

CCG-C-18-10096

**PHASE I / PHASE II GROUND
INVESTIGATION REPORT FOR
SITE AT**

**CROSS LANE / CARRS TERRACE,
WHISTON, MERSEYSIDE**

MAY 2024



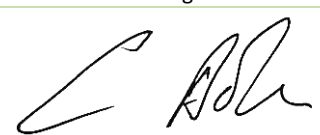
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DOCUMENT CONTROL FORM

Client:	CL DEVELOPMENTS LTD
Project Title:	PHASE I / PHASE II GROUND INVESTIGATION REPORT FOR SITE AT CROSS LANE / CARRS TERRACE, WHISTON, MERSEYSIDE
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Date:	May 2024
Revision Number:	0
Comments:	
Status:	FINAL
Distribution:	CL DEVELOPMENTS LTD

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1.0 INTRODUCTION

CC GEOTECHNICAL LIMITED (CCG) is providing consultancy services to **YOUNG HOMES LTD (The Contractor)** on behalf of **CL DEVELOPMENTS LTD (The Client)** in connection with the construction of 30nr apartments across 3nr Blocks, with associated parking and landscaped areas at Cross Lane / Carrs Terrace, Whiston, Merseyside.

The site has been investigated in two stages. The 1st stage was carried out January 2018 and related to the northeastern half of the site, with the 2nd stage comprising of the remaining southwestern half, which was carried out August 2022. A site walkover was carried out prior to commencing the 2nd stage, to confirm that the site remained unchanged. A further site walkover was carried out in May 2024 to again confirm that site conditions remained unchanged. Each of these inspections confirmed that no discernible changes had taken place and the findings of each stage of investigation remain valid.

The proposed site layout is presented on **PADDOCK JOHNSON LIMITED** architectural drawing 21041-PJS-00-00-DR-A-100-H contained in Appendix A.

The proposed development falls within the administrative jurisdiction of **KNOWSLEY METROPOLITAN BOROUGH COUNCIL**. At the time of reporting no formal planning consent had been granted.

In anticipation of the granting of planning consent, a combined desk study and ground investigation report was prepared, to provide environmental and geotechnical data relevant to the planning, design, and construction of the project. The findings of these studies and investigations are discussed hereunder.

This report should be read in conjunction with the Notes on Limitations, given in Appendix K.

2.0 PURPOSE & AIMS OF THE STUDY & INVESTIGATION

The primary aim of the Phase I Desk Study was to assess whether the site is likely to be affected by contamination, to an extent that it may pose a risk to human health and/or the built environment and/or the wider natural environment or is affected by any other natural or artificial feature which may impact on the proposed development. Specific tasks undertaken to achieve this were as follows:

- A review of available information including historical mapping, commercial environmental databases, and Environment Agency Data
- The undertaking of a site walkover
- The development of a Preliminary Conceptual Model

The main purpose of the Phase II Intrusive Investigation was to confirm the conclusions of the desk study, with reference to:

- The assessment of the nature and extent of contamination in relation to potential risks to human health for end users, construction workers, and worker occupants of adjacent properties
- The assessment of the nature and extent of contamination in relation to potential risks to controlled waters
- The assessment of the nature and extent of contamination in relation to potential risks to the fabric of buildings and services
- The refinement of the Preliminary Conceptual Model confirming those pollution linkages that have been demonstrated to be present
- The identification of feasible remediation measures to remove or break the identified pollution linkages

- The provision of information and interpretative comment on ground conditions in relation to foundation selection / design / construction, and the design of associated infrastructure.

3.0 SITE DATA

3.1 Site Location

The site comprises an irregularly shaped parcel of vacant land, approximating to an area of 4000m² and located at the junction of Cross Lane and Carrs Terrace, Whiston, Knowsley, Merseyside, L35 3QQ, as illustrated on **SNOOK ARCHITECTS** Drawing No. 105 contained herein.

The approximate **Ordnance Survey** coordinates for the overall site centre are 346759E, 391395N. It stands at an approximate elevation of c. 44.5maOD.

3.2 Site Description & Walkover Observations

The site is set in a residential / high street context, bound to the north by Carrs Terrace, to the east by Cross Lane, residential properties to the south, and Stadt Moers Park to the west.

Photographs of the site (taken May 2024) are presented in Appendix B.

The site comprises of a derelict parcel of land, largely comprising soft landscaping with localised stockpiles of vegetation and felled trees. The remnants of a former fuel filling station and forecourt are present in the northeast part of the site. In the southwest part of the site are the remnants of a demolished former scout hut.

The surface topography across the site rises slightly from east (44.1m AOD) to west (44.8m AOD). At the time of undertaking the site walkover survey, there was no visual evidence of potential contamination sources on the major proportion of the site, although the former fuel filling station must be considered as potentially contaminated.

The information obtained from the visit is summarised in Table 1 hereunder.

Table 1: Summary of Walkover Observations

FEATURE	OBSERVATION
Current use of proposed development Land	Disused Land
Context	Suburban residential setting
Surface & Topography	The site comprised of a derelict parcel of land, largely soft landscaping with localised stockpiles of vegetation and felled trees. Concrete / tarmac is present at the location of the former fuel filling station forecourt. The surface topography across the site rises slightly from east (44.1m AOD) to west (44.8m AOD).
Dimensions	Approximately 95m x 25m, its long axis being on a northeast-southwest alignment.
Access	Vehicle / pedestrian access to the site via Cross Lane.
Buildings Adjacent to the Site	The site is bound to the north by Carrs Terrace, Cross Lane to the east, residential properties to the south and Stradt Moers Public Park to the west
Services	None observed, although likely to be present
Material storage	None observed
Waste disposal	None observed
Other potential contamination	None observed, although contaminants associated with the former filling station may be present. Buried fuel storage tanks may also remain on site.

4.0 SITE HISTORY

The history of the site and its immediate surrounds was investigated by consultation with a range of archive resources. Geographical information, historical mapping and environmental data were primarily based on a GroundSure Environmental Report (Reference No. CMAPS-AAG-682480-4165-120118, dated January 2018), presented in Appendix I.

A summary of the historical mapping data is given hereunder:

Table 2: Historical Map Review

YEAR	SCALE	ON SITE	ADJACENT TO SITE	<250M
1850	1:10,560	Vacant / agricultural land	NE: Stank Lane [road] SE/ SW: Vacant / agricultural land NW: Path/road	Much of the land surrounding the site has not been developed, and is therefore vacant/agricultural c.240m NE: Pond Much of the land to the SW of the site forms part of Carrs Colliery
1891 1892	1:10,560 1:2,500	Water Body occupying most of the site, extending beyond the SW boundary	SW: Water body NW: Unspecified properties	c.60m SW: Railway line, extending to the S c.75m SW: Shaft c.140m S: Magazine c.210m SE: Magazine c.250m S: Prescott Colliery Carrs Colliery to the SW of the site now recognised as 'Disused'
1906 1907 1925 1927	1:10,560 1:2,500 1:10,560 1:2,500	Water body no longer recognised	Water body no longer recognised SE: Stank Lane recognised as 'Cross Lane' in 1925 mapping	c.60-250m S: Railway lines no longer recognised c.75m SW: Shafts now recognised as 'Old Shafts' c.140m S / c.210m SE: Magazines no longer recognised c.250m S: Prescott Colliery now recognised as 'Disused'
1937 1938	1:2,500 1:10,560	No significant change	SE: Residential properties and associated gardens delineating Lancaster Avenue to the SE	Residential properties (mostly semi-detached) and associated gardens delineate Cross Lane
1947-50	1:10,560	No significant change	No significant change	Much of the land to the NE of the site developed for residential land use
1955 1955 1956	1:1,250 1:2,500 1:10,560	1nr residential property in the northeastern-most corner of the site. 1nr unspecified property located at approximately the centre of the SE boundary	No significant change	Much of the land to the N/NW of the site developed for residential land use
1956-61 1964 1965 1966	1:1,250 1:2,500 1:1,250 1:10,560	Footpath cross the site on a N-S alignment	No significant change	No significant change
1969-72 1978	1:1,250 1:10,000	A 3 rd unspecified property located in the SW portion of the site	No significant change	No significant change
1983-84 1990 1988-93 2002 2010 2014	1:1,250 1:10,000 1:1,250 1:10,000 1:10,000 1:10,000	4 th unspecified structure adjacent to the 3 rd property – assumed canopy associated with fuel filling station	No significant change	No significant change

5.0 ENVIRONMENTAL SETTING

5.1 Documented Geology

The **BGS** superficial drift mapping data indicates that the site is underlain by natural drift deposits of Till, Devensian – sedimentary superficial deposits from the Quaternary period.

The underlying solid geology is documented to largely comprise of Ravenhead Rock – Sandstone from the Carboniferous period. The area to the extreme south of the site borders Pennine Lower Coal Measures Formation - Mudstone, siltstone and sandstone. Sedimentary bedrock formed during the Carboniferous period.

As with all previously developed sites, made ground soils of an unknown thickness, composition and lateral extent may underlie parts of the site.

The '*Indicative Atlas of Radon in England and Wales*' (Miles. J.C.H *et.al*, 2007) Map 13 '*Northern Welsh Marches and Liverpool*', shows the site to be situated within an area where it is believed that less than 1% of the properties within the area are affected by Radon and therefore no Radon Protection Measures will be required for new structures in contact with the ground.

Geological Information obtained from the GroundSure Environmental Report is presented in Appendix I, and summarised hereunder:

Table 3: Summary of Geological Data from GroundSure Report

GEOLOGY		
Data	Distance	Comments
Artificial Ground	N/A	If present, artificial ground and/or reworked ground deposits associated with the development of the site & its immediate surroundings
Superficial Deposits / Drift Geology	On Site	Till, Devensian
Permeability of Superficial deposits	Maximum Permeability	High
	Minimum Permeability	Low
Bedrock and Solid Geology	On Site	Pennine Lower Coal Measures
Permeability of Bedrock: On Site	Minimum Permeability	High
	Maximum Permeability	Low
Geological Lines of Weakness	On Site	No records
	<250m	32m SW Marine band 161m S Coal Seam, inferred 174m S Coal Seam, inferred 214m NE Coal Seam, inferred
Radon Affected Area	On Site	The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level
Radon Protection	On Site	No radon protective measures are necessary
MINING, GROUNDWORKINGS AND NATURAL CAVITIES		
Data	Distance	Comments
Historical Surface Ground Working	<250m	On Site: Colliery [1891] / Disused Colliery [1906] On Site: Unspecified Pit [1906] On Site: Pond [1891] 2m SW: Colliery [1925] 54m S: Colliery [1891] 74m SW: Unspecified Heap [1947] 88-89m SW: Unspecified Ground Workings [1906-25] 91m SW: Unspecified Heap [18981] 111m S: Unspecified Ground Workings [1947] 115m S: Unspecified Ground Workings [1947] 117m SW: Unspecified Ground Workings [1966] 121m SW: Refuse Heap [1947] 124m SW: Pond [1891] 139m SW: Refuse Heap [1966] 150m SW: Unspecified Heap [1947] 167-69m SE: Disused Colliery [1906-25] 203m SW: Unspecified Heap [1966] 207m SE: Pond [1891-1947] 210m S: Unspecified Pit [1947] 213m SE: Pond [1947] 213m S: Cuttings [1891-1947] 214m NE: Pond [1891] 217-18m NE: Pond [1906-25] 220m W: Unspecified Ground Workings [1966] 238m SE: Unspecified Heap [1966] 242-43m SE: Unspecified Heap [1925-47] 242m SE: Refuse Heap [1906]
Historical Underground Workings	<1000m	On Site: Colliery [1891] / Disused Colliery [1906] 2m SW: Colliery [1925] 48m SW: Disused Shaft [1975-90] 50m SW: Disused Shaft [1966] 53m SW: Unspecified Old Shafts [1947] 54m S: Colliery [1891] 58m SW: Unspecified Old Shafts [1925-47] 59m SW: Unspecified Disused Shafts [1966] 54m SW: Unspecified Old Shafts [1947] 69m SW: Unspecified Old Shafts [1925-47] 87m SW: Unspecified Old Shafts [1947] 135m SW: Unspecified Old Shafts [1947] 167-69m SE: Disused Colliery [1906-25] 261m S: Unspecified Old Shafts [1990] 276m S: Unspecified Old Shafts [1947] 278m S: Unspecified Old Shafts [1925-47] 296m SE: Unspecified Disused Shafts [1990] 311m SE: Unspecified Old Shafts [1925] 318m SE: Unspecified Old Shafts [1925] 356m SE: Unspecified Old Shafts [1947] 379m SE: Unspecified Old Shafts [1947]

