviro Insight

Address: LAND CORNER OF GREENWOOD ROAD, GLADESIDE ROAD, MANCHESTER, M22 9RA

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviro Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully

[redacted]

Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

Enviro Insight

Address:	**LAND CORNER OF GREENWOOD ROAD, GLADESIDE ROAD, MANCHESTER, M22 9RA**
Date:	**22 Jan 2019**
Reference:	**GS-5767274**
Client:	**STL Projects Ltd**

NW N NE

W E

SW S SE



Aerial Photograph Capture date:	21-Apr-2016
Grid Reference:	381959,387746
Site Size:	0.19ha

Report Reference: GS-5767274
Client Reference: 18-3262

Contents Page

Contents Page 3
Overview of Findings 6
Using this report 10
1. Historical Land Use 11
1. Historical Industrial Sites 12
1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping....12
1.2 Additional Information – Historical Tank Database....12
1.3 Additional Information – Historical Energy Features Database....12
1.4 Additional Information – Historical Petrol and Fuel Site Database....13
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database....13
1.6 Historical military sites....13
1.7 Potentially Infilled Land....13
2. Environmental Permits, Incidents and Registers Map 15
2. Environmental Permits, Incidents and Registers 16
2.1 Industrial Sites Holding Licences and/or Authorisations....16
2.1.1 Records of historic IPC Authorisations within 500m of the study site:....16
2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:....16
2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:....16
2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:....16
2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:....16
2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site: 17
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:....17
2.1.8 Records of Licensed Discharge Consents within 500m of the study site:....17
2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site: 17
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:....17
2.2 Dangerous or Hazardous Sites....17
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents....18
2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:....18
2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:....18
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990....18
3. Landfill and Other Waste Sites Map 19
3. Landfill and Other Waste Sites 20
3.1 Landfill Sites....20
3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site: 20
3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site: 20
3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:....20
3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:....20
3.2 Other Waste Sites....21
3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site: 21
3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site: 21
4. Current Land Use Map 22
4. Current Land Uses 23
4.1 Current Industrial Data....23
4.2 Petrol and Fuel Sites....23
4.3 National Grid High Voltage Underground Electricity Transmission Cables....23
4.4 National Grid High Pressure Gas Transmission Pipelines....24

5. Geology 25
5.1 Artificial Ground and Made Ground 25
5.2 Superficial Ground and Drift Geology 25
5.3 Bedrock and Solid Geology 25
6 Hydrogeology and Hydrology 26
6a. Aquifer Within Superficial Geology 26
6b. Aquifer Within Bedrock Geology and Abstraction Licences 27
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licences 28
6d. Hydrogeology – Source Protection Zones within confined aquifer 29
6e. Hydrology – Watercourse Network and River Quality 30
6.Hydrogeology and Hydrology 31
6.1 Aquifer within Superficial Deposits 31
6.2 Aquifer within Bedrock Deposits 31
6.3 Groundwater Abstraction Licences 32
6.4 Surface Water Abstraction Licences 32
6.5 Potable Water Abstraction Licences 32
6.6 Source Protection Zones 32
6.7 Source Protection Zones within Confined Aquifer 33
6.8 Groundwater Vulnerability and Soil Leaching Potential 33
6.9 River Quality 33
6.9.1 Biological Quality: 33
6.9.2 Chemical Quality: 33
6.10 Ordnance Survey MasterMap Water Network 34
6.11 Surface Water Features 34
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea) 35
7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map 36
7 Flooding 37
7.1 River and Coastal Zone 2 Flooding 37
7.2 River and Coastal Zone 3 Flooding 37
7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating 37
7.4 Flood Defences 37
7.5 Areas benefiting from Flood Defences 37
7.6 Areas benefiting from Flood Storage 38
7.7 Groundwater Flooding Susceptibility Areas 38
7.8 Groundwater Flooding Confidence Areas 38
8. Designated Environmentally Sensitive Sites Map 39
8. Designated Environmentally Sensitive Sites 40
8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site: 40
8.2 Records of National Nature Reserves (NNR) within 2000m of the study site: 40
8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site: 40
8.4 Records of Special Protection Areas (SPA) within 2000m of the study site: 40
8.5 Records of Ramsar sites within 2000m of the study site: 40
8.6 Records of Ancient Woodland within 2000m of the study site: 41
8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site: 41
8.8 Records of World Heritage Sites within 2000m of the study site: 41
8.9 Records of Environmentally Sensitive Areas within 2000m of the study site: 41
8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site: 41
8.11 Records of National Parks (NP) within 2000m of the study site: 41
8.12 Records of Nitrate Sensitive Areas within 2000m of the study site: 42
8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site: 42

8.14 Records of Green Belt land within 2000m of the study site:....42
9. Natural Hazards Findings 43
9.1 Detailed BGS GeoSure Data....43
9.1.1 Shrink Swell....43
9.1.2 Landslides....43
9.1.3 Soluble Rocks....43
9.1.4 Compressible Ground....44
9.1.5 Collapsible Rocks....44
9.1.6 Running Sand....44
9.2 Radon....45
9.2.1 Radon Affected Areas....45
9.2.2 Radon Protection....45
10. Mining 46
10.1 Coal Mining....46
10.2 Non-Coal Mining....46
10.3 Brine Affected Areas....46
Contact Details 47
Standard Terms and Conditions 49

Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	0	3	7
1.2 Additional Information – Historical Tank Database	0	0	0	0
1.3 Additional Information – Historical Energy Features Database	0	0	1	7
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	0
1.6 Historical military sites	0	0	0	0
1.7 Potentially Infilled Land	0	0	3	39

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	0	0
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	2
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	0	0	0
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	1	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	0	1

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	0	3	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Records of Artificial Ground and Made Ground present beneath the study site	None identified
5.2 Records of Superficial Ground and Drift Geology present beneath the study site	Identified
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m
6.1 Records of Strata Classification in the Superficial Geology within 500m of the study site	Identified
6.2 Records of Strata Classification in the Bedrock Geology within 500m of the study site	Identified

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	2
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	0	0	#250GWV#	#500GWV#	Not searched	Not searched

Section 6: Hydrogeology and Hydrology

	0-500m					
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site	No	No	No	No	No	No
6.10 Ordnance Survey MasterMap Water Network entries within 500m of the site	0	2	0	2	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	No	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Enviroment Agency Zone 2 floodplains within 250m of the study site	None identified
7.2 Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	None identified
7.3 Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site	Very Low
7.4 Flood Defences within 250m of the study site	None identified
7.5 Areas benefiting from Flood Defences within 250m of the study site	None identified
7.6 Areas used for Flood Storage within 250m of the study site	None identified
7.7 Maximum BGS Groundwater Flooding susceptibility within 50m of the study site	Potential at Surface
7.8 BGS confidence rating for the Groundwater Flooding susceptibility areas	Moderate

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	0	0
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	1
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
8.14 Records of Green Belt land	0	0	0	0	0	4

Section 9: Natural Hazards

9.1 Maximum risk of natural ground subsidence	Very Low
9.1.1 Maximum Shrink-Swell hazard rating identified on the study site	Very Low
9.1.2 Maximum Landslides hazard rating identified on the study site	Very Low
9.1.3 Maximum Soluble Rocks hazard rating identified on the study site	Negligible
9.1.4 Maximum Compressible Ground hazard rating identified on the study site	Negligible
9.1.5 Maximum Collapsible Rocks hazard rating identified on the study site	Very Low
9.1.6 Maximum Running Sand hazard rating identified on the study site	Very Low
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Section 10: Mining

10.1 Coal mining areas within 75m of the study site	None identified
10.2 Non-Coal Mining areas within 50m of the study site boundary	None identified
10.3 Brine affected areas within 75m of the study site	None identified

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licences, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

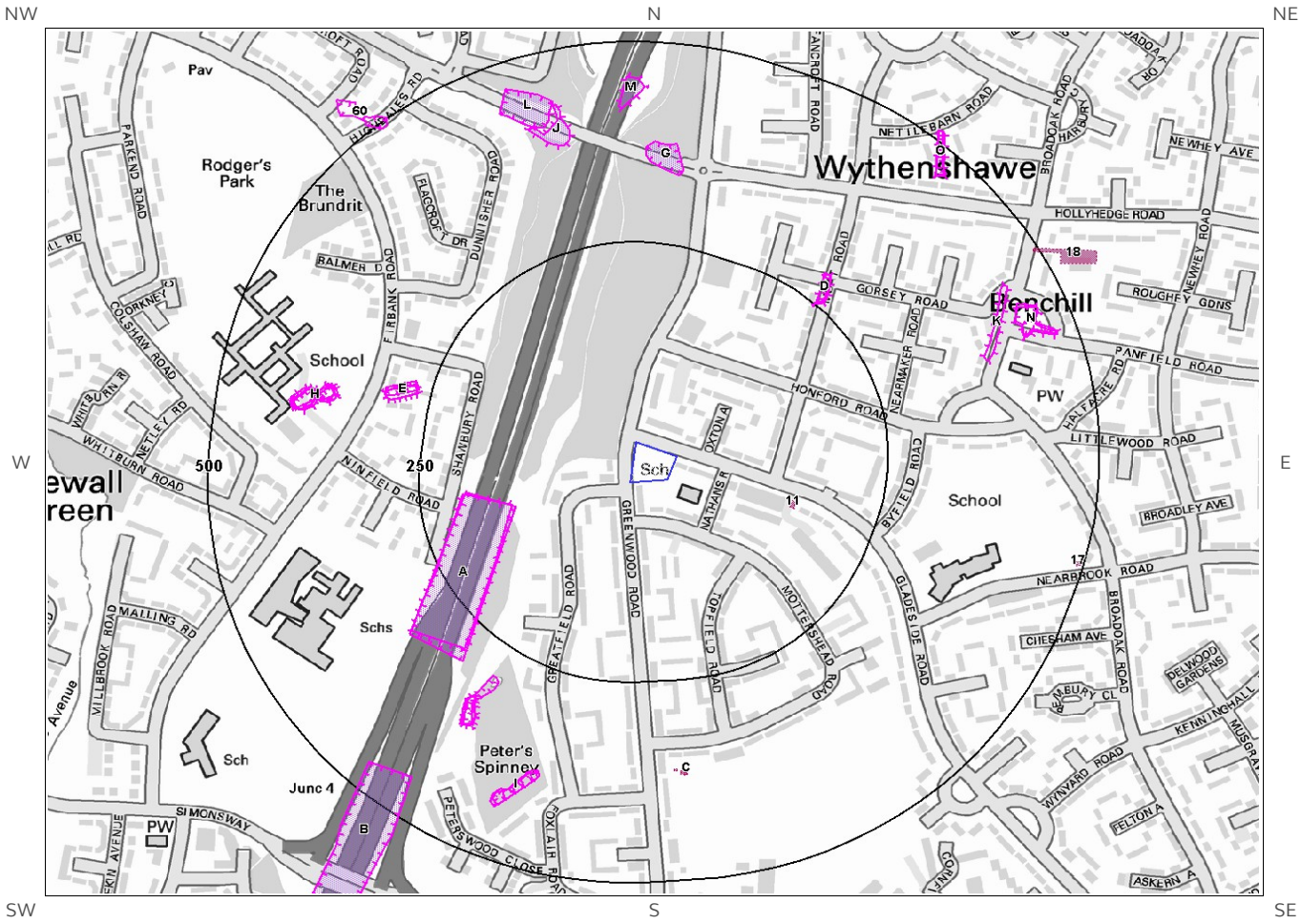
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Historical Land Use



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Historical 1:10,000 and 1:10,560 scale mapping

Site Outline

Industrial Land Use

Potentially Infilled Land

250
500
Search Buffers (m)

Historical 1:2,500, 1:1,250 and 1:500 scale mapping

Energy Features

Petrol Stations

Historical military sites

Tanks

Garages

1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 10

ID	Distance [m]	Direction	Use	Date
1A	139	W	Cuttings	1975
2A	142	W	Cuttings	1995
3A	142	W	Cuttings	1989
4G	337	N	Unspecified Heap	1967
5J	380	N	Unspecified Heap	1967
6L	408	N	Unspecified Heap	1967
7M	417	N	Unspecified Pit	1967
8B	450	SW	Cuttings	1995
9B	450	SW	Cuttings	1975
10B	450	SW	Cuttings	1989

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary: 0

Database searched and no data found.

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary: 8

ID	Distance (m)	Direction	Use	Date
11	147	E	Electricity Substation	1985
12C	360	S	Electricity Substation	1995
13C	360	S	Electricity Substation	1995
14C	361	S	Electricity Substation	1978

15C	361	S	Electricity Substation	1987
16C	363	S	Electricity Substation	1974
17	490	E	Electricity Substation	1985
18	492	NE	Electricity Substation	1992

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 0

Database searched and no data found.

1.6 Historical military sites

Certain military installations were not noted on historic mapping for security reasons. Whilst not all military land is necessarily of concern, Groundsure has researched and digitised a number of Ordnance Factories and other military industrial features (e.g. Ordnance Depots, Munitions Testing Grounds) which may be of contaminative concern. This research was drawn from a number of different sources, and should not be regarded as a definitive or exhaustive database of potentially contaminative military installations. The boundaries of sites within this database have been estimated from the best evidence available to Groundsure at the time of compilation.

Records of historical military sites within 500m of the search boundary: 0

Database searched and no data found.

1.7 Potentially Infilled Land

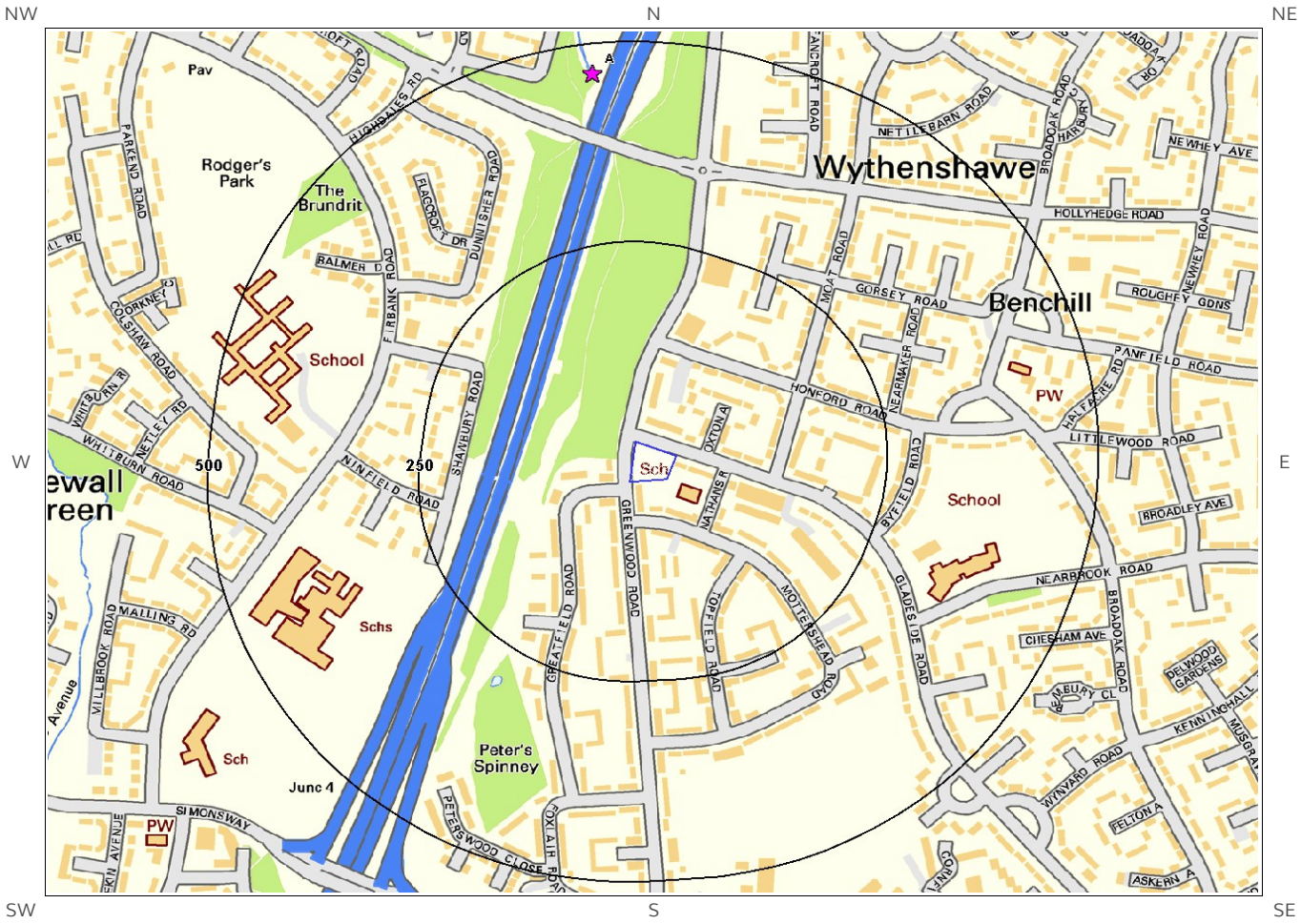
Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 42

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
19A	139	W	Cuttings	1975
20A	142	W	Cuttings	1995
21A	142	W	Cuttings	1989

22D	252	NE	Pond	1907
23D	252	NE	Pond	1907
24D	253	NE	Pond	1907
25E	265	W	Pond	1938
26E	265	W	Pond	1897
27E	265	W	Pond	1907
28E	266	W	Pond	1907
29E	266	W	Pond	1907
30F	290	SW	Ponds	1954
31F	322	SW	Pond	1907
32F	322	SW	Pond	1907
33F	322	SW	Pond	1907
34F	322	SW	Pond	1938
35G	337	N	Unspecified Heap	1967
36H	358	W	Pond	1938
37H	358	W	Pond	1907
38H	358	W	Pond	1907
39H	361	W	Pond	1907
40H	361	W	Ponds	1897
41H	363	W	Pond	1954
42I	375	S	Ponds	1938
43I	379	S	Ponds	1954
44J	380	N	Unspecified Heap	1967
45K	384	E	Ponds	1907
46K	384	E	Ponds	1907
47L	408	N	Unspecified Heap	1967
48M	417	N	Unspecified Pit	1967
49N	433	NE	Pond	1907
50N	433	NE	Pond	1907
51N	433	NE	Pond	1897
52N	433	NE	Pond	1907
53B	450	SW	Cuttings	1989
54B	450	SW	Cuttings	1975
55B	450	SW	Cuttings	1995
56O	465	NE	Pond	1897
57O	465	NE	Pond	1907
58O	466	NE	Pond	1907
59O	466	NE	Pond	1907
60	493	NW	Ponds	1938

2. Environmental Permits, Incidents and Registers Map



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- Site Outline
- Search Buffers (m) — 250 — 500
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site: 0

Database searched and no data found.

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations: 0

Database searched and no data found.

2.1.8 Records of Licensed Discharge Consents within 500m of the study site: 0

Database searched and no data found.

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site: 0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site: 0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 0

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

2

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1A	463	N	381891 388236	Incident Date: 10-Apr-2001 Incident Identification: 2078 Pollutant: Sewage Materials Pollutant Description: Other Sewage Material	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
2A	463	N	381891 388236	Incident Date: 10-Apr-2001 Incident Identification: 2078 Pollutant: Sewage Materials Pollutant Description: Other Sewage Material	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

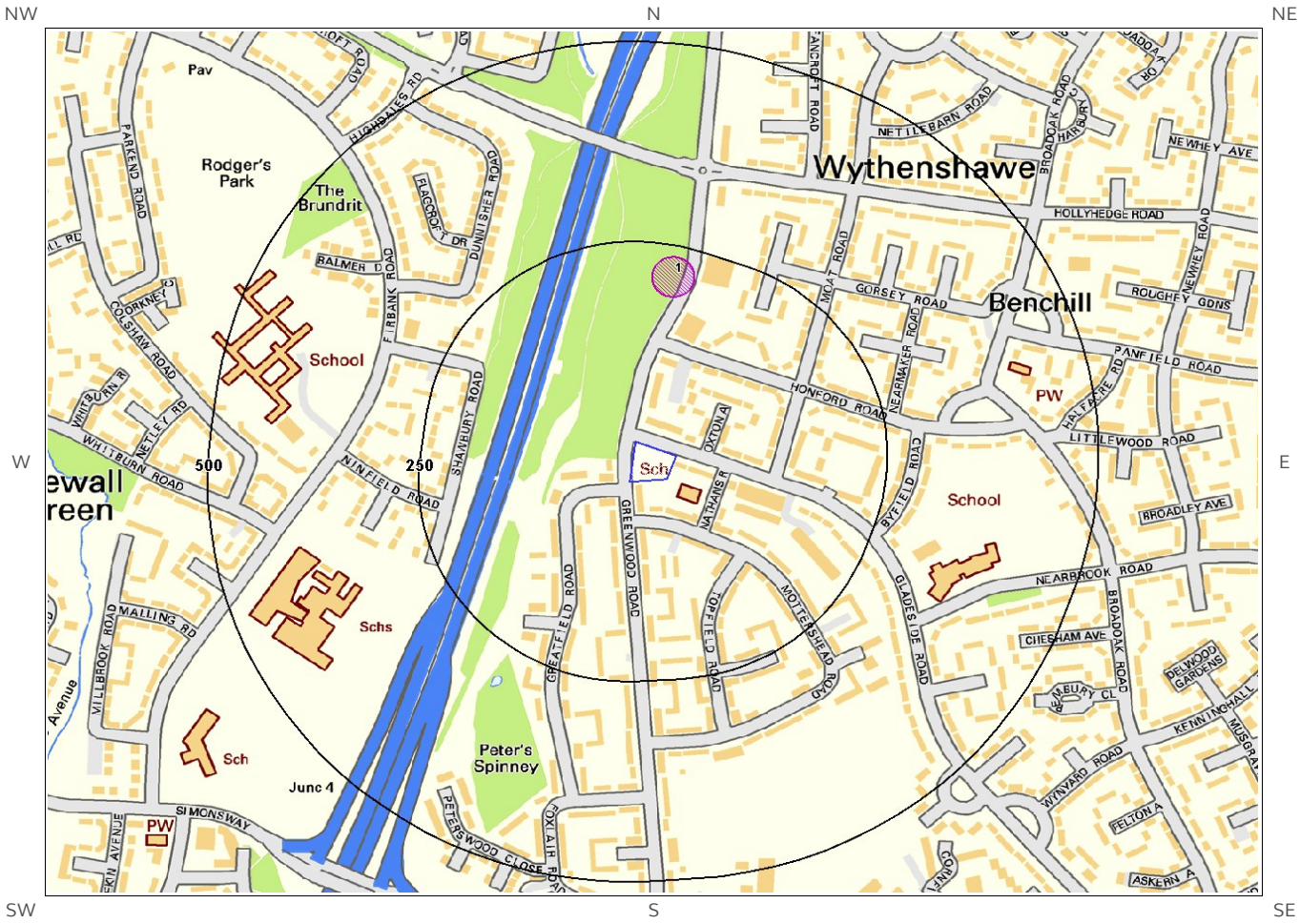
Database searched and no data found.

2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

Records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site 0

Database searched and no data found.

3. Landfill and Other Waste Sites Map



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Site Outline

250 / 500 Search Buffers (m)

EA/NRW Active Landfill

EA/NRW Historic Landfill

BGS / DoE Survey Landfill

Historic and Planned Waste Sites

EA/NRW Licensed Waste Site

Local Authority/Historical Mapping Landfill Records

3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

0

Database searched and no data found.

3.2 Other Waste Sites

3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

1

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details		
1	186	N	381988 387982	Type of Site: Waste Transfer Facility Site Address: Land Opposite, 307 Greenwood Road, Wythenshawe, Manchester, Greater Manchester, M22 9HD	Planning Application Reference: 109991/WST/2015/S2 Date: -	Further Details: Scheme comprises installation of waste collection and recycling facility together with associated hard standing, boundary treatments, car parking and vehicular access. Data Source: Historic Planning Application Data Type: Point

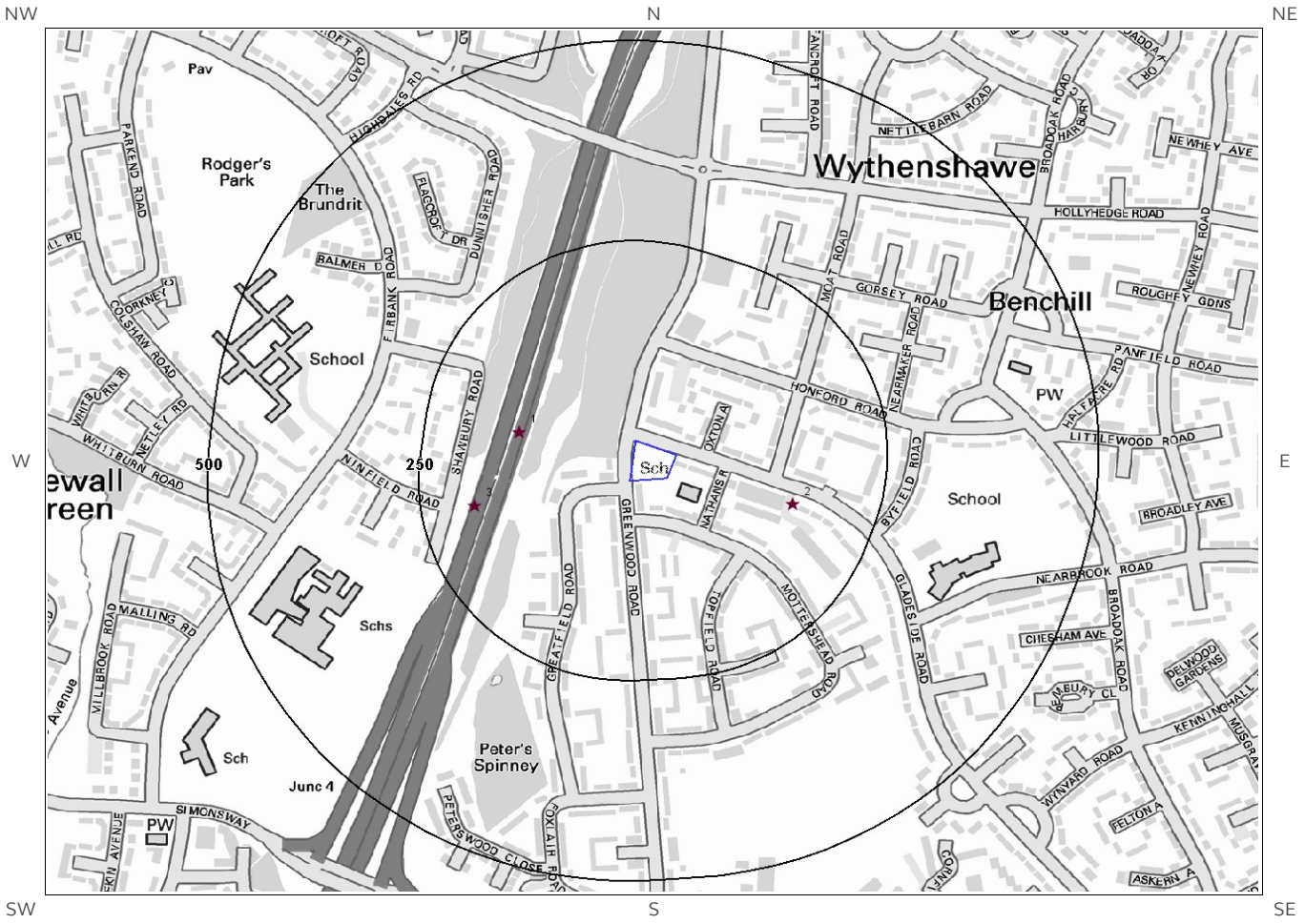
3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

1

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1248	W	380701 387901	Site Address: Southmoor Road, Wythenshawe, Manchester, M23 9LT Type: Clinical Waste Transfer Station Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SMU001 EPR reference: EA/EPR/AP3892CC/S002 Operator: South Manchester University Hospitals N H S Trust Waste Management licence No: 53585 Annual Tonnage: 5000.0	Issue Date: 25/09/1996 Effective Date: - Modified: - Surrendered Date: 16/11/2004 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Wythenshawe Hospital Clinical Waste Transfer Station Correspondence Address: -

4. Current Land Use Map



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Site Outline

Search Buffers (m)
250
500

Current Industrial Sites

Petrol & Fuel Sites

Electricity Transmission Cables

Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 3

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	139	W	Gantry	381805 387788	Greater Manchester, M22	Travelling Cranes and Gantries	Industrial Features
2	150	E	Electricity Sub Station	382129 387698	Greater Manchester, M22	Electrical Features	Infrastructure and Facilities
3	187	W	Gantry	381752 387696	Greater Manchester, M23	Travelling Cranes and Gantries	Industrial Features

4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: 0

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

5.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON

5.3 Bedrock and Solid Geology

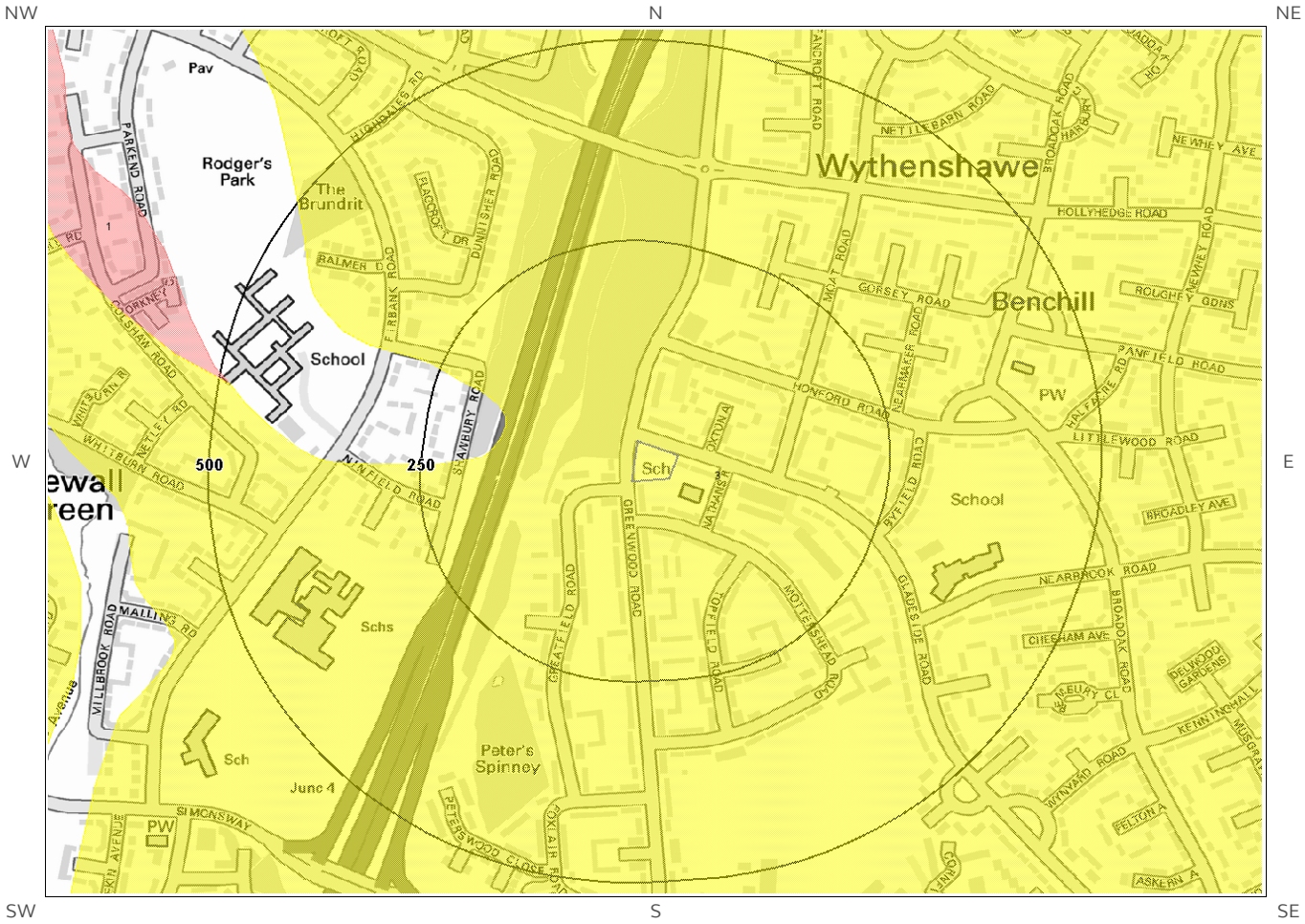
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
BOM-MDST	BOLLIN MUDSTONE MEMBER	MUDSTONE