		390m SE: Unspecified Old Shaft [1947] 680m SW: Colliery [1891] 823m SW: Unspecified Old Shaft [1925] 845m SW: Unspecified Old Shaft [1891] 851m N: Unspecified Old Shaft [1925] 854m N: Unspecified Old Shaft [1908] 867m SW: Disused Colliery [1906] 900m NW: Unspecified Shaft [1891] 900m N: Unspecified Old Shaft [1891] 915m N: Unspecified Old Shaft [1925] 919m N: Unspecified Old Shaft [1906] 940m NW: Unspecified Old Level [1947] 958m W: Old Trial Level [1906] 958m W: Unspecified Old Levels [1925-47] 973m W: Old Trial Levels [1906] / Unspecified Old Levels [1925-47] 997m S: Unspecified Disused Mine [1966] 997-98m S: Disused Colliery [1906-47]
BGS Current Ground Workings	<1000m	On Site: Colliery [1891] / Disused Colliery [1906] 2m SW: Colliery [1925] 48m SW: Unspecified Disused Shaft [1975-90] 50m SW: Unspecified Disused Shaft [1966] 53m SW: Unspecified Old Shaft [1947] 54m S: Colliery [1891] 58m SW: Unspecified Old Shafts [1925-47] 59m SW: Unspecified Disused Shafts [1966] 64m SW: Unspecified Old Shafts [1947] 69m SW: Unspecified Old Shafts [1925-47] 87m SW: Unspecified Old Shafts [1947] 135m SW: Unspecified Old Shafts [1947] 167m SE: Disused Colliery [1925] 169m SE: Disused Colliery [1906] 261m S: Unspecified Disused Shafts [1990] 276m S: Unspecified Old Shafts [1947] 278m S: Unspecified Old Shafts [1925-47] 296m SE: Unspecified Disused Shafts [1990] 311m SE: Unspecified Old Shafts [1925] 318m SE: Unspecified Old Shafts [1925] 356m SE: Unspecified Old Shafts [1947] 379m SE: Unspecified Old Shafts [1947] 390m SE: Unspecified Old Shafts [1947] 680m SW: Colliery [1891] 823m SW: Unspecified Old Shaft [1925] 845m N: Unspecified Old Shaft [1891] 851m N: Unspecified Old Shaft [1925] 854m N: Unspecified Old Shaft [1906] 867m SW: Disused Colliery [1906] 900m NW: Unspecified Shaft [1891] 900m N: Unspecified Old Shaft [1891] 915m N: Unspecified Old Shaft [1925] 919m N: Unspecified Old Shaft [1906] 940m NW: Unspecified Old Level [1947] 958m W: Old Trial Levels [1906] / Unspecified Old Levels [1925-47] 973m W: Old Levels [1906] / Unspecified Old Levels [1925-47] 997m S: Unspecified Disused Mine [1966] 997-98m S: Disused Colliery [1906-47]
Historical Mining areas	<1000m	On Site: Colliery [1891] / Disused Colliery [1906] 2m SW: Colliery [1925] 48m SW: Unspecified Disused Shaft [1975-90] 50m SW: Unspecified Disused Shaft [1966] 53m SW: Unspecified Old Shaft [1947] 54m S: Colliery [1891] 58m SW: Unspecified Old Shafts [1925-47] 59m SW: Unspecified Disused Shafts [1966] 64m SW: Unspecified Old Shafts [1947] 69m SW: Unspecified Old Shafts [1925-47] 87m SW: Unspecified Old Shafts [1947] 135m SW: Unspecified Old Shafts [1947] 167m SE: Disused Colliery [1925] 169m SE: Disused Colliery [1906] 261m S: Unspecified Disused Shafts [1990] 276m S: Unspecified Old Shafts [1947] 278m S: Unspecified Old Shafts [1925-47] 296m SE: Unspecified Disused Shafts [1990] 311m SE: Unspecified Old Shafts [1925]

		318m SE: Unspecified Old Shafts [1925] 356m SE: Unspecified Old Shafts [1947] 379m SE: Unspecified Old Shafts [1947] 390m SE: Unspecified Old Shafts [1947] 680m SW: Colliery [1891] 823m SW: Unspecified Old Shaft [1925] 845m N: Unspecified Old Shaft [1891] 851m N: Unspecified Old Shaft [1925] 854m N: Unspecified Old Shaft [1906] 867m SW: Disused Colliery [1906] 900m NW: Unspecified Shaft [1891] 900m N: Unspecified Old Shaft [1891] 915m N: Unspecified Old Shaft [1925] 919m N: Unspecified Old Shaft [1906] 940m NW: Unspecified Old Level [1947] 958m W: Old Trial Levels [1906] / Unspecified Old Levels [1925-47] 973m W: Old Levels [1906] / Unspecified Old Levels [1925-47] 997m S: Unspecified Disused Mine [1966] 997-98m S: Disused Colliery [1906-47]
Coal Mining areas	<1000m	The study site is located within the specified search distance of an identified mining area
Non-Coal Mining areas	<1000m	681m E: Vein Mineral: Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered
Non-Coal Mining cavities	<1000m	No records
Natural Cavities	<1000m	No records
Gypsum Extraction areas	<1000m	No records
Tin Mining areas	<1000m	No records
Clay Mining areas	<1000m	No records
HAZARDS		
Data	Distance	Comments
Maximum Shrink-Swell hazard rating	On site	Very Low
Maximum Landslide hazard rating	On site	Very Low
Maximum Soluble Rocks hazard rating	On site	Negligible
Maximum Compressible Deposits hazard rating	On site	Negligible
Maximum Collapsible Deposits hazard rating	On site	Very Low
Maximum Running Sand hazard rating	On site	Very Low

5.2 Historical Coal Mining

The appended environmental data, **BGS** mapping data suggests sandstone to be present beneath the site. However, it is known that coal is present in the local area, and therefore considered prudent to procure a **COAL AUTHORITY** mining report. The report is presented in Appendix G.

5.3 Hydrology and Hydrogeology

Information on hydrology and hydrogeology obtained from a GroundSure Environmental Report is presented in Appendix I, and summarised hereunder:

Table 4: Summary of Hydrology and Hydrogeological Data from GroundSure Environmental Report

HYDROGEOLOGY AND HYDROLOGY		
Aquifer within Superficial Drift Deposits	On site	Till - Secondary (undifferentiated): In general terms these layers have previously formerly classified as minor and non-aquifers
Aquifer within Bedrock Deposits	On site	Mudstone – Secondary A: Permeable layers 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.
Groundwater Abstraction Licenses	<1000m	No Records
Surface Water Abstraction Licenses	<1000m	No records
Potable Water Abstraction Licences	<1000m	No records
Source Protection Zones	<500m	483m E: Zone 3 [Total Catchment]
Environment Agency information on groundwater	<500m	On Site: Minor Aquifer / High Leaching Potential (HU)

vulnerability and soil leaching potential		480m E: Major Aquifer / High Leaching Potential (HU)
Nearest surface water body	<250m	No records
EA information on biological quality of river	<1500m	1001m NW: Ditton Bank – Prescott Stw to Fox's Bank. Grade E [2009] 1001m NW: Ditton Bank – Knowsley Park to Prescott Stw. Grade C [2009]
Detailed River Networks	<500m	No records
FLOODING		
Environment Agency indicative Zone 2 floodplains	<250m	No records
Environment Agency indicative Zone 3 floodplains	<250m	No records
Are there any Flood Defences within 250m of the study site?	<250m	No
Are there any areas used for Flood Storage?	<250m	No
Are there any BGS groundwater flooding susceptibility flood areas	<50m	Yes – Clearwater Flooding
What is the BGS Flood Risk Susceptibility Rating?	On site	Potential at Surface

For simplified interpretation, the geological succession underlying the site may be regarded as a series of discrete units in terms of their hydrogeological significance, as illustrated hereunder:

Table 5: Hydrogeological Interpretation

UNIT	PROPERTIES	HYDROGEOLOGICAL DESIGNATION
Made / Reworked Ground	If present, likely to be generally granular and permeable and will permit vertical and lateral transmission of groundwater.	Unproductive Aquifer
Till Deposits	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	Secondary (undifferentiated)
Pennine Lower Coal Measures	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	Secondary A

5.4 Further Environmental Data

Environmental data was researched using several sources including Environment Agency Maps and GroundSure EnviroSight Report presented in Appendix I and is summarised hereunder in Table 6. This environmental data has been used to carry out a Preliminary Qualitative Risk Assessment (Tier 1) and formulate the preliminary conceptual model as discussed in Section 20.0 of this report.

Table 6: Summary of Environmental Data

POTENTIALLY CONTAMINATIVE USES IDENTIFIED FROM 1:10,000 SCALE MAPPING		
Data	Distance	Comments
Historical industrial land uses	<100m	On Site - Unspecified Pit [1906] On Site - Colliery [1891] On Site - Disused Colliery [1906] On Site - Disused Colliery [1938] On Site - Disused Colliery [1938] 2m SW - Colliery [1925] 32m SW - Railway Sidings [1891] 48m SW - Unspecified Disused Shaft 1990 48m SW - Unspecified Disused Shaft 1975 50m SW - Unspecified Disused Shaft 1966 53m SW - Unspecified Old Shafts 1955 54m S - Colliery 1891 54m S - Railway Sidings 1891 57m SW - Unspecified Old Shafts 1938 57m SW - Unspecified Old Shafts 1938 58m SW - Unspecified Old Shafts 1947 58m SW - Unspecified Old Shafts 1925 59m SW - Unspecified Disused Shaft 1966 64m SW - Unspecified Old Shafts 1955 68m SW - Unspecified Old Shafts 1938 68m SW - Unspecified Old Shafts 1938 69m SW - Unspecified Old Shafts 1925 69m SW - Unspecified Old Shafts 1947 74m SW - Unspecified Heap 1955 87m SW - Unspecified Old Shafts 1947 88m SW - Unspecified Ground Workings 1925 89m SW - Unspecified Ground Workings 1906 89m SW - Unspecified Ground Workings 1938

		89m SW - Unspecified Ground Workings 1938 91m SW - Unspecified Heap 1891 97m S - Unspecified Ground Workings 1938
Historical tanks	<250m	No records
Historical energy features	<100m	86m SE: Electric Sub-Station [1972] 87m SE: Electric Sub-Station [1984]
Historical petrol stations	<250m	No records
Historical garages	<250m	No records
Historical military land	<250m	No records
Records of Current Industrial Land Use		
Data	Distance	Comments
Current industrial land uses	<250m	95m SE: Electric Sub-Station
Petrol & Fuel Sites	<250m	115m NE: Wilson Green Filling Station
Underground High Pressure Oil and Gas Pipelines	<250m	No records
WASTE AND LANDFILL		
Data	Distance	Comments
Environment Agency Historical Landfill Sites	<500m	7m SW: Whiston Tip 379m: Whiston Tip 469m SW: Coalgate Lane Landfill Site 472m SW: Whiston Tip
LA Authority Landfill Sites	<500m	No records
Environmental Agency Licenced Waste Sites	<500m	No records
BGS/DoE non-operational landfill sites	<500m	No records
Operational Waste Treatments, Transfer or Disposal Sites	<500m	No records
Non-Operational Waste Treatments, Transfer or Disposal Sites	<500m	No records
ENVIRONMENTAL DESIGNATIONS		
Data	Distance	Comments
Sites of Special Scientific Interest (SSSI)	<500m	No records
Ramsar sites	<500m	No records
Special Areas of Conservation (SAC)	<500m	No records
Special Protection Areas (SPA)	<500m	No records
National Nature Reserves (NNR)	<500m	No records
Local Nature Reserves (LNR)	<500m	No records
Nitrate Vulnerable Zones	<500m	No records

6.0 ARCHAEOLOGICAL DATA

Examination of historical maps indicates no features of significant archaeological interest in the general vicinity of the site.

7.0 PRELIMINARY MINING RISK ASSESSMENT

By reference to the Consultants Coal Mining Report in Appendix G, the following observations are made:

- The property is in the likely zone of influence from workings in 5 seams of coal from 70m to 290m deep, and last worked in 1895. The Coal Authority express the opinion that any ground movement from these coal workings should have stopped by now
- No known mine entries within 20m of the site
- The Authority is not aware of any evidence of damage arising due to geological faults or lines of weakness that have been affected by coal mining
- There is no record of mine gas emissions requiring action by the Coal Authority within the boundary of the property.

The Coal Authority report does not state that there may be shallow reserves of coal which may have been worked and of which they have no knowledge. Notwithstanding the foregoing, it is concluded that that part of the site underlain by coal measures may be at risk of surface instability.

8.0 PETROLEUM OFFICER REPORT

Given the former history of the site, with a fuel filling station present on the eastern section of the site fronting Cross Lane, a

petroleum officers report was procured. A search of the petroleum archive revealed the following information:

- 28th November 2007 – an Improvement Notice was issued to the then owner, Mr L Stockton, detailing that the underground tanks and all associated pipework were to be made safe.
- 30th July 2008 – an agreement was made with Mr L Stockton that the underground petroleum tanks would be made temporarily safe, ie water filled, by Neston Tank Cleaners Ltd. The agreement was for 12 months whilst planning approval for the site was obtained. The time allowed for works under the Improvement Notice was extended to the end of January 2009.
- 15th January 2009 - a visit to the site forecourt and the adjoining property revealed that they were unoccupied. No confirmation of water filling had been received.
- 26th February 2009 - Mr Stockton agreed to provide documentation confirming water filling of the tanks.
- 9th April 2009 – a request was made to Mr L Stockton for documentation confirming water filling of the tanks; no reply was received.
- 8th July 2009 – a request was made to Mr L Stockton for documentation confirming water filling of the tanks, no reply was received.
- The above summary identified that there was a proposal to water fill the petroleum tanks as a temporary measure. There is no evidence to suggest that the tanks have been made temporarily safe. Additionally, there is no evidence to confirm that the tanks have been made permanently safe.
- It is recommended that the tanks are properly surveyed to determine their condition and state before any work is carried out at the site.

A copy of the petroleum office report is presented in Appendix H. On the basis of this report a programme of tank removal must be undertaken, and a supplementary phase of ground investigation carried out following the tank removal and associated remedial works.

9.0 PREVIOUS SITE INVESTIGATIONS / REPORTS

Searches and consultations have not established evidence of previous site investigations having been undertaken on site.

10.0 PRELIMINARY QUALITATIVE RISK ASSESSMENT (TIER 1)

10.1 Introduction

The risk assessment methodologies adopted by **CCG** are based on current available guidance from several sources and are included in Appendix J.

The Tier 1 Risk Assessment and Preliminary Conceptual Model (PCM) were formulated using the information discussed above and based on the following assumptions:

- Construction of 30nr apartments across 3nr Blocks, with associated parking and landscaped areas
- Drinking water will be from a mains supply.

In constructing the Preliminary Conceptual Model (PCM), **CCG** applied the guidance contained in CIRIA C552: 2001. This recommends use of a Risk Matrix which classifies risk based on the product of Probability of a source being present, and the

Consequence of receptors being exposed to the source. Guidance tables setting out the classifications of probability and consequence together with a risk matrix are given in Tables 7-9 hereunder. In using this approach **CCG** generally recommends actual intrusive investigation of any Risk Classification of “*Moderate*” or over. In the case of residential housing, risk ratings of ‘*Low*’ may also warrant investigation.

Table 7: Matrix of consequences against probability to gain a risk classification [CIRIA C552, 2001]

		CONSEQUENCE			
		SEVERE	MEDIUM	MILD	MINOR
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate / Low Risk
	Likely	High Risk	Moderate Risk	Moderate / Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate / Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate / Low Risk	Low Risk	Very Low Risk	Very Low Risk

10.2 Preliminary Conceptual Model

By application of the risk assessment methodology outlined above, the following PCM was constructed. There is some evidence obtained from the desk study and site inspections of a significant risk of contamination being present on the site. The development and adjoining land may have resulted in the deposition of some deleterious matter at the boundary of the site, although none was evident from site inspection. On the basis of the absence of specific indicators, a precautionary approach to development of a Preliminary Conceptual Model was adopted as summarised in the table hereunder:

Table 8: Preliminary Conceptual Model (PCM)

POLLUTANT LINKAGE	SOURCE	PATHWAY	RECEPTOR	PROBABILITY	CONSEQUENCE	RISK RATING
1	Broad spectrum of heavy metals, aggressive pH, hydrocarbons, PAH's in superficial made ground fill deposits	Soil and / or soil dust ingestion	Construction workers Future occupants Offsite receptors	Likely	Medium	Moderate
2	Fuel filling station including associated infrastructure i.e storage tanks (above and/or below ground), piping, spillages, and leaks on forecourt	Soil and / or soil dust ingestion and inhalation Inhalation of vapours Vertical migration	Construction workers Future occupants Offsite receptors	Likely	Medium	Moderate
3	Asbestos containing materials (ACM) in superficial soils including demolition of former scout hut (i.e roofing) and fuel station (i.e lagging)	Fibre Inhalation	Construction workers Future occupants Offsite receptors	Likely	Severe (ACM)	High
4	Inhalation of ground gases from onsite or offsite sources i.e., made ground soils, reworked soil material on site, former colliery to south (Carrs Colliery) and organic soils	Inhalation	Future residents	Likely	Medium	Moderate
5	pH & Sulphate attack on concrete	Direct contact with concrete	Future building	Likely	Mild	Moderate / Low
6	Organic contamination in superficial soils	Direct contact with water mains	Potable water supply	Low	Medium	Moderate / Low

The contaminants of concern associated with those risks which require intrusive investigation were researched by reference to published industry profiles, and are summarised hereunder:

Table 9: Summary of Contaminants of Concern based on PCM

LINKAGE NO.	METALS	NON-METALS	ORGANICS	GASES	OTHERS
PL1 & PL2	Cd, Cr (total & hexavalent), Ni, Cu, Zn, Pb, Hg, Se	As, sulphates, sulphides, boron, free cyanide	TPHCWG, PAH's, BTEX, SOM	-	pH Asbestos (ACM)
PL3	-	-	-	-	Asbestos (ACM)
PL4	-	-	-	CH ₄ , CO ₂ , CO, H ₂ S	-
PL5	-	sulphates	-	-	pH
PL6	-	-	TPHCWG, BTEX	-	-
Summary (PL1 to PL5)	Cd, Cr, Ni, Cu, Pb, Hg, Se, Zn	As, sulphates	TPHCWG, BTEX PAH's, SOM	CH ₄ , CO ₂ , CO, H ₂ S	pH Asbestos

10.3 Summary of Risks

The foregoing analysis identified several potential risks, and if present, these could adversely impact on human or environmental receptors. Since no previous site investigation has been undertaken, an intrusive phase of investigation was undertaken to determine whether the postulated pollutant linkages are present on site.

11.0 SCOPE OF PHASE II INTRUSIVE INVESTIGATION

Based on the findings of the Phase I desk study and taking account of the potential presence of pollution linkages an intrusive investigation was undertaken.

The primary objectives of the investigation were to obtain soil & water contamination data to reliably assess risks to human and environmental receptors, and to provide engineering parameters on which suitable foundation solutions could be selected.

12.0 FIELDWORK

12.1 Introduction

A programme of fieldwork investigation was undertaken in two stages January 2018 (initial investigation) & August 2022 (supplementary investigation) and comprised the following:

- The sinking of 8nr boreholes (WS1 to WS8) by light dynamic sampling methods (initial investigation on land fronting Cross Lane (January 2018)
- The sinking of 5nr boreholes (WS101 to WS105) by light dynamic sampling methods (supplementary investigation on former scout hut land – August 2022)
- The installation of 50mm HDPE plain and slotted well-tube complete with non-lime pea gravel surround and bentonite seals together with associated headworks at 8nr borehole positions (WS1, WS3, WS4, WS6, WS8, WS101, WS103 & WS105)
- The subsampling of soils for geotechnical testing and geoenvironmental analyses
- The instigation of a gas – groundwater monitoring programme comprising 6nr rounds over a 3-month period

The fieldwork was planned and carried out in accordance with BS10175:2011+A2:2017 and BS5930:2015+A1:2020, and the sampling and monitoring methodologies employed by **CCG** presented in Appendix J.

The layout of the investigation is as annotated on **CCG** Drawing No. 1 presented in Appendix A.

12.2 Borehole Drilling & Monitoring Installations

12.2.1 Light Dynamic Sampling Boreholes

A total of 13nr boreholes were sunk across two areas of the site – the land on the frontage of Cross lane (8nr positions) and the land to the rear - former Scout hut (5nr positions). All boreholes were carried out using light dynamic sampling methods and sunk to depths of up to 5.0mbgl.

All borehole locations were positioned clear of all buried services and scanned using CAT cable avoidance scanner before and during hand excavation of a starter pit extending to 1.2mbgl. Boring tools were decontaminated prior to commencement.

In this method of investigation samples of subsoils are recovered by driving and extracting a series of reducing diameter 1m long steel tubes. Standard penetration test's (SPT's) were undertaken at regular depth increments. This method of sampling recovers relatively "undisturbed" soil profiles in Perspex tubes, which are used to line the steel tubes. The Perspex tubes were split and carefully logged and subsampled. Subsamples for potential chemical analysis were removed at appropriate positions from the profile and transferred to chilled amber glass jars and vials for laboratory analysis.

Logs of the boreholes, annotated with sampling details, SPT 'N' value are given in Appendix C.

12.2.2 Monitoring Installations

Standpipes comprising 50mm diameter HDPE plain and slotted well-tube set in bentonite and non-limestone pea gravel surround were installed at 8nr borehole positions. Each standpipe was fitted with a gas valve connector and was protected by a flush cover set in concrete.

Details of standpipe installations are provided on the relevant borehole logs in Appendix C and summarised in the tabulation hereunder:

Table 10: Borehole Installation Details

BOREHOLE	DEPTH OF BOREHOLE (mbgl)	DEPTH OF STANDPIPE [mbgl]	RESPONSE ZONE	
			FROM [mbgl]	TO [mbgl]
WS1	5.0m	4.5m	1.0m	4.5m
WS3	3.5m	3.4m	0.5m	3.4m
WS4	5.0m	3.5m	0.5m	3.5m
WS6	5.0m	4.0m	1.0m	4.0m
WS8	4.6m	3.8m	0.5m	3.8m
WS101	4.4m	3.0m	1.0m	3.0m
WS103	4.5m	2.0m	1.0m	2.0m
WS105	5.0m	3.0m	1.0m	3.0m

The standpipe installations were periodically monitored for flow rate and composition of ground gas using a Geotechnical Instruments GA infra-red analyser. The installations were also monitored for standing water levels with an electronic dip meter. The results of the gas and groundwater monitoring data is given in Appendix F.

13.0 OBSERVED GROUND CONDITIONS

13.1 Stratigraphy

The stratigraphy of the boreholes was generally consistent with the documented geology. The succession may be generalised as tabulated hereunder:

Table 11: Observed Stratigraphy

STRATIGRAPHY	Typical depth to base
TOPSOIL	0.3mbgl
MADE GROUND comprising of intermixed granular and cohesive soils, with inclusions of brick, sandstone, cinders, coal, limestone glass and slag in varying proportions	4.0mbgl
NATURAL SUPERFICIAL SOILS: Soft grey slightly sandy slightly gravelly CLAY	4.5mbgl
SOLID BEDROCK GEOLOGY: Eastern half of site - Light brown weathered SANDSTONE (Ravenhead Rock) Western half of site - Grey weathered MUDSTONE (Pennine Lower Coal Measures)	Proven to 5.0mbgl

13.2 Groundwater Regime

Groundwater was not recorded during borehole sinking, nor subsequent monitoring visits. However, a localised pocket of water was recorded at WS8, perched on the clay stratum.