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

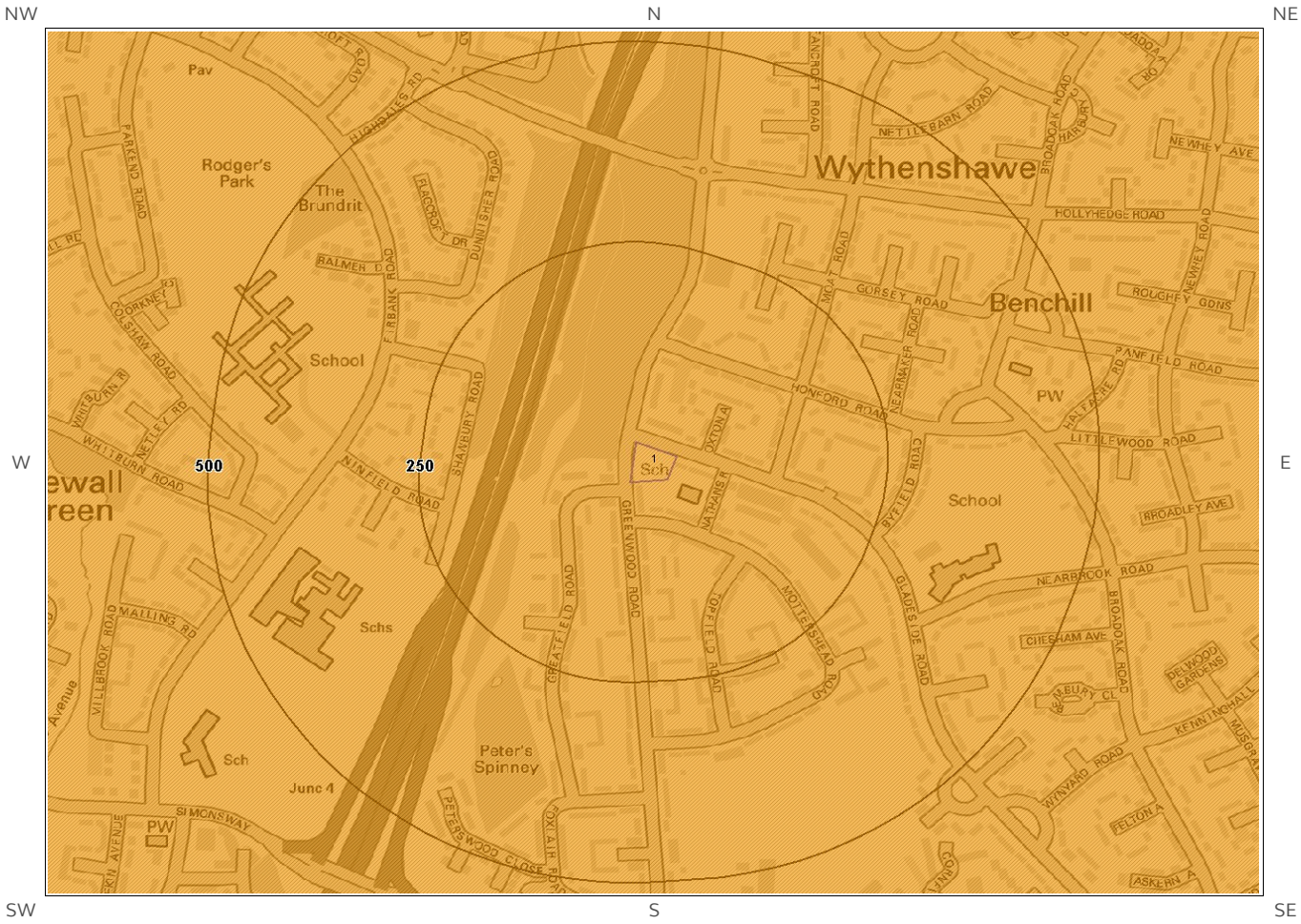
6 Hydrogeology and Hydrology

6a. Aquifer Within Superficial Geology



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6b. Aquifer Within Bedrock Geology and Abstraction Licences



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Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Groundwater Abstraction Licence

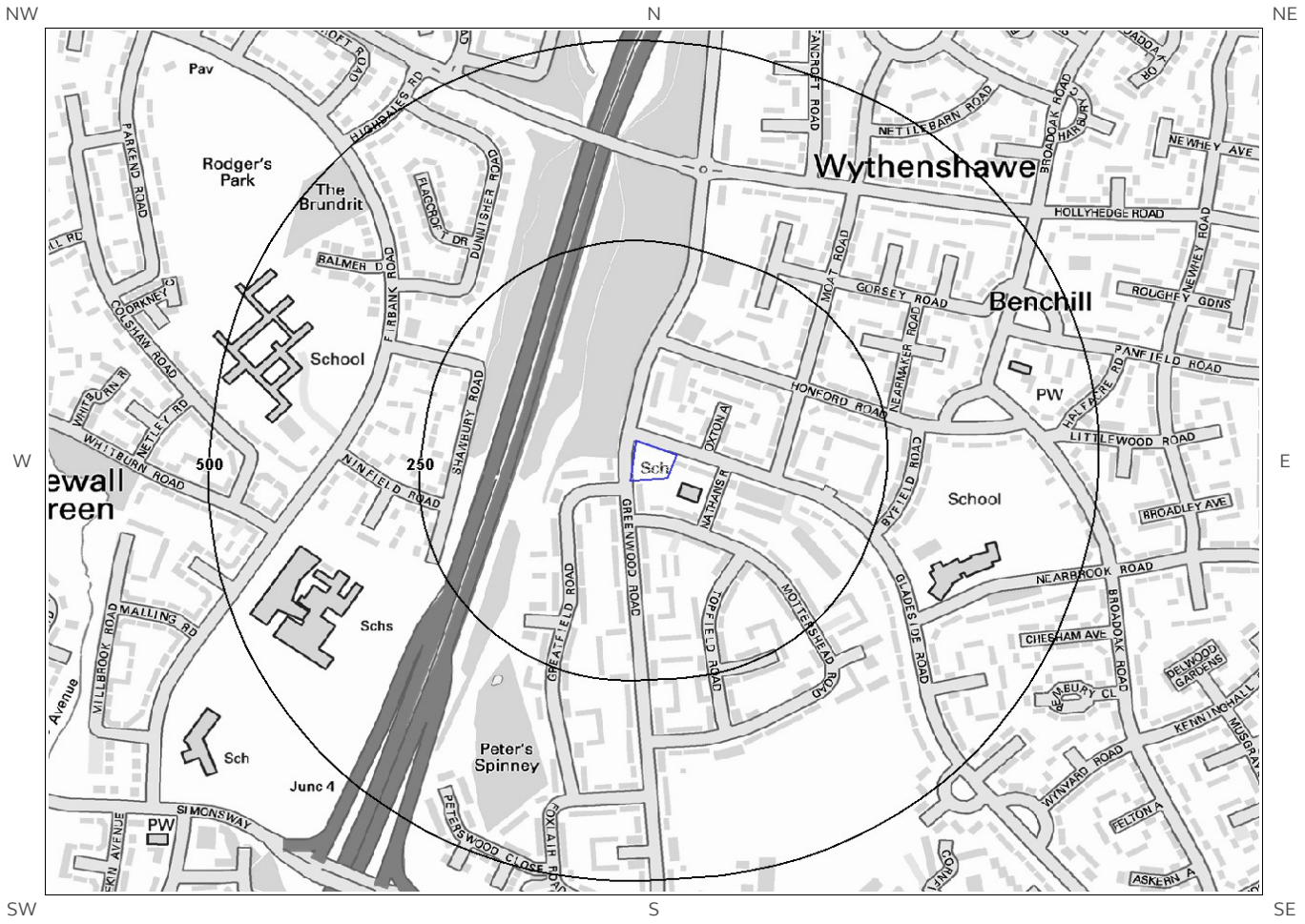
Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

Surface Water Abstraction Licence

6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licences



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Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

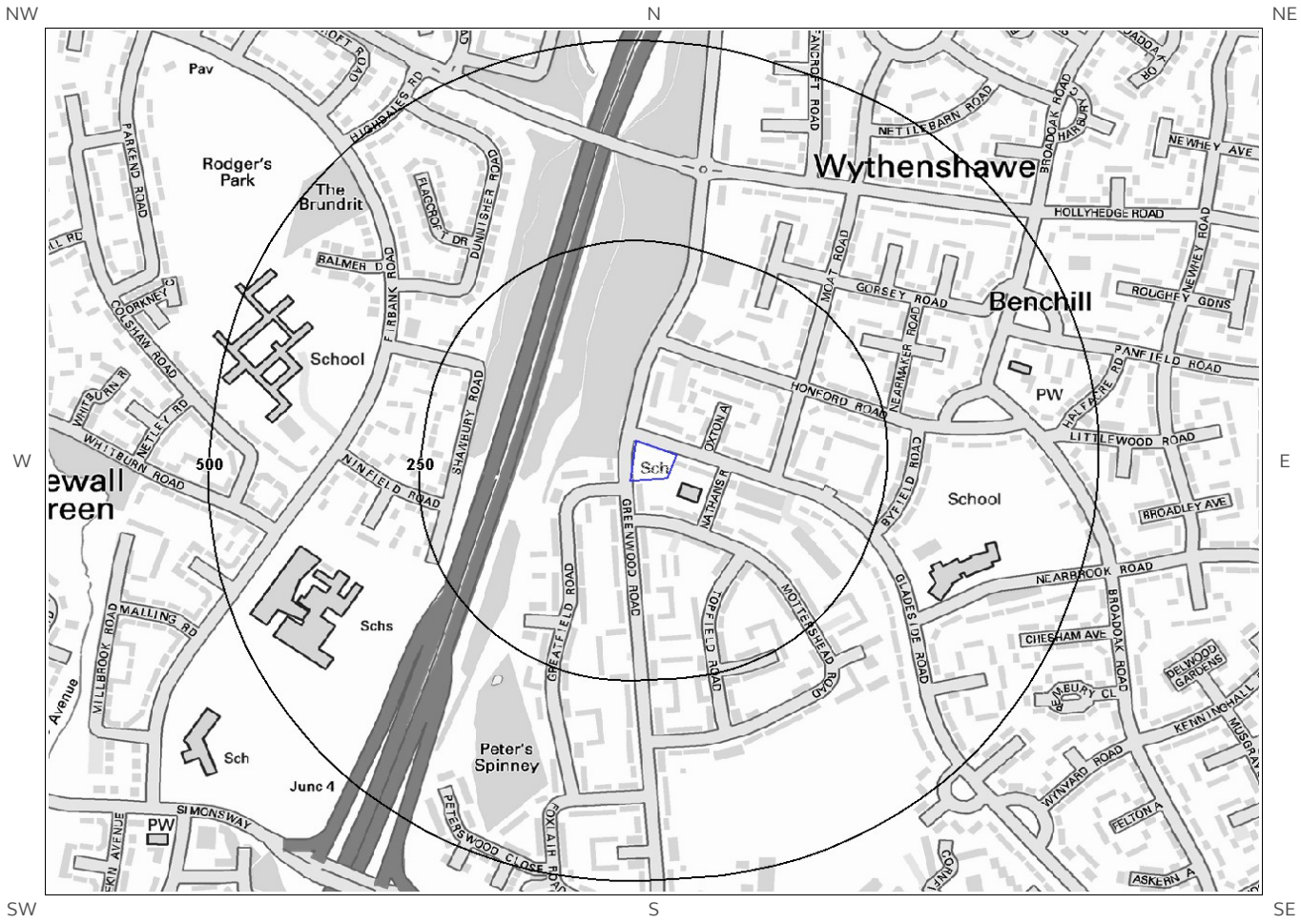
Source Protection Zone 2 - Outer Catchment

Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

6d. Hydrogeology – Source Protection Zones within confined aquifer



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Site Outline

250 — 500 Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2C - Outer Catchment within Confined Aquifer

Source Protection Zone 3C - Total Catchment within Confined Aquifer

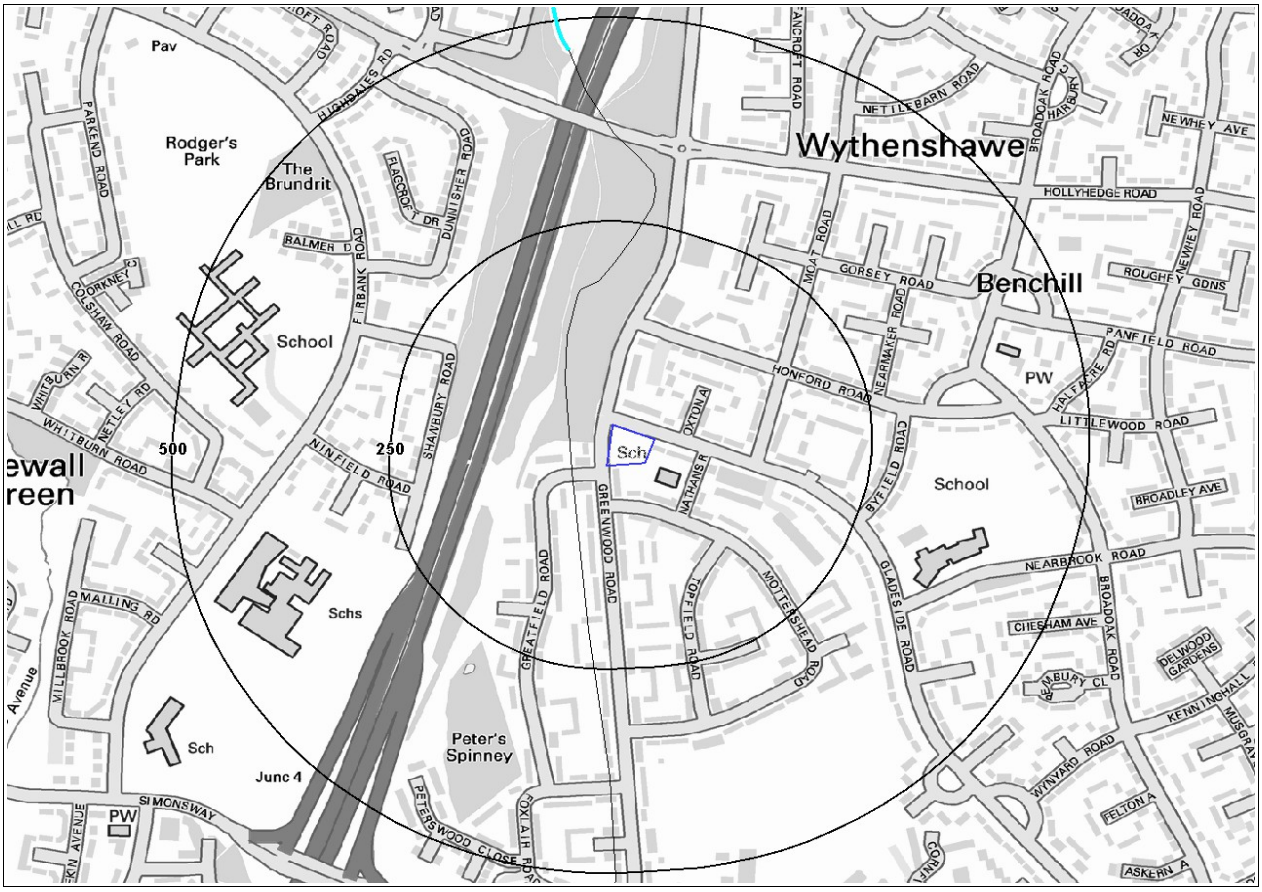
Potable Water Abstraction Licence

6e. Hydrology – Watercourse Network and River Quality

NW N NE

W E

SW S SE



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Site Outline

250 / 500 Search Buffers (m)

Tidal River

Inland River

Underground or Elevated Tidal River

Underground or Elevated Inland River

Foreshore

General Quality Assessment: Chemistry

Canal

Underground or Elevated Canal

Lock or Flight of Locks

Lake, Reservoir, or Marsh

Drain or Transfer

General Quality Assessment: Biology

6.Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Records of strata classification within the superficial geology at or in proximity to the property Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
3	0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
1	487	W	Secondary A	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. These are generally aquifers formerly classified as minor aquifers

6.2 Aquifer within Bedrock Deposits

Records of strata classification within the bedrock geology at or in proximity to the property Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers

6.3 Groundwater Abstraction Licences

Groundwater Abstraction Licences within 2000m of the study site — Identified

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
Not shown	1957	NE	383610 388860	Status: Historical Licence No: 2569014037 Details: Laundry Use Direct Source: Ground Water - North West Region Point: UNDERGROUND STRATA: BOREHOLE AT SHARSTON, MANCHESTER Data Type: Point Name: MR KHALID SALEEM	Annual Volume (m^3): 20975 Max Daily Volume (m^3): 80.67 Original Application No: - Original Start Date: 15/11/2002 Expiry Date: 31/03/2018 Issue No: 1 Version Start Date: 15/11/2002 Version End Date:
Not shown	1957	NE	383610 388860	Status: Historical Licence No: 2569014037 Details: Laundry Use Direct Source: Ground Water - North West Region Point: "UNDERGROUND STRATA: BOREHOLE AT SHARSTON, MANCHESTER" Data Type: Point Name: MR KHALID SALEEM	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 15/11/2002 Expiry Date: 31-Mar-18 Issue No: 1 Version Start Date: 15/11/2002 Version End Date:

6.4 Surface Water Abstraction Licences

Surface Water Abstraction Licences within 2000m of the study site — None identified

Database searched and no data found.

6.5 Potable Water Abstraction Licences

Potable Water Abstraction Licences within 2000m of the study site — None identified

Database searched and no data found.

6.6 Source Protection Zones

Source Protection Zones within 500m of the study site — None identified

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Source Protection Zones within the Confined Aquifer within 500m of the study site None identified

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site Identified

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
216	W	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

6.9 River Quality

Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site None identified

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Ordnance Survey MasterMap Water Network

Ordnance Survey MasterMap Water Network entries within 500m of the study site

This watercourse information is provided by Ordnance Survey MasterMap Water Network. The data provides a detailed centre line following the curve of the waterway precisely, so all distances provided in the report should be understood as measurements to the centreline rather than a measurement to the nearest point of the watercourse. Underground watercourses are inferred from entry and exit points so caution is advised in using these to indicate precise locations of underground watercourses when planning site investigation and development.

The following Ordnance Survey MasterMap Water Network records are represented on the Hydrology Map (6e):

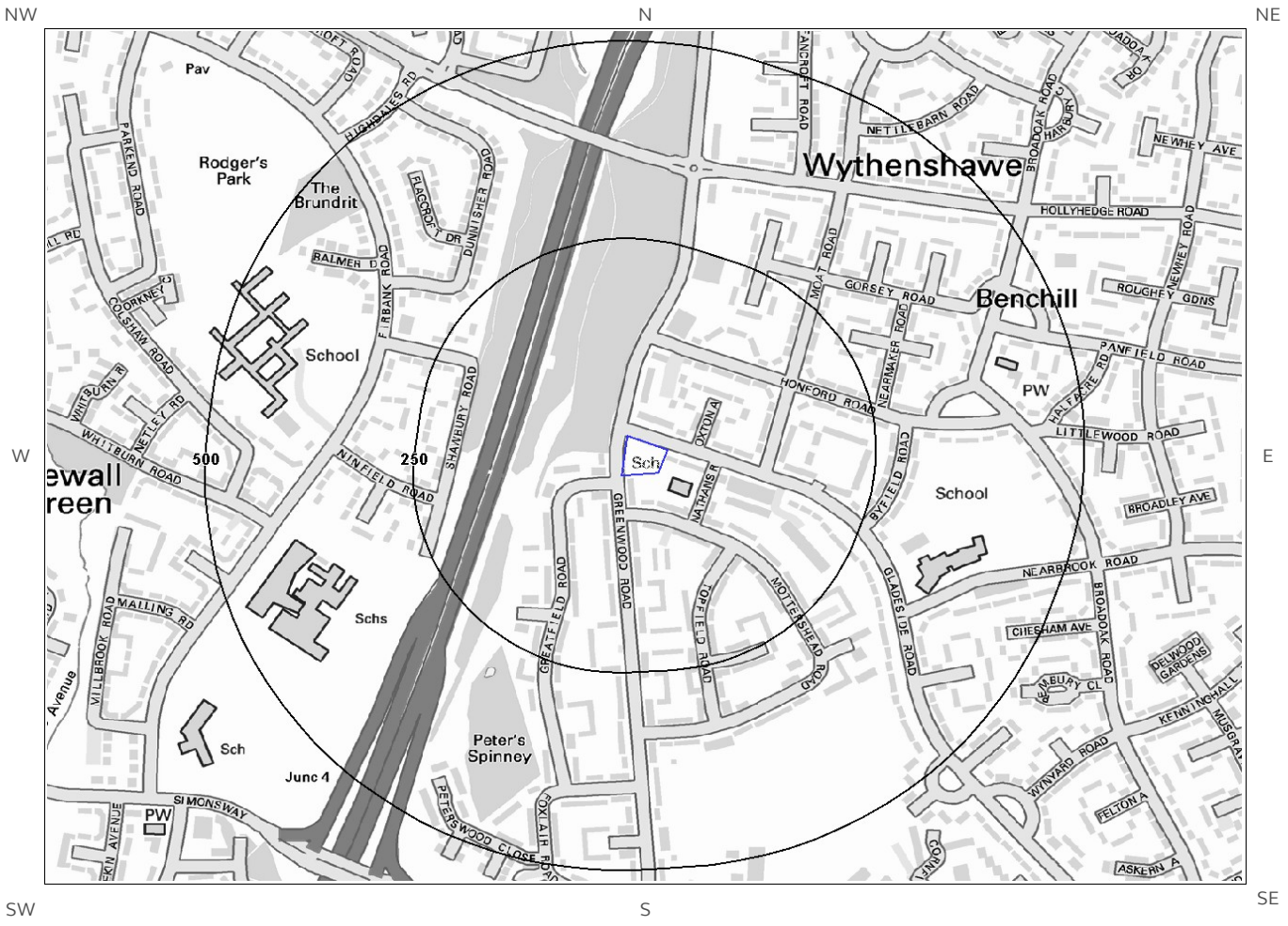
ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
1	41 W	Baguley Brook	Inland river not influenced by normal tidal action.	Catchment Area: Mersey Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
1	41 W	Baguley Brook	Inland river not influenced by normal tidal action.	Catchment Area: Mersey Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
2	463 N	Baguley Brook	Inland river not influenced by normal tidal action.	Catchment Area: Mersey Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.4
Not shown	463 N	Baguley Brook	Inland river not influenced by normal tidal action.	Catchment Area: Mersey Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.4

6.11 Surface Water Features

Surface water features within 250m of the study site — None identified

Database searched and no data found.

7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



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Site Outline

100
250
Search Buffers (m)

Zone 2 Floodplain

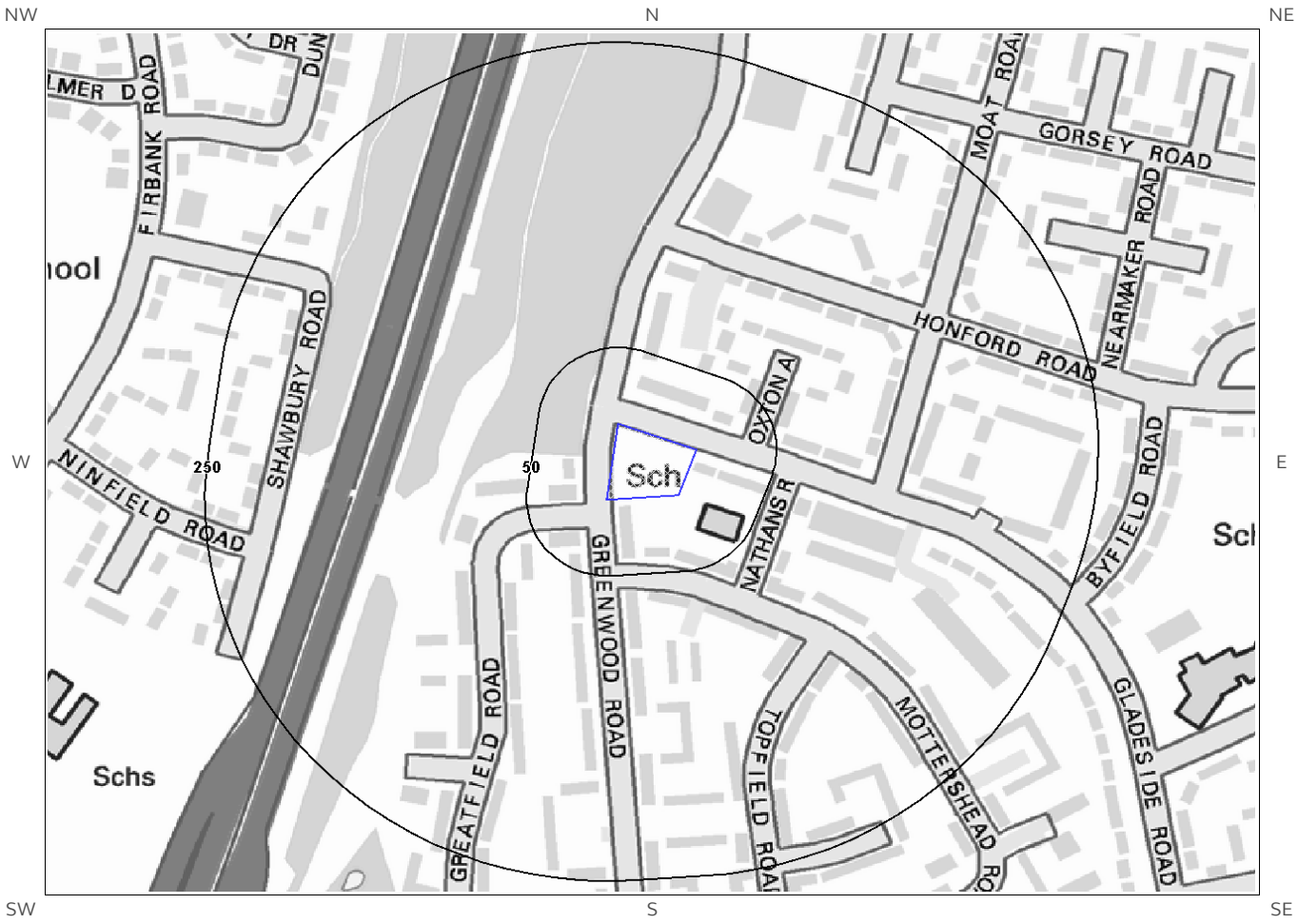
Zone 3 Floodplain

Flood Defences

Area used for Flood Storage

Area Benefiting from Flood Defences

7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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Site Outline

100
250
Search Buffers (m)

RoFRaS Rating

- Very Low
- Low
- Medium
- High

7 Flooding

7.1 River and Coastal Zone 2 Flooding

Environment Agency/Natural Resources Wales Zone 2 floodplain within 250m — None identified

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Environment Agency/Natural Resources Wales Zone 3 floodplain within 250m — None identified

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

Database searched and no data found.

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

Highest risk of flooding onsite — Very Low

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

7.4 Flood Defences

Flood Defences within 250m of the study site — None identified

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Areas benefiting from Flood Defences within 250m of the study site — None identified

7.6 Areas benefiting from Flood Storage

Areas used for Flood Storage within 250m of the study site	None identified

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site	Identified
Clearwater Flooding or Superficial Deposits Flooding	Superficial Deposits Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 Highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

7.8 Groundwater Flooding Confidence Areas

British Geological Survey confidence rating in this result	Moderate

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

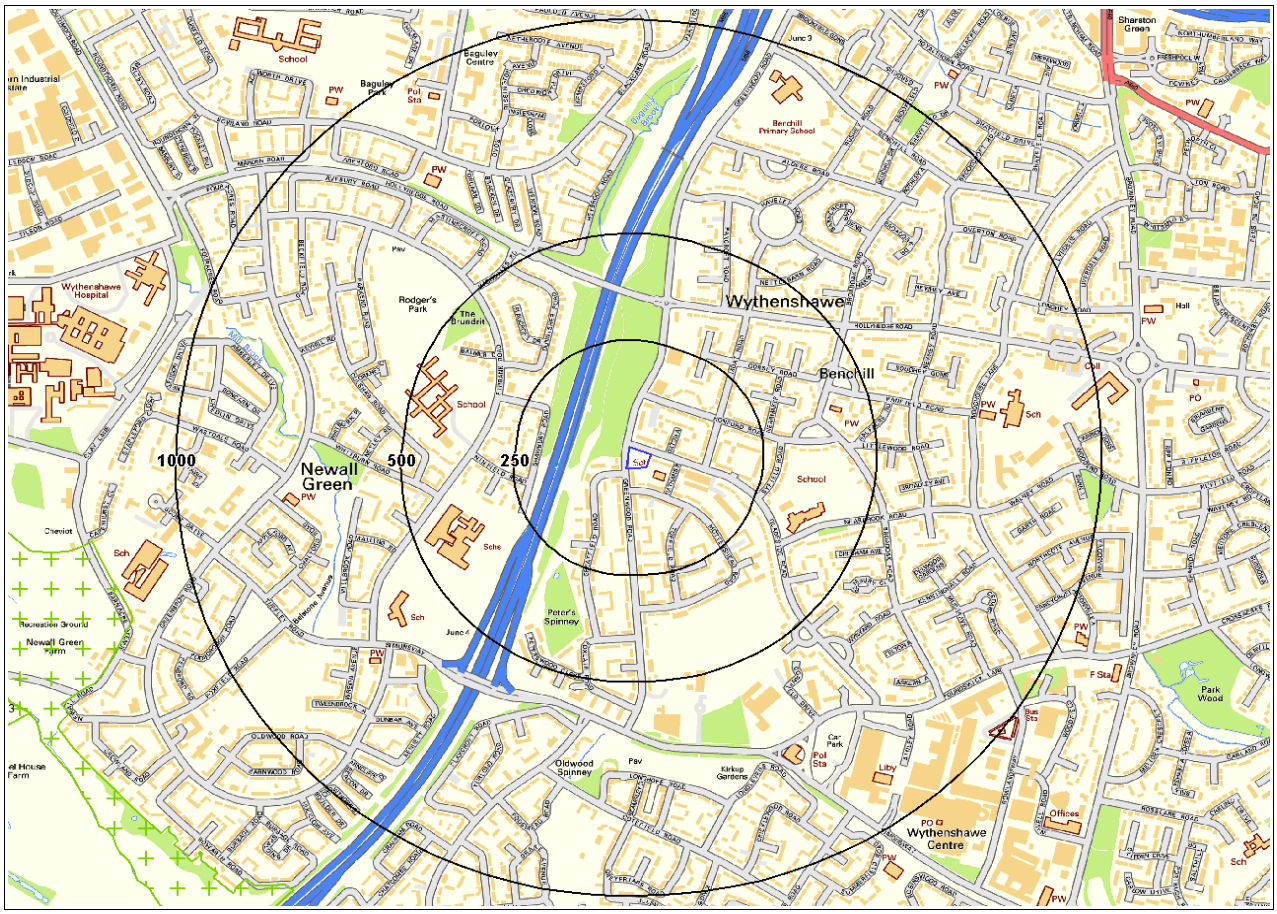
The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

8. Designated Environmentally Sensitive Sites Map

NW N NE

W E

SW S SE



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Site Outline

100 250 Search Buffers (m)

AONB

National Park

SSSI

Special Protection Areas

Nitrate Vulnerable Zones

Green Belt

Environmentally Sensitive Areas

Special Areas of Conservation

World Heritage Sites

Nitrate Sensitive Areas

Ancient Woodland

National Nature Reserve

Local Nature Reserves

Ramsar Sites

8. Designated Environmentally Sensitive Sites

Designated Environmentally Sensitive Sites within 2000m of the study site	Identified

8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

0

Database searched and no data found.

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

0

Database searched and no data found.

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

1

The following Local Nature Reserve (LNR) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	LNR Name	Data Source
Not shown	1558	N	Wythenshawe Park	Natural England

8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

0

Database searched and no data found.

8.14 Records of Green Belt land within 2000m of the study site:

4

Green Belt data contains Ordnance Survey data © Crown copyright and database right [2015].

ID	Distance	Direction	Green Belt Name	Local Authority Name
2	1151	W	Liverpool, Manchester and West Yorks Greenbelt	Manchester District (B)
3	1442	SW	Liverpool, Manchester and West Yorks Greenbelt	Trafford District (B)
Not shown	1936	W	Liverpool, Manchester and West Yorks Greenbelt	Trafford District (B)
Not shown	1952	E	Liverpool, Manchester and West Yorks Greenbelt	Stockport District (B)

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a Groundsure Geo Insight, available from our website. The following information has been found:

9.1.1 Shrink Swell

Maximum Shrink-Swell*[*] hazard rating identified on the study site — Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

9.1.2 Landslides

Maximum Landslide* hazard rating identified on the study site — Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

9.1.3 Soluble Rocks

Maximum Soluble Rocks* hazard rating identified on the study site — Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

* This indicates an automatically generated 50m buffer and site.

9.1.4 Compressible Ground

Maximum Compressible Ground* hazard rating identified on the study site — Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

9.1.5 Collapsible Rocks

Maximum Collapsible Rocks* hazard rating identified on the study site — Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

Maximum Running Sand*[*] hazard rating identified on the study site — Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

* This indicates an automatically generated 50m buffer and site.

9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing
ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Coal mining areas within 75m of the study site — None identified

Database searched and no data found.

10.2 Non-Coal Mining

Non-Coal Mining areas within 50m of the study site boundary — None identified

Database searched and no data found.

10.3 Brine Affected Areas

Brine affected areas within 75m of the study site — None identified
Guidance: No Guidance Required.

Contact Details

Groundsure Helpline
Telephone: 08444 159 000
info@groundsure.com

British Geological Survey Enquiries
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk

Environment Agency
National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 03708 506 506
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Ordnance Survey
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SO16 0AS
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Local Authority
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Phone: 0161 234 5000
Web: http://www.manchester.gov.uk/
Address: Town Hall, Albert Square, Manchester, M60 2LA

Gemapping PLC
Virginia Villas, High Street, Hartley Witney,
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Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:

https://www.groundsure.com/terms-and-conditions-may25-2018

Groundsure
LOCATION INTELLIGENCE

STL Projects Ltd

1, Barkers Lane,
Sale, M33 6RP

Groundsure Reference:	GS-5767275
Client Reference:	18-3262
Report Date	22 Jan 2019
Report Delivery Method:	xml
Client Email:	jonathan@stlprojectsltd.co.uk

Flood Insight

Address: LAND CORNER OF GREENWOOD ROAD, GLADESIDE ROAD, MANCHESTER, M22 9RA

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Flood Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,

[redacted]

Managing Director
Groundsure Limited

Enc.
Groundsure Floodinsight

Flood Insight

Address:	**LAND CORNER OF GREENWOOD ROAD, GLADESIDE ROAD, MANCHESTER, M22 9RA**
Date:	**22 Jan 2019**
Reference:	**GS-5767275**
Client:	**STL Projects Ltd**

NW N NE



W E

SW S SE

Aerial Photograph Capture date:	21-Apr-2016
Grid Reference:	381959,387746
Site Size:	0.19ha

Contents Page

Contents Page 3
Overview of Findings 4
1. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea) 6
1. Environment Agency/Natural Resources Wales Flood Zones 7
2. Environment Agency/Natural Resources Wales RoFRaS Flooding Map 12
2. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) 13
3. Environment Agency/Natural Resources Wales Historic Flooding Events Map 14
3. Environment Agency/Natural Resources Wales Historic Flooding Events 15
4. JBA Surface Water (Pluvial) Flood Map 16
4. JBA Surface Water (Pluvial) Flooding 17
5. Surface Water Features map 19
5. Surface Water Features 20
6. BGS Groundwater Flooding Map 21
6. Groundwater Flooding 22
7. BGS Geological Indicators of Flooding 24
8. JBA Canal Break map 25
8. JBA Reservoir and Canal Data 26

Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed.

Section 1: Environment Agency/Natural Resources Wales Flood Zones	
1.1 Are there any Enviroment Agency Zone 2 floodplains within 250m of the study site?	No
1.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	No
1.3 Are there any Flood Defences within 250m of the study site?	No
1.4 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
1.5 Are there any Proposed Flood Defences within 250m of the study site?	No
1.6 Are there any areas used for Flood Storage within 250m of the study site?	No

Section 2: Risk of Flooding from Rivers and the Sea (RoFRaS)	
2.1 What is the Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating for the study site?	Very Low

Section 3: Historic Flood Events	
3.1 Has the site been subject to past flooding as recorded by the Environment Agency/Natural Resources Wales?	No

Section 4: JBA Surface Water (Pluvial) Flood	
4.1 Is the site or any area within 50m at risk of Surface Water (Pluvial) Flooding?	Yes

Section 5: Surface Water Features	
5.1 Are there any surface water features within 250m of the study site?	No

Section 6: Groundwater Flooding	
6.1 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential at Surface
6.2 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Moderate

Section 7: BGS Geological Indicators of historic flooding	
7.1 Are there any geological indicators of historic flooding within 250m of the study site?	No

Section 8: JBA Reservoir and Canal Data	
8.1 Is the property located in an area identified as being at potential risk in the event of a reservoir failure?	No
8.2 Is the property located in an area identified as being at potential risk in the event of a canal break?	No

Additional Matters

Riparian ownership

If your land abuts a river, stream or ditch, you may have responsibility to maintain this watercourse, even if Title Deeds show the property boundary to be adjacent to the watercourse. This includes the responsibility for clearing debris and obstructions which may impede the free passage of water and fish, and also includes the responsibilities to accept flood flows through your land, even if these are caused by inadequate capacity downstream. There is no duty in common law for a landowner to improve the drainage capacity of a watercourse. Please contact Groundsure if you need further advice on riparian ownership issues relating to this property.

Sewerage Flooding

Extreme rainfall events may overwhelm sewerage systems and cause local flooding. The water and sewerage companies within the UK are required to maintain 'DG5 – At Risk Registers' which record properties that have flooded from sewers and/or are considered to be at risk of flooding from sewers in the future. If your property is on the 'At Risk' Register, this may be recorded within a standard CON29 Drainage and Water search.

Using this Report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client.

Note: Maps

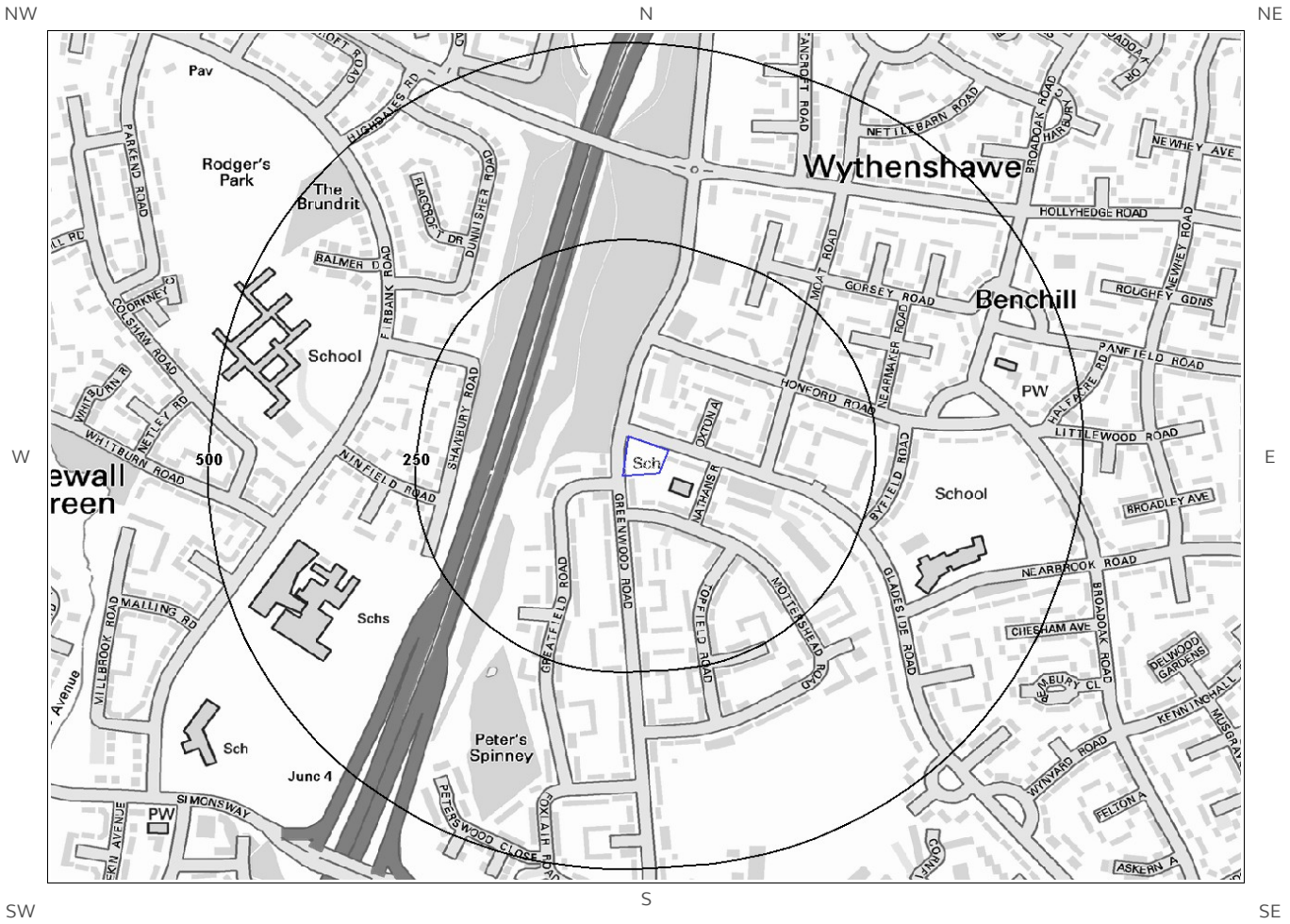
Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

---

1. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



Environment Agency/Natural Resources Wales Flood Map for Planning Legend

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- Search Centre
- Search Buffers (m): 100, 250
- Zone 2 Floodplain
- Zone 3 Floodplain
- Flood Defences
- Area used for Flood Storage
- Proposed Flood Defence Scheme
- Area Benefiting from Flood Defences

Report Reference: GS-5767275
Client Reference: 18-3262

1. Environment Agency/Natural Resources Wales Flood Zones

1.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 2 floodplain? No

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 1 – Flood Map for Planning:

Database searched and no data found.

1.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? No

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 1 – Flood Map for Planning.

Database searched and no data found.

1.3 River and Coastal Flood Defences

Are there any Flood Defences within 250m of the study site ? No

This search consists only of flood defences present in the dataset provided by the Environment Agency/Natural Resources Wales. Any relevant data is represented on Map 1 – Flood Map for Planning.

Database searched and no data found.

1.4 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

Any relevant data is represented on Map 1 – Flood Map for Planning.

1.5 Areas of Proposed Flood Defences

Are there any Proposed Flood Defences within 250m of the study site? No

* This illustrates the number of households that move from 'very significant' or 'significant' to 'moderate' or 'low' probability of flood risk bands if the proposed flood scheme is to be implemented.

Any relevant data is represented on Map 1 – Flood Map for Planning.

Guidance: This search consists only of proposed flood defences present in the dataset provided by the Environment Agency/Natural Resources Wales. Please note that proposed flood defence schemes will not influence the current RoFRaS ratings for the site.

1.6 Areas used for Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

Flood Storage Areas are considered part of the functional floodplain, and are areas where water has to flow or be stored in times of flood. Technical Guidance to the National Planning Policy Framework states that only water-compatible development and essential infrastructure should be permitted within flood storage areas, and existing development within this area should be relocated to an area with a lower risk of flooding. Any relevant data is represented on Map 1 – Flood Map for Planning.

Notes on Flood Zone Data:

This data relates solely to flooding from rivers or the sea. The Environment Agency/Natural Resources Wales estimate that over 2.5 million properties are at risk of flooding within England and Wales. River flooding occurs when a watercourse cannot cope with the water draining into it from the surrounding land. This can happen, for example, when heavy rain falls on an already waterlogged catchment. Coastal flooding results from a combination of high tides and stormy conditions. If low atmospheric pressure coincides with a high tide, a tidal surge may happen which can cause serious flooding.

The Groundsure Flood Insight Report comments upon whether a property lies in proximity to Environment Agency/Natural Resources Wales Zone 2 and Zone 3 floodplains. The Government's Technical Guidance to the National Planning Policy Framework explains how flood risk should be considered at all stages of the planning and development process in order to reduce future damage to property and potential loss of life. The Government looks to planning authorities to ensure that flood risk is properly taken into account in the planning of developments to reduce the risk of flooding and the damage which floods cause.

Flood Zones enable planning authorities to apply the sequential test (see Technical Guidance to the National Planning Policy Framework) for development proposals and prevent inappropriate development.

Technical Guidance to the National Planning Policy Framework defines the flood zones as: -

Zone 1 – little or no risk with an annual probability of flooding from rivers and the sea of less than 0.1%

Zone 2 – low to medium risk with an annual probability of flooding of 0.1-1.0% from rivers and 0.1-0.5% from the sea.

Zone 3 – high risk with an annual probability of flooding of 1.0% or greater from rivers, and 0.5% or greater from the sea.

Flood Zone 3b/Flood Storage Areas - very high risk with the site being used as part of the functional flood plain or as a Flood Storage Area.

The flood zones are the main constraint map underpinning decisions on development and flood risk.

Existing Flood Defences

Flood defences seek to reduce the risk of flooding and to safeguard life, protect property, sustain economic activity and the natural environment. Flood defences are designed to protect against flood events of a particular magnitude, expressed as risk in any one year. For example, defences in urban areas may be built to provide protection against flood events of a size which might occur on average once in one hundred years or less.

Proposed Flood Defences

This information is taken from the Environment Agency/Natural Resources Wales's database of Areas to Benefit from New and Reconditioned Flood Defences under the Medium Term Plan (MTP). The dataset contains funding allocation for the first financial year (from April). Funding for the following four financial years is not guaranteed, being only indicative, and will be reviewed annually. Projects within the Medium Term Plan qualify for inclusion in this dataset if:

- the investment leads to a change in the current standard of protection (change projects);
- the investment is a replacement or refurbishment in order to sustain the current standard of protection (sustain projects);
- the project has an initial construction budget of £100,000 or more; and
- the project is included within the first five years of the MTP

The data includes all the Environment Agency/Natural Resources Wales's projects over £100K that will change or sustain the standards of flood defence in England and Wales over the next 5 years. It also includes the equivalent schemes for all Local Authority and Internal Drainage Boards. The number of households and areas of land contributing to DEFRA's Outcome Measures (OM) are also attributed i.e. could benefit from major work on flood defences.

These data also contain Intermittence Flood Maintenance Programme that show the annual maintenance programme of work scheduled to be carried by the Environment Agency/Natural Resources Wales, Local Authority or Internal Drainage Board on flood defences. Data details routine maintenance as well as intermittent work that has been funded for the coming year. The data contains a start and end coordinate defining the relevant river section where work is planned.

Information Warning

Please note that the maps show the areas where investment is being made to reduce the flood and coastal erosion risk and are not detailed enough to account for individual addresses. Individual properties may not always face the same risk of flooding as the areas that surround them. Also, note that funding figures are indicative and any use or interpretation should account for future updates where annual values may change.

Every possible care is taken to ensure that the maps reflect all the data possessed by the Environment Agency/Natural Resources Wales and that they have applied their expert knowledge to create conclusions that are as reliable as possible. The Environment Agency/Natural Resources Wales consider that they have created the maps as well as they can and so should not be liable if the maps by their nature are not as accurate as might be desired or are misused or misunderstood, despite their warnings. For this reason, they are not able to promise that the maps will always be accurate or completely up to date.

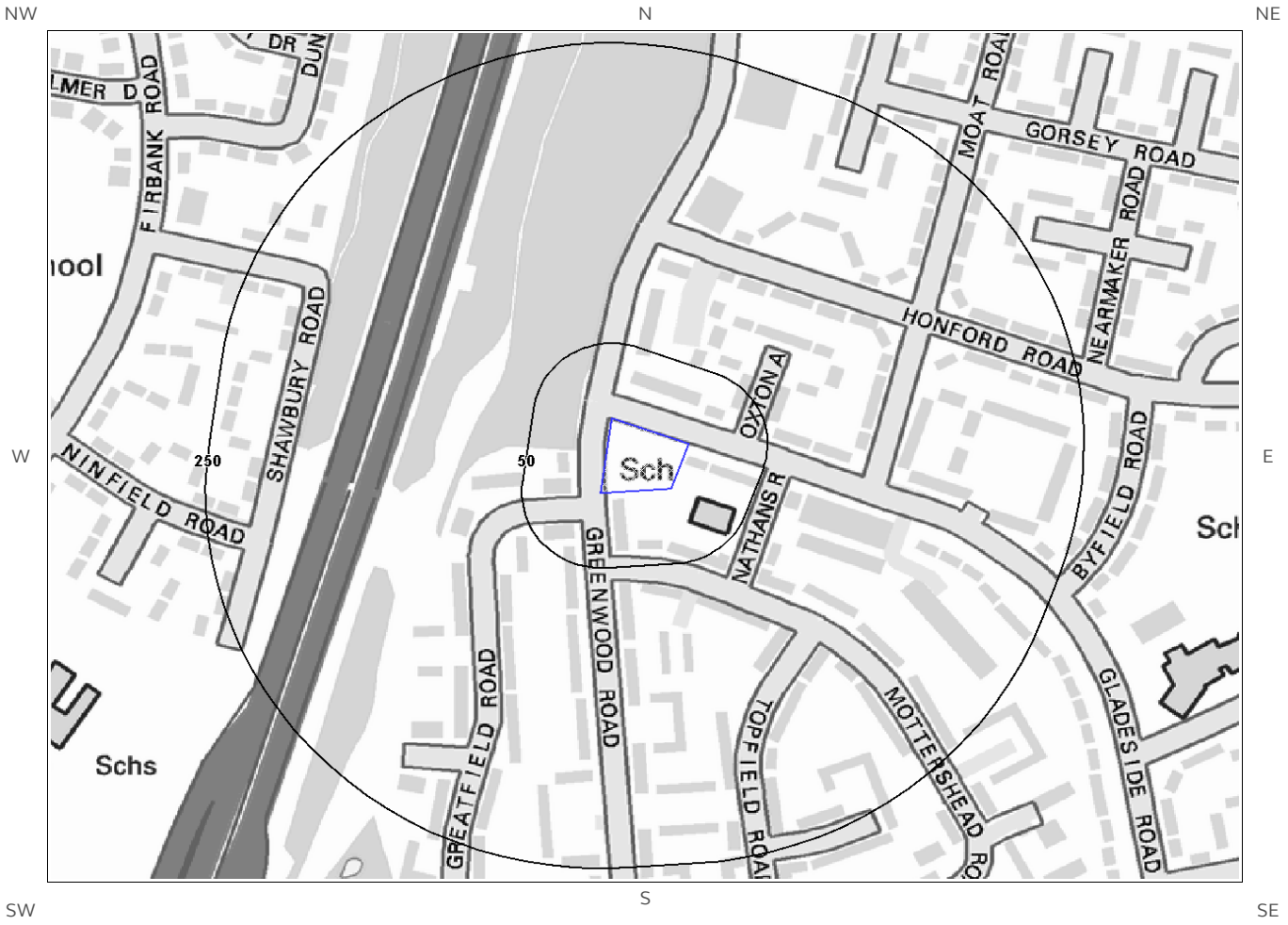
This site includes mapping data licensed from Ordnance Survey used for setting the Environment Agency/Natural Resources Wales's data in its geographical context. Ordnance Survey retains the copyright of this material and it can not be used for any other purpose.

Flood Storage Areas

Flood Storage Areas may also act as flood defences. A flood storage area may also be referred to as a balancing reservoir, storage basin or balancing pond. Its purpose is to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel. It may also delay the timing of a flood peak so that its volume is discharged over a longer time interval.

A flood storage area may take the form of a wet or dry reservoir. A wet reservoir is a water storage facility in which storage can be effected by allowing water levels to rise during flood times. A dry reservoir is typically adjacent to a river and comprises an enclosed area that accepts water only at peak times. These areas are also referred to as Zone 3b or 'the functional floodplain' and has a 5% or greater chance of flooding in any given year, or is designed to flood in the event of an extreme (0.1%) flood or another probability which may be agreed between the Local Planning Authority and the Environment Agency/Natural Resources Wales, including water conveyance routes. Development within Flood Storage Areas is severely restricted.

2. Environment Agency/Natural Resources Wales RoFRaS Flooding Map



Environment Agency/Natural Resources Wales RoFRaS Flooding legend

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Site Outline

Search Buffers (m)

RoFRaS Rating

- Very Low
- Low
- Medium
- High

2. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS)

2.1 Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating (River and Coastal)

What is the highest risk of flooding onsite? Very Low

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

Notes on RoFRaS data:

This information is based on the very latest Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) data. This data has been created by dividing the flood plain into 50m squares, or smaller areas where a square if intersected by a river or coastline. These are called impact cells. The method then calculates the likelihood that the centre of each impact cell will start to flood using a number of different flood scenarios.

A number of insurance companies providing cover for flood risk use this data as the basis of their risk model, although they may also utilise additional information such as claims histories, which may further influence their decision. Where a high risk of flooding is identified flood risk insurance may be difficult to obtain without further work being undertaken. Property owners of sites within Low and Medium risk areas are still considered to be at risk of flooding and insurance premiums may be increased as a result. Owners of properties within Low, Medium and High risk areas are advised to sign up to the Environment Agency/Natural Resources Wales's Flood Warning scheme. The probability estimates for RoFRaS risk bands are as follows:

Very Low – the chance of flooding from rivers or the sea is considered to be less than 1 in 1000 (0.1%) in any given year.

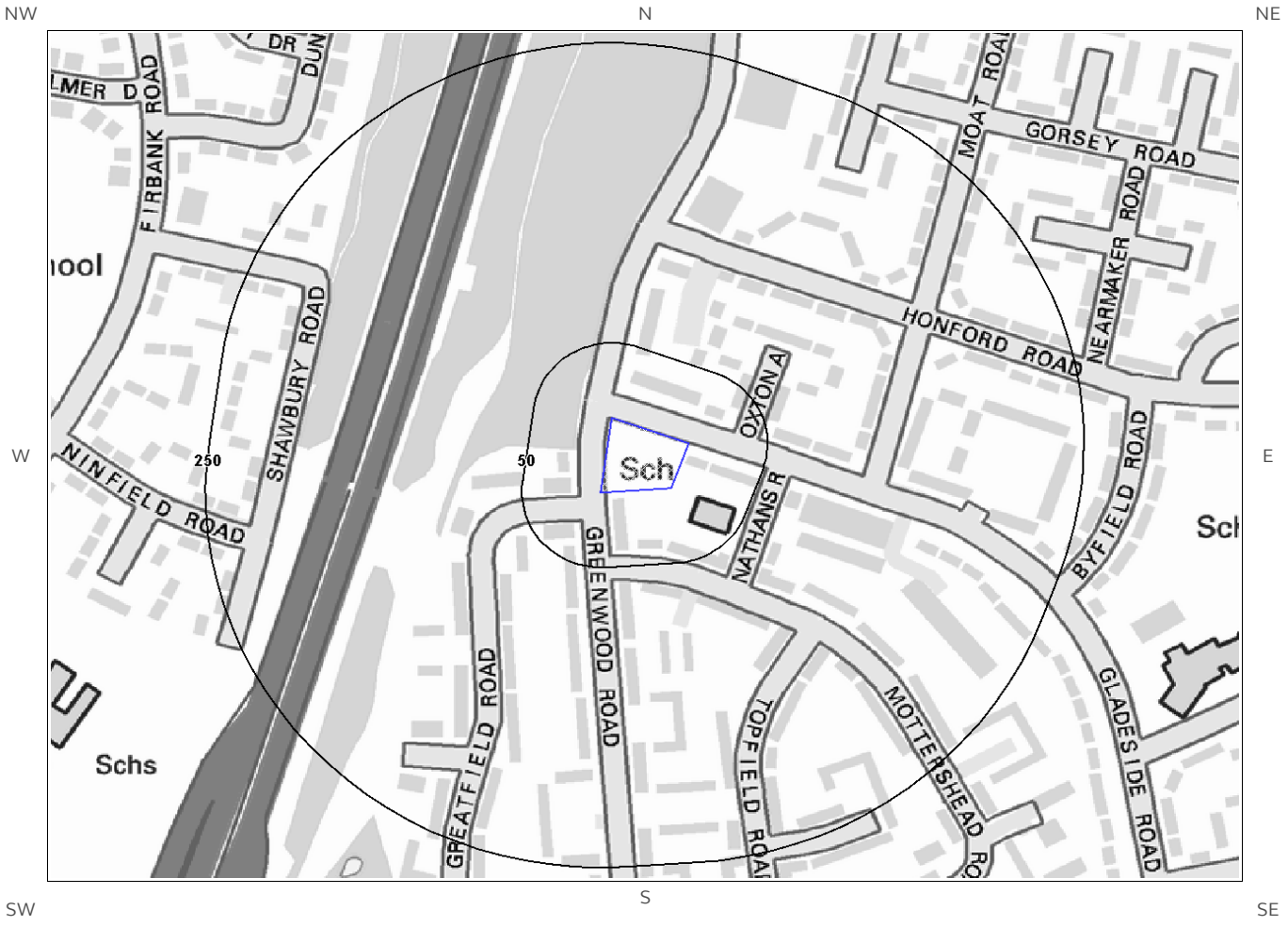
Low – the chance of flooding from rivers or the sea is considered to be less than 1 in 100 (1%) but greater than or equal to 1 in 1000 (0.1%) in any given year.

Medium – the chance of flooding from rivers or the sea is considered to be less than 1 in 30 (3.3%) but greater than 1 in 100 (1%) in any given year.

High – the chance of flooding from rivers or the sea is considered to be greater than or equal to 1 in 30 (3.3%) in any given year.

---

3. Environment Agency/Natural Resources Wales Historic Flooding Events Map



Environment Agency/Natural Resources Wales Historic Flooding Events legend

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Site Outline

125
250
Search Buffers (m)

Historic Flood Events

3. Environment Agency/Natural Resources Wales Historic Flooding Events

3.1 Historic Flood Outlines

Has the site or any area within 250m been subject to historic flooding as recorded by the Environment Agency/Natural Resources Wales? No

This database shows the individual footprint of every flood event recorded by the Environment Agency/Natural Resources Wales and previous bodies.

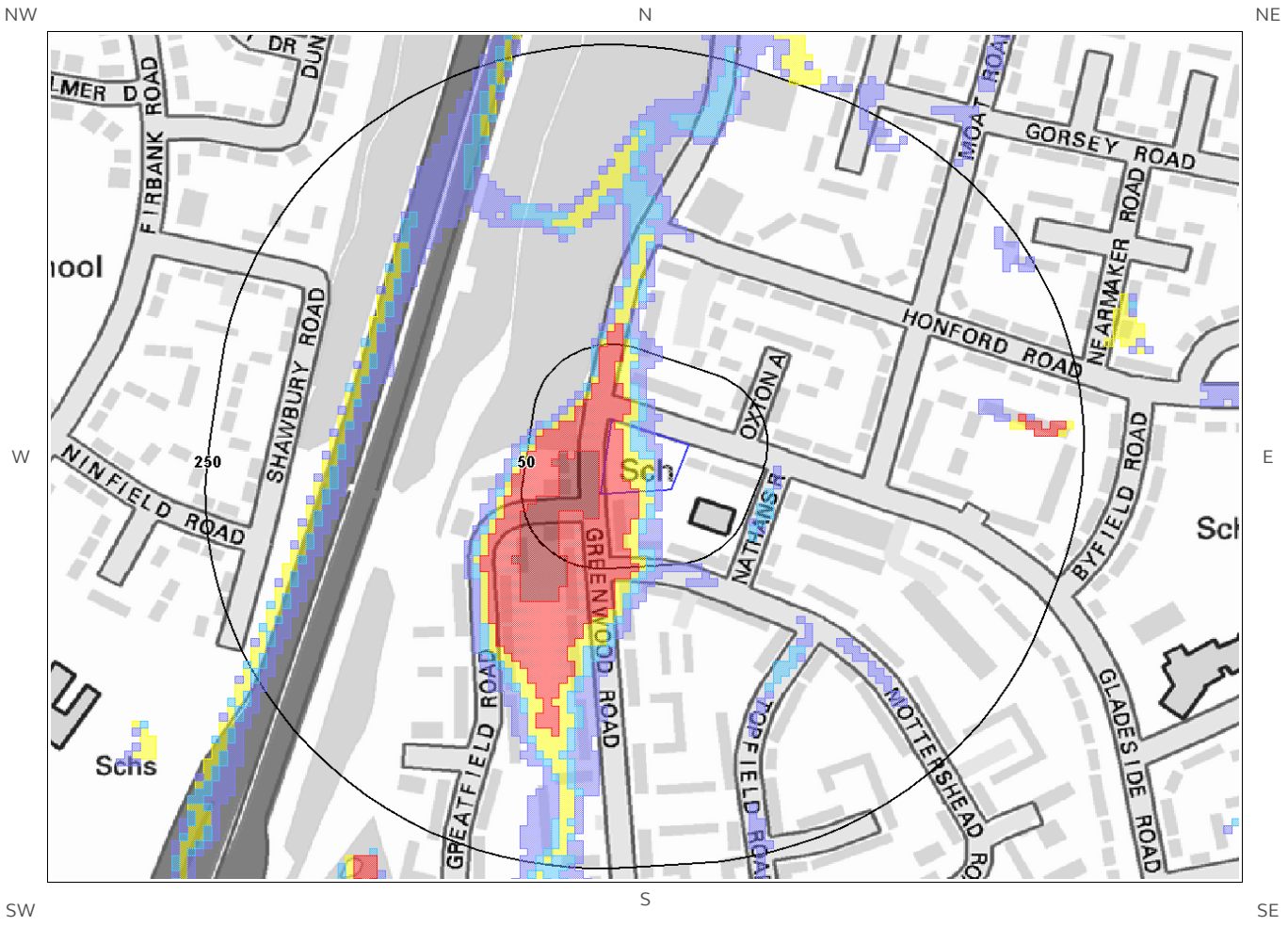
Any records found within the search radius are displayed on Map 3 – Historic Flooding Events.

Notes on Historic Flooding data:

Over 21,000 separate events are recorded within this database, dating back to 1947. This data is used to understand where flooding has occurred in the past and provides details as available. Absence of a historic flood event for an area does not mean that the area has never flooded, but only that the Environment Agency/Natural Resources Wales do not currently have records of flooding within the area. Equally, a record of a flood footprint in previous years does not mean that an area will flood again, and this information does not take account of flood management schemes and improved flood defences.

---

4. JBA Surface Water (Pluvial) Flood Map



JBA Surface Water (Pluvial) Flood Legend

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Site Outline

125
250
Search Buffers (m)

Highly Significant
Significant
High
Moderate to High
Moderate
Low to Moderate
Low

4. JBA Surface Water (Pluvial) Flooding

Surface Water (pluvial) flooding is defined as flooding caused by rainfall-generated overland flow before the runoff enters a watercourse or sewer. In such events, sewerage and drainage systems and surface watercourses may be entirely overwhelmed.

Surface Water (pluvial) flooding will usually be a result of extreme rainfall events, though may also occur when lesser amounts of rain falls on land which has low permeability and/or is already saturated, frozen or developed. In such cases overland flow and 'ponding' in topographical depressions may occur.