14.0 SOIL CONTAMINATION ANALYSES

A programme of soil chemical analyses was undertaken at a **UKAS / MCERTS** accredited laboratory:

- 10nr subsamples of superficial soils were analysed to a broad-spectrum suite of contaminants including metals, non-metals, heavy metals, speciated PAH's, hydrocarbons to the TPHCWG methodology
- 10nr subsamples of superficial soils were screened for asbestos containing materials (ACM's)
- Leachates prepared from each of 2nr subsamples of superficial soils were analysed to a broad-spectrum suite of contaminants including metals, non-metals, heavy metals, speciated PAH's, hydrocarbons to the TPHCWG methodology
- 1nr sample of groundwater was analysed to a broad-spectrum suite of contaminants including metals, non-metals, heavy metals, speciated PAH's, hydrocarbons to the TPHCWG methodology
- 6nr subsamples of soils were analysed for pH and water-soluble sulphates

The soil, soil leachate and groundwater analysis results and certificates are presented in Appendix D.

15.0 RISK ASSESSMENT FOR THE PROTECTION OF HUMAN HEALTH

15.1 Generic Quantitative Risk Assessment (Tier 2 / GQRA)

An assessment of the soil analysis data was carried out in accordance with the guidance presented in LCRM and in accordance with current guidance and legislation.

The Human Health Risk Assessment was carried out in accordance with the **CCG** methodology for assessing soil contamination data, and since it is proposed that the site be redeveloped for residential land use, the assessment was based on criteria contained in publication LQM/CIEH S4UL's for Human Health Risk Assessment (2015) (CCG licence S4UL3233), applicable to the "Residential without home grown produce" land use scenario. This document does not provide criteria for Lead, for which the results were compared to the C4SL published by DEFRA SP1010 Development of Category 4 Screening Levels.

15.2 Assessment of Contamination Data

Based on a Soil Organic Matter content of 2.5%, the assessment of the soil data is summarised in the tabulations hereunder, and presented on the worksheets in Appendix E.

15.2.1 Assessment of Metal Data

The assessment of the metal data concluded single exceedances of Arsenic (WS1) and Lead (WS101) and therefore a potential risk to human health is indicated. These exceedances are discussed further in Section 15.2.7 hereunder.

15.2.2 Assessment of Non-Metal Data

The assessment of the non-metal data concluded that all analyses are below their respective guideline criteria, and therefore no potential risk to human health is indicated.

15.2.3 Assessment of Polycyclic Aromatic Hydrocarbon (PAH) Data

The assessment of the Polycyclic Aromatic Hydrocarbon (PAH) data concluded elevated levels of Benzo(b)fluoranthene, Benzo(a)pyrene & Dibenzo(a,h)anthracene at a single location (WS6), and therefore a potential risk to human health is indicated. These exceedances are discussed further in Section 15.2.7 hereunder.

15.2.4 Assessment of Total Petroleum Hydrocarbon (TPH) Data

The assessment of TPH data concluded that all analyses are below their respective guideline criteria, and therefore no potential risk to human health is indicated.

15.2.5 Assessment of BTEX Data

All BTEX compounds were reported to be below their limit of detection and therefore no risk to human health is indicated.

15.2.6 Assessment of Asbestos Data

Asbestos containing materials (ACM's) were not detected in any soil analysed and therefore no risk to human health is indicated.

15.2.7 Summary of Human Health Risk Assessment

The above human health risk assessment identified exceedances of Arsenic, Lead, Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenzo(ah)anthracene across 3nr locations (WS1, WS6 & WS101) against their respective soil guideline criteria for 'Residential without Homegrown Produce' land use.

Based on these findings, a potential risk to human health is indicated. Exposure risks associated with these contaminants arise via the dermal and ingestion pathways and as such remedial works are required to mitigate these risks. Suitable forms of remediation are discussed in Table 17 hereunder.

16.0 CONTROLLED WATERS RISK ASSESSMENT

16.1 Assessment of Metals, Non-Metals & Polycyclic Aromatic Hydrocarbon (PAH) Data

A total of 2nr soil samples were prepared for soil leachate testing and a single water sample, with all analysed for a broad range of contaminants including speciated PAH and TPH concentrations. The results were assessed against Environmental Quality Standards (AA-EQS) for freshwater as shown hereunder.

Table 12: Assessment of Metals, Non-Metals & Polycyclic Aromatic Hydrocarbon (PAH) Data

Contaminant	AA-EQS (ug/l)	Maximum soil leachate (ug/l)	Water analysis		Exceedances Location
			(ug/l)	(ug/kg)	
Arsenic	25	<5	<5	-	-
Boron	1000	23	125	-	-
Cadmium	2.5	<1	<1	-	-
Chromium	15	<5	<5	-	-
Copper	12	18	113	18 113	WS3 (Leachate) WS8 (Water)
Lead	20	<5	<1	-	-
Mercury	1	0.1	<0.1	-	-
Nickel	40	<5	17	-	-
Selenium	-	<5	<5	-	-
Zinc	50	13	641	641	WS8 (Water)
Sulphate	400,000	2,000	804,000	804,000	WS8 (Water)
Cyanide	-	<5	<5	-	-
Naphthalene	2.4	0.07	0.76	-	-
Acenaphthylene	-	<0.01	0.09	-	-
Fluorene	-	0.02	2.13	-	-
Phenanthrene	-	0.09	22.6	-	-
Anthracene	-	0.02	4.86	-	-
Fluoranthene	0.1	0.04	23.4	23.4	WS8 (Water)
Pyrene	-	0.03	18.8	-	-
Benzo[a]anthracene	0.05	<0.01	17.1	17.1	WS8 (Water)
Chrysene	-	0.01	12.4	-	-
Benzo[b]fluoranthene	0.03	<0.01	13.4	13.4	WS8 (Water)
Benzo[k]fluoranthene	0.03	<0.01	10.5	10.5	WS8 (Water)
Benzo[a]pyrene	0.05	<0.01	15.2	15.2	WS8 (Water)
Indeno(123-cd)pyrene	0.02	<0.01	6.57	6.57	WS8 (Water)
Dibenzo(a,h)anthracene	-	<0.01	2.06	-	-
Benzo(ghi)perylene	0.02	0.01	6.74	6.74	WS8 (Water)

The above assessment confirms several contaminants exceed their respective guideline criteria, and therefore a potential risk to controlled water is indicated. These exceedances are discussed further in Section 16.3 hereunder.

16.2 Assessment of Hydrocarbon (TPH) Data

Speciated hydrocarbon results were assessed by comparison with AA-EQS values for inland waters. In case of determinants not covered by AA-EQS values, results were compared to EQS Inland water Criteria values or where no EQS Inland water Criterion is available, then WHO guidelines for Drinking Water are adopted.

Table 13: Assessment of Hydrocarbon (TPH) Data

Contaminant	AA-EQS (ug/l)	Maximum soil leachate (ug/l)	Water analysis		Exceedances Location
			(ug/l)	(mg/kg)	
Aliphatic EC5-EC6	15000	<1.0	<1.0	-	-
Aliphatic EC6-EC8	15000	<1.0	<1.0	-	-
Aliphatic EC8-EC10	300	<5.0	<5.0	-	-
Aliphatic EC10-EC12	300	<5.0	<5.0	-	-
Aliphatic EC12-EC16	300	<5.0	<5.0	-	-
Aliphatic EC16-EC21	(300)*	<5.0	6.3	-	-
Aliphatic EC21-EC35	(300)*	19.8	37.6	-	-
Aromatic EC5-EC7	10	<1.0	<1.0	-	-
Aromatic EC7-EC8	700	<1.0	<1.0	-	-
Aromatic EC8-EC10	300	<5.0	<5.0	-	-
Aromatic EC10-EC12	100	<5.0	<5.0	-	-
Aromatic EC12-EC16	100	<5.0	<5.0	-	-
Aromatic EC16-EC21	90	<5.0	18.2	-	-

Aromatic EC21-EC35	90	5.4	77.3	-	-
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The above assessment did not identify exceedances of hydrocarbons species that exceed their respective guideline criteria, and therefore no risk to controlled waters is indicated.

16.3 Summary of Controlled Waters Risk Assessment

Whilst the above transgressions of recognised assessment criteria are noted, the following site conditions should be borne in mind:

- Underlying bedrock is classified as Secondary A Aquifer
- No groundwater abstraction licences within 1000m of the site
- No surface water abstraction licences within 1000m of the site
- No potable water abstraction licences within 1000m of the site
- Site not located within a source projection zone. Nearest SPZ is Zone 3 (Total catchment), which is located >450m from site.
- No surface water body within 250m of the site
- No detailed river network within 500m of the site

Given there are no credible receptors, it is concluded that there is no significant risk to controlled waters arising from site deposits and therefore no mitigation measures are proposed.

17.0 SPECIFICATION OF BURIED CONCRETE

The data obtained in the investigations was assessed against the guidance given in BRE Special Digest 1: 2005, as summarised hereunder:

Table 14: Design Chemical Class Based on Soil Data

CONCRETE SPECIFICATION DATA SHEET		
Is the site Brownfield or Greenfield?	Brownfield	
Is the water table static or mobile?	Static	
Highest water-soluble Sulphate results	120mg/l	Design Sulphate Class of
Lowest pH result	6.2	DS-1 Class of AC-1
Intended Working Life	100 years	Adopt Design Chemical Classification of DC-1

Table 15: Design Chemical Class Based on Water Data

CONCRETE SPECIFICATION DATA SHEET		
Is the site Brownfield or Greenfield?	Brownfield	
Is the water table static or mobile?	Static	
Highest water-soluble Sulphate results	80mg/l	Design Sulphate Class of
Lowest pH result	6.6	DS-1 Class of AC-1
Intended Working Life	100 years	Adopt Design Chemical Classification of DC-1

Based on the foregoing assessment, concrete in the ground should be specified to conform to the compositional requirements of Design Chemical Class DC-1, as defined in BRE Special Digest 1: 2005.

18.0 ASSESSMENT OF RISK FROM GROUND GASES

A total of 8nr standpipes were installed across the site for subsequent monitoring. Using the data gathered in the monitoring programme, a gas risk assessment was undertaken in accordance with the ground gas risk assessment methodology (See Appendix J) employed by **CCG**. The ground gas risk assessment methodology conforms to current UK guidance on the assessment of risks posed by ground gases.

The potential sources of gas identified in the desk study were generally considered as sources of “Low” generation potential, and “High” sensitivity, resulting in a programme of monitoring comprising of 6nr rounds distributed over a 3-month period.

A gas risk assessment was undertaken in accordance with current UK guidelines set out in CIRCA C665 2007 “Assessing Risk Posed by Hazardous Gases to Buildings”. The CIRIA risk assessment methodology uses typical maximum soil gas concentrations and worse case borehole flow rates to define a “Characteristic Situation” for the shallow gas regime.

The volumetric gas flow rate used by the risk assessment is termed “Gas Screening Value (GSV)” in the guidance and is defined below.

$$\text{Where: GSV (litres/hr)} = \text{borehole flow rate (litres/hr)} \times \text{gas concentration.}$$

There are also two stages to the assessment method proposed in CIRIA C665; compliance with a GSV Threshold Value and secondly, compliance with additional factors such as maximum permissible gas concentration. The gas monitoring data is presented in Appendix F and summarised hereunder.

Table 16: Summary of Gas Monitoring Data

Position No Visits	WS1 6	WS3 6	WS4 6	WS6 6	WS8 6	WS101 6	WS103 6	WS105 6
Highest CH ₄ (%)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Highest CO ₂ (%)	0.9	0.1	0.1	2.1	3.2	4.2	1.3	0.5
Lowest O ₂ (%)	19.2	19.8	19.9	19.2	19.0	15.6	19.8	19.7
Highest H ₂ S (ppm)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Highest CO (ppm)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Highest Flow (l/hr)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Water Levels (m)	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
PID response (Max)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pressure Range (mb)	999 to 1031mbar					998 to 1024mbar		

Notes: All above recorded values are Peak – refer to Appendix F for Peak v Steady

After 6 rounds of monitoring across, a preliminary Gas Screening Value (GSV) of 0.0042l/hrs is calculated for CO₂.

Using the GSV value, the risk to the proposed development was assessed in line with building Situation A as defined in CIRIA C665. On the basis of this building classification, the results conform to Characteristic Situation 1, under which gas protection measures are not required.

19.0 NEW WATER MAINS SUPPLY

The specification for new water mains at this site was based on the criteria specified in Paper 10/WM/03/21 ‘Guidance for the selection of Water Supply Pipes to be used in Brownfield Sites’ published by UK Water Industry Research (UKWIR) January 2011.