What is the risk of pluvial flooding at the study site? Significant

Guidance: The site or an area in close proximity has been assessed to be at Significant Risk of surface water (pluvial) flooding. This indicates that this area would be expected to be affected by surface water flooding in a 1 in 75 year rainfall event to a depth of between 0.3m to 1m.

Flood data provided by JBA RISK MANAGEMENT LIMITED Copyright © JBA RISK MANAGEMENT LIMITED 2008-2019

The following pluvial (surface water) flood risk records within 50m of the study site are shown on the JBA Surface Water Flooding Map:

Distance	Direction	Risk
0.0	On Site	High
0.0	On Site	Low
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Significant
1.0	W	Highly Significant
4.0	N	Low to Moderate
8.0	S	Low to Moderate
15.0	N	High
17.0	N	Low to Moderate
18.0	S	High
18.0	S	Low
18.0	S	Low to Moderate
19.0	NW	High
19.0	N	Low
20.0	NW	High
23.0	W	High
23.0	NW	Low
23.0	NW	Low to Moderate
25.0	N	High

Distance	Direction	Risk
25.0	W	Low
29.0	W	Low
30.0	N	Low to Moderate
32.0	W	High
33.0	W	Low
36.0	N	Low to Moderate
37.0	W	Low to Moderate
38.0	S	Low to Moderate
41.0	W	High
42.0	W	Low
45.0	W	High
45.0	N	Low to Moderate
46.0	W	Low
46.0	W	Low to Moderate
49.0	W	High
49.0	N	High
50.0	N	Low
50.0	W	Low to Moderate

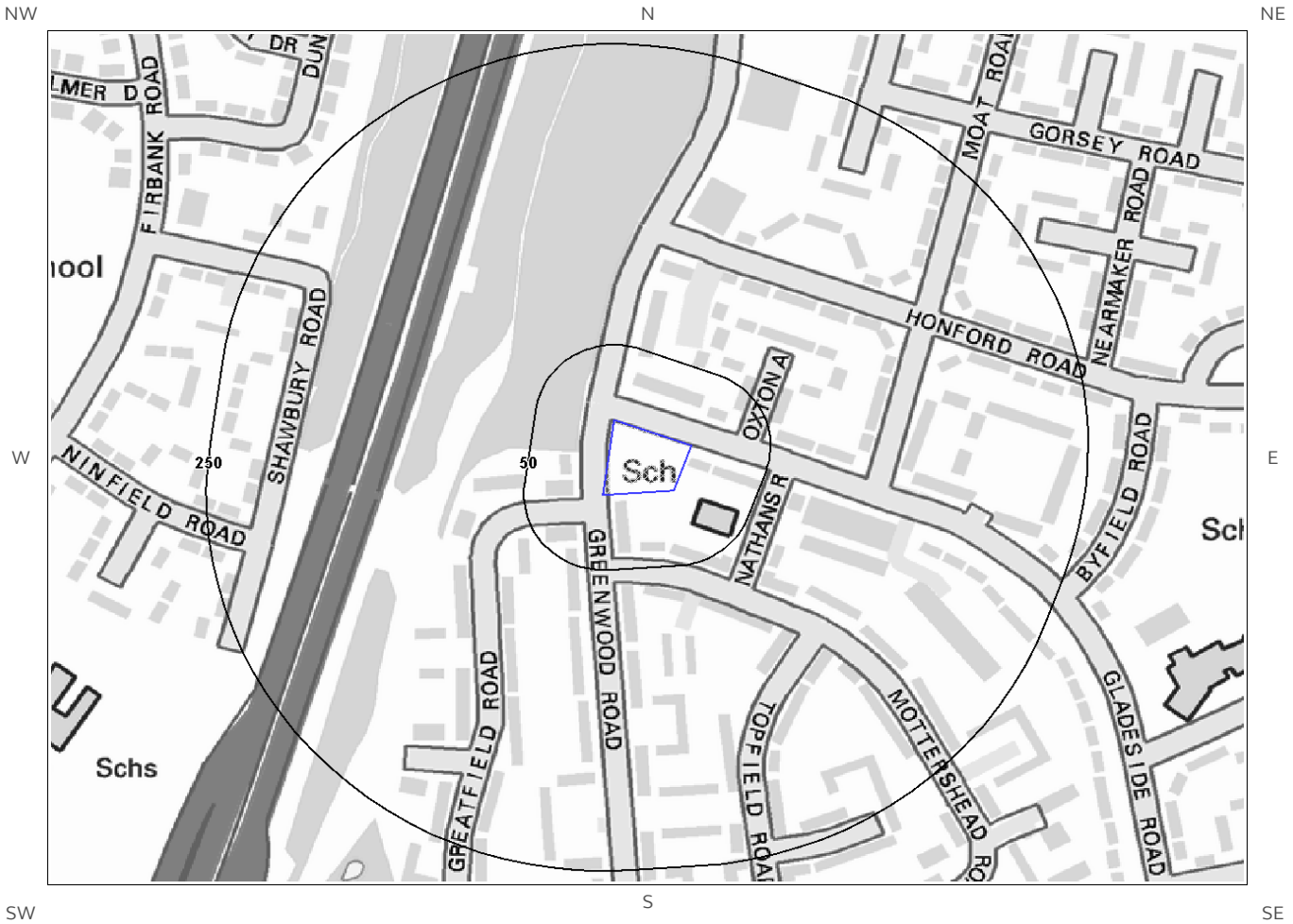
Notes on Surface water (Pluvial) Flooding data:

JBA Consulting surface water flood map identifies areas likely to flood following extreme rainfall events, i.e. land naturally vulnerable to surface water or "pluvial" flooding. This data set was produced by simulating 1 in 75 year, 1 in 200 year and 1 in 1000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though older ones may even flood in a 1 in 5 year rainstorm event.

The model provides the maximum depth of flooding in each 5m "cell" of topographical mapping coverage. The maps include 7 bands indicating areas of increasing natural vulnerability to surface water flooding. These are:-

- **Less than 0.1m in a 1 in 1000 year rainfall event** - Negligible
- **Greater than 0.1m in a 1 in 1000 year rainfall event** - Low
- **Between 0.1m and 0.3m in a 1 in 200 year rainfall event** – Low to Moderate
- **Between 0.3m and 1m in a 1 in 200 year rainfall event –** Moderate
- **Greater than 1m in a 1 in 200 year rainfall event** – Moderate to High
- **Between 0.1m and 0.3m in a 1 in 75 year rainfall event** – High
- **Between 0.3m to 1m in a 1 in 75 year rainfall event** - Significant
- **Greater than 1m in a 1 in 75 year rainfall event** – Highly Significant

5. Surface Water Features map



Surface Water Features legend

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Site Outline

Search Buffers (m)

50

250

Surface Water Feature (wider than 5m)

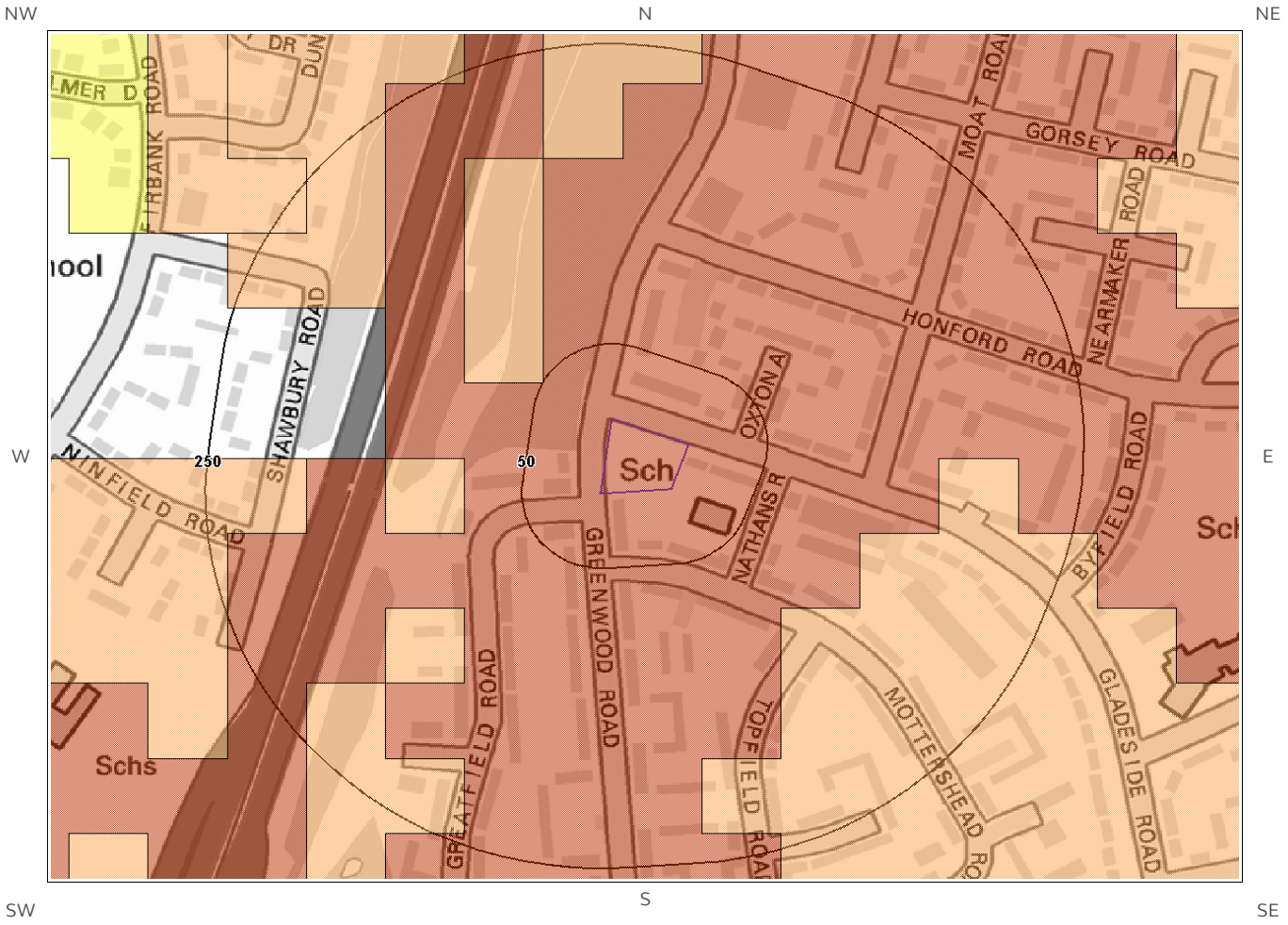
Surface Water Feature (narrower than 5m)

5. Surface Water Features

Are there any surface water features within 250m of the study site? No

Database searched and no data found.

6. BGS Groundwater Flooding Map



BGS Groundwater Flooding legend

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Site Outline

50
250
Search Buffers (m)

Limited potential for groundwater flooding to occur

Potential for groundwater flooding of property below ground level

Potential for groundwater flooding to occur at surface

6. Groundwater Flooding

6.1 Groundwater Flooding Susceptibility Areas

Are there any British Geological Survey groundwater flooding susceptibility flood areas within 50m of the boundary of the study site? Yes

What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions? Potential for groundwater flooding at surface

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Superficial Deposits Flooding

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

6.2 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result? Moderate

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

Notes on Groundwater Flooding data:

The BGS Susceptibility to Groundwater Flooding hazard dataset identifies areas where geological conditions could enable groundwater flooding to occur and where groundwater may come close to the ground surface.

Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

The susceptibility data is suitable for use for regional or national planning purposes where the groundwater flooding information will be used along with a range of other relevant information to inform land-use planning decisions. It might also be used in conjunction with a large number of other factors, e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information, to establish relative, but not absolute, risk of groundwater flooding at a resolution of greater than a few hundred metres. The susceptibility data should not be used on its own to make planning decisions at any scale, and, in particular, should not be used to inform planning decisions at the site scale. The susceptibility data cannot be used on its own to indicate risk of groundwater flooding.

7. BGS Geological Indicators of Flooding

Are there any geological indicators of flooding within 250m of the study site? No

This dataset identifies the presence of superficial geological deposits which indicate that the site may be, or have been in the past, vulnerable to inland and/or coastal flooding. This assessment does not take account of any man-made factors such as flood protection schemes, and the data behind the report are purely geological.

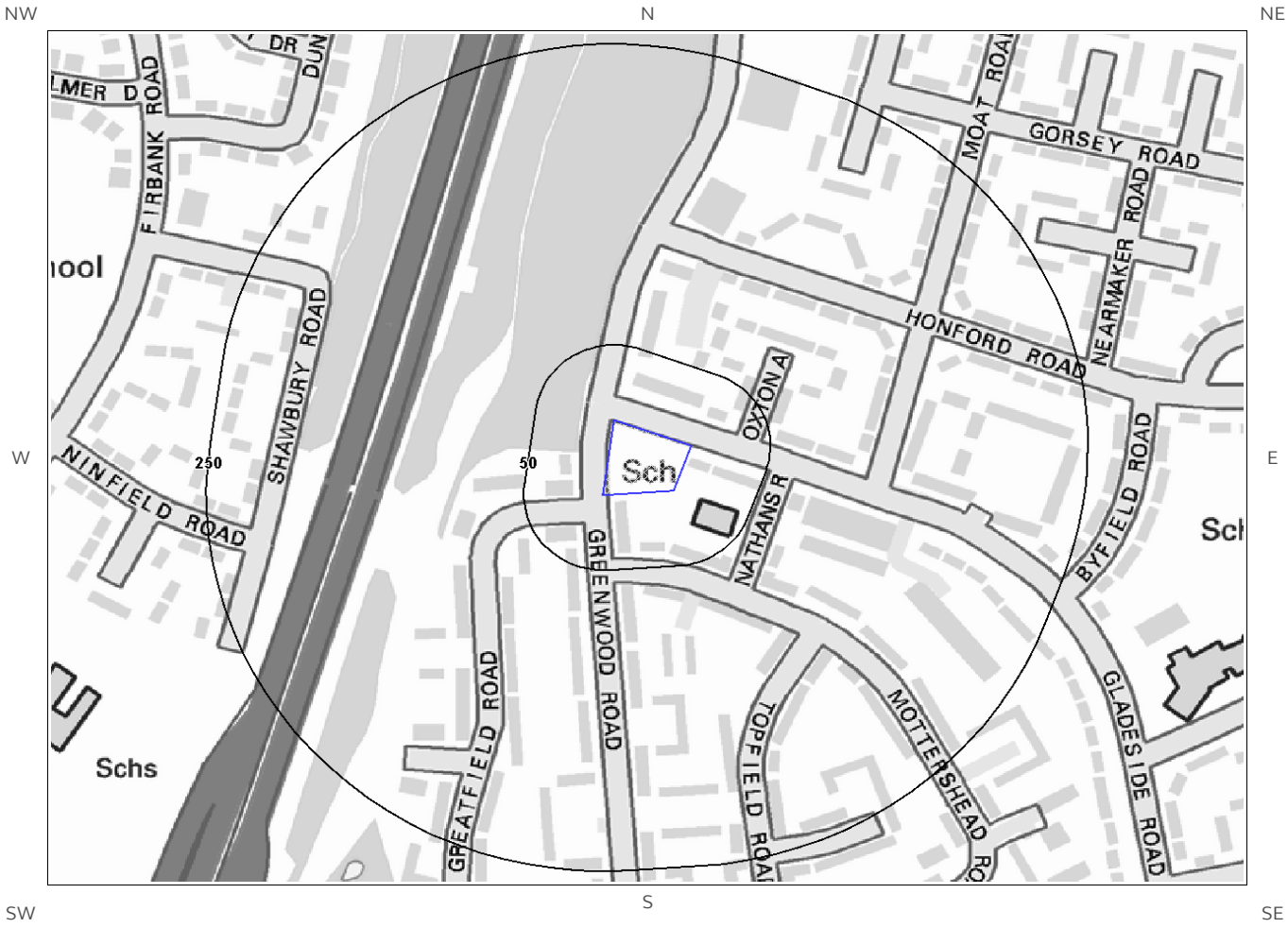
Notes on BGS Geological Indicators of Flooding data:

The BGS Geological Indicators of Flooding (GIF) data set is a digital map based on the BGS Digital Geological Map of Great Britain at the 1:50,000 scale (DiGMapGB-50). It was produced by characterising Superficial (Drift) Deposits on DiGMapGB-50 in terms of their likely vulnerability to flooding, either from coastal or inland water flow. These Superficial Deposits are considered 'recent' in geological terms, most having been formed in the later parts of the Quaternary geological period (i.e. within the last few tens of thousands of years). Observations made during recent major inland and coastal flooding events have demonstrated that the erosion and deposition of these recent geological sediments have produced subtle topographical variations, resulting in landforms such as fluvial and coastal floodplains. The mapping of these landforms, in conjunction with the fluvial and/or coastal deposits that underlie them, has in turn determined the extent of previous coastal and inland flooding.

On this basis, the floodplains which are at greatest risk from flooding can be both visualised and defined by Superficial Deposits as depicted on geological maps. These include deposits such as river alluvium and lacustrine (lake) alluvium, as well as the First River Terrace or 'Floodplain terrace' (raised flat areas adjacent to or within floodplains, which represent the level of the floodplain prior to the most recent episode of down-cutting). Older and higher river terraces have been excluded as they lie outside the geologically defined floodplain. Areas at risk from coastal inundation are similarly characterised by a range of estuarine or marine deposits that include, for example, tidal flats.

---

8. JBA Canal Break map



JBA Canal Break legend

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Site Outline

50
250
Search Buffers (m)

Areas at risk from Canal Breach

8. JBA Reservoir and Canal Data

8.1 JBA Reservoir Failure Impact Modelling

Is the property located in an area identified as being at potential risk in the event of a reservoir failure? No

JBA consulting have modelled the flooding impact from 1,700 reservoirs in England and Wales, should there be a catastrophic failure of a reservoir wall or embankment. This data is not displayed on mapping.

Guidance: None required

Notes on Reservoir Failure Impact data:

This dataset identified areas that are most likely to flood following the sudden catastrophic failure of a reservoir and is provided by JBA Consulting. JBA has identified over 1,700 reservoirs that pose a risk to people and property. These maps identify properties that would flood in the unlikely event of the failure of the reservoir's dam or embankment. Empirical methods were used to predict the flow that would result from the failure which was then modelled onto high resolution Digital Terrain Models (DTM) using JBA's advanced 2D hydraulic modelling techniques. The model provides the maximum depth of flooding in each cell of the DTM.

8.2 JBA Canal Break Modelling

Is the property located within 500m of an area identified as being at potential risk in the event of a canal break? No

Database searched and no data found.

Notes on Canal Break modelling data

Canal failure mapping includes two types of failure:

- Breach of raised canal embankments - failure of the embankment due to weaknesses; these are typically caused by erosion or animal burrowing but can also arise from poor maintenance.
- Aqueduct failure - an aqueduct is where the canal passes over infrastructure such as roads, railways and subways, or over other canals and rivers. Failures of these are typically caused by the collapse of the underlying culvert.

A length of over 1,700km of canal covering England, Wales and Scotland was modelled. The canal modelling is restricted to the areas where LIDAR is available as the raised embankments are more defined in the LIDAR than in the Photogrammetry data. Each canal is categorised as part of the Merchant Shipping Notice (MSN 1776 (M)). The majority of the modelled canals are categorised as A, with a few exceptions, which fell under category B.

- Category A: narrow rivers and canals where the depth of water is generally less than 1.5m.
- Category B: wider rivers and canals where the depth of water is generally 1.5m or more and where the significant wave height could not be expected to exceed 0.6m at any time.
- Category C: tidal rivers and estuaries and large, deep lakes and lochs where the significant wave height could not be expected to exceed 1.2m at any time.
- Category D: tidal rivers and estuaries where the significant wave height could not be expected to exceed 2m at any time.

The canal map provides flood extent data only and show flooded areas with a depth greater than 0.1m.

Contact Details

Groundsure Helpline

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info@groundsure.com

British Geological Survey Enquiries

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Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:**enquiries@bgs.ac.uk**
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries

Environment Agency

National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 03708 506 506
Web: www.environment-agency.gov.uk
Email: enquiries@environment-agency.gov.uk

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BD23 3AE
Tel: 01756 799919

Ordnance Survey

Adanac Drive, Southampton
SO16 0AS

Tel: 08456 050505
Website: http://www.ordnancesurvey.co.uk/

Local Authority

Authority: Manchester City Council
Phone: 0161 234 5000
Web: http://www.manchester.gov.uk/
Address: Town Hall, Albert Square, Manchester, M60 2LA

Getmapping PLC

Virginia Villas, High Street, Hartley Witney
Hampshire RG27 8NW
Tel: 01252 845444
Website: http://www1.getmapping.com/

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Standard Terms and Conditions

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https://www.groundsure.com/terms-and-conditions-may25-2018

Groundsure
LOCATION INTELLIGENCE

STL Projects Ltd

1, Barkers Lane,
Sale, M33 6RP

Groundsure Reference:	GS-5767276
Your Reference:	18-3262
Report Date	22 Jan 2019
Report Delivery Method:	Email - pdf

Geo Insight

Address: LAND CORNER OF GREENWOOD ROAD, GLADESIDE ROAD, MANCHESTER, M22 9RA

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Geo Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,

[redacted]

Managing Director
Groundsure Limited

Enc.
Groundsure Geo Insight

Geo Insight

Address:	**LAND CORNER OF GREENWOOD ROAD, GLADESIDE ROAD, MANCHESTER, M22 9RA**
Date:	**22 Jan 2019**
Reference:	**GS-5767276**
Client:	**STL Projects Ltd**

NW N NE



W E

SW S SE

Aerial Photograph Capture date:	21-Apr-2016
Grid Reference:	381959,387746
Site Size:	0.19ha

Groundsure
LOCATION INTELLIGENCE

Contents Page

Contents Page ... 3
Overview of Findings ... 5
1:10,000 Scale Availability ... 8
Availability of 1:10,000 Scale Geology Mapping ... 9
1 Geology (1:10,000 scale) ... 10
1.1 Artificial Ground map (1:10,000 scale) ... 10
1. Geology 1:10,000 scale ... 11
1.1 Artificial Ground ... 11
1.2 Superficial Deposits and Landslips map (1:10,000 scale) ... 12
1.2 Superficial Deposits and Landslips ... 13
1.2.1 Superficial Deposits/ Drift Geology ... 13
1.2.2 Landslip ... 13
1.3 Bedrock and linear features map (1:10,000 scale) ... 14
1.3 Bedrock and linear features ... 15
1.3.1 Bedrock/ Solid Geology ... 15
1.3.2 Linear features ... 15
2 Geology 1:50,000 Scale ... 16
2.1 Artificial Ground map ... 16
2. Geology 1:50,000 scale ... 17
2.1 Artificial Ground ... 17
2.1.1 Artificial/ Made Ground ... 17
2.1.2 Permeability of Artificial Ground ... 17
2.2 Superficial Deposits and Landslips map (1:50,000 scale) ... 18
2.2 Superficial Deposits and Landslips ... 19
2.2.1 Superficial Deposits/ Drift Geology ... 19
2.2.2 Permeability of Superficial Ground ... 19
2.2.3 Landslip ... 19
2.2.4 Landslip Permeability ... 19
2.3 Bedrock and linear features map (1:50,000 scale) ... 20
2.3 Bedrock, Solid Geology & linear features ... 21
2.3.1 Bedrock/Solid Geology ... 21
2.3.2 Permeability of Bedrock Ground ... 21
2.3.3 Linear features ... 21
3 Radon Data ... 22
3.1 Radon Affected Areas ... 22
3.2 Radon Protection ... 22
4 Ground Workings map ... 23
4 Ground Workings ... 24
4.1 Historical Surface Ground Working Features derived from Historical Mapping ... 24
4.2 Historical Underground Working Features derived from Historical Mapping ... 24
4.3 Current Ground Workings ... 24
5 Mining, Extraction & Natural Cavities ... 26
5.1 Historical Mining ... 26
5.2 Coal Mining ... 26
5.3 Johnson Poole and Bloomer ... 26
5.4 Non-Coal Mining ... 26
5.5 Non-Coal Mining Cavities ... 27
5.6 Natural Cavities ... 27
5.7 Brine Extraction ... 27
5.8 Gypsum Extraction ... 27
5.9 Tin Mining ... 27
5.10 Clay Mining ... 28
6 Natural Ground Subsidence ... 29
6.1 Shrink-Swell Clay map ... 29
6.2 Landslides map ... 30
6.3 Ground Dissolution of Soluble Rocks map ... 31
6.4 Compressible Deposits map ... 32
6.5 Collapsible Deposits map ... 33
6.6 Running Sand map ... 34

6 Natural Ground Subsidence..... 35
6.1 Shrink-Swell Clays.....35
6.2 Landslides.....35
6.3 Ground Dissolution of Soluble Rocks.....35
6.4 Compressible Deposits.....36
6.5 Collapsible Deposits.....36
6.6 Running Sands.....36
7 Borehole Records..... 38
8 Estimated Background Soil Chemistry..... 39
9 Railways and Tunnels map..... 40
9 Railways and Tunnels..... 41
9.1 Tunnels 41
9.2 Historical Railway and Tunnel Features 41
9.3 Historical Railways.....42
9.4 Active Railways.....42
9.5 Railway Projects.....42

Overview of Findings

The Groundsure Geo Insight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 and 1:10,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Non-coal mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and Groundsure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Geology 1:10,000 Scale		
1.1 Artificial Ground	1.1 Is there any Artificial Ground/ Made Ground present beneath the study site at 1:10,000 scale?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site at 1:10,000 scale?*	Yes
	1.2.2 Are there any records of landslip within 500m of the study site boundary at 1:10,000 scale?	No
1.3 Bedrock, Solid Geology and linear features	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records of linear features within 500m of the study site boundary at 1:10,000 scale?	No

Section 2: Geology 1:50,000 Scale		
2.1 Artificial Ground	2.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	2.1.2 Are there any records relating to permeability of artificial ground within the study site*boundary?	No
2.2 Superficial Geology and Landslips	2.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
	2.2.2 Are there any records of permeability of superficial ground within 500m of the study site?	Yes
	2.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	2.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No

Section 2: Geology 1:50,000 Scale

2.3 Bedrock, Solid Geology and linear features	2.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	2.3.2 Are there any records relating to permeability of bedrock ground within the study site boundary?	Yes
	2.3.3 Are there any records of linear features within 500m of the study site boundary?	No

Section 3: Radon

3. Radon	3.1Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
	3.2Radon Protection	No radon protective measures are necessary.

Section 4: Ground Workings	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	0	0	3	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
4.3 Current Ground Workings	0	0	0	0	0

Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	0	0
5.2 Coal Mining	0	0	0	0	0
5.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
5.4 Non-Coal Mining*	0	0	0	0	0
5.5 Non–Coal Mining Cavities	0	0	0	0	0
5.5 Natural Cavities	0	0	0	0	0

Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0

Section 6: Natural Ground Subsidence	On-site
6.1 Shrink-Swell Clay	Very Low
6.2 Landslides	Very Low
6.3 Ground Dissolution of Soluble Rocks	Negligible
6.4 Compressible Deposits	Negligible
6.5 Collapsible Deposits	Very Low
6.5 Running Sand	Very Low

Section 7: Borehole Records	On-site	0-50m	51-250
7 BGS Recorded Boreholes	0	0	3

Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250
8 Records of Background Soil Chemistry	1	1	0

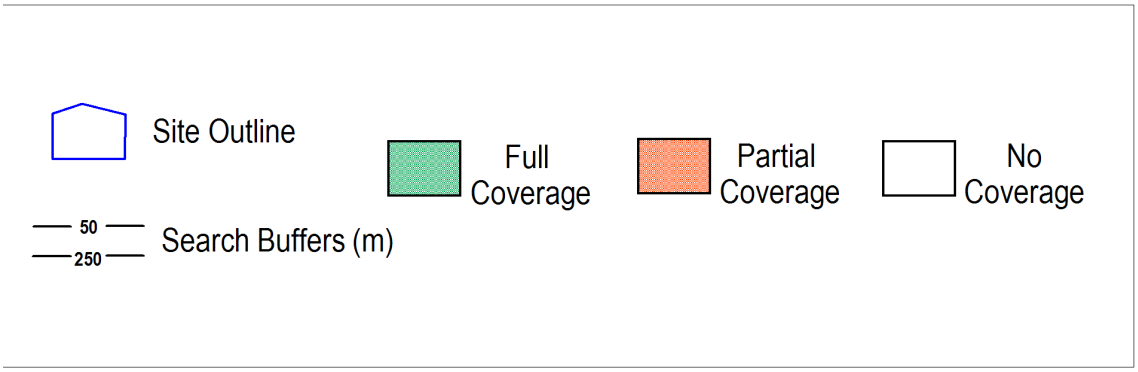
Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500
9.1 Tunnels	0	0	0	Not Searched
9.2 Historical Railway and Tunnel Features	0	0	0	Not Searched
9.3 Historical Railways	0	0	0	Not Searched
9.4 Active Railways	0	0	0	Not Searched
9.5 Railway Projects	0	0	0	0

1:10,000 Scale Availability



1_10,000 Availability Legend

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Availability of 1:10,000 Scale Geology Mapping

The following information represents the availability of the key components of the 1:10,000 scale geological data.

ID	Distance	Artificial Coverage	Superficial Coverage	Bedrock Coverage	Mass Movement Coverage
1	0.0	No deposits are mapped	Full	Full	No coverage
N2	1936.0	No deposits are mapped	Full	Full	No coverage

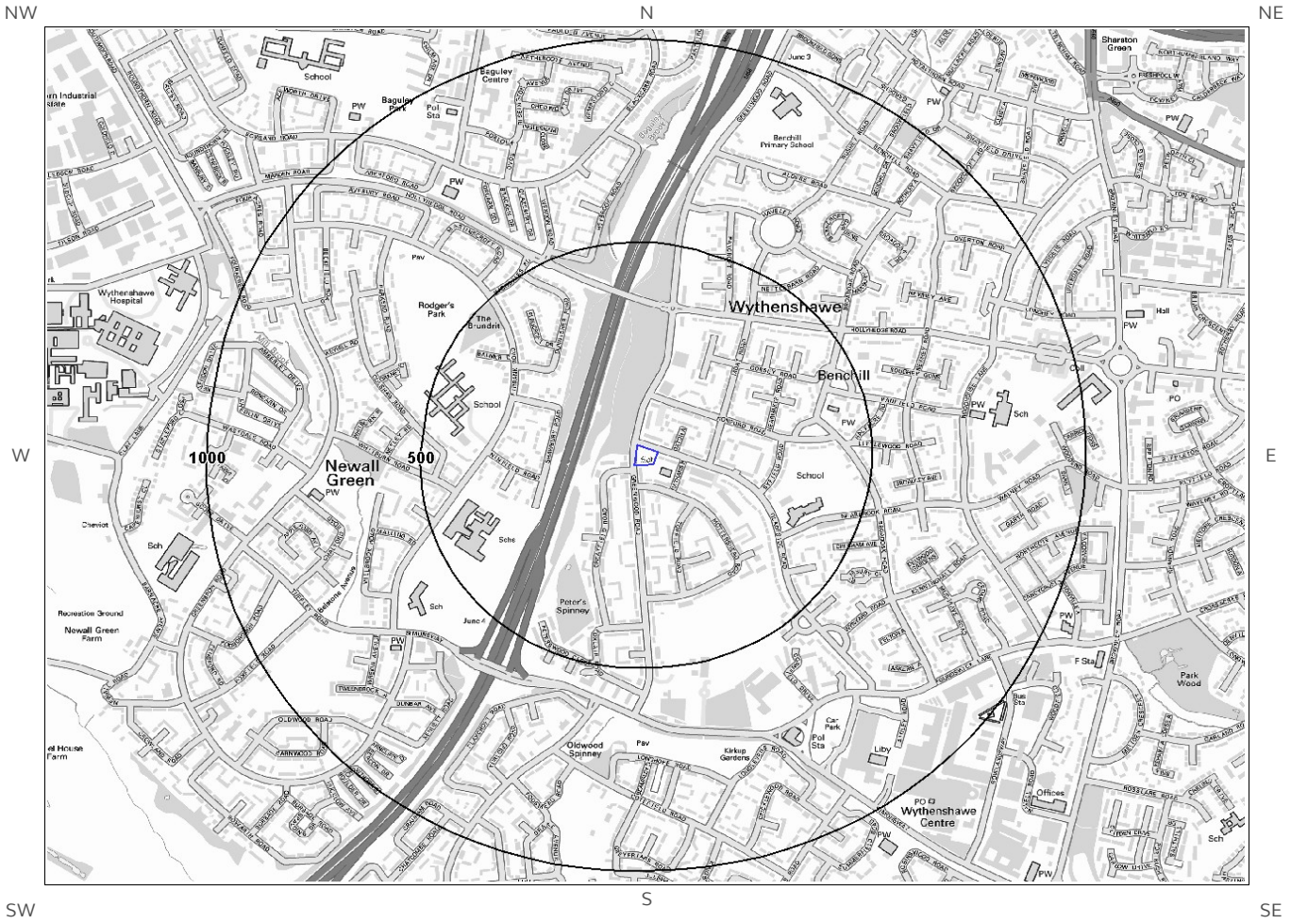
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not all themes are mapped or available on every map sheet. Therefore a coverage layer showing the availability of the four themes is presented above.

The definitions of coverage are as follows:

Geology	Full Coverage	Partial Coverage	No Coverage
Bedrock	The whole tile has been mapped	Some but not all the tile has been mapped	No coverage
Superficial	The whole tile has been mapped	Some but not all of the tile has been mapped	No coverage
Artificial	Some deposits are mapped on this tile	-	No deposits are mapped
Mass Movement	Some deposits are mapped on this tile	-	No coverage

1 Geology (1:10,000 scale).

1.1 Artificial Ground map (1:10,000 scale)



Artificial Ground Legend

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Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Disturbed Ground (undivided)

Worked Ground (undivided)

Landscaped Ground (undivided)

Infilled Ground

Reclaimed Ground

1. Geology 1:10,000 scale

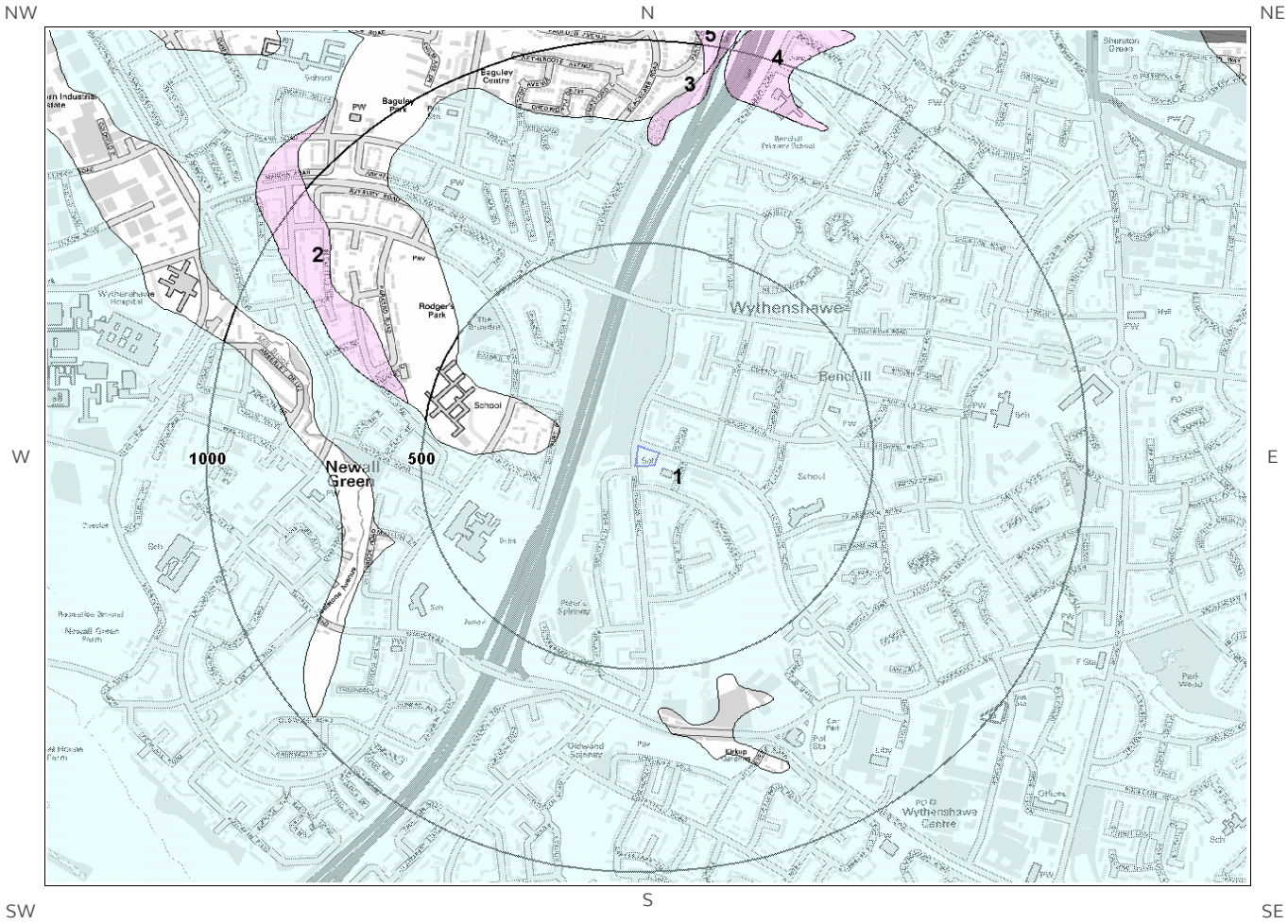
1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

Are there any records of Artificial/ Made Ground within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found.

1.2 Superficial Deposits and Landslips map (1:10,000 scale)



Artificial Ground Legend

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Site Outline

500
1000
Search Buffers (m)

1.2 Superficial Deposits and Landslips

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary at 1:10,000 scale? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton

1.2.2 Landslip

Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale?

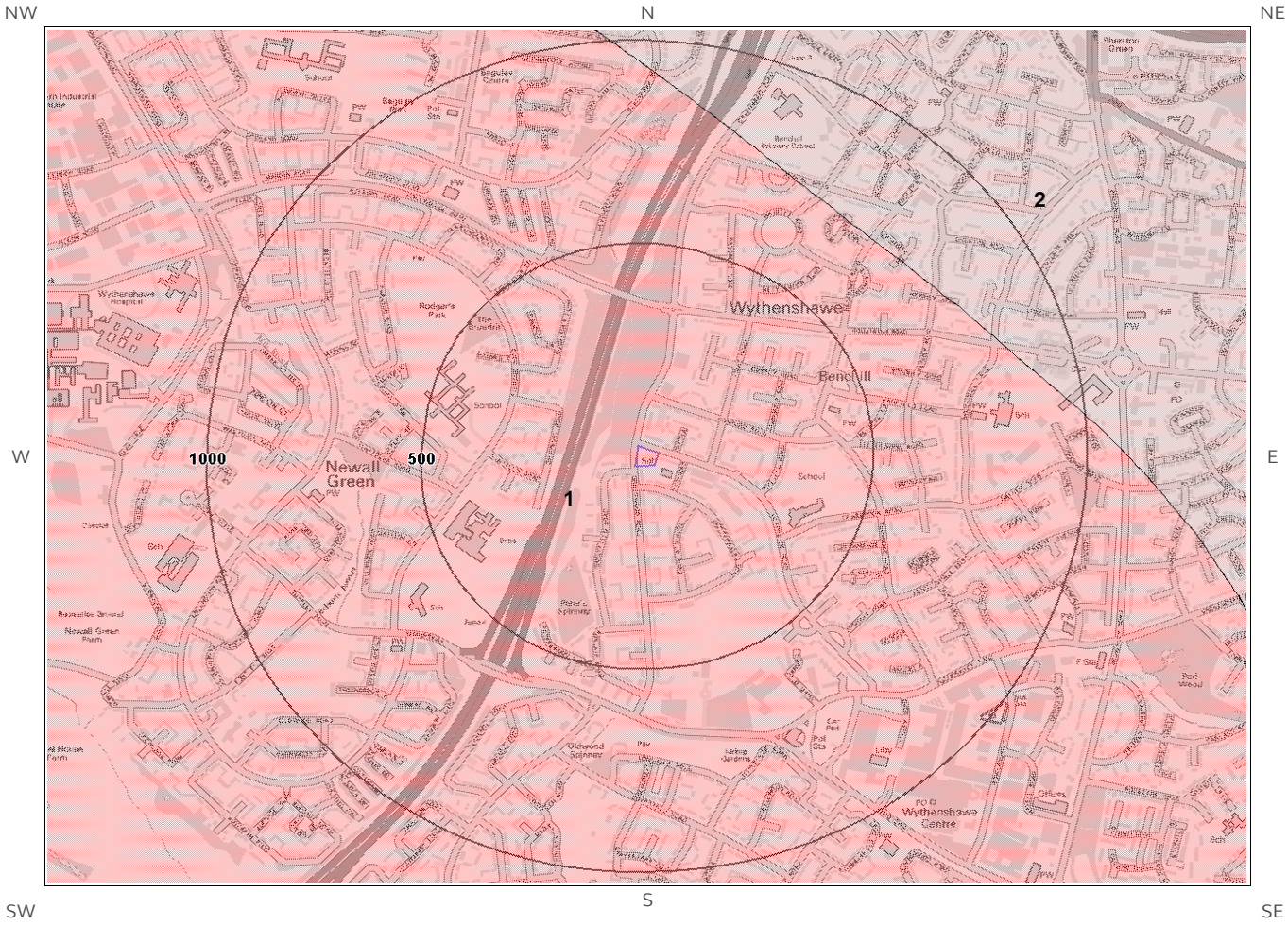
No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:10,000 scale

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.3 Bedrock and linear features map (1:10,000 scale)



Bedrock and linear features Legend

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Site Outline

500
1000
Search Buffers (m)

1.3 Bedrock and linear features

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

1.3.1 Bedrock/ Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary at 1:10,000 scale.

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	BOM-MDST	Bollin Mudstone Member - Mudstone	Anisian Age

1.3.2 Linear features

Are there any records of linear features within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found at this scale.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of great Britain at 1:10,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2 Geology 1:50,000 Scale

2.1 Artificial Ground map

NW N NE

W E

SW S SE



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Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Worked Ground (undivided)

Infilled Ground

Disturbed Ground (undivided)

Landscaped Ground (undivided)

Reclaimed Ground

2. Geology 1:50,000 scale

2.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 098

2.1.1 Artificial/ Made Ground

Are there any records of Artificial/ Made Ground within 500m of the study site boundary? No

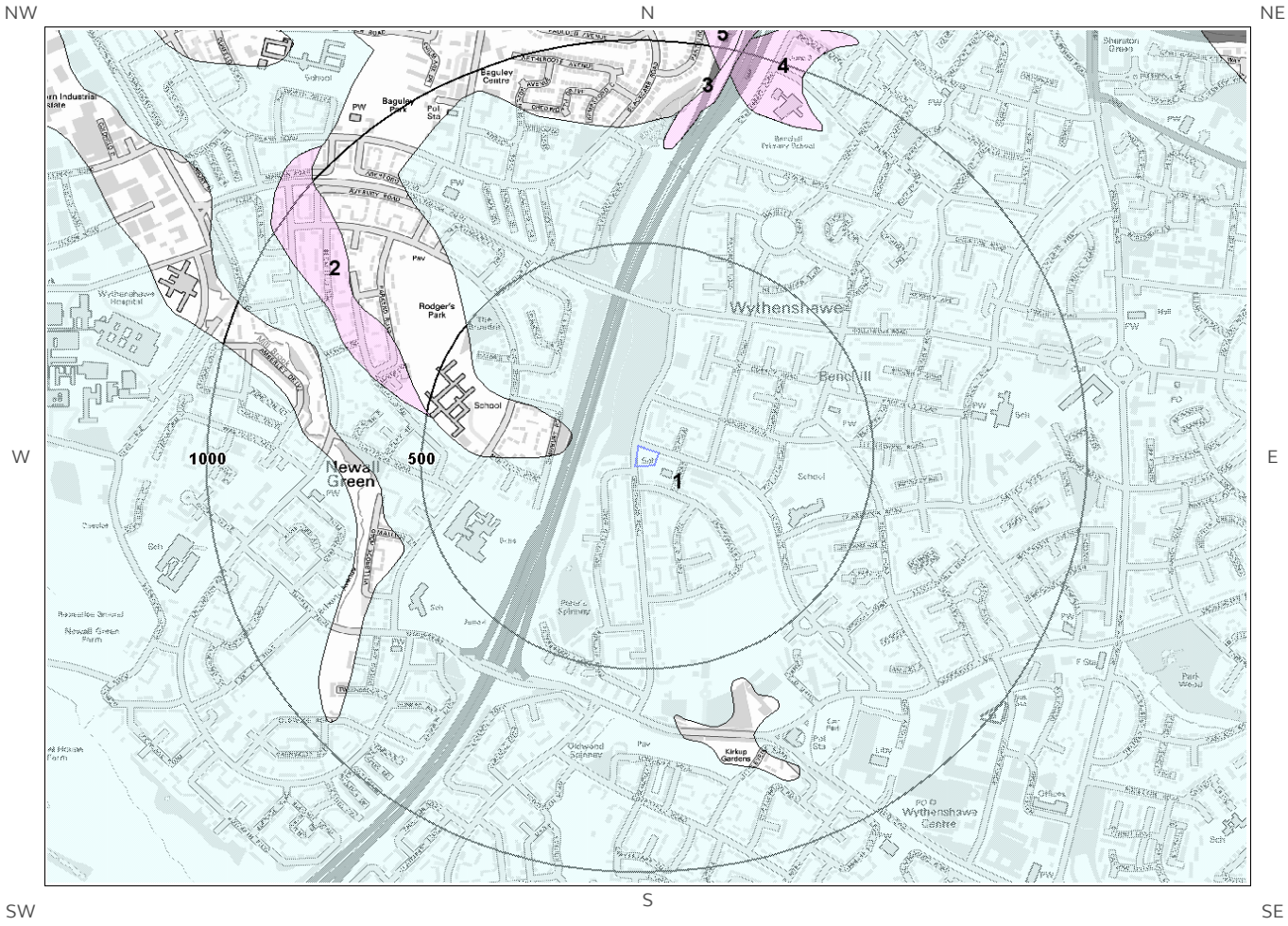
Database searched and no data found.

2.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? No

Database searched and no data found.

2.2 Superficial Deposits and Landslips map (1:50,000 scale)



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Site Outline

500
1000
Search Buffers (m)

2.2 Superficial Deposits and Landslips

2.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

ID	Distance	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
2	487.0	W	GFDUD-XSV	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL

2.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	High	Low

2.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

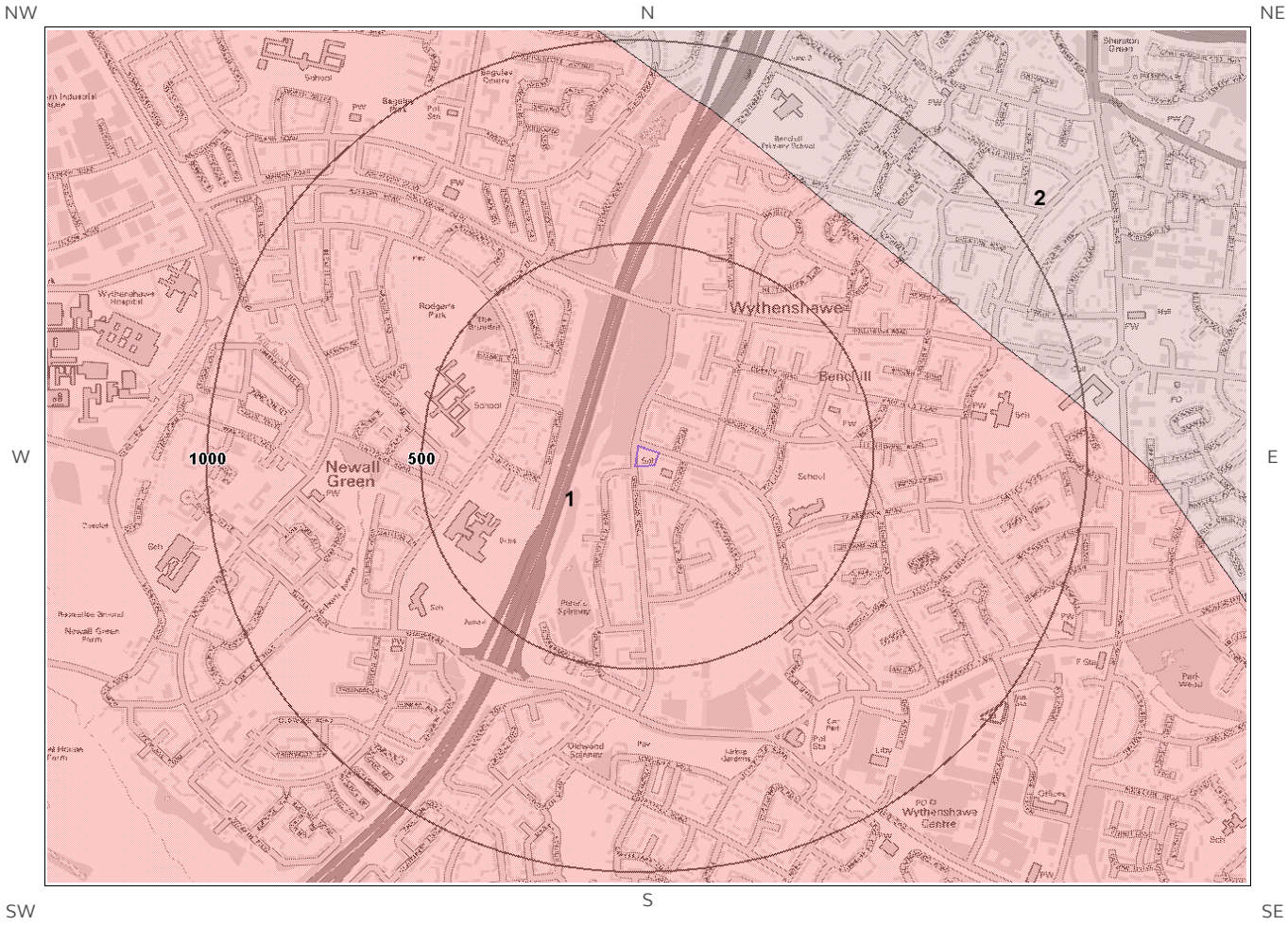
This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site boundary? No

Database searched and no data found.

2.3 Bedrock and linear features map (1:50,000 scale)



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Site Outline

500
1000
Search Buffers (m)

2.3 Bedrock, Solid Geology & linear features

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 098

2.3.1 Bedrock/Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary:

ID	Distance	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	BOM-MDST	BOLLIN MUDSTONE MEMBER - MUDSTONE	ANISIAN

2.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site boundary? Yes

Distance	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Low	Low

2.3.3 Linear features

Are there any records of linear features within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/Solid Geology and linear features such as faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nation wide coverage.

3 Radon Data

3.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

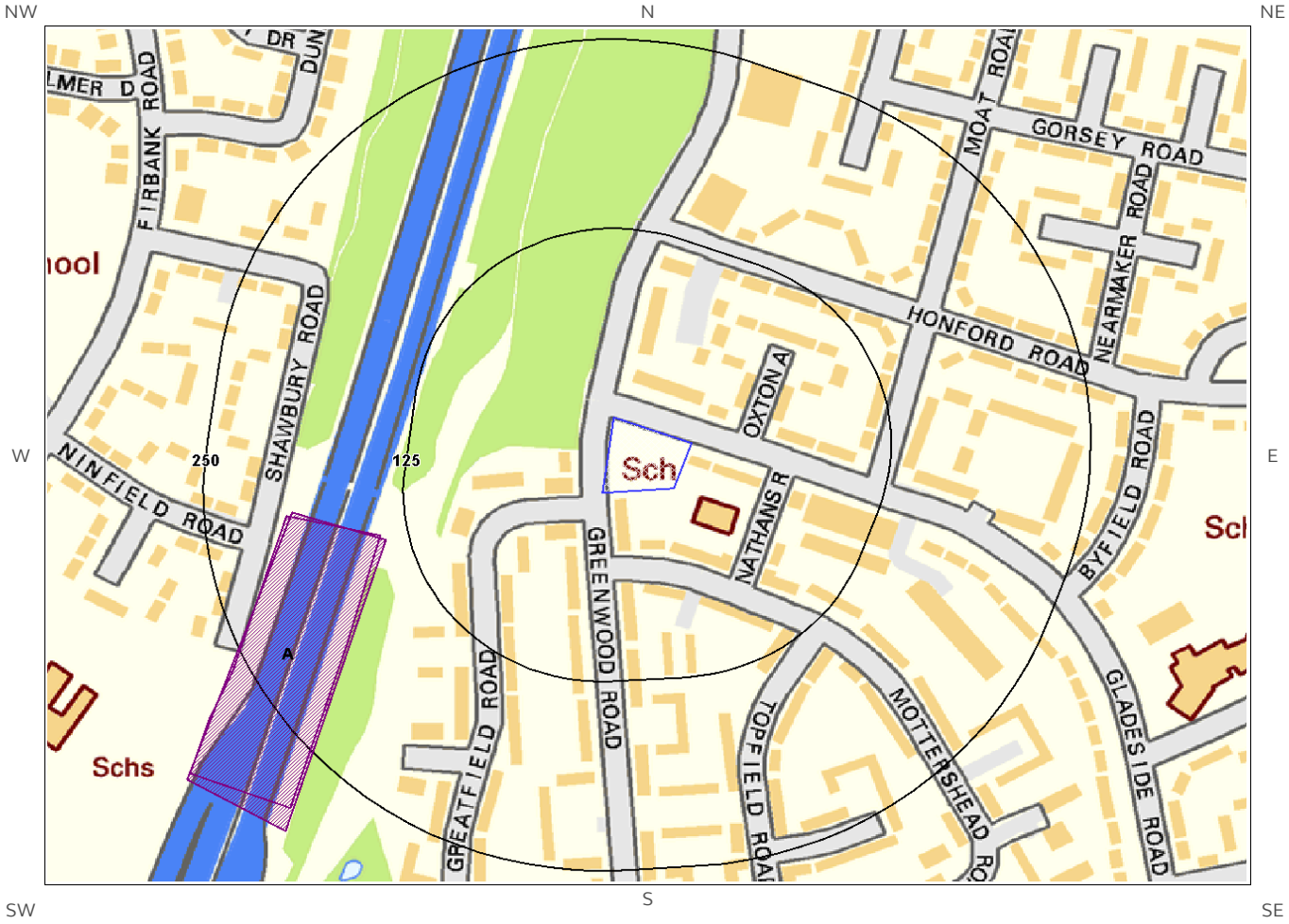
The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

3.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

---

4 Ground Workings map



Ground Workings Legend

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Site Outline

125
250
Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings

4 Ground Workings

4.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on Groundsure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

ID	Distance (m)	Direction	NGR	Use	Date
1A	139.0	W	381738 387608	Cuttings	1975
2A	142.0	W	381737 387615	Cuttings	1995
3A	142.0	W	381737 387615	Cuttings	1989

4.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the Groundsure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? No

Database searched and no data found.

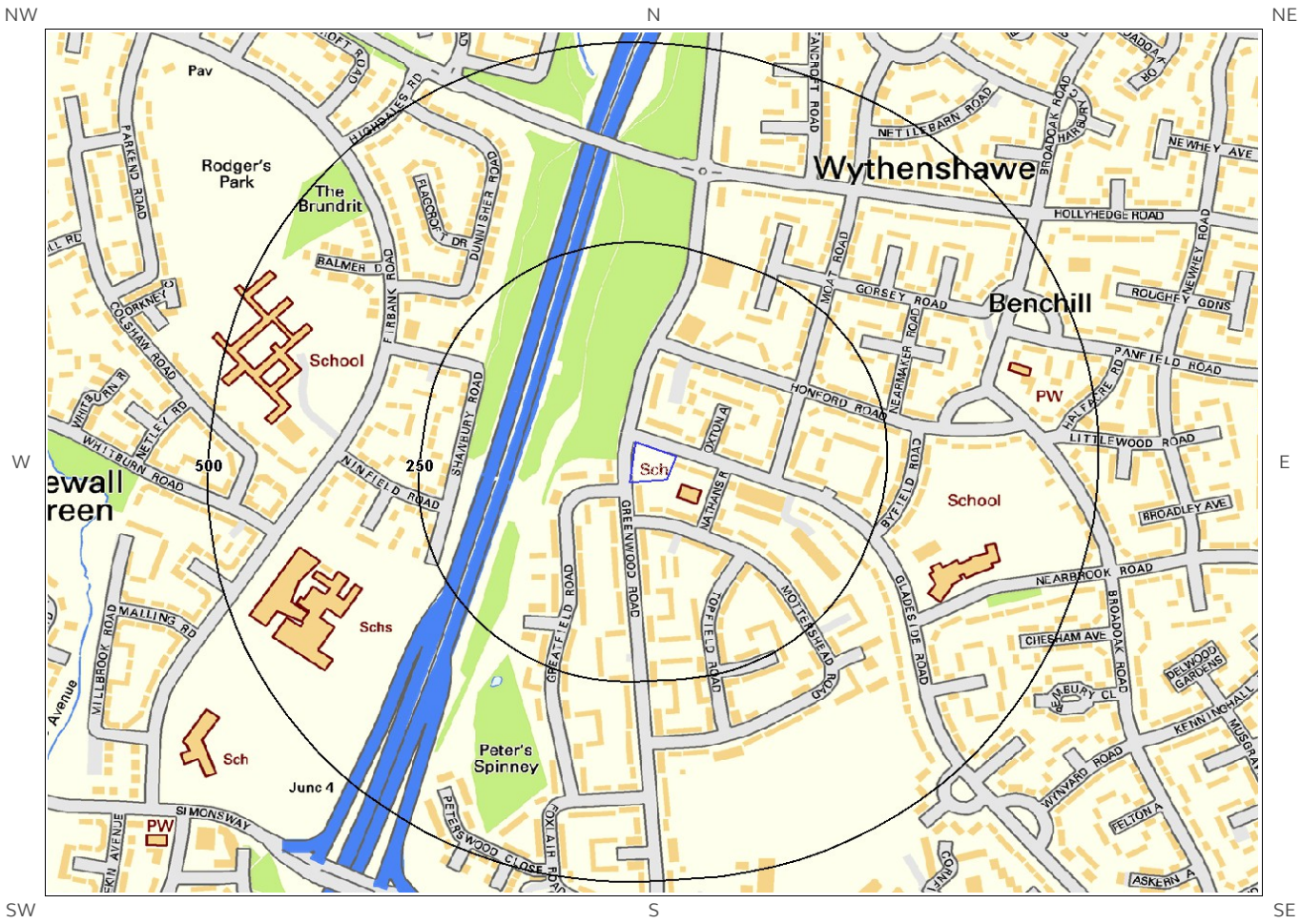
4.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? No

Database searched and no data found.

5 Mining, Extraction & Natural Cavities map



Mining, Extraction and Natural Cavities Legend

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Site Outline

Search Buffers (m) — 250 — 500

Historical Mining

Non-Coal Mining Cavities

Natural Cavities (point data)

Natural Cavities (polygon data)

Non-Coal Mining

- Highly likely
- Likely
- Unlikely
- Highly unlikely
- Rare

5 Mining, Extraction & Natural Cavities

5.1 Historical Mining

This dataset is derived from Groundsure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? No

The following information provided by JPB is not represented on mapping: Database searched and no data found.

5.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? No

Database searched and no data found.

5.6 Natural Cavities

This dataset provides information based on the Peter Brett Associates natural cavities database. The dataset is made up of points and polygons. Where polygons are used these represent an area in which it is expected the cavities could be found. It does not indicate that cavities are present everywhere within the polygon, and caution should be used in the interpretation of this data.

Are there any Natural Cavities within 1000m of the study site boundary? No

Database searched and no data found.

5.7 Brine Extraction

This data provides information from the Cheshire Brine Subsidence Compensation Board.

Are there any Brine Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

5.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

5.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level..