Preliminary findings indicate that the soil concentrations of pertinent soil contaminants are below the threshold concentrations recommended under the UKWIR guidance. On this basis, new water mains may be specified as normal Alkathene (PE) pipe construction.

Good practice requires that mains be laid in a remediated alignment comprising of clean granular fill extending to 600mm + pipe diameter and to 300mm below pipe underside.

Pipes should be laid in accordance with BS EN 12201-2 ‘Plastic piping systems for water supply, and for drainage and sewerage under pressure – Polyethylene (PE) as stated in UKWIR guidance.

Notwithstanding the above preliminary assessment, the developer should contact the relevant water supply company to obtain concurrence with the recommendations given above and may be required to return a completed Risk Assessment.

20.0 POST INVESTIGATION CONCEPTUAL MODEL

Based on the findings of the investigation, a conceptual model could be constructed illustrating proven pollution linkages and summarising the conceptual remediation recommendations discussed above, as tabulated hereunder.

Table 17: Conceptual Model

Source	Pathway	Receptor	Remedial Options / Further Works
The above human health risk assessment identified the presence of elevated concentrations within the soils of: - Arsenic - Lead - Benzo(b)fluoranthene - Benzo(a)pyrene - Dibenz(ah)anthracene	Oral / dermal pathways	Construction works Future residents (adults / children)	Site levels in the garden area to be reduced to 600mm below proposed finished garden levels, with site levels then being reconstructed by the placement of 600mm of clean imported topsoil on a geotextile of Terram 1000. The cover soils are to be placed under a strict validation regime comprising a 1nr analyses per 50m³ with a minimum of 4nr analyses per material source. Cover thickness on all gardens / soft landscaping is to be independently validated by pit excavation and photography for inclusion in a Validation Report. No remedial works required under areas of permanent hard standing.
Buried fuel storage tanks	Inhalation / Oral / dermal pathways	Construction works Future residents (adults / children)	Carry out buried tank intrusive investigation to include: - Locating buried storage tanks - Confirming if tanks have been made safe - Remove tanks from site - Sample and analyse soils surrounding storage tanks and infrastructure for hydrocarbons and volatile - Remediate impacted soils (if required)
Potential surface instability affecting eastern extremity of site	Surface ground movements	Integrity of buildings	Sink 2nr x 40m boreholes at positions indicated on CCG Drawing No. 2 presented in Appendix A.

21.0 FOUNDATIONS & FLOOR SLABS RECOMMENDATIONS

21.1 Introduction

It is understood that the site is to be developed for residential land use by the construction of 30nr apartments across 3nr Blocks, with associated parking and landscaped areas.

The investigation has shown that the ground conditions vary across the site, with deep made ground deposits (to depths >5.0m) and two types of bedrock formation (sandstone to the front – west; and mudstone to the rear (east) encountered, both typically around 4.5 to 5.0mbgl.

21.2 Foundations

Based on the ground conditions, traditional strip (spread) should not be used, and a piled ground beam solution should be adopted.

A driven pile solution is preferred with bottom driven steel cased cast insitu piles being the preferred solution. For the purposes of preliminary design, the SWL of bottom driven steel cased piles may be taken as shown below.

Table 18: Pile Design Parameters

Pile Diameter (mm)	SWL (kN)
150	120
220	250
273	500

The above values are provided for the purposes of preliminary design, and piling contractors must be required to provide their own design calculations for their own pile type/s in isolation, and in groups, as appropriate to the design. It is recommended that dynamic load testing is carried out on a suitable number of piles to verify the design loadings.

21.3 Ground Slabs

Fully suspended block and beam floors are recommended.

21.4 Excavations

Excavations may be undertaken by light hydraulic excavators. Excavations in excess of 1.2mbgl will require side support. It is not likely that trench fill excavations will stand vertically.

21.5 Groundwater Management

Groundwater was not recorded during the fieldworks or subsequent monitoring visits. Notwithstanding this, the contractor should plan for seasonal and other variations, and allow for pumping to maintain dry working conditions during foundation construction / service installations particularly during heavy and/or prolonged periods of precipitation.

22.0 CONCLUSIONS & RECOMMENDATIONS

The conclusions and recommendations hereunder are based on the salient sections of the report and should not be referred to in isolation of the relevant sections of the text. All recommendations are subject to Regulatory Authority review.

Table 19: Conclusions & Recommendations

Soil Contamination	The human health risk assessment identified exceedances of Arsenic, Lead, Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenzo(ah)anthracene across 3nr locations (WS1, WS6 & WS101) against their respective soil guideline criteria for 'Residential without Homegrown Produce' land use. Based on these findings, a potential risk to human health is indicated. Exposure risks associated with these contaminants arise via the dermal and ingestion pathways and as such remedial works are required to mitigate these risks. Site levels in the garden area to be reduced to 600mm below proposed finished garden levels, with site levels then being reconstructed by the placement of 600mm of clean imported topsoil on a geotextile of Terram 1000. The cover soils are to be placed under a strict validation regime comprising a 1nr analyses per 50m³ with a minimum of 4nr analyses per material source. Cover thickness on all gardens / soft landscaping is to be independently validated by pit excavation and photography for inclusion in a Validation Report. No remedial works required under areas of permanent hard standing.
Concrete Specification	Based on the foregoing assessment, concrete in the ground should be specified to conform to the compositional requirements of Design Chemical Class DC-1, as defined in BRE Special Digest 1: 2005.
Water Mains	The specification for new water mains at this site was based on the criteria specified in Paper 10/WM/03/21 'Guidance for the selection of Water Supply Pipes to be used in Brownfield Sites' published by UK Water Industry Research (UKWIR) January 2011. Preliminary findings indicate that the soil concentrations of pertinent soil contaminants are below the threshold concentrations recommended under the UKWIR guidance. On this basis, new water mains may be specified as normal Alkathene (PE) pipe construction. Good practice requires that mains be laid in a remediated alignment comprising of clean granular fill extending to 600mm + pipe diameter and to 300mm below pipe underside. Pipes should be laid in accordance with BS EN 12201-2 'Plastic piping systems for water supply, and for drainage and sewerage under pressure – Polyethylene (PE) as stated in UKWIR guidance. Notwithstanding the above preliminary assessment, the developer should contact the relevant water supply company to obtain concurrence with the recommendations given above and may be required to return a completed Risk Assessment.
Gas Risk Assessment	The risk to the proposed development was assessed in line with building Situation A as defined in CIRIA C665. On the basis of this building classification, the results conform to Characteristic Situation 1, under which gas protection measures are not required.
Foundations & Ground Floor slabs	See Section 21.0 for full discussion
Excavations	Excavations may be undertaken by light hydraulic excavators. Excavations in excess of 1.2mbgl will require side support. It is not likely that trench fill excavations will stand vertically.

Table 19: Conclusions & Recommendations (Continued)

Groundwater Management	Groundwater was not recorded during the fieldworks or subsequent monitoring visits. Notwithstanding this, the contractor should plan for seasonal and other variations, and allow for pumping to maintain dry working conditions during foundation construction / service installations particularly during heavy and/or prolonged periods of precipitation.
Further Works	• Carry out buried fuel storage tank removal and associated remediation. • Sink 2nr mining investigation boreholes at eastern side of site as shown on CCG Drawing No. 2 presented in Appendix A. • Prepare supplementary report • Following above investigations, prepare Phase III Remediation Strategy • Prepare Phase IV Validation completion report



APPENDIX A

DRAWINGS



Do not scale from this drawing

All dimensions are to be checked on site prior to commencing works on site. Discrepancy found between information given on this drawing and that given elsewhere or recorded on site shall be notified immediately to the project architect in writing.

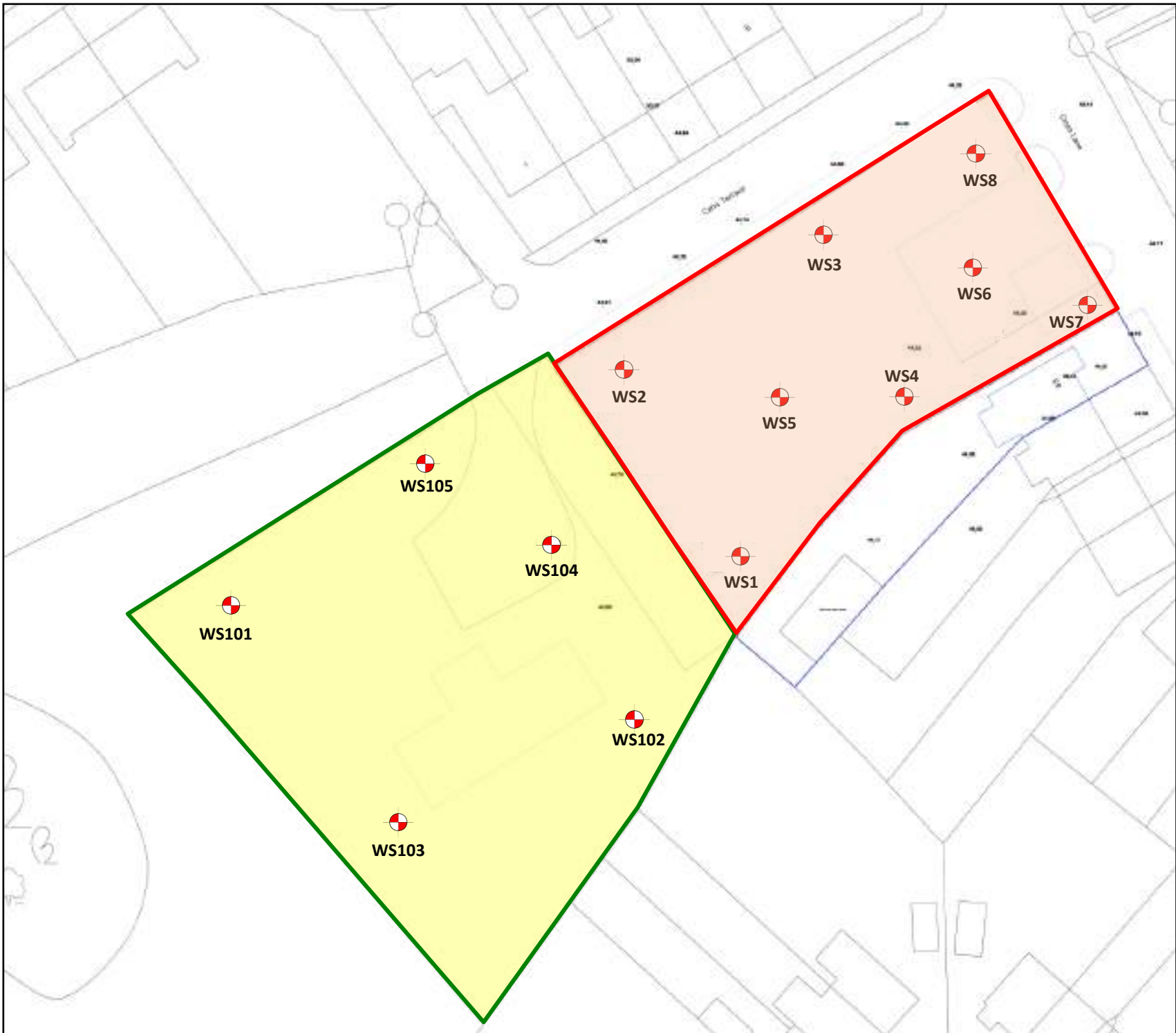
PRELIMINARY ISSUE
for discussion purposes only



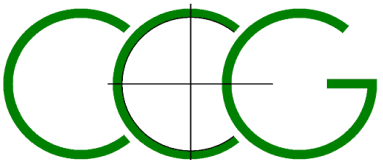
snookarchitects
Unit 25a
5-9 Slater Street
Liverpool
L1 4BW
t: 0151 707 0100

project:	carrs terrace
dwg no:	105
dwg:	existing site levels
scale:	1:200 @ A1





-  Dynamic sampling borehole
-  1st Stage of investigation carried out Jan 2018
-  2nd Stage of investigation carried out Aug 2022