Are there any Tin Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.10 Clay Mining

This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

6 Natural Ground Subsidence

6.1 Shrink-Swell Clay map

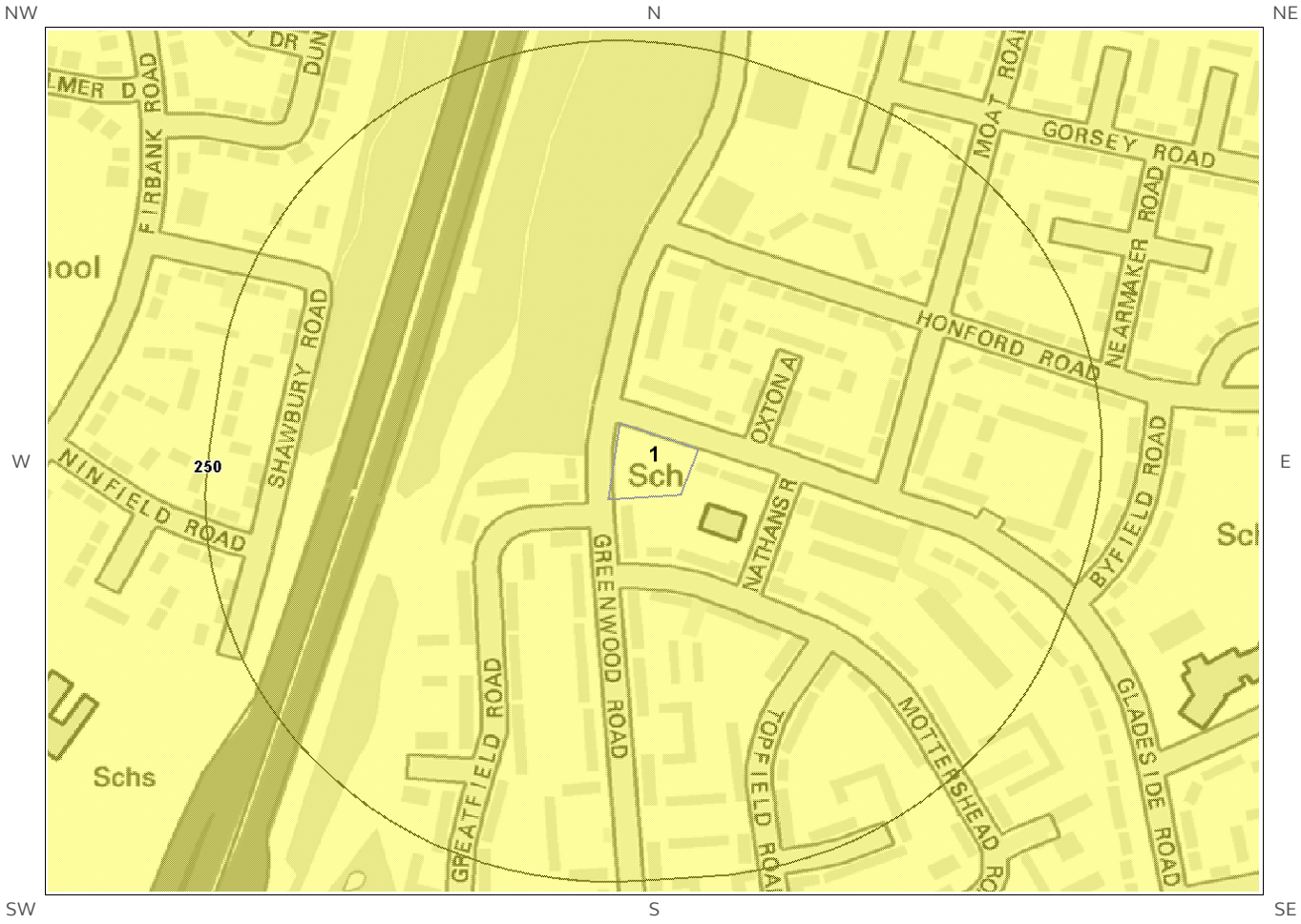


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Shrink Swell Clay Legend



6.2 Landslides map

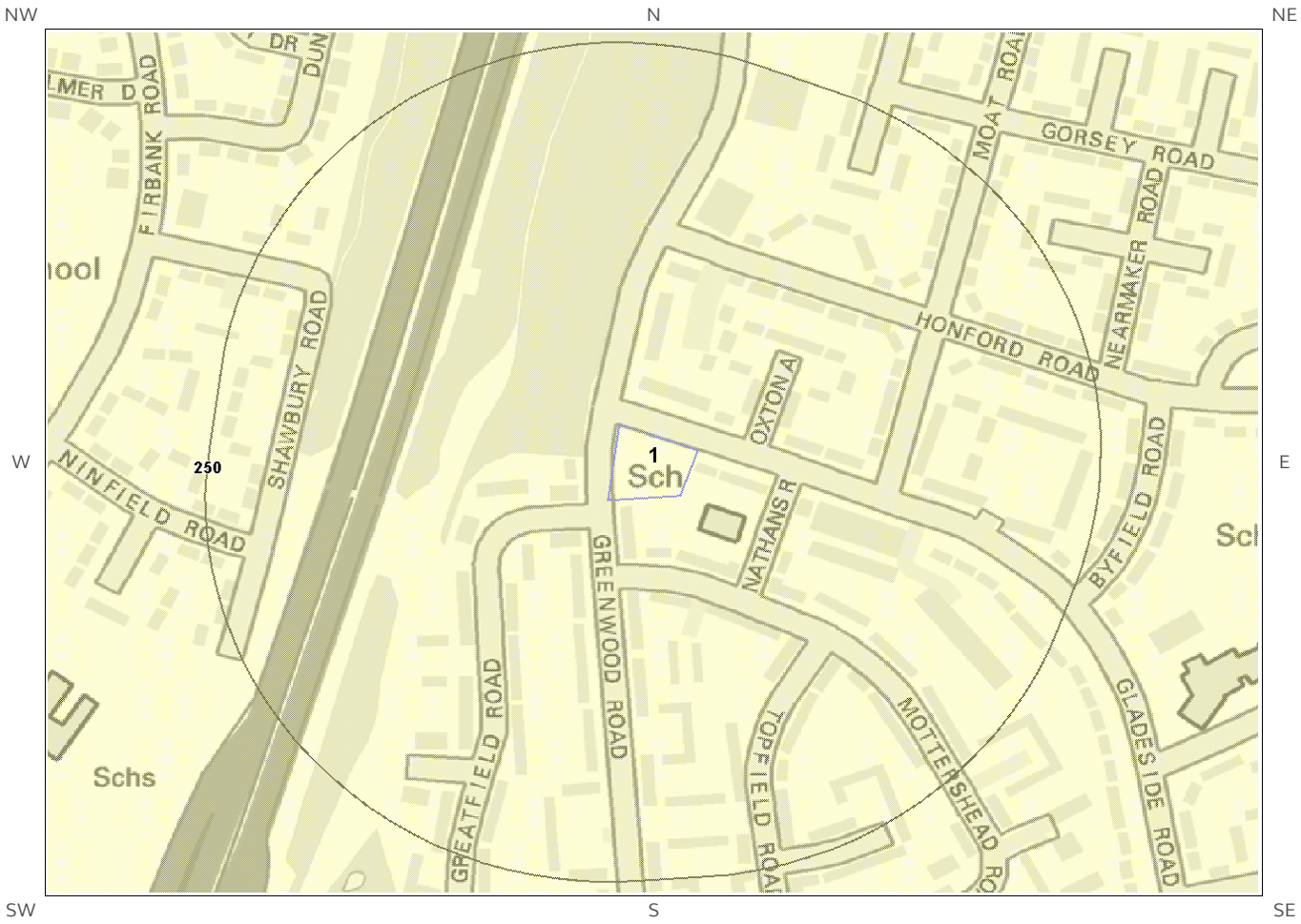


Landslides Legend

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6.3 Ground Dissolution of Soluble Rocks map



Ground Dissolution Soluble Rocks Legend

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6.4 Compressible Deposits map



Compressible Deposits Legend

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6.5 Collapsible Deposits map

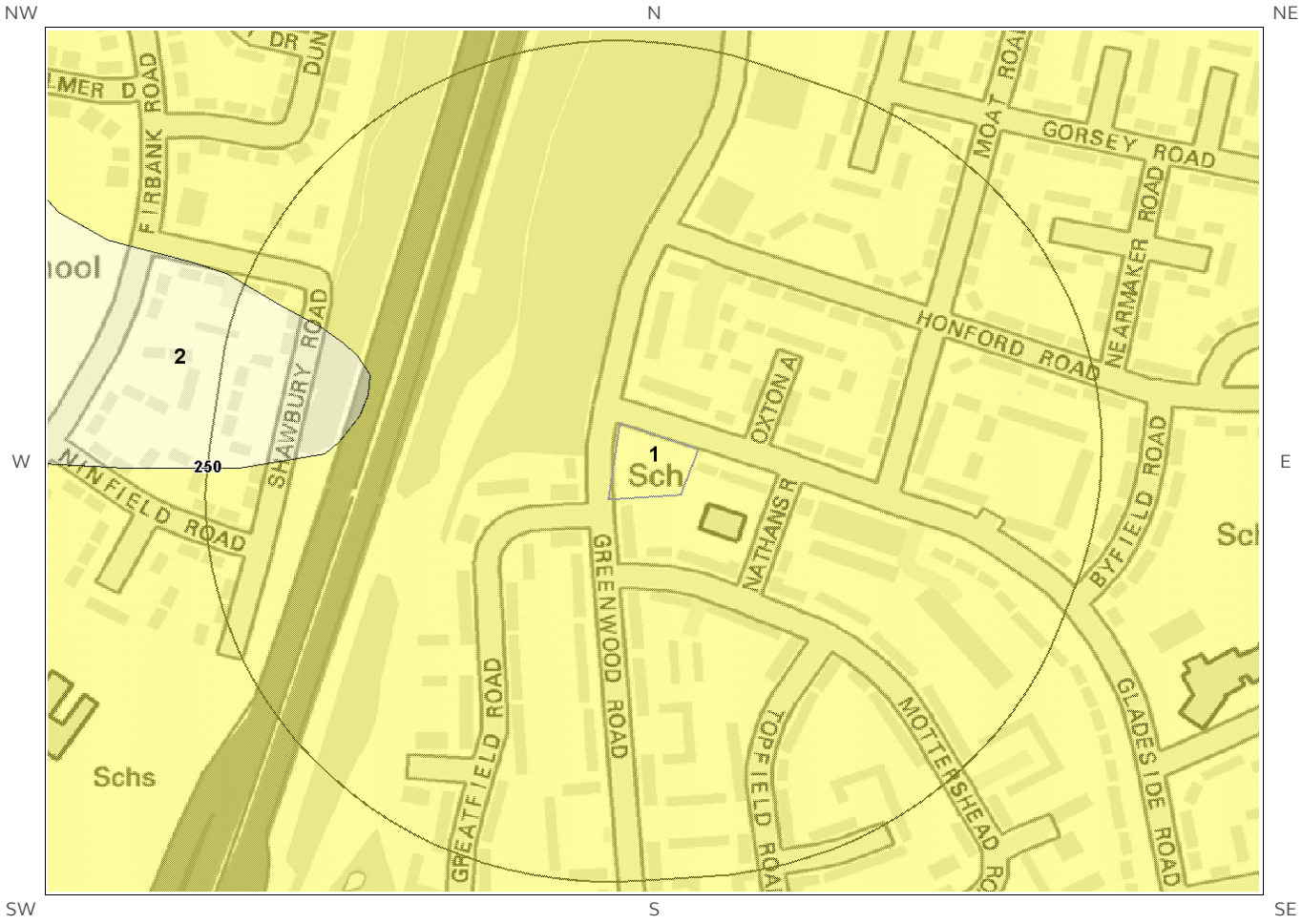


Collapsible Deposits Legend

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6.6 Running Sand map



Running Sand Legend

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6 Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site*[*] boundary? Very Low

6.1 Shrink-Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

6.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

6.3 Ground Dissolution of Soluble Rocks

The following Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

* This includes an automatically generated 50m buffer zone around the site

6.4 Compressible Deposits

The following Compressible Deposits information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

6.5 Collapsible Deposits

The following Collapsible Rocks information provided by the British Geological Survey:

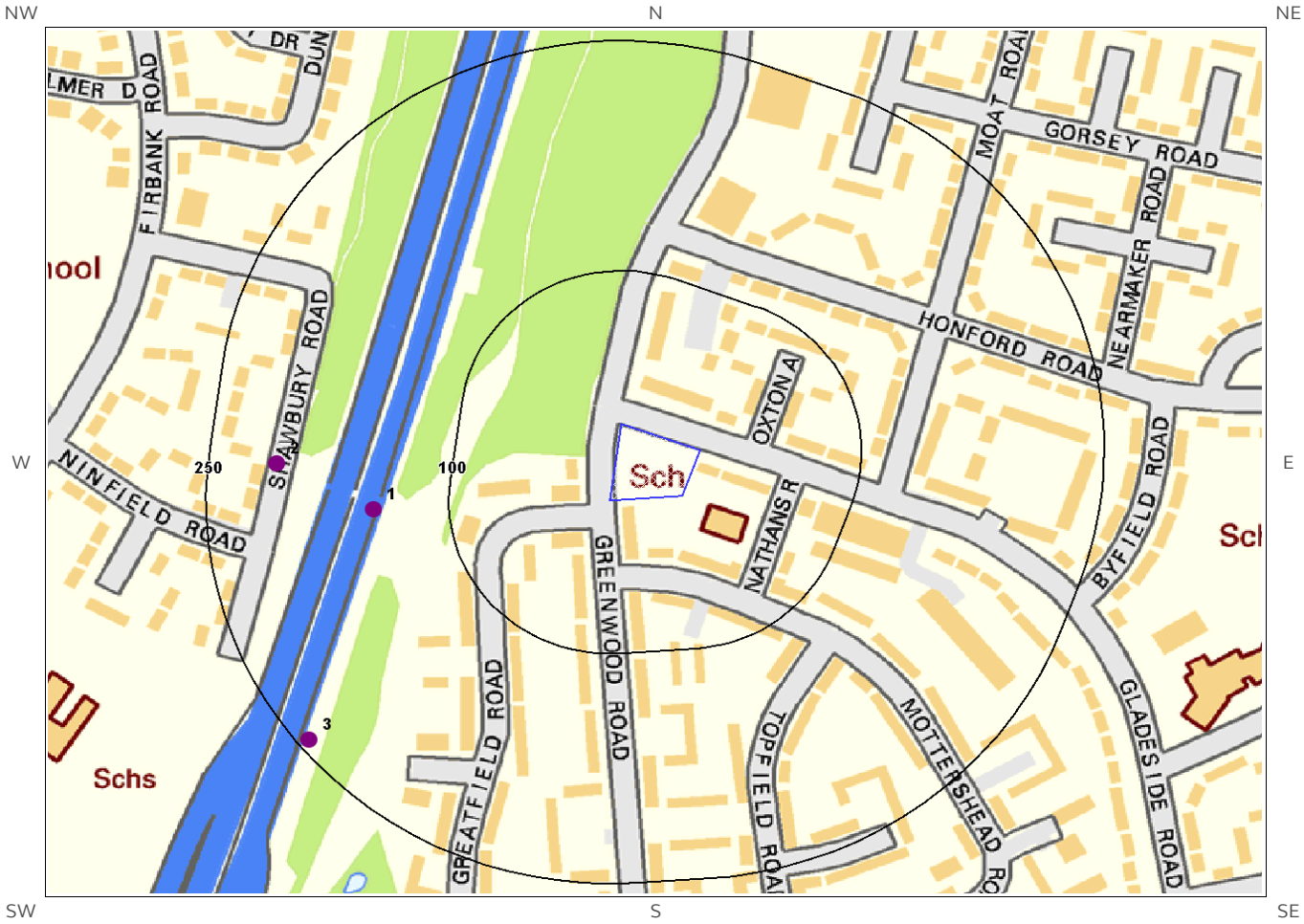
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

6.6 Running Sands

The following Running Sands information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

7 Borehole Records map



Borehole Records Legend

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Site Outline

Borehole Locations

125
250
Search Buffers (m)

7 Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary: 3

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	147.0	W	381790 387720	SJ88NW907	14.8	M56 WIDENING JUNCTIONS 4 - 6 CH21
2	208.0	W	381730 387750	SJ88NW906	20.0	M56 WIDENING JUNCTIONS 4 - 6 CH20
3	243.0	SW	381750 387570	SJ88NW905	11.85	M56 WIDENING JUNCTIONS 4 - 6 CH19

The borehole records are available using the hyperlinks below: Please note that if the donor of the borehole record has requested the information be held as commercial-in-confidence, the additional data will be held separately by the BGS and a formal request must be made for its release.

#1: scans.bgs.ac.uk/sobi_scans/boreholes/915588
#2: scans.bgs.ac.uk/sobi_scans/boreholes/915587
#3: scans.bgs.ac.uk/sobi_scans/boreholes/915586

8 Estimated Background Soil Chemistry

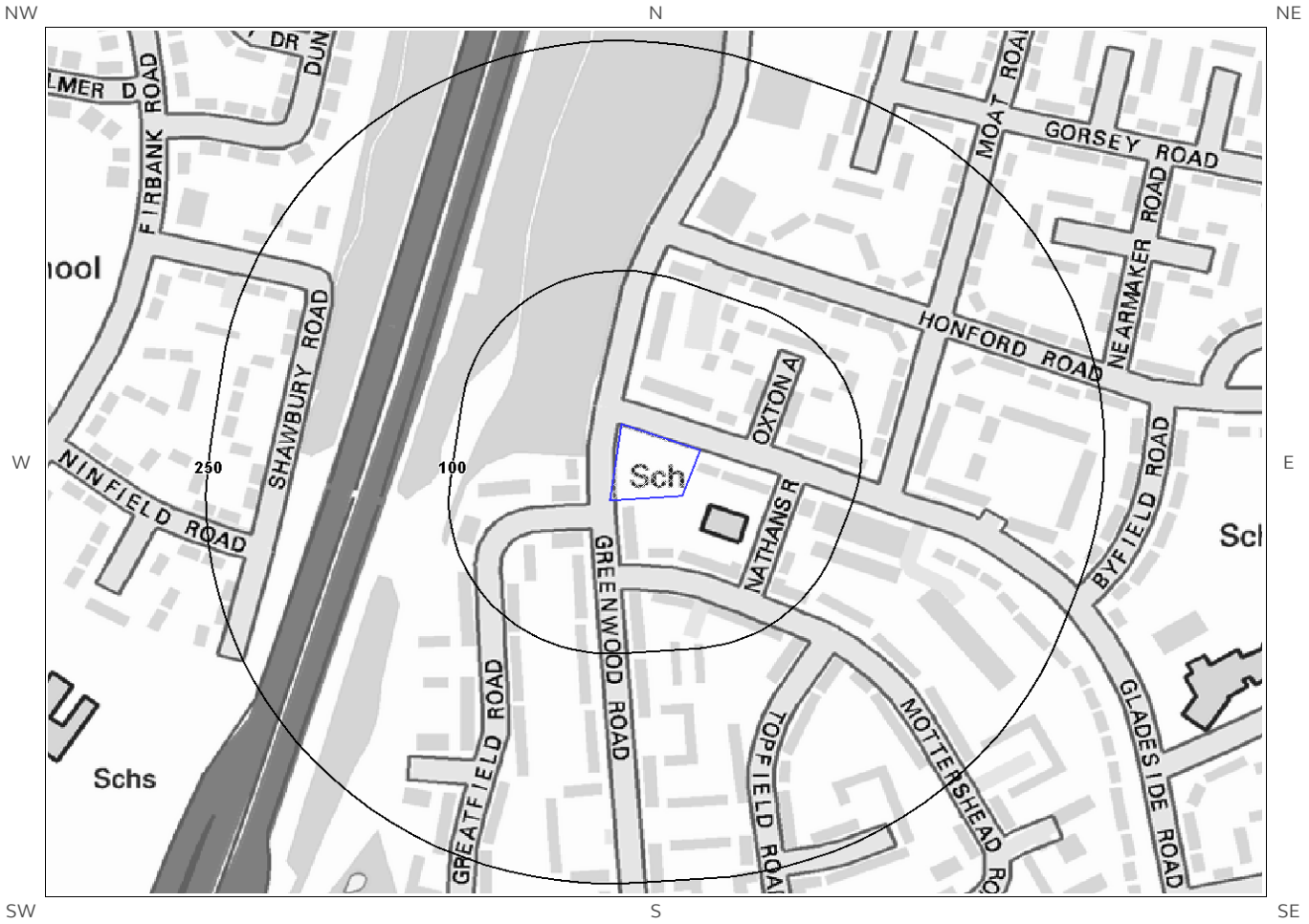
Records of background estimated soil chemistry within 250m of the study site boundary: 2

For further information on how this data is calculated and limitations upon its use, please see the Groundsure Geo Insight User Guide, available on request.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
8.0	E	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

9 Railways and Tunnels map



Railways and Tunnels Legend

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- Site Outline
- Search Buffers (m) 250 500
- Underground or Partially Underground Railway / Subway System
- Railway Tunnel (OS Mapping)
- Abandoned or Dismantled Railway (OpenStreetMap)
- Railway Track (OS Mapping)
- Railway Track (OpenStreetMap)
- High Speed 2
- High Speed 2 Revised Proposed Route
- Crossrail 1
- Railway and/or Tunnel Feature from Historical Mapping

9 Railways and Tunnels

9.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary?	No
Have any underground railway lines been identified within 250m of the study site boundary?	No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels map.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary?	No
Have any other railway tunnels been identified within 250m of the site boundary?	No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels map.

9.2 Historical Railway and Tunnel Features

This data is derived from Groundsure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary?	No
Have any historical railway or tunnel features been identified within 250m of the study site boundary?	No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels map.

9.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary? No

Have any historical railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels map.

9.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary? No

Have any active railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels map.

9.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail 1 .

Is the study site within 5km of the route of the High Speed 2 rail project? Yes

Is the study site within 500m of the route of the Crossrail 1 rail project? No

Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a Groundsure HS2 and Crossrail 1 Report.

The route data has been digitised from publicly available maps by Groundsure. The route as provided relates to the Crossrail 1 project only, and does not include any details of the Crossrail 2 project, as final details of the route for Crossrail 2 are still under consultation.

Please note that this assessment takes account of both the original Phase 2b proposed route and the amended route proposed in 2016. As the Phase 2b route is still under consultation, Groundsure are providing information on both options until the final route is formally confirmed. Practitioners should take account of this uncertainty when advising clients.

Contact Details

Groundsure Helpline

Telephone: 08444 159 000
info@groundsure.com

British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:**enquiries@bgs.ac.uk**
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries

British Gypsum

British Gypsum Ltd
East Leake
Loughborough
Leicestershire
LE12 6HX

The Coal Authority

200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
https://www.gov.uk/government/organisations/public-health-england
Email: **enquiries@phe.gov.uk**
Main switchboard: 020 7654 8000

Johnson Poole & Bloomer Limited

Harris and Pearson Building, Brettel Lane
Brierley Hill, West Midlands
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Tel: +44 (0) 1384 262 000
Email:**enquiries.gs@jpb.co.uk**
Website: **www.jpb.co.uk**

Ordnance Survey

Adanac Drive, Southampton
SO16 0AS

Tel: 08456 050505
Website: http://www.ordnancesurvey.co.uk/

Getmapping PLC

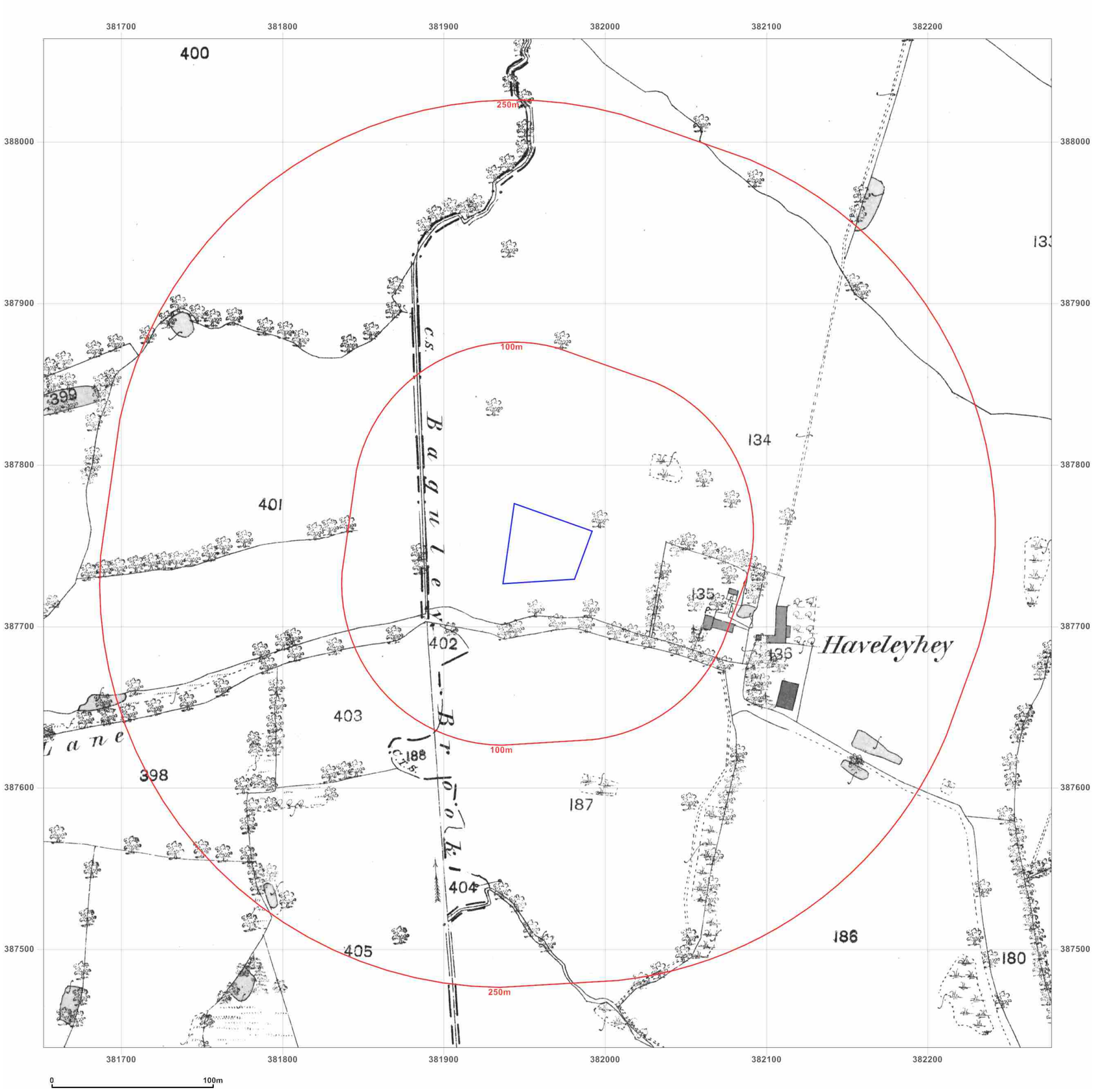
Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444
Website:**http://www1.getmapping.com/**

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Website:**http://www.peterbrett.com/home**

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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
GREENWOOD ROAD,
GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: County Series

Map date: **1876**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1876
Revised 1876
Edition N/A
Copyright N/A
Levelled N/A

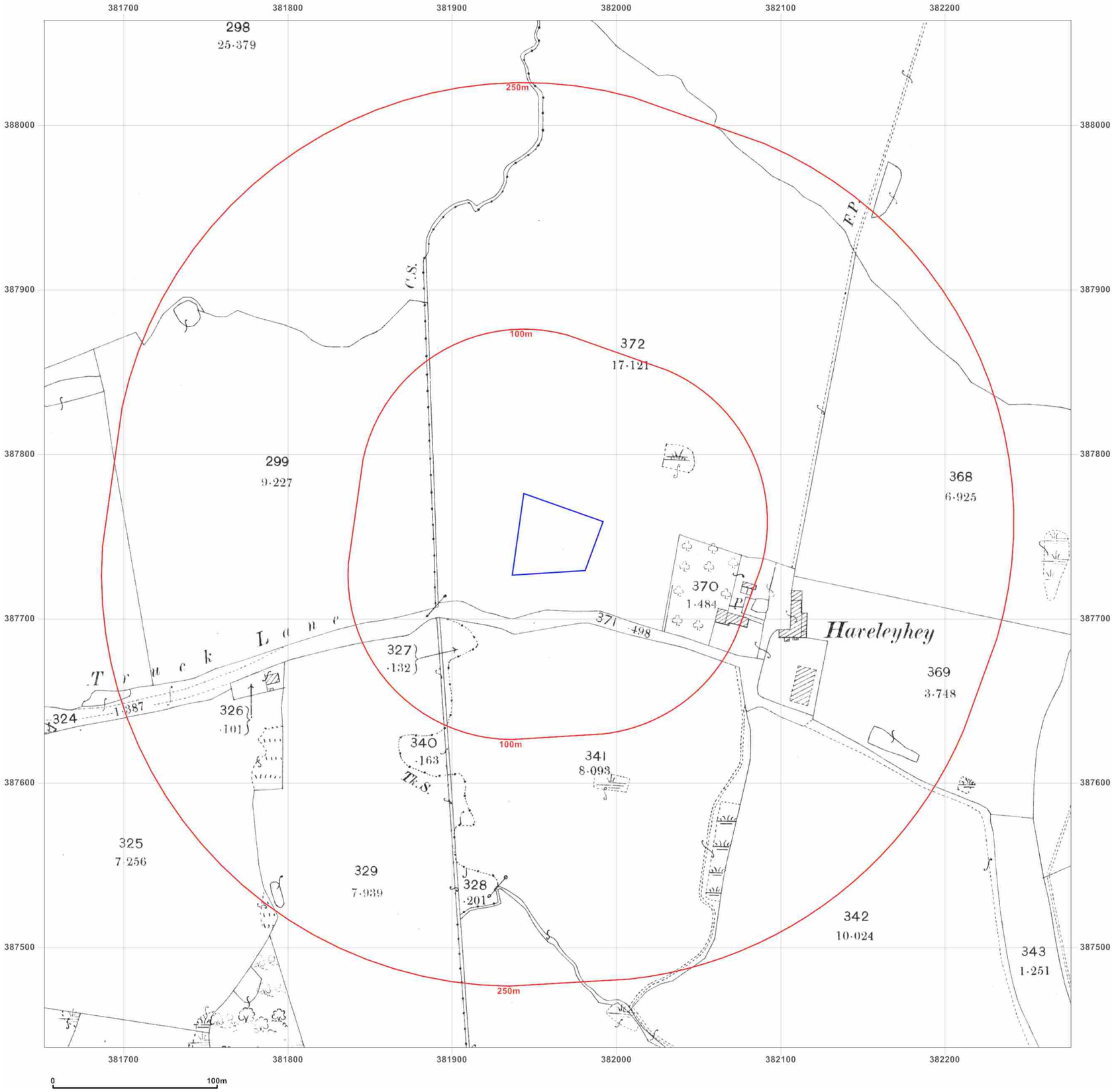
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W: www.groundsure.com

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Production date: 22 January 2019

Map legend available at:
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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
GREENWOOD ROAD,
GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: County Series

Map date: **1898**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1877
Revised 1897
Edition 1898
Copyright N/A
Levelled N/A

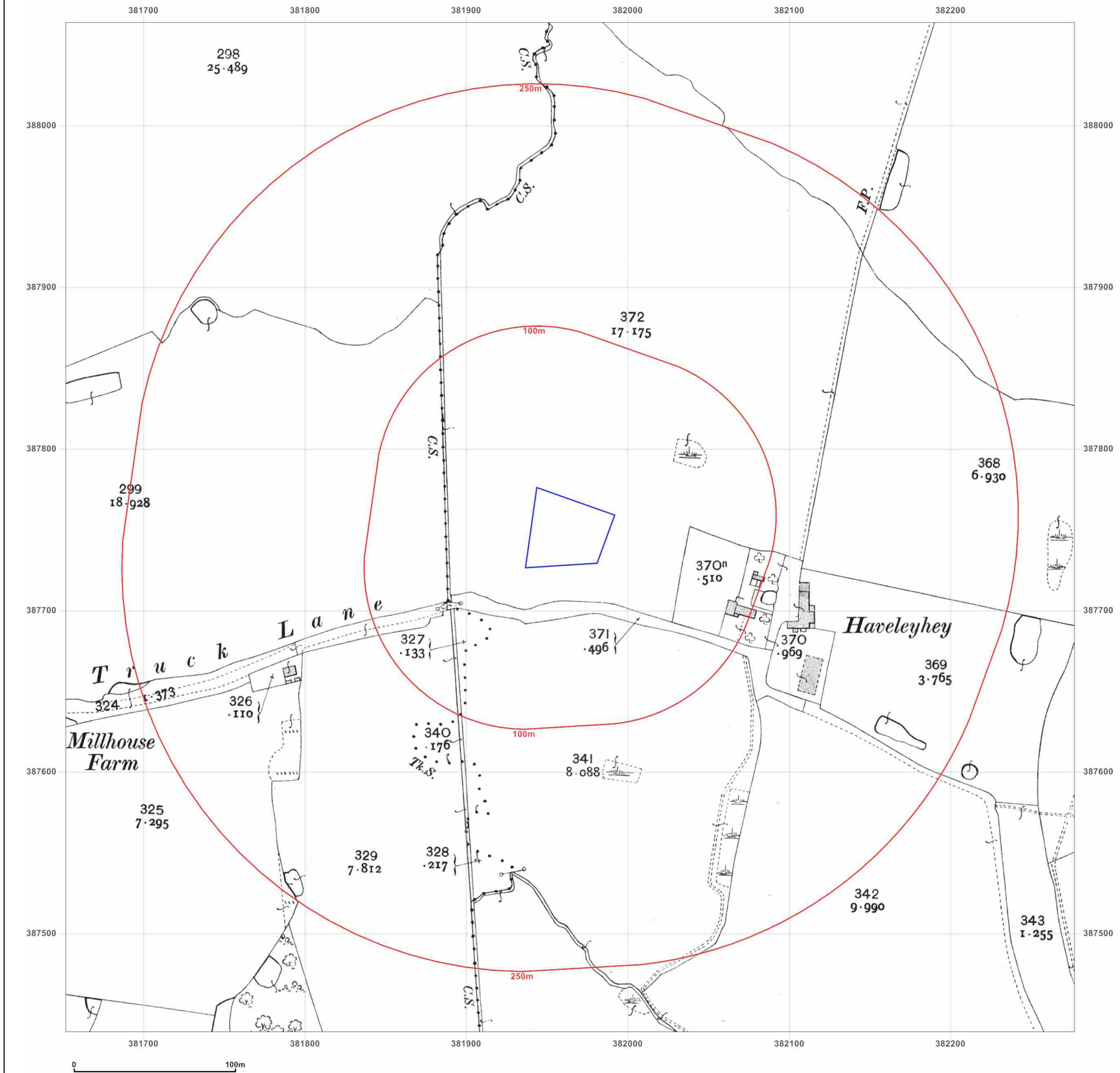
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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
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GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: County Series

Map date: **1910**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1910
Revised 1908
Edition 1910
Copyright N/A
Levelled N/A

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Production date: 22 January 2019

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Groundsure INSIGHTS

Site Details:

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GREENWOOD ROAD,
GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: National Grid

Map date: **1960**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1959
Revised 1959
Edition N/A
Copyright 1960
Levelled 1949

Surveyed 1959
Revised 1959
Edition N/A
Copyright 1960
Levelled 1949

Surveyed 1960
Revised 1960
Edition N/A
Copyright 1960
Levelled 1949

Surveyed 1959
Revised 1959
Edition N/A
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Groundsure INSIGHTS

Site Details:

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GREENWOOD ROAD,
GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: National Grid

Map date: **1959-1960**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1960
Revised 1960
Edition N/A
Copyright 1961
Levelled 1950

Surveyed 1959
Revised 1959
Edition N/A
Copyright 1960
Levelled 1949

Surveyed 1960
Revised 1960
Edition N/A
Copyright 1961
Levelled 1949

Surveyed 1959
Revised 1959
Edition N/A
Copyright 1960
Levelled 1949

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Map legend available at:
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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
GREENWOOD ROAD,
GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: National Grid

Map date: **1974-1978**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1959
Revised 1973
Edition N/A
Copyright 1974
Levelled 1959

Surveyed 1959
Revised 1976
Edition N/A
Copyright 1978
Levelled 1959

Surveyed 1960
Revised 1973
Edition N/A
Copyright 1974
Levelled 1959

Surveyed N/A
Revised N/A
Edition N/A
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Groundsure INSIGHTS

Site Details:

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Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

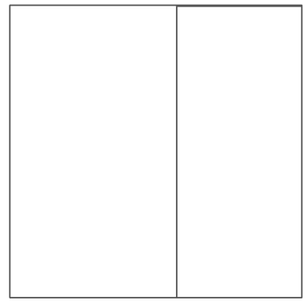
Map Name: National Grid

Map date: **1985**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S



Surveyed 1959
Revised 1985
Edition N/A
Copyright 1985
Levelled 1959

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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
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GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: National Grid

Map date: **1992**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

Surveyed 1992
Revised 1992
Edition N/A
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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
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GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: National Grid
Map date: **1992-1995**
Scale: 1:1,250
Printed at: 1:2,000

N
W E
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Surveyed 1995
Revised 1995
Edition N/A
Copyright 1995
Levelled N/A

Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

Surveyed 1995
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Edition N/A
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Groundsure INSIGHTS

Site Details:

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MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: National Grid

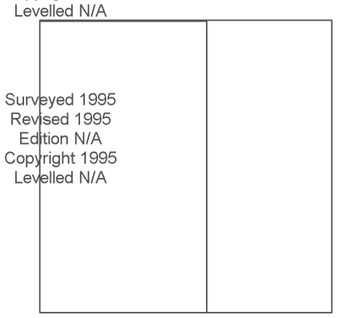
Map date: **1995**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1995
Revised 1995
Edition N/A
Copyright 1995
Levelled N/A



Surveyed 1995
Revised 1995
Edition N/A
Copyright 1995
Levelled N/A

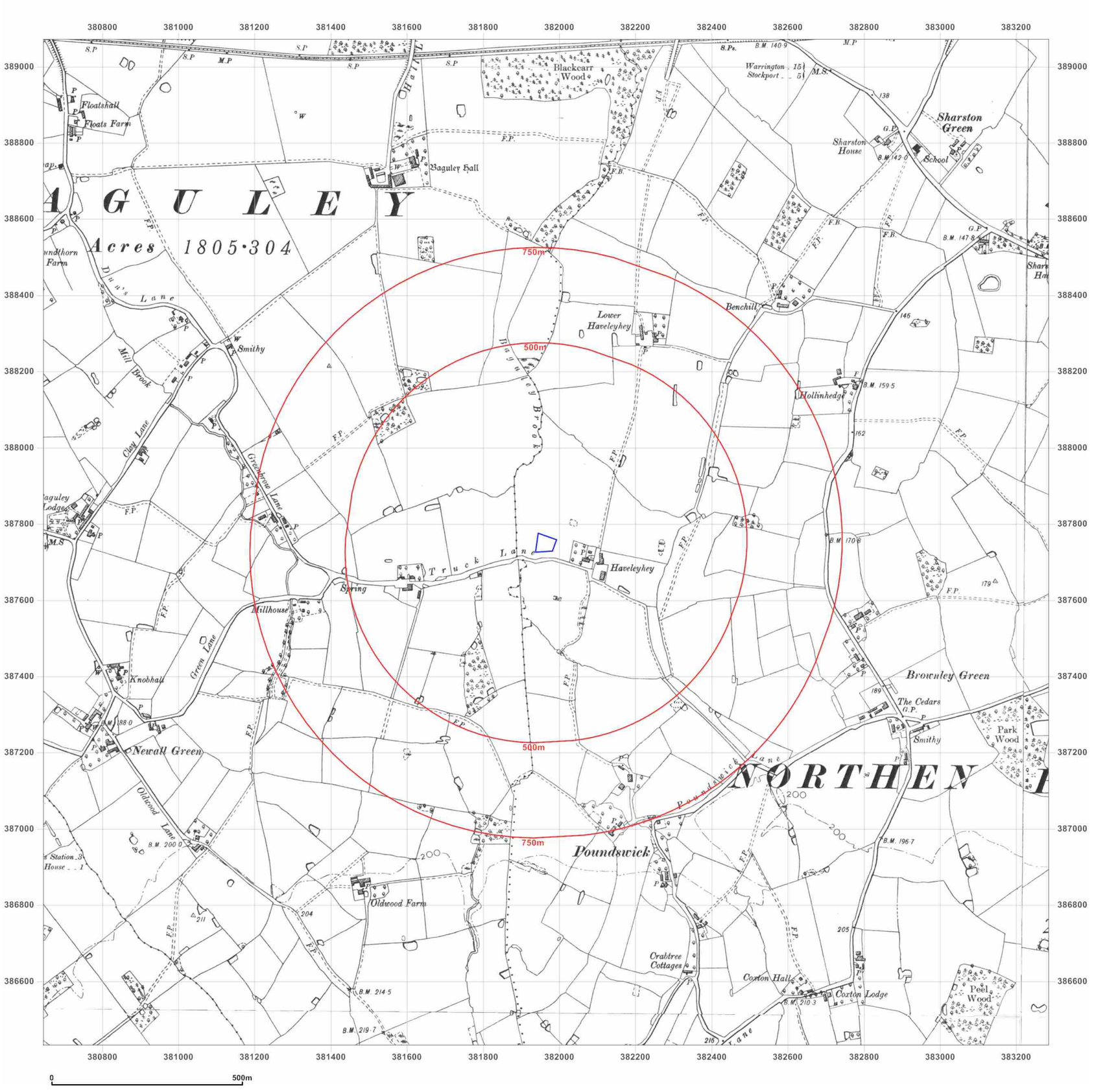
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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
GREENWOOD ROAD,
GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

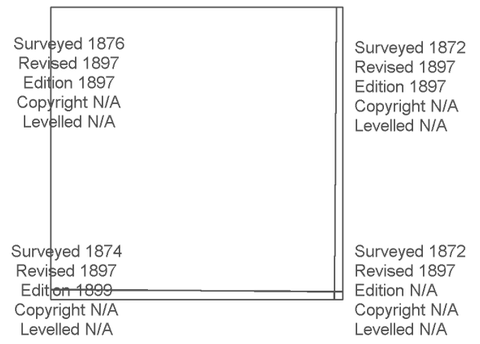
Map Name: County Series

Map date: **1897-1899**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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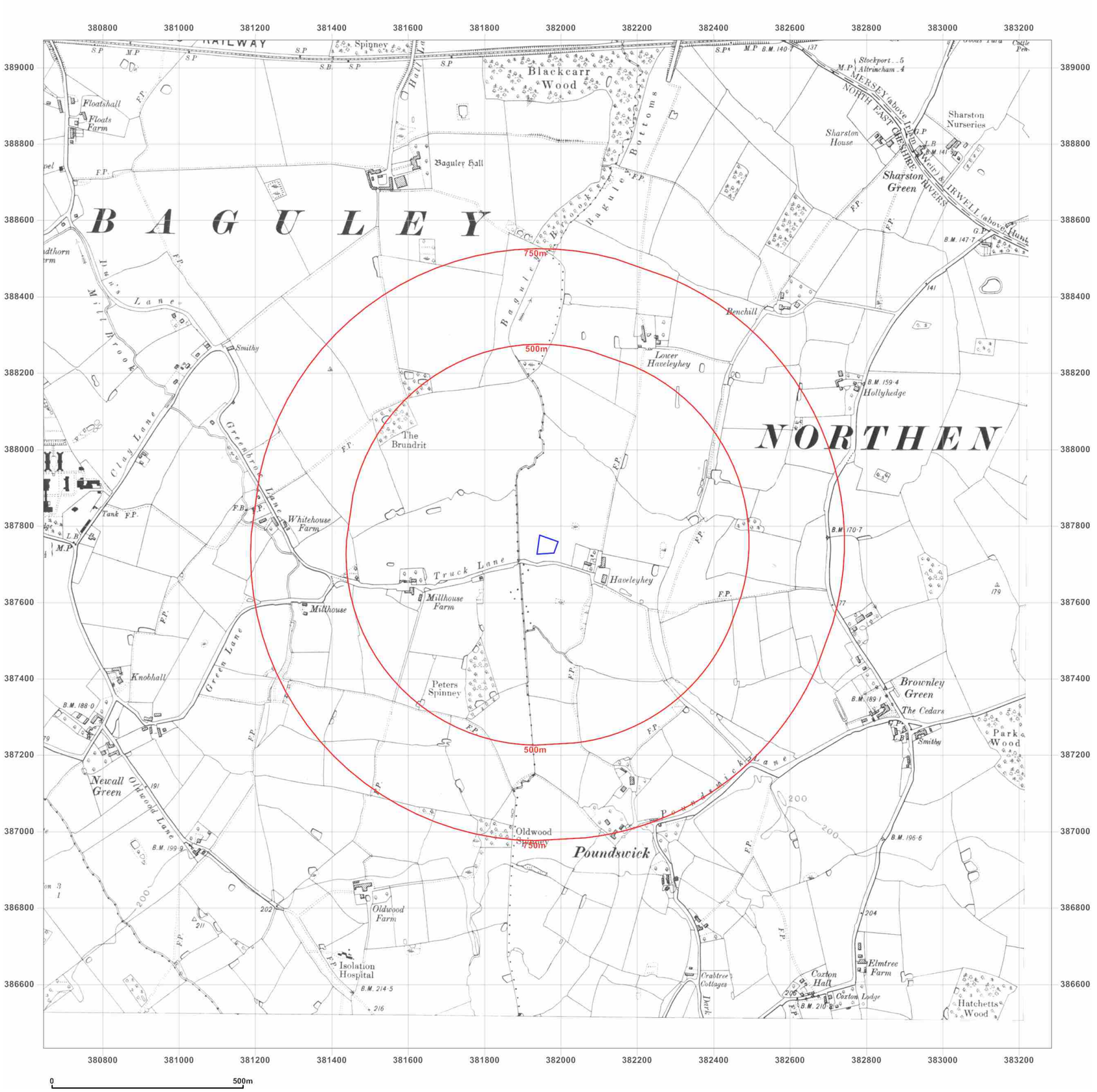
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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
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GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: County Series

Map date: **1907**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1873
Revised 1907
Edition 1907
Copyright N/A
Levelled N/A

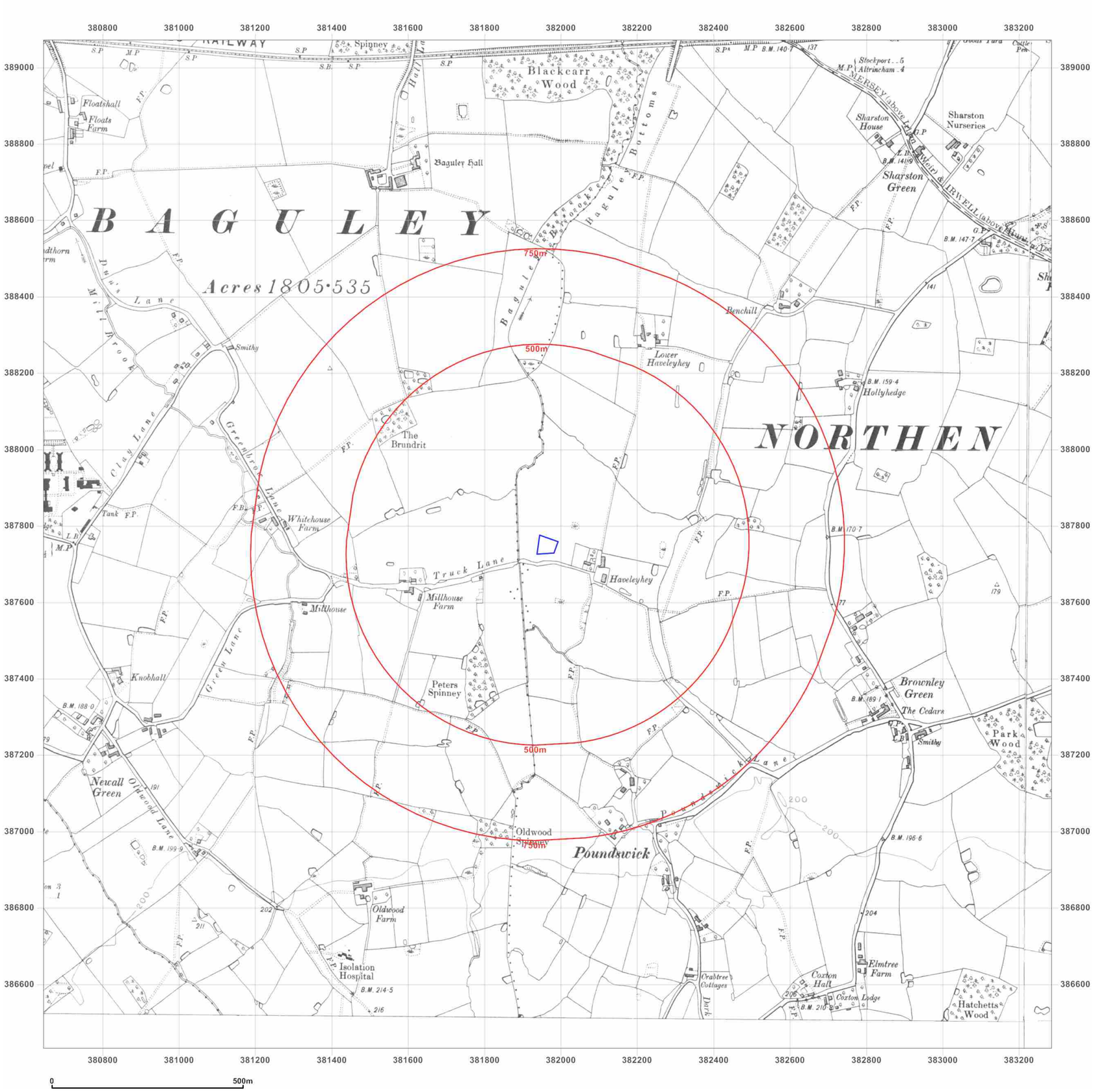
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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
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GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

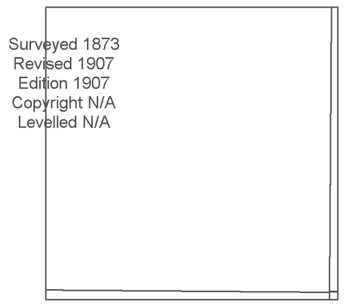
Map Name: County Series

Map date: **1907-1908**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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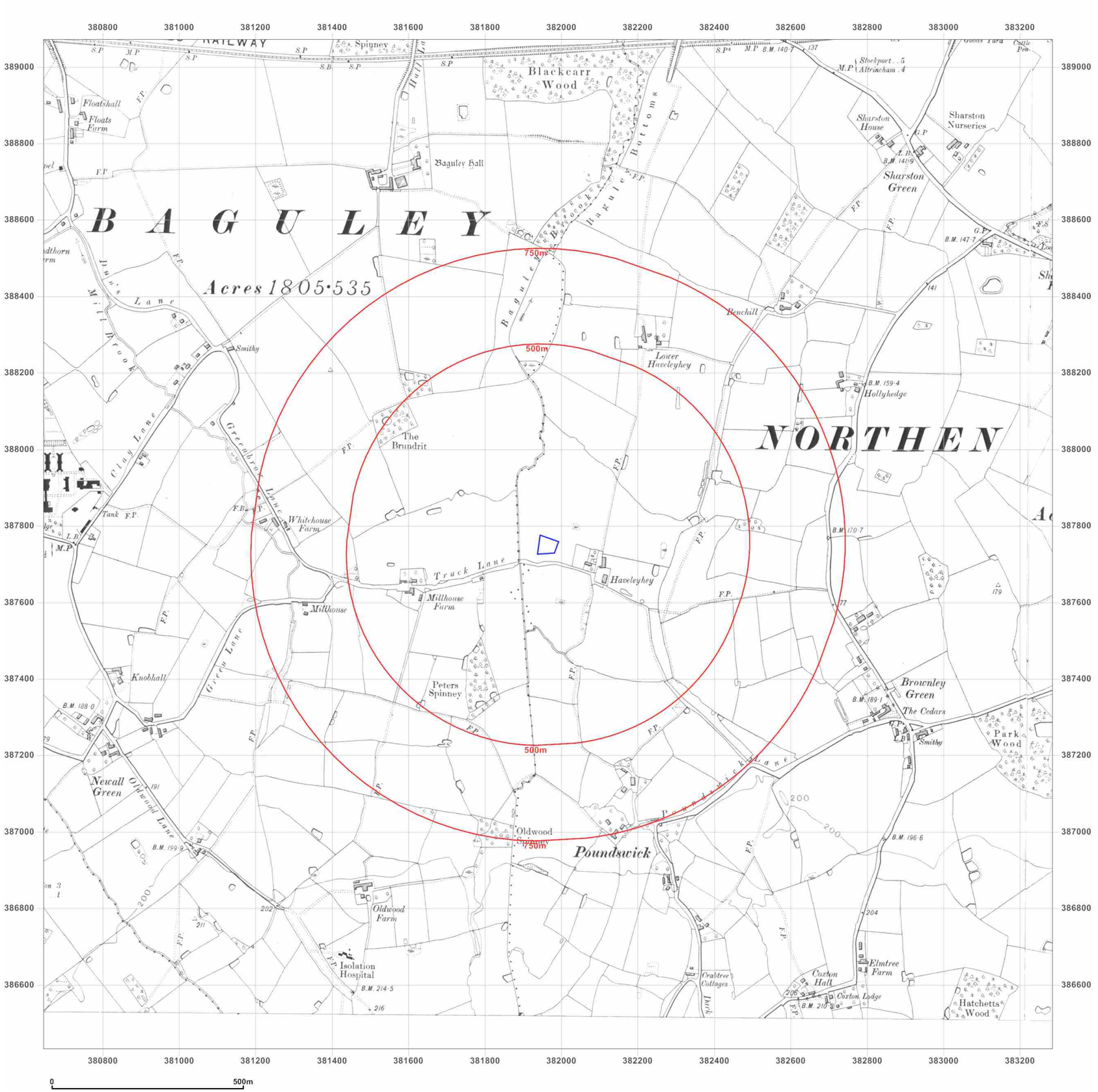
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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
GREENWOOD ROAD,
GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

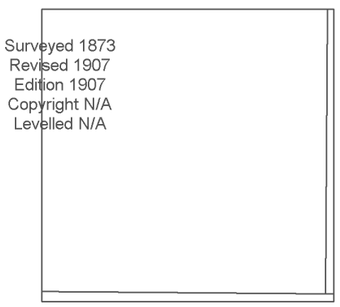
Map Name: County Series

Map date: **1907-1911**

Scale: 1:10,560

Printed at: 1:10,560

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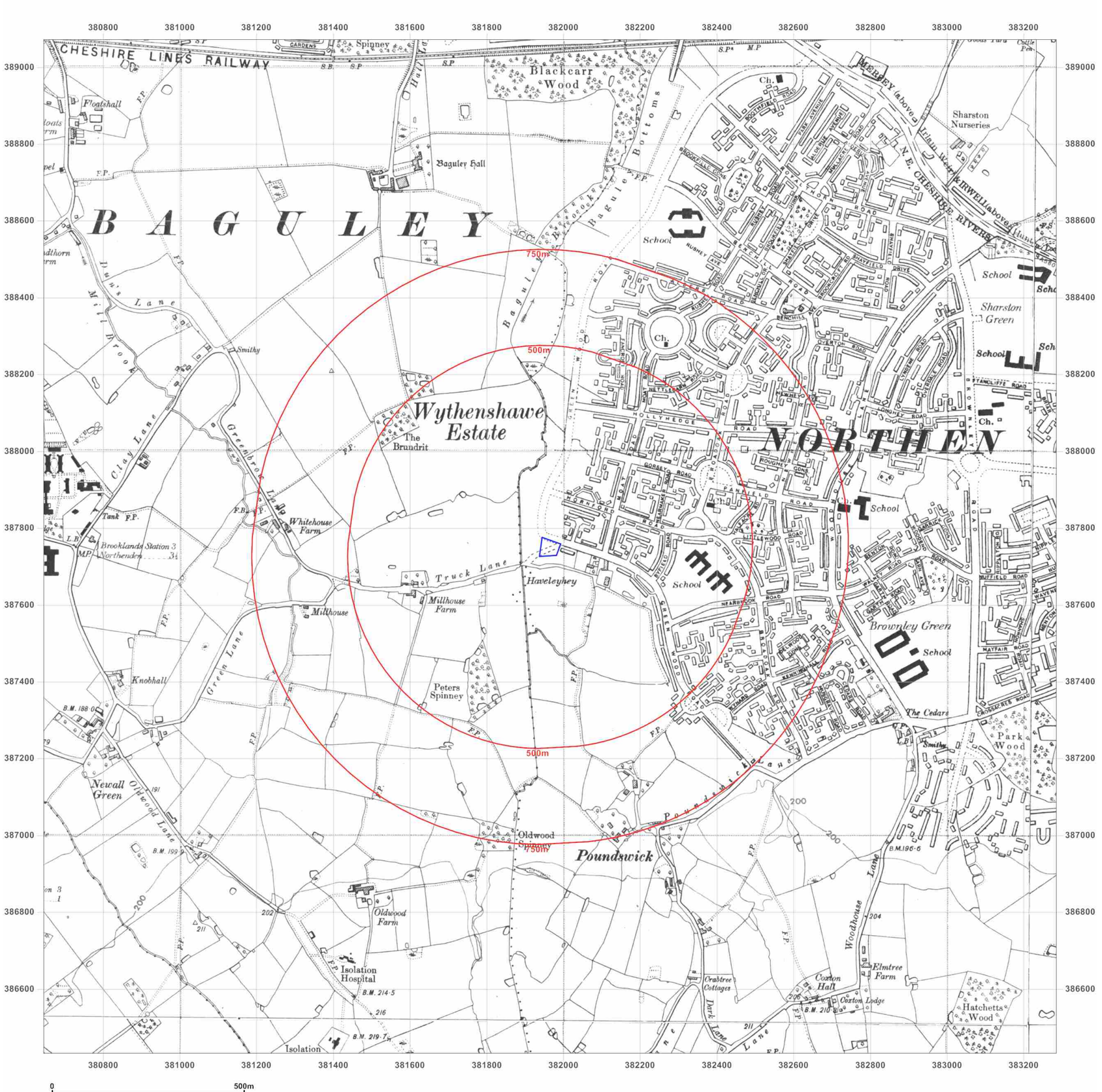
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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
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GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1873
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A

Surveyed 1872
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A

Surveyed 1874
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A

Surveyed 1872
Revised 1938
Edition 1938
Copyright N/A
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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
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GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: Provisional

Map date: **1954**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1949
Revised 1954
Edition N/A
Copyright N/A
Levelled N/A

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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
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GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: Provisional

Map date: **1967**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1967
Revised 1967
Edition N/A
Copyright 1967
Levelled N/A

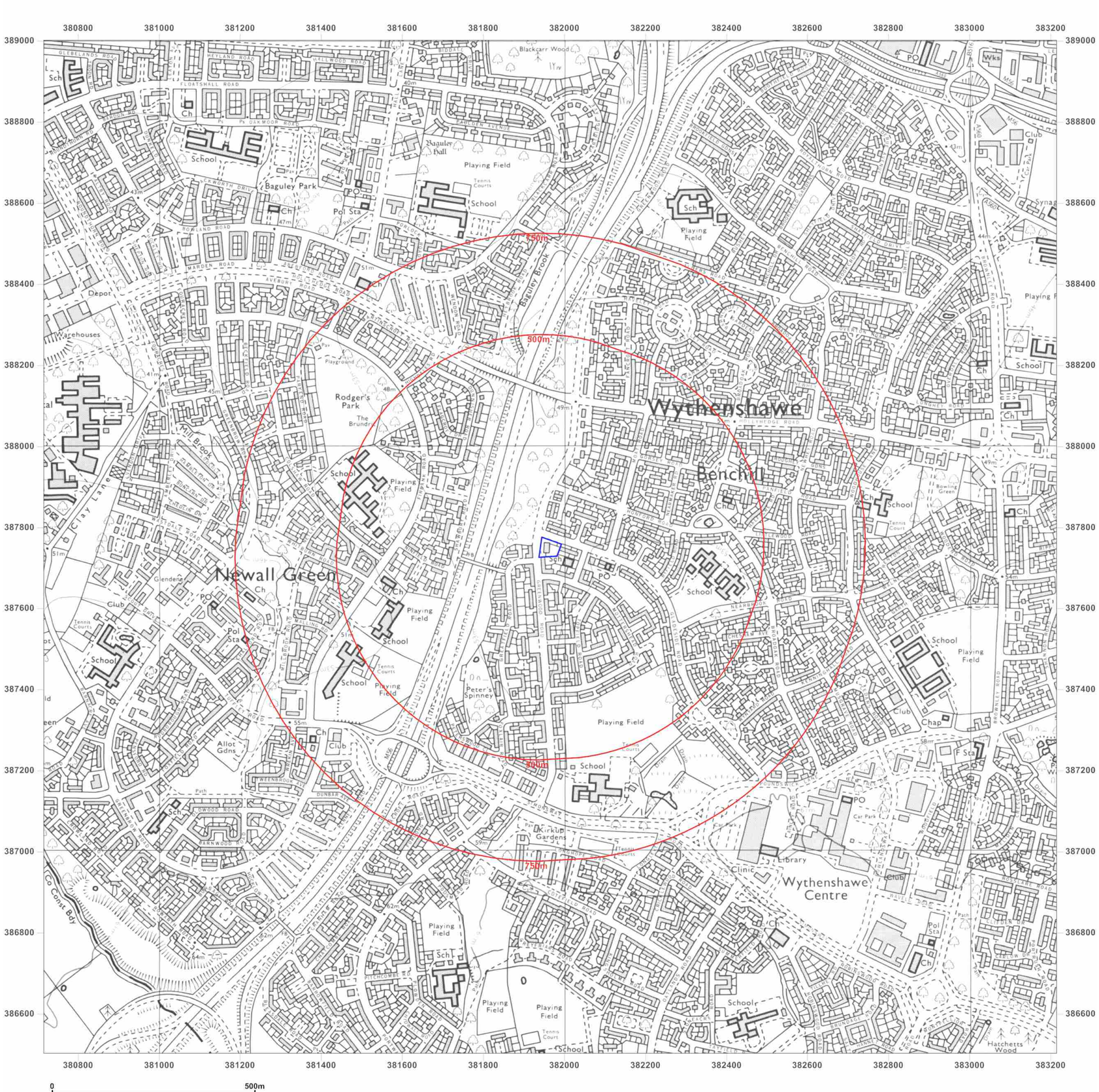
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Site Details:

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GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: National Grid

Map date: **1977**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1975
Revised 1977
Edition N/A
Copyright 1977
Levelled 1964

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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
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GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: National Grid

Map date: **1989**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1984
Revised 1989
Edition N/A
Copyright 1989
Levelled 1981

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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
GREENWOOD ROAD,
GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: National Grid

Map date: **1995**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1984
Revised 1995
Edition N/A
Copyright 1995
Levelled 1981

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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
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GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: 1:10,000 Raster

Map date: **2002**

Scale: 1:10,000

Printed at: 1:10,000

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2002

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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
GREENWOOD ROAD,
GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: National Grid
Map date: **2010**
Scale: 1:10,000
Printed at: 1:10,000

N
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2010

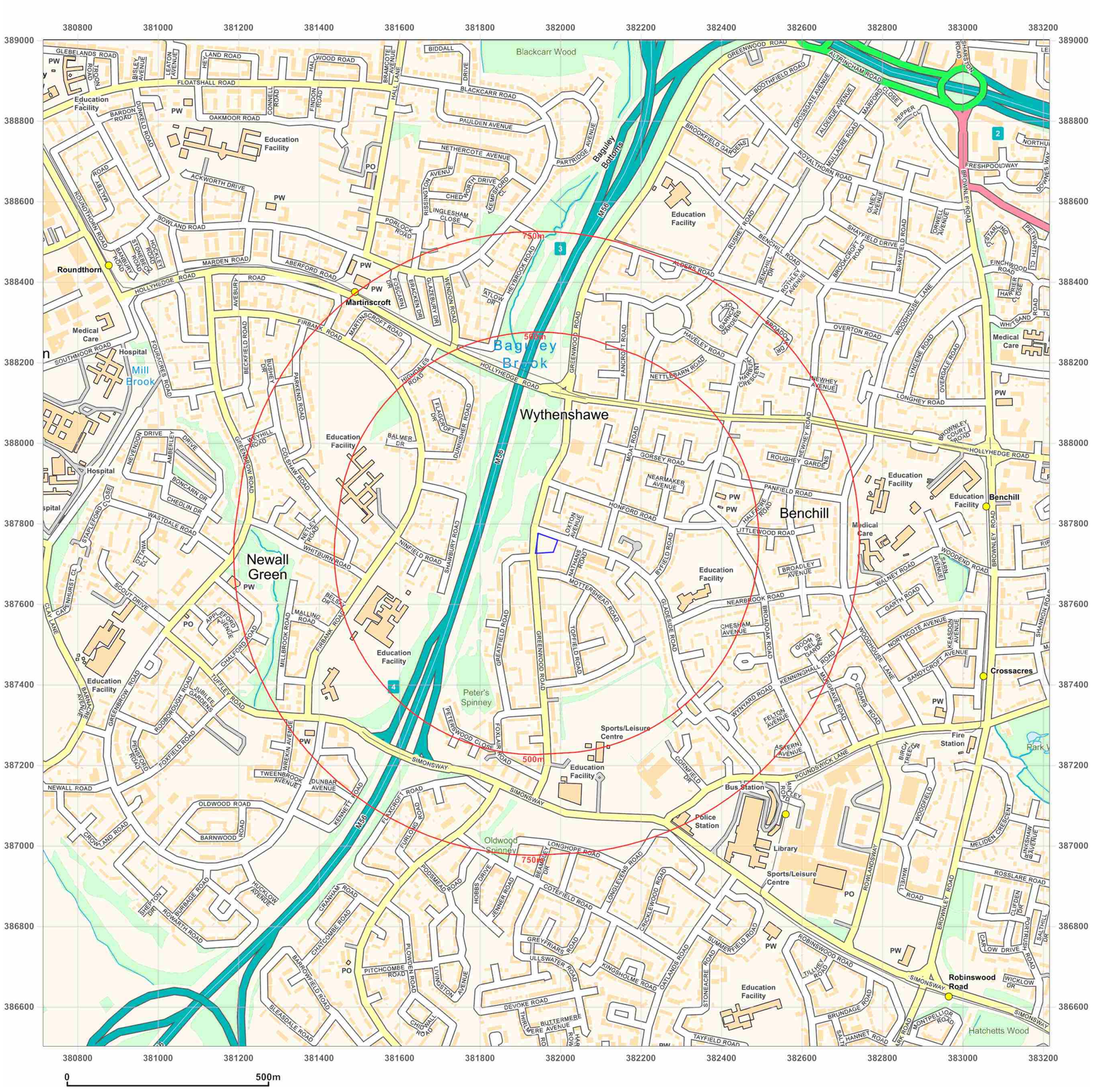
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Groundsure INSIGHTS

Site Details:

LAND CORNER OF
GREENWOOD ROAD,
GLADESIDE ROAD,
MANCHESTER, M22 9RA

Client Ref: 18-3262
Report Ref: GS-5767277
Grid Ref: 381964, 387751

Map Name: National Grid

Map date: **2014**

Scale: 1:10,000

Printed at: 1:10,000

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2014

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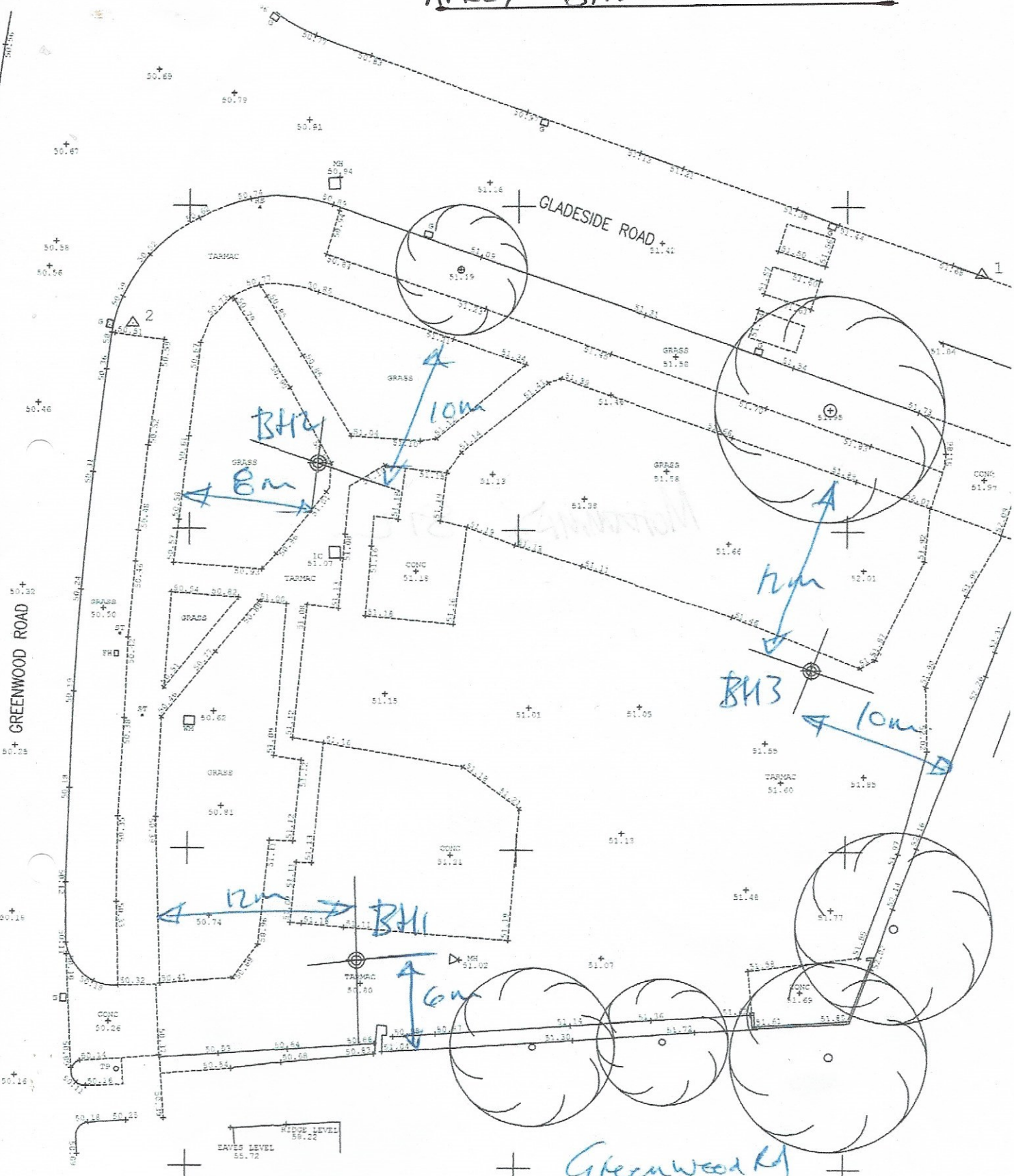
Production date: 22 January 2019

Map legend available at:
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MIN 50706

GREENWOOD / GLADESIDE ROAD, MANCHESTER

APROX B/HOLE LOCATIONS.