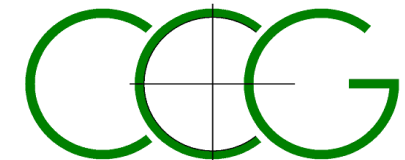


CC GEOTECHNICAL LIMITED
UNIT 1 DELTIC WAY
KNOWSLEY INDUSTRIAL ESTATE
LIVERPOOL
L33 7BA
0151 545 2750

Client: CL Developments Ltd	
Project: Carrs Terrace / Cross Lane, Whiston, Knowsley, Merseyside	
Title: Site Investigation Layout Plan	
Scale: NTS	Issue: 1
Drawn by: DO	Date: May 2024
Project No. CCG-C-18-10096	Drawing No. 1



-  Proposed Rotary Boreholes
-  Area to undergo storage tank investigation / remedial / validation works



CC GEOTECHNICAL LIMITED
 UNIT 1 DELTIC WAY
 KNOWSLEY INDUSTRIAL ESTATE
 LIVERPOOL
 L33 7BA
 0151 545 2750

Client: CL Developments Ltd	
Project: Carrs Terrace / Cross Lane, Whiston, Knowsley, Merseyside	
Title: Proposed further site Investigation Layout Plan	
Scale: NTS	Issue: 1
Drawn by: DO	Date: May 2024
Project No. CCG-C-18-10096	Drawing No. 2



APPENDIX B

SITE PHOTOGRAPHS



Unit 1
Deltic Way
Knowsley Industrial Estate
Merseyside
L33 7BA
e: enquiries@ccgeotechnical.com
w: www.ccgeotechnical.com

Site	Cross Lane, Whiston
Job Number:	18-10096
View:	Northeast looking southwest
Comments	Junction of Cross Lane / Carrs Terrace
Photograph Number:	1



Unit 1
Deltic Way
Knowsley Industrial Estate
Merseyside
L33 7BA
e: enquiries@ccgeotechnical.com
w: www.ccgeotechnical.com

Site	Cross Lane, Whiston
Job Number:	18-10096
View:	Northeast looking along western boundary
Comments	Former fuel filling forecourt
Photograph Number:	2



Unit 1
Deltic Way
Knowsley Industrial Estate
Merseyside
L33 7BA
e: enquiries@ccgeotechnical.com
w: www.ccgeotechnical.com

Site	Cross Lane, Whiston
Job Number:	18-10096
View:	Northeast corner looking along northern boundary
Comments	Showing stockpile of vegetation / felled trees
Photograph Number:	3



Unit 1
Deltic Way
Knowsley Industrial Estate
Merseyside
L33 7BA
e: enquiries@ccgeotechnical.com
w: www.ccgeotechnical.com

Site	Cross Lane, Whiston
Job Number:	18-10096
View:	Centre of site looking west
Comments	-
Photograph Number:	4



Unit 1
Deltic Way
Knowsley Industrial Estate
Merseyside
L33 7BA
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w: www.ccgeotechnical.com

Site	Cross Lane, Whiston
Job Number:	18-10096
View:	Centre of site looking east towards Cross Lane
Comments	-
Photograph Number:	5



Unit 1
Deltic Way
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Merseyside
L33 7BA
e: enquiries@ccgeotechnical.com
w: www.ccgeotechnical.com

Site	Cross Lane, Whiston
Job Number:	18-10096
View:	Northern boundary looking west towards northwestern corner
Comments	Stradt Moers Park beyond fence line
Photograph Number:	6



Unit 1
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w: www.ccgeotechnical.com

Site	Cross Lane, Whiston
Job Number:	18-10096
View:	Northwestern corner looking along northern boundary
Comments	Showing stockpile of vegetation / felled trees
Photograph Number:	7



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Site	Cross Lane, Whiston
Job Number:	18-10096
View:	Southern boundary looking towards southwestern corner
Comments	Residential properties to the south (left) and former remnants of Scout Hut (right)
Photograph Number:	8



Unit 1
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Site	Cross Lane, Whiston
Job Number:	18-10096
View:	Location of former Scout Hut
Comments	Stockpile of building rubble on former footprint
Photograph Number:	9



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Site	Cross Lane, Whiston
Job Number:	18-10096
View:	Northern boundary of site (left)
Comments	Entrance to Stadt Moers Park
Photograph Number:	10



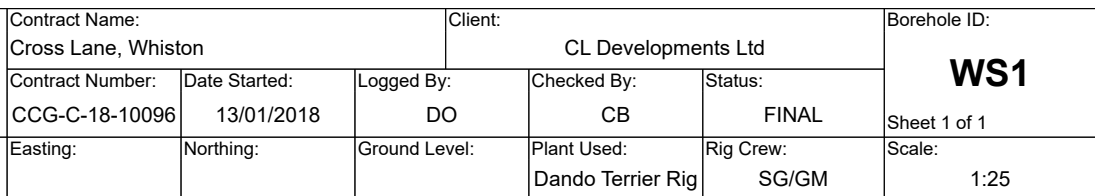
Unit 1
Deltic Way
Knowsley Industrial Estate
Merseyside
L33 7BA
e: enquiries@ccgeotechnical.com
w: www.ccgeotechnical.com

Site	Cross Lane, Whiston
Job Number:	18-10096
View:	Western boundary (left) within Stadt Moers Park
Comments	Showing potential gas monitoring installation associated with former Carrs Colliery
Photograph Number:	11



APPENDIX C

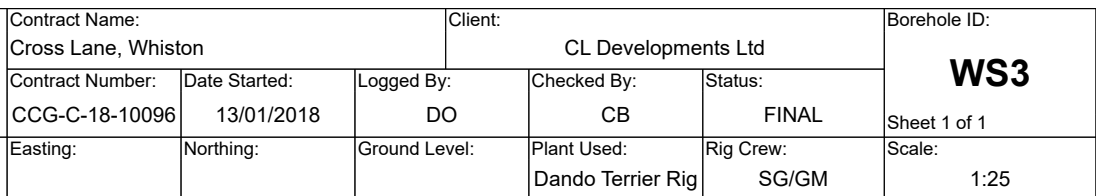
BOREHOLE LOGSHEETS



Samples & In Situ Testing	Strata Details	Groundwater
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Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	
									1 hour hand excavating 1.20mbgl service avoidance pit
									</

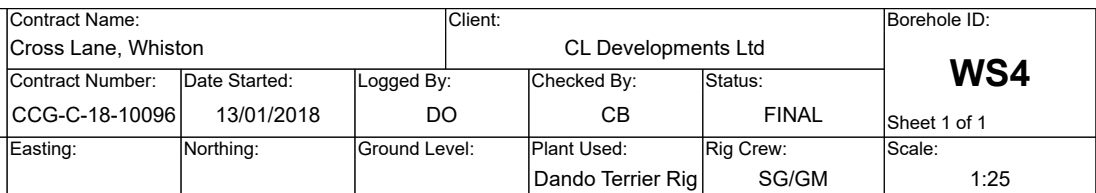
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
									4.00			0		Seepage
									CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com					



Samples & In Situ Testing	Strata Details	Groundwater
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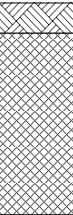
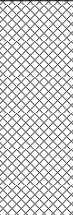
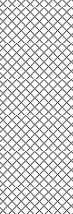
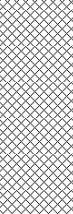
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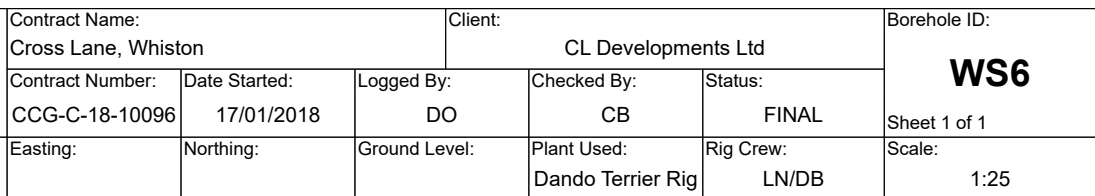
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	1 hour hand excavating 1.20mbgl service avoidance pit					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
					0.00	0.50	PLAIN					0		Borehole dry
					0.50	3.40	SLOTTED							
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com														



Samples & In Situ Testing	Strata Details	Groundwater
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Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks: 1 hour hand excavating 1.20mbgl service avoidance pit Borehole advanced by dynamic probing methods- rockhead inferred to be at 5.8mbgl (Not confirmed)					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
					0.00	0.50	PLAIN					0		Borehole dry
					0.50	3.50	SLOTTED							
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com														

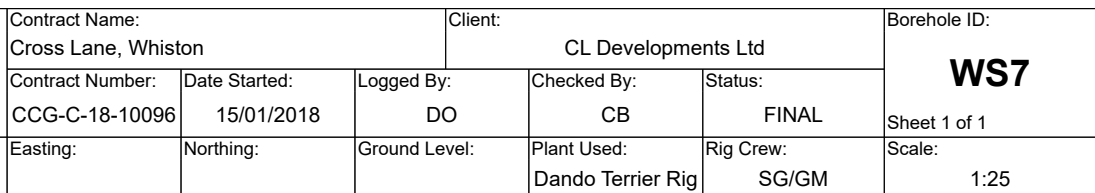
	Contract Name: Cross Lane, Whiston				Client: CL Developments Ltd			Borehole ID: WS5		
	Contract Number: CCG-C-18-10096		Date Started: 17/01/2018		Logged By: DO		Checked By: CB		Status: FINAL	
	Easting:		Northing:		Ground Level:		Plant Used: Dando Terrier Rig		Rig Crew: LN/DB	
Dynamic Sampling Borehole Log								Scale: 1:25		
Weather: Wet				Termination: Refusal				SPT Hammer: N/R, Energy Ratio: N/R		
Samples & In Situ Testing				Strata Details					Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description			Water Strike	Backfill/ Installation
0.00 - 1.00	U			0.10		Grassed TOPSOIL. Recovered as brown very silty SAND			1	
		HVP=30		(0.60)		Soft grey slightly sandy slightly gravelly silty CLAY. Gravel is fine to coarse sub-angular to sub-rounded coal, mudstone and brick (MADE GROUND)				
		HVP=50		0.70		Firm brown slightly sandy slightly gravelly silty CLAY with occasional pockets of sand. Gravel is fine to coarse sub-angular to sub-rounded sandstone and brick (MADE GROUND)				
1.00 - 2.00	U	SPT(S)N=9 (2,2/3,2,2,2)							2	
		HVP=60								
		SPT(S)N=6 (1,1/2,1,1,2)		(2.60)						
2.00 - 3.00	U								3	
		SPT(S)N=3 (0,1/1,1,0,1)								
				3.30		Light brown weathered SANDSTONE. Recovered as sandy slightly silty GRAVEL				
3.00 - 4.00	U			4.00		End of Borehole at 4.00m			4	
		SPT(S)50 (25 for 90mm/50 for 35mm)								
				(0.70)						
									5	
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	1 hour hand excavating 1.20mbgl service avoidance pit	
Chiselling					Installation				Water Strikes	
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)
								0		
										Remarks Borehole dry
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com										



Samples & In Situ Testing	Strata Details	Groundwater
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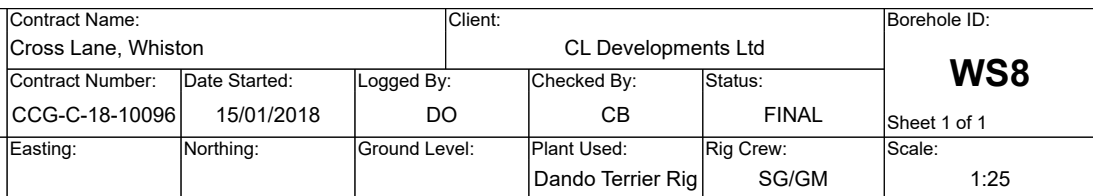
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
0.00 - 1.00	U			0.10		CONCRETE		
				(0.30)		Brown slightly silty fine to medium grained SAND (MADE GROUND)		
				0.40		Loose becoming very loose black very gravelly slightly silty SAND. Gravel is fine to coarse angular to sub-angular limestone, cinders, coal, brick and slag (MADE GROUND)		
1.00 - 2.00	U	SPT(S)N=5 (2,2/1,2,1,1)					1	
2.00 - 3.00	U	SPT(S)N=2 (1,0/1,1,0,0)		(3.05)			2	
3.00 - 4.00	U	SPT(S)N=1 (0,1/1,0,0,0)					3	
				3.45		Soft dark brown slightly sandy slightly gravelly silty organic CLAY with occasional pocket of sand. Gravel is fine sub-rounded mudstone (MADE GROUND)		
				(0.65)				
4.00 - 4.90	U	SPT(S)N=5 (1,1/2,1,1,1)		4.10		Loose brown slightly silty slightly sandy GRAVEL. Gravel is fine to coarse angular to sub-angular brick and sandstone (MADE GROUND)	4	
				(0.50)				
		HVP=60		4.60		Firm to stiff grey sandy slightly gravelly silty CLAY. Gravel is fine to coarse sub-rounded mudstone and sandstone		
				(0.30)				
		SPT(S)50 (15 for 70mm/50 for 10mm)		4.90		Brown weathered SANDSTONE		
				5.00		End of Borehole at 5.00m	5	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	
									1 hour hand excavating 1.20mbgl service avoidance pit



Samples & In Situ Testing	Strata Details	Groundwater
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Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks: 1 hour hand excavating 1.20mbgl service avoidance pit Borehole terminated at 1.50mbgl on refusal on obstruction					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0		Borehole dry
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com														

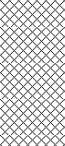
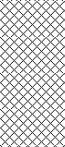


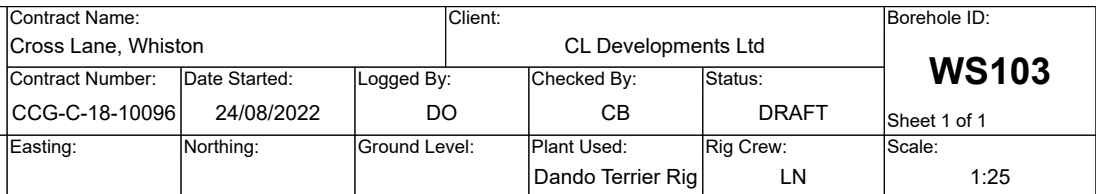
Samples & In Situ Testing	Strata Details	Groundwater
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[illegible]

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks: 1 hour hand excavating 1.20mbgl service avoidance pit					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
					0.00	0.50	PLAIN					0		Borehole dry
					0.50	3.80	SLOTTED							
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com														

	Contract Name: Cross Lane, Whiston			Client: CL Developments Ltd			Borehole ID: WS101						
	Contract Number: CCG-C-18-10096		Date Started: 24/08/2022		Logged By: DO		Checked By: CB		Status: DRAFT				
	Easting:		Northing:		Ground Level:		Plant Used: Dando Terrier Rig		Rig Crew: LN				
Dynamic Sampling Borehole Log										Sheet 1 of 1			
Weather: Dry				Termination: Refusal				SPT Hammer: N/R, Energy Ratio: N/R					
Samples & In Situ Testing				Strata Details						Groundwater			
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description				Water Strike	Backfill/ Installation		
0.00 - 1.00	U			(0.40)		TOPSOIL. Recovered as dark brown gravelly silty SAND. Gravel is subangular coal and cinders (MADE GROUND)							
				0.40		Loose greyish brown very gravelly silty SAND. Gravel is fine to coarse subangular mudstone, coal and cinders (MADE GROUND)							
1.00 - 2.00	U	SPT(S)N=9 (2,2/2,2,2,3)		(1.40)						1			
				1.80		Loose grey silty sandy GRAVEL. Gravel is subangular mudstone (Possible MADE GROUND)							
2.00 - 3.00	U	SPT(S)N=6 (1,2/2,2,1,1)		(1.50)						2			
				3.30		Light brown very sandy silty GRAVEL. Gravel is mudstone							
3.00 - 4.00	U	SPT(S)N=8 (1,2/2,1,2,3)		(0.70)						3			
				4.00		Yellow weathered SANDSTONE				4			
4.00 - 4.40	U	SPT(S)50 (3,12/50 for 210mm)		(0.40)									
				4.40		End of Borehole at 4.40m							
										5			
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:				
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	1 hour hand excavating 1.20mbgl service avoidance pit				
Chiselling					Installation				Water Strikes				
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
				0.00	1.00	PLAIN					0		Dry
				1.00	3.00	SLOTTED							
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com													

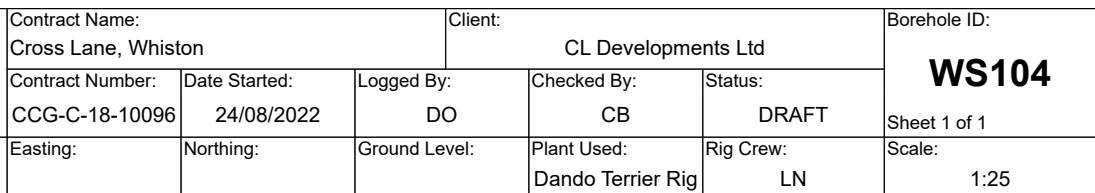
	Contract Name: Cross Lane, Whiston				Client: CL Developments Ltd			Borehole ID: WS102		
	Contract Number: CCG-C-18-10096		Date Started: 24/08/2022		Logged By: DO		Checked By: CB		Status: DRAFT	
	Easting:		Northing:		Ground Level:		Plant Used: Dando Terrier Rig		Rig Crew: LN	
Dynamic Sampling Borehole Log								Scale: 1:25		
Weather: Dry				Termination: Refusal				SPT Hammer: N/R, Energy Ratio: N/R		
Samples & In Situ Testing				Strata Details					Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description			Water Strike	Backfill/ Installation
0.00 - 1.00	U			(0.50)		Dark brown/ grey very clayey sandy GRAVEL. Gravel is subangular mudstone, coal and cinders (MADE GROUND)				
				0.50		Loose dark brown gravelly silty SAND. Gravel is fine to coarse subangular brick, coal and cinders (MADE GROUND)				
1.00 - 2.00	U	SPT(S)N=8 (1,2/2,2,2,2)		(0.60)					1	
				1.10		Loose to medium dense grey very sandy slightly silty GRAVEL. Gravel is fine to coarse subangular mudstone (MADE GROUND)				
2.00 - 3.00	U	SPT(S)N=10 (2,2/2,2,3,3)		(1.30)					2	
				2.40		Dark grey very sandy silty GRAVEL. Gravel is subangular to coal, cinders and sandstone (MADE GROUND)				
3.00 - 4.00	U	SPT(S)N=8 (1,1/1,2,2,3)		(0.50)					3	
				2.90		Soft to firm brown sandy slightly gravelly friable silty CLAY. Gravel is subangular mudstone				
4.00 - 4.10	U	SPT(S)N=48 (2,7/9,10,13,16)		(1.10)					4	
				4.00		Grey weathered MUDSTONE. Recovered as very sandy silty GRAVEL.				
				(0.40)					5	
				4.40		End of Borehole at 4.40m				
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	1 hour hand excavating 1.20mbgl service avoidance pit	
Chiselling					Installation				Water Strikes	
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com										



Samples & In Situ Testing	Strata Details	Groundwater
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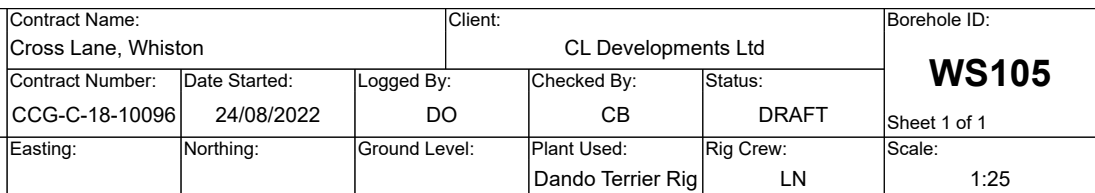
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	1 hour hand excavating 1.20mbgl service avoidance pit					
Chiselling					Installation				Water Strikes					
									Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)				0		Dry
					0.00	1.00	PLAIN							
					1.00	2.00	SLOTTED							
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com														



Weather: Dry	Termination: Scheduled depth	SPT Hammer: N/R, Energy Ratio: N/R
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Samples & In Situ Testing			Strata Details				Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
0.00 - 1.00	U	SPT(S)N=6 (1,2/1,2,2,1)		(0.30)		TOPSOIL	1	
				0.30		Loose dark brown silty clayey gravelly fine to coarse grained SAND. Gravel is fine to coarse angular to sub-angular brick, ash, coal and mudstone (MADE GROUND)		
1.00 - 2.00	U			1.90				
2.00 - 3.00	U	SPT(S)N=4 (1,1/1,1,1,1)		(1.00)		Loose brown sandy silty GRAVEL. Gravel is subangular mudstone and sandstone (MADE GROUND)	2	
			2.90					
3.00 - 4.00	U	SPT(S)N=7 (1,1/2,2,1,2)		(2.10)		Loose dark brown very gravelly silty SAND. Gravel is subangular, coal, cinders, brick and sandstone (MADE GROUND)	3	
4.00 - 5.00	U	SPT(S)N=6 (1,1/1,2,1,2)		5.00			4	
						End of Borehole at 5.00m	5	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	
Chiselling					Installation				
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com									



Samples & In Situ Testing	Strata Details	Groundwater
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Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/Installation
0.00 - 1.00	U			(0.70)		Brown clayey silty gravelly fine to coarse grained SAND. Gravel is subangular brick, coal and cinders with inclusions of plastic (MADE GROUND)		
1.00 - 2.00	U	SPT(S)N=7 (1,2/2,2,2,1)		0.70 (0.40)		Dark brown very sandy slightly silty GRAVEL. Gravel is subangular ceramic and cinders (MADE GROUND)	1	
				1.10		Loose light brown sandy slightly silty GRAVEL. Gravel is subangular sandstone		
2.00 - 3.00	U	SPT(S)N=10 (1,2/2,3,3,2)		(1.60)			2	
				2.70		Loose dark brown sandy slightly silty GRAVEL. Gravel is subangular cinders, coal, brick, sandstone and mudstone (MADE GROUND)		
3.00 - 4.00	U	SPT(S)N=5 (2,2/2,1,1,1)		(1.00)			3	
				3.70		Grey weathered MUDSTONE. Recovered as very sandy silty GRAVEL		
4.00 - 5.00	U	SPT(S)N=12 (1,3/2,3,3,4)		(1.30)			4	
		SPT(S)N=27 (4,5/5,6,7,9)		5.00		End of Borehole at 5.00m	5	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
Chiselling					Installation				Water Strikes					
									Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)				0		Dry
					0.00	1.00	PLAIN							
					1.00	3.10	SLOTTED							
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com														



APPENDIX D

SOIL, SOIL LEACHATE & GROUNDWATER CHEMICAL DATA



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THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 18-15948

Issue: 1

Date of Issue: 06/02/2018

Contact: Daniel O'Regan

Customer Details: CC Geotechnical Ltd
Unit 1 & 2 Deltic Place
Deltic Way
Liverpool
Merseyside L33 7BA

Quotation No: Q14-00045

Order No: Not Supplied

Customer Reference: 18-10096

Date Received: 30/01/2018

Date Approved: 06/02/2018

Details: 69 Cross Lane, Whiston

Approved by: 

Mike Varley, Technical Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



Sample Summary

Report No.: 18-15948

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
125419	WS1 0.50	26/01/2018	30/01/2018	Sandy silty loam	
125420	WS2 0.30	26/01/2018	30/01/2018	Sandy silty loam	
125421	WS3 0.30	26/01/2018	30/01/2018	Sandy silty loam	
125422	WS4 0.40	26/01/2018	30/01/2018		
125423	WS5 0.40	26/01/2018	30/01/2018	Sandy silty loam	
125424	WS6 0.50	26/01/2018	30/01/2018	Sandy silty loam	
125425	WS7 0.50	26/01/2018	30/01/2018	Loamy sand	

Results Summary

Report No.: 18-15948

ELAB Reference	125419	125420	125423	125424	125425
Customer Reference					
Sample ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	WS1	WS2	WS5	WS6	WS7
Sample Depth (m)	0.50	0.30	0.40	0.50	0.50
Sampling Date	26/01/2018	26/01/2018	26/01/2018	26/01/2018	26/01/2018