Station	Easting	Northing	Level
1	381909.151	387775.696	51.620
2	381936.526	387772.784	50.354

Greenwood Rd
Gladeside Rd.
Manchester M22 9RA
18-3262 STL Projects Ltd

MINI • SOIL • SURVEYS

Minisoils Ltd Ridgeway Nurseries, 6 Ridgeway Road, Timperley, Cheshire WA15 7EY
Tel: 0161 980 4937
Fax: 0161 980 0055

Job Number: MIN50706 Borehole No: 1 of 3

Site: Greenwood / Gladeside Rd Manchester M22 9RA Crew: A Date Drilled: 01/02/2019

Description	Depth	Leg	Test Depth	Type	Value
Loose brown gravely topsoil with fragmented brick,becoming clayey from 1.00M MADE GROUND			1.20	SPT	N=6
Soft/firm brown CLAY	1.70		1.80	SPT	N=11
			2.20	DS	
			2.30	SV	Cu=95kN/m2
			2.40	SPT	N=44
Dense grey slightlky clayey SHALE	2.50				
End of Hole	3.00				

S P T @ 1.20M 1/1/2.1.2.1. S P T @ 1.80M 3/2/3,3,2,3,
S P T @ 2.40M 6/9/11,10,11,12,
DISTURBED SAMPLES 2.2 - 2.80M/
NO STANDING WATER ON COMPLETION OF BOREHOLE

MINI • SOIL • SURVEYS

Minisoils Ltd Ridgeway Nurseries, 6 Ridgeway Road, Timperley, Cheshire WA15 7EY
Tel: 0161 980 4937
Fax: 0161 980 0055

Job Number: MIN50706 Borehole No: 2 of 3

Site: Greenwood / Gladeside Rd Manchester M22 9RA Crew: A Date Drilled: 01/02/2019

Description	Depth	Leg	Test Depth	Type	Value
Loose brown topsoil with fragments of brick and gravel, becoming clayey with depth. MADE GROUND					
Firm becoming stiff brown CLAY	0.70		1.00	DS	
			1.20	SPT	N=11
			1.70	SV	Cu=75kN/m2
			1.80	SPT	N=19
			2.30	SV	Cu=120kN/m2
			2.40	SPT	N=28
Stiff brown slightly shaley CLAY	2.50				
End of Hole	3.00				

S P T @ 1.20M 2/2/2,3,3,3, S P T @ 1.80M 2/4/4,4,5,6, S P T @ 2.40M 4/6/6,7,7,8,
DISTURBED SAMPLES 1.0 - 1.60M/
NO STANDING WATER ON COMPLETION OF BOREHOLE

MINI • SOIL • SURVEYS

Minisoils Ltd Ridgeway Nurseries, 6 Ridgeway Road, Timperley, Cheshire WA15 7EY
Tel: 0161 980 4937
Fax: 0161 980 0055

Job Number: MIN50706 Borehole No: 3 of 3

Site: Greenwood / Gladeside Rd Manchester M22 9RA Crew: A Date Drilled: 01/02/2019

Description	Depth	Leg	Test Depth	Type	Value
Loose brown gravely topsoil with fine roots and fragments of brick, becoming clayey with depth. MADE GROUND					
Firm/stiff brown CLAY becoming slightly silty from 1.40M	0.80		0.80	DS	
			1.20	SPT	N=12
			1.70	SV	Cu=90kN/m2
			1.80	SPT	N=21
Stiff brown slightly silty CLAY becoming shaley with depth.	1.90				
			2.30	SV	Cu=120kN/m2
			2.40	SPT	N=27
End of Hole	3.00				

S P T @ 1.20M 2/2/2,3,4,3, S P T @ 1.80M 3/4/4,5,6,6, S P T @ 2.40M 4/5/6,6,7,8,
DISTURBED SAMPLES .800 - 1.60M/
NO STANDING WATER ON COMPLETION OF BOREHOLE

Certificate of Analysis

Certificate Number 19-02333

18-Feb-19

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference 19-02333

Client Reference PSL19/0847

Order No (not supplied)

Contract Title Greenwood, Gladeside Road Manchester

Description 3 Soil samples.

Date Received 07-Feb-19

Date Started 07-Feb-19

Date Completed 18-Feb-19

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved [redacted]

Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Soil Samples

Our Ref 19-02333
Client Ref PSL19/0847
Contract Title Greenwood, Gladeside Road Manchester

			Lab No	1456896	1456897	1456898
			Sample ID	BH1	BH2	BH3
			Depth	0.00-0.60	0.00-0.70	0.00-0.60
			Other ID			
			Sample Type	SOIL	SOIL	SOIL
			Sampling Date	n/s	n/s	n/s
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	22	12	12
Boron, Water Soluble	DETSC 2123#	0.2	mg/kg	1.2	0.9	1.0
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.3	1.3
Chromium	DETSC 2301#	0.15	mg/kg	17	20	18
Copper	DETSC 2301#	0.2	mg/kg	42	46	41
Lead	DETSC 2301#	0.3	mg/kg	110	61	220
Mercury	DETSC 2325#	0.05	mg/kg	0.11	0.12	0.12
Nickel	DETSC 2301#	1	mg/kg	24	21	19
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	100	78	160
Inorganics						
pH	DETSC 2008#			8.1	8.1	8.3
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.3	0.2	0.3
Cyanide, Free	DETSC 2130#	0.1	mg/kg	0.2	< 0.1	0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	1.3	1.0	0.8
Organic matter	DETSC 2002#	0.1	%	3.8	2.6	4.7
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	41	23	120
Sulphide	DETSC 2024*	10	mg/kg	52	< 10	36
Sulphur as S, Total	DETSC 2320	0.01	%	0.06	0.03	0.05
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.12	0.05	0.09
Petroleum Hydrocarbons						
C5-C10 Gasoline Range Organics (GRO)	DETSC 3321*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
C10-C24 Diesel Range Organics (DRO)	DETSC 3311#	10	mg/kg	23	29	22
EPH (C10-C40)	DETSC 3311#	10	mg/kg	56	79	120
PAHs						
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.3	1.1	0.6
Anthracene	DETSC 3301	0.1	mg/kg	0.2	0.5	0.3
Fluoranthene	DETSC 3301	0.1	mg/kg	1.9	4.5	1.8
Pyrene	DETSC 3301	0.1	mg/kg	1.1	3.5	1.2
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	0.7	2.3	0.6
Chrysene	DETSC 3301	0.1	mg/kg	1.0	2.3	0.5
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	0.6	2.0	0.5
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.4	1.2	0.3
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	0.8	2.1	0.7
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	0.6	1.5	0.6
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	0.1	0.2	0.2
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	0.6	1.7	0.8

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 19-02333
Client Ref PSL19/0847
Contract Title Greenwood, Gladeside Road Manchester

			Lab No	1456896	1456897	1456898
			Sample ID	BH1	BH2	BH3
			Depth	0.00-0.60	0.00-0.70	0.00-0.60
			Other ID			
			Sample Type	SOIL	SOIL	SOIL
			Sampling Date	n/s	n/s	n/s
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAH Total	DETSC 3301	1.6	mg/kg	8.4	23	8.2
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 19-02333
Client Ref PSL19/0847
Contract Greenwood, Gladeside Road Manchester

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1456896	BH1 0.00-0.60 SOIL		PG	Sample date not supplied, Anions 2:1 (365 days), Boron (365 days), BTEX (14 days), Mercury (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP (365 days), Metals ICP Prep (365 days), Naphthalene (14 days), Organic Matter (Manual) (28 days), PAH FID (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), EPH/TPH (14 days)	BTEX, Naphthalene, PAH FID, EPH/TPH
1456897	BH2 0.00-0.70 SOIL		PG	Sample date not supplied, Anions 2:1 (365 days), Boron (365 days), BTEX (14 days), Mercury (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP (365 days), Metals ICP Prep (365 days), Naphthalene (14 days), Organic Matter (Manual) (28 days), PAH FID (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), EPH/TPH (14 days)	BTEX, Naphthalene, PAH FID, EPH/TPH
1456898	BH3 0.00-0.60 SOIL		PG	Sample date not supplied, Anions 2:1 (365 days), Boron (365 days), BTEX (14 days), Mercury (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP (365 days), Metals ICP Prep (365 days), Naphthalene (14 days), Organic Matter (Manual) (28 days), PAH FID (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), EPH/TPH (14 days)	BTEX, Naphthalene, PAH FID, EPH/TPH

Information in Support of the Analytical Results

Our Ref 19-02333
Client Ref PSL19/0847
Contract Greenwood, Gladeside Road Manchester

Key: P-Plastic G-Bag

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix C

Inspection Pit Photographs

Inspection Pit Photographs

Photograph 1



Photograph 2



Photograph 3



Photograph 4



Photograph 5



Photograph 6



Photograph 7



Photograph 8



Photograph 9



Photograph 10



Photograph 11



Appendix D

Topsoil Laboratory Testing Results

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Client:	**Tarmac Trading Limited**
Project:	**Eaton Hall**
Job:	**Topsoil Analysis - BS3882:2015**
Date:	**17/09/2024**
Job Ref No:	**TOHA/24/1535/SS**

Sample Reference			**Eaton Hall Topsoil**
		Accreditation	
Clay (<0.002mm)	%	UKAS	2
Silt (0.002-0.063mm)	%	UKAS	9
Very Fine Sand (0.05-0.15mm)	%	UKAS	44
Fine Sand (0.15-0.25mm)	%	UKAS	30
Medium Sand (0.25-0.50mm)	%	UKAS	10
Coarse Sand (0.50-1.0mm)	%	UKAS	3
Very Coarse Sand (1.0-2.0mm)	%	UKAS	2
Total Sand (0.063-2.0mm)	%	UKAS	89
Texture Class (UK Classification)	--	UKAS	S
Stones (2-20mm)	% DW	GLP	1
Stones (20-50mm)	% DW	GLP	0
Stones (>50mm)	% DW	GLP	0
pH Value (1:2.5 water extract)	units	UKAS	8.8
Electrical Conductivity (1:2.5 water extract)	uS/cm	UKAS	744
Electrical Conductivity (1:2 $CaSO_4$ extract)	uS/cm	UKAS	2935
Exchangeable Sodium Percentage	%	UKAS	4.8
Organic Matter (LOI)	%	UKAS	5.3
Total Nitrogen (Dumas)	%	UKAS	0.22
C : N Ratio	ratio	UKAS	14
Extractable Phosphorus	mg/l	UKAS	76
Extractable Potassium	mg/l	UKAS	1421
Extractable Magnesium	mg/l	UKAS	134
Total Arsenic (As)	mg/kg	MCERTS	2.8
Total Cadmium (Cd)	mg/kg	MCERTS	< 0.2
Total Chromium (Cr)	mg/kg	MCERTS	5.6
Total Copper (Cu)	mg/kg	MCERTS	16
Total Lead (Pb)	mg/kg	MCERTS	13
Total Mercury (Hg)	mg/kg	MCERTS	< 0.3
Total Nickel (Ni)	mg/kg	MCERTS	5.2
Total Selenium (Se)	mg/kg	MCERTS	< 1.0
Total Zinc (Zn)	mg/kg	MCERTS	38
Water Soluble Boron (B)	mg/kg	MCERTS	< 1.0
Total Cyanide (CN)	mg/kg	MCERTS	< 1.0
Total (mono) Phenols	mg/kg	MCERTS	< 1.0
Naphthalene	mg/kg	MCERTS	< 0.05
Acenaphthylene	mg/kg	MCERTS	< 0.05
Acenaphthene	mg/kg	MCERTS	< 0.05
Fluorene	mg/kg	MCERTS	< 0.05
Phenanthrene	mg/kg	MCERTS	0.24
Anthracene	mg/kg	MCERTS	< 0.05
Fluoranthene	mg/kg	MCERTS	0.96
Pyrene	mg/kg	MCERTS	0.90
Benzo(a)anthracene	mg/kg	MCERTS	0.62
Chrysene	mg/kg	MCERTS	0.70
Benzo(b)fluoranthene	mg/kg	MCERTS	0.87
Benzo(k)fluoranthene	mg/kg	MCERTS	0.44
Benzo(a)pyrene	mg/kg	MCERTS	0.83
Indeno(1,2,3-cd)pyrene	mg/kg	MCERTS	0.43
Dibenzo(a,h)anthracene	mg/kg	MCERTS	0.09
Benzo(g,h,i)perylene	mg/kg	MCERTS	0.53
Total PAHs (sum USEPA16)	mg/kg	MCERTS	6.62
Aliphatic TPH >C5 - C6	mg/kg	MCERTS	< 0.010
Aliphatic TPH >C6 - C8	mg/kg	MCERTS	< 0.010
Aliphatic TPH >C8 - C10	mg/kg	MCERTS	< 0.010
Aliphatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0
Aliphatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0
Aliphatic TPH >C16 - C21	mg/kg	MCERTS	< 8.0
Aliphatic TPH >C21 - C35	mg/kg	MCERTS	< 8.0
Aliphatic TPH (C5 - C35)	mg/kg	MCERTS	< 10
Aromatic TPH >C5 - C7	mg/kg	MCERTS	< 0.010
Aromatic TPH >C7 - C8	mg/kg	MCERTS	< 0.010
Aromatic TPH >C8 - C10	mg/kg	MCERTS	< 0.020
Aromatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0
Aromatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0
Aromatic TPH >C16 - C21	mg/kg	MCERTS	< 10
Aromatic TPH >C21 - C35	mg/kg	MCERTS	< 10
Aromatic TPH (C5 - C35)	mg/kg	MCERTS	< 10
Benzene	mg/kg	MCERTS	< 0.005
Toluene	mg/kg	MCERTS	< 0.005
Ethylbenzene	mg/kg	MCERTS	< 0.005
o-xylene	mg/kg	MCERTS	< 0.005
p&m-xylene	mg/kg	MCERTS	< 0.005
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	MCERTS	< 0.005
Asbestos	ND/D	ISO 17025	Not-detected

S = SAND

Visual Examination

The sample was described as a light yellowish brown (Munsell Colour 10YR 6/4), slightly moist, non-plastic, non-calcareous SAND with a single grain structure. The sample was virtually stone-free and contained a low proportion of organic fines and occasional woody fragments. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

[redacted]

Ebony Gheorghe
BSc MSc
Soil Scientist

Results of analysis should be read in conjunction with the report they were issued with

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Tarmac Trading Limited

Appendix E

Hardcore Laboratory Testing Results

GRADATION ANALYSIS TEST REPORT

Product: **40/80MM GRADED LIMESTONE**

Material Code: **110L4043**

Supplied by: TUNSTEAD QUARRY

Customer:

Site Address:

Material type: Proprietary / Limestone

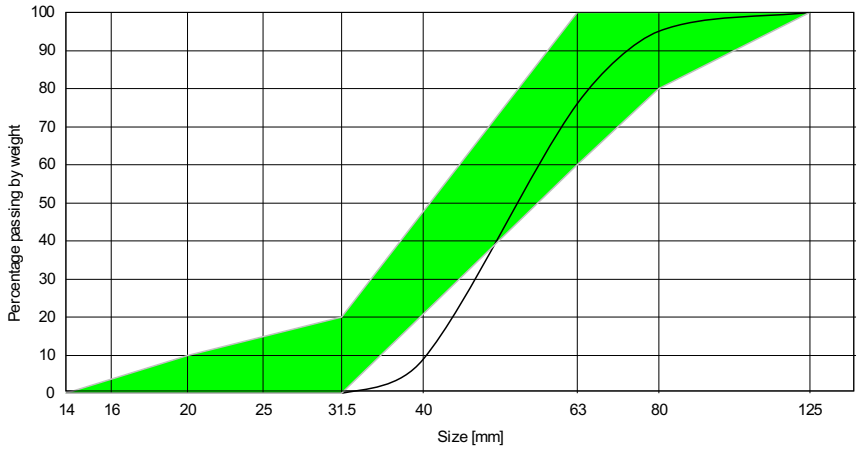
Sampled to: LPM 3.2 Methods for sampling aggregates

Prepared to: LPM 3.3 Aggregate reduction to test portion from a bulk sample

Test method: BS EN 933-1: 2012

Sample number	199
Ticket No	A20/288
Sampled by	LAB
Date Sampled	13/03/2020
Sample location	
Weather Conditions	

Remarks



Sieve Size (mm)	Percent passing	Specification	Complies (Spec)	Control limits	Complies (Ctrl)
150		-	-	-	-
125	100	100 - 100	Yes	-	-
80	95	80 - 100	Yes	-	-
63	76	60 - 100	Yes	-	-
40	9	-	-	-	-
31.5	0	0 - 20	Yes	-	-
25	0	-	-	-	-
20	0	0 - 10	Yes	-	-
16	0	-	-	-	-
14	0.0	-	-	-	-
Moisture content (%)	0.3				
Uniformity Coefficient	1				

Sampled By: LAB Tested By: DANIELS-HILL Date Tested: 13/03/2020

GRADATION ANALYSIS TEST REPORT

Product: **20/40MM SINGLE SIZE LIMESTONE**

Material Code: **110L2040**

Supplied by: TUNSTEAD QUARRY

Customer:

Site Address:

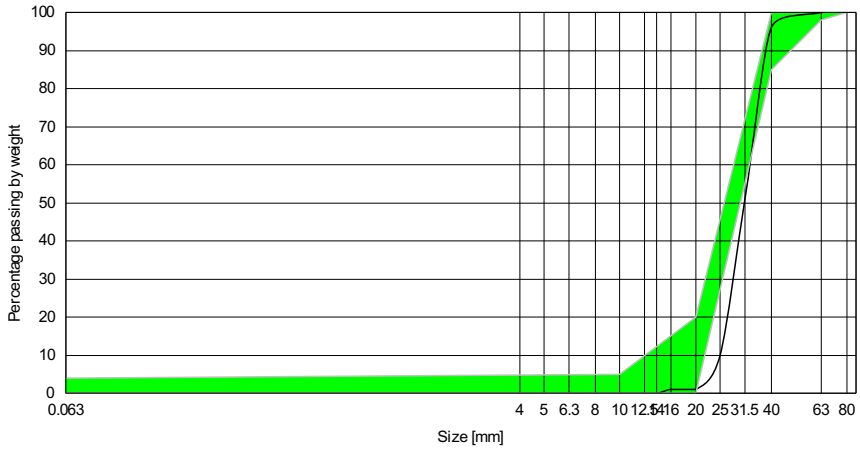
Material type: EN 12620 / EN 13043 / EN 13242 / Limestone

Sampled to: LPM 3.2 Methods for sampling aggregates

Prepared to: LPM 3.3 Aggregate reduction to test portion from a bulk sample

Test method: BS EN 933-1: 2012

Sample number	605
Ticket No	A23/817
Sampled by	DANIELS-HILL
Date Sampled	13/07/2023
Sample location	STOCK
Weather Conditions	
Remarks	



Sieve Size (mm)	Percent passing	Specification	Complies (Spec)	Control limits	Complies (Ctrl)
80	100	100	Yes	-	-
63	100	98 - 100	Yes	-	-
40	96	85 - 100	Yes	-	-
31.5	51	-	-	-	-
25	10	-	-	-	-
20	1	0 - 20	Yes	-	-
16	1	-	-	-	-
14	0	-	-	-	-
12.5	0	-	-	-	-
10	0	0 - 5	Yes	-	-
8	0	-	-	-	-
6.3	0	-	-	-	-
5	0	-	-	-	-
4	0	-	-	-	-
0.063	0.0	0 - 4.0	Yes	-	-
Moisture content (%)	0.1				
Uniformity Coefficient	1				

Sampled By: DANIELS-HILL Tested By: DANIELS-HILL Date Tested: 13/07/2023

AGGREGATE PROPERTIES REPORT

Unit :- **Tunstead**
Rock Type
Carboniferous Limestone
Aggregate Colour :-

TARMAC A CRH COMPANY (Central)
The Hub,Loughborough Rd,Mountsorrel,
Leicestershire
LE12 7GZ
Tel: +44 (0)116 2465000
Fax: +44 (0)

	Test Standard	Test Result	Aggregate Size	Date
Aggregate Abrasion Value	EN 1097-8	5.7	6/14mm	Jan 2023
Los Angeles Coefficient	EN 1097-2	24	6/14mm	Jan 2023
Magnesium Sulfate Value	EN 1367-2	1	6/14mm	Jan 2023
Micro-Deval Coefficient	EN 1097-1	14	6/14mm	Jan 2023
PSV	EN 1097-8	41	4/10mm	Jan 2023

Acid Soluble Sulfate Content	EN 1744-1 cl12	<0.1 (SO3/SO4)	0/2mm / 0-4mm Washed	Jan 2023
Acid Soluble Sulfate Content	EN 1744-1 cl12	<0.1(SO3/SO4)	0/4mm	Jan 2023
Acid Soluble Sulfate Content	EN 1744-1 cl13	0.04 / 0.53 (SO4)	0/2mm / 0-4mm Washed	Jan 2023
Acid Soluble Sulfate Content	EN 1744-1 cl13	0.13	0/4mm	Jan 2023
Water Soluble Sulfate	EN 1744-1 cl10	<0.01(SO3/SO4)	0/2mm / 0-4mm Washed	Jan 2023
Water Soluble Sulfate	EN 1744-1 cl10	<0.01(SO3/SO4)	0/4mm	Jan 2023
Water Soluble Chloride	EN 1744-1 cl7	<0.001	0/2mm / 0-4mm Washed	Jan 2023
Water Soluble Chloride	EN 1744-1 cl7	0.007	0/4mm	Jan 2023
Total Sulfur	EN 1744-1 cl11	<0.1 / <0.1	0/2mm / 0-4mm Washed	Jan 2023
Total Sulfur	EN 1744-1 cl11	<0.1	0/4mm	Jan 2023
Carbon Dioxide	EN 196	38.68% / 37.8%	0/2mm / 0-4mm Washed	Jan 2023
Carbon Dioxide	EN 196	40.73%	0/4mm	Jan 2023
Calcium Carbonate Equivalent	EN 196	87.91% / 85.91%	0/2mm / 0-4mm Washed	Jan 2023
Calcium Carbonate Equivalent	EN 196	92.57%	0/4mm	Jan 2023
pH Value	BS 1377-3	8.3 / 8.4	0/2mm / 0-4mm Washed	Jan 2023
pH Value	BS 1377-3	8.5	0/4mm	Jan 2023

		0/2mm	0/4mm	0/4mm Washed	10-63 Feb22	20/32mm	Date
Loose Bulk Density	EN 1097-3	1.55	1.62	1.44	1.34	1.35	Jan-23
Compacted Bulk Density	EN 1097-3	1.8	1.82	1.81	1.49	1.52	Jan-23
Apparent Particle Density	EN 1097-6	2.69	2.71	2.68	2.7		Jan-23
S.S.D. Density	EN 1097-6	2.67	2.7	2.67	2.68		Jan-23
Oven Dry Density	EN 1097-6	2.67	2.69	2.67	2.67		Jan-23
Water Absorption	EN 1097-6	0.3	0.3	0.1	0.4		Jan-23
Void Content%	EN 1097-3				50		
Void Content Compacted%	EN 1097-3				44		

Chemical Analysis - XRF %				
0/2mm / 0/4mm / 0/4mm Washed	Al_2O_3	0.16 / 0.54 / 0.31	CaO	54.65 / 54.44 / 54.03
0/2mm Jan 2023	Fe_2O_3	0.24 / 0.14 / 0.55	K_2O	<0.01 / 0.04 / 0.05
0/4mm 2023 & 0-4mm Wsh 2023	TiO_2	<0.01 / <0.01 / 0.02	P_2O_5	0.03 / 0.03 / 0.03
0/4mm Loss on Ignition 43.1%	MgO	0.53 / 0.35 / 0.49	Mn_2O_3	0.02 / 0.01 / 0.03
0/4 Wsh Loss on Ignition 42.7%	SiO_2	1.09 / 1.37 / 1.62	BaO	<0.01 / <0.01 / 0.03
0/2mm Loss on Ignition 43.2%	So_3	0.15 / 0.06 / 0.23	Na_2O	<0.02 / <0.02 / 0.02

Additional Tests	Test Standard	Test Result	Aggregate Size	Date
Methylene Blue Value	BS:933-9	0.5 / 0.5	0/2mm / 0/4mm Washed	Jan 2023
Methylene Blue Value	BS:933-9	1.3	0/4mm	Jan 2023
Bond Work Index	EPRI	9.6kWhr/t	14mm-dust FGD	Feb 2023
Mass of lightweight particles	BS:1744-1	<0.1	0/2mm / 0/4mm Washed	Jan 2023
Mass of lightweight particles	BS:1744-1	<0.1	0/4mm	Jan 2023
Organic Content	BS:1377-3	0.2 / 0.3 / 0.2	0/2mm / 0/4mm / 0/4mm Washed	Feb 2019
Organic Contaminators (Mortar)	BS:1744-1 CL15.3	on request	0/2mm / 0/4mm / 0/4mm Washed	Jan 2023

AGGREGATE PROPERTIES REPORT

Unit :-	**Tunstead**
Rock Type	
Carboniferous Limestone	
Aggregate Colour :-	

TARMAC A CRH COMPANY (Central)
The Hub,Loughborough Rd,Mountsorrel,
Leicestershire
LE12 7GZ
Tel: +44 (0)116 2465000
Fax: +44 (0)

	Test Standard	Test Result	Aggregate Size	Date
Acid Soluble Sulfate Content	EN 1744-1 cl12	<0.1	4/20mm	Jan 2O23
Acid Soluble Sulfate Content	EN 1744-1 cl13	<0.03 (SO4)	4/20mm	Jan 2O23
Water Soluble Sulfate	EN 1744-1 cl10	<0.01(SO3/S04)	4/20mm	Jan 2O23
Water Soluble Sulphate	BS 1377(TRL 447)	62mg/L (SO4)	4/20mm	Mar 2O20
Water Soluble Chloride	EN 1744-1 cl7	<0.001	4/20mm	Jan 2O23
Total Potential Sulphate	BS 1377(TRL 447)	0.06	4/20mm	Mar 2O20
Total Sulphur	BS 1377(TRL 447)	0.02	4/20mm	Mar 2O20
Total Sulfur	EN 1744-1 cl11	<0.1	4/20mm	Jan 2O23
Oxidisable Sulphides	BS 1377(TRL 447)	0.02	4/20mm	Mar 2O20
Carbon Dioxide	EN 196	41.32%	4/20mm	Jan 2O23
Calcium Carbonate Equivalent	EN 196	93.91%	4/20mm	Jan 2O23
pH Value	BS 1377-3	8.5	4/20mm	Jan 2O23

	Test Standard	4/20mm	2/6mm	4/10mm	6/14mm	10/20mm	Date
Loose Bulk Density	EN 1097-3	1.42	1.36	1.33	1.36	1.36	Jan-23
Compacted Bulk Density	EN 1097-3	1.6	1.53	1.50	1.53	1.5	Jan-23
Apparent Particle Density	EN 1097-6	2.69	2.7	2.67	2.7	2.69	Jan-23
S.S.D. Density	EN 1097-6	2.67	2.61	2.64	2.68	2.67	Jan-23
Oven Dry Density	EN 1097-6	2.66	2.55	2.63	2.67	2.65	Jan-23
Water Absorption	EN 1097-6	0.4	2.2	0.6	0.5	0.5	Jan-23
Flakiness Index	EN 933-3						
Shape	EN 933-4						
Void Content %	EN 1097-3						
Void Content Compacted %	EN 1097-3						

Additional Tests	Test Standard	Test Result	Aggregate Size	Date
Mass of lightweight particles	BS:1744-1	<0.1	4/20mm	Jan 2O23
MSV	DWFS	12	0/4mm	March 2O19
MSV	DWFS	3	2/6mm	March 2O19
MSV	DWFS	2	4/10mm	July 2O21
MSV	DWFS	2	6/14mm	March 2O19
MSV	DWFS	1	10/20mm	July 2O21
Petrographic Report	EN 932-3	Limestone	6/14mm	June 2O22
Major>10%		LOW ASR		
Dry Shrinkage	EN 1367-4	O.026%	0/2mm	Jan 2O23
Dry Shrinkage	EN 1367-4	O.016%	0/4mm washed	Jan 2O23
Dry Shrinkage	EN 1367-4	O.007%	Tunstead Coarse/Washed Fines	Aug 2O20
Dry Shrinkage	EN 1367-4	0.023%	0/4mm	Jan 2O22

Issued By : Date of Issue : 28 February 2023

David St Dennis

Technical Systems Manager

Notes

1. The above data is provided in good faith as a guide to typical values and does not constitute a specification
2. The company reserves the right to revise the data at any time
3. Individual Certification available on request