Determinand	Codes	Units	LOD					
Metals								
Arsenic	M	mg/kg	1	50.4	18.6	23.6	39.6	10.4
Cadmium	M	mg/kg	0.5	1.8	2.4	3.8	2.1	< 0.5
Chromium	M	mg/kg	5	25.8	26.3	27.4	28.8	11.2
Copper	M	mg/kg	5	314	148	218	724	69.1
Lead	M	mg/kg	5	210	122	144	390	42.9
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	67.8	21.2	25.4	74.9	10.2
Selenium	M	mg/kg	1	1.3	< 1.0	< 1.0	1.5	< 1.0
Zinc	M	mg/kg	5	281	194	213	827	68.5
Anions								
Water Soluble Sulphate	M	g/l	0.02	0.06	0.04	0.06	0.12	0.04
Inorganics								
Free Cyanide	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Total Sulphide	N	mg/kg	2	< 2	< 2	< 2	< 2	< 2
Acid Soluble Sulphate (SO4)	U	%	0.02	0.06	0.04	0.05	0.13	0.23
Water Soluble Boron	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5	c < 0.5	< 0.5
Miscellaneous								
pH	M	pH units	0.1	6.8	6.7	6.2	7.4	11.6
Soil Organic Matter	U	%	0.1	6.7	5.5	5.3	6.0	0.9
Polyaromatic hydrocarbons								
Naphthalene	M	mg/kg	0.1	0.3	< 0.1	< 0.1	0.3	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	0.1	< 0.1	< 0.1	0.7	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0.4	< 0.1
Phenanthrene	M	mg/kg	0.1	1.0	0.5	0.4	5.6	< 0.1
Anthracene	M	mg/kg	0.1	0.3	0.1	0.1	1.4	< 0.1
Fluoranthene	M	mg/kg	0.1	2.1	1.4	1.8	11.8	< 0.1
Pyrene	M	mg/kg	0.1	2.1	1.3	1.7	10.5	< 0.1
Benzo(a)anthracene	M	mg/kg	0.1	1.1	0.6	1.0	5.2	< 0.1
Chrysene	M	mg/kg	0.1	1.2	0.7	1.0	6.2	0.1
Benzo (b) fluoranthene	M	mg/kg	0.1	2.2	1.5	1.5	6.8	< 0.1
Benzo(k)fluoranthene	M	mg/kg	0.1	1.4	0.8	1.2	5.8	< 0.1
Benzo (a) pyrene	M	mg/kg	0.1	1.5	0.8	1.2	6.2	0.1
Indeno (1,2,3-cd) pyrene	M	mg/kg	0.1	1.2	0.6	0.8	4.2	0.3
Dibenzo(a,h)anthracene	M	mg/kg	0.1	0.2	0.2	0.2	0.8	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	1.1	0.7	0.9	4.6	0.2
Total PAH(16)	M	mg/kg	0.4	15.8	9.3	12.0	70.7	0.9

Results Summary

Report No.: 18-15948

ELAB Reference	125419	125420	125423	125424	125425
Customer Reference					
Sample ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	WS1	WS2	WS5	WS6	WS7
Sample Depth (m)	0.50	0.30	0.40	0.50	0.50
Sampling Date	26/01/2018	26/01/2018	26/01/2018	26/01/2018	26/01/2018

Determinand	Codes	Units	LOD					
BTEX								
Benzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Toluene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Ethylbenzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Xylenes	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
TPH CWG								
>C5-C6 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C6-C8 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C10-C12 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C12-C16 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	2.5	< 1.0
>C16-C21 Aliphatic	N	mg/kg	1	1.7	< 1.0	< 1.0	6.4	< 1.0
>C21-C35 Aliphatic	N	mg/kg	1	14.1	1.8	< 1.0	85.6	1.5
>C35-C40 Aliphatic	N	mg/kg	1	4.1	< 1.0	< 1.0	38.7	< 1.0
>C5-C7 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C7-C8 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aromatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C10-C12 Aromatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C12-C16 Aromatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	3.8	< 1.0
>C16-C21 Aromatic	N	mg/kg	1	3.3	< 1.0	< 1.0	18.8	< 1.0
>C21-C35 Aromatic	N	mg/kg	1	30.3	3.2	< 1.0	205	1.5
>C35-C40 Aromatic	N	mg/kg	1	5.9	< 1.0	< 1.0	79.8	< 1.0
Total (>C5-C40) Ali/Aro	N	mg/kg	1	59.3	5.0	< 1.0	440	3.0

Results Summary

Report No.: 18-15948

ELAB Reference	125419	125421
Customer Reference		
Sample ID		
Sample Type	SOIL	SOIL
Sample Location	WS1	WS3
Sample Depth (m)	0.50	0.30
Sampling Date	26/01/2018	26/01/2018

Determinand	Codes	Units	LOD		
Metals					
Arsenic	N	ug/l	5	< 5	< 5
Boron	N	ug/l	5	16	23
Cadmium	N	ug/l	1	< 1	< 1
Calcium	N	ug/l	100	8620	2170
Chromium	N	ug/l	5	< 5	< 5
Copper	N	ug/l	5	7	18
Lead	N	ug/l	5	< 5	< 5
Magnesium	N	ug/l	100	955	904
Mercury	N	ug/l	0.1	< 0.1	< 0.1
Nickel	N	ug/l	5	< 5	< 5
Selenium	N	ug/l	5	< 5	< 5
Zinc	N	ug/l	5	< 5	13
Anions					
Sulphate	N	mg/l	1	2	1
Inorganics					
Free Cyanide	N	ug/l	5	< 5	< 5
Sulphide	N	mg/l	0.1	< 0.1	< 0.1
Miscellaneous					
Dissolved organic carbon	N	mg/l	1.5	4.1	9.3
pH	N	pH units	0.1	7.3	7.5
Hardness (CaCO ₃)	N	mg/l CaCO ₃	0.1	25	9
Polyaromatic hydrocarbons					
Naphthalene Leachate GCMS	N	ug/l	0.01	0.06	0.07
Acenaphthylene Leachate GCMS	N	ug/l	0.01	< 0.01	< 0.01
Acenaphthene Leachate GCMS	N	ug/l	0.01	0.01	0.02
Fluorene Leachate GCMS	N	ug/l	0.01	0.02	0.02
Phenanthrene Leachate GCMS	N	ug/l	0.01	0.08	0.09
Anthracene Leachate GCMS	N	ug/l	0.01	0.02	0.02
Fluoranthene Leachate GCMS	N	ug/l	0.01	0.04	0.04
Pyrene Leachate GCMS	N	ug/l	0.01	0.02	0.03
Benzo (a) anthracene Leachate GCMS	N	ug/l	0.01	< 0.01	< 0.01
Chrysene Leachate GCMS	N	ug/l	0.01	0.01	< 0.01
Benzo (b) fluoranthene Leachate GCMS	N	ug/l	0.01	< 0.01	< 0.01
Benzo (k) fluoranthene Leachate GCMS	N	ug/l	0.01	< 0.01	< 0.01
Benzo (a) pyrene Leachate GCMS	N	ug/l	0.01	< 0.01	< 0.01
Indeno (1,2,3-cd) pyrene Leachate GCMS	N	ug/l	0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene Leachate GCMS	N	ug/l	0.01	< 0.01	< 0.01
Benzo(ghi)perylene Leachate GCMS	N	ug/l	0.01	0.01	0.01
Total PAH(16) Leachate GCMS	N	ug/l	0.01	0.29	0.30



Results Summary

Report No.: 18-15948

ELAB Reference	125419	125421
Customer Reference		
Sample ID		
Sample Type	SOIL	SOIL
Sample Location	WS1	WS3
Sample Depth (m)	0.50	0.30
Sampling Date	26/01/2018	26/01/2018

Determinand	Codes	Units	LOD		
TPH CWG					
>C5-C6 Aliphatic in Leachate	N	ug/l	1	< 1.0	< 1.0
>C6-C8 Aliphatic in Leachate	N	ug/l	1	< 1.0	< 1.0
>C8-C10 Aliphatic Leachate	N	ug/l	5	< 5.0	< 5.0
>C10-C12 Aliphatic Leachate	N	ug/l	5	< 5.0	< 5.0
>C12-C16 Aliphatic Leachate	N	ug/l	5	< 5.0	< 5.0
>C16-C21 Aliphatic Leachate	N	ug/l	5	< 5.0	< 5.0
>C21-C35 Aliphatic Leachate	N	ug/l	5	< 5.0	19.8
>C35-C40 Aliphatic Leachate	N	ug/l	5	< 5.0	< 5.0
Total (>C5-C40) Aliphatic Leachate	N	ug/l	5	< 5.0	19.8
>C5-C7 Aromatic in Leachate	N	ug/l	1	< 1.0	< 1.0
>C7-C8 Aromatic in Leachate	N	ug/l	1	< 1.0	< 1.0
>C8-C10 Aromatic Leachate	N	ug/l	5	< 5.0	< 5.0
>C10-C12 Aromatic Leachate	N	ug/l	5	< 5.0	< 5.0
>C12-C16 Aromatic Leachate	N	ug/l	5	< 5.0	< 5.0
>C16-C21 Aromatic Leachate	N	ug/l	5	< 5.0	< 5.0
>C21-C35 Aromatic Leachate	N	ug/l	5	5.4	< 5.0
>C35-C40 Aromatic Leachate	N	ug/l	5	< 5.0	< 5.0
Total (>C5-C40) Aromatic Leachate	N	ug/l	5	5.4	< 5.0
Total (>C5-C40) Ali/Aro Leachate	N	ug/l	5	5.4	19.8



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Results Summary
Report No.: 18-15948

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #)
in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
125419	0.50	WS1	Brown sandy soil, stones, brick, clinker, wood	No asbestos detected	n/t	n/t	n/t	n/t
125420	0.30	WS2	Brown sandy soil, stones, clinker	No asbestos detected	n/t	n/t	n/t	n/t
125423	0.40	WS5	Brown sandy soil, stones, concrete, clinker	No asbestos detected	n/t	n/t	n/t	n/t
125424	0.50	WS6	Brown sandy soil, stones, clinker	No asbestos detected	n/t	n/t	n/t	n/t
125425	0.50	WS7	Sand, stones, concrete, clinker	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 18-15948

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Aliphatic hydrocarbons in leachate	N		02/02/2018		GC-FID
Aliphatic/Aromatic hydrocarbons in leach	N		05/02/2018		GC-FID
Aromatic hydrocarbons in leachate	N		02/02/2018		GC-FID
Carbon in leachates	N		02/02/2018		IR
Cyanide (L) in solids in leachates	N		01/02/2018		Colorimetry
Metals by ICP in leachates	N		01/02/2018		ICPMS
Sulphide in solids in leachates	N		05/02/2018		Colorimetry
pH of leachates	N		05/02/2018		Electromeric
Free cyanide	N	As submitted sample	01/02/2018	107	Colorimetry
Sulphide	N	As submitted sample	02/02/2018	109	Colorimetry
Hexavalent chromium	N	As submitted sample	31/01/2018	110	Colorimetry
pH	M	Air dried sample	01/02/2018	113	Electromeric
Acid Soluble Sulphate	U	Air dried sample	02/02/2018	115	Ion Chromatography
Aqua regia extractable metals	M	Air dried sample	31/01/2018	118	ICPMS
PAH (GC-FID)	M	As submitted sample	31/01/2018	133	GC-FID
PAHs and/or PCBs in leachates	N		02/02/2018	135	GC-MS
Water soluble anions	M	Air dried sample	31/01/2018	172	Ion Chromatography
BTEX in solids	M	As submitted sample	02/02/2018	181A	GC-MS
Water soluble boron	N	Air dried sample	31/01/2018	202	Colorimetry
Aliphatic hydrocarbons in soil	N	As submitted sample	31/01/2018	214	GC-FID
Aliphatic/Aromatic hydrocarbons in soil	N	As submitted sample	02/02/2018	214	GC-FID
Aromatic hydrocarbons in soil	N	As submitted sample	31/01/2018	214	GC-FID
Low range Aliphatic hydrocarbons leachat	N		05/02/2018	214	GC-MS
Low range Aliphatic hydrocarbons soil	N	As submitted sample	02/02/2018	214	GC-MS
Low range Aromatic hydrocarbons leachate	N		05/02/2018	214	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	02/02/2018	214	GC-MS
Anions in leachates	N		01/02/2018	270	Ion Chromatography
Soil organic matter	U	Air dried sample	01/02/2018	BS1377:P3	Titrimetry
Asbestos identification	U	As submitted sample	01/02/2018	PMAN	Microscopy
Water					
Hardness in soil leachates	N		02/02/2018	APHA	ICPMS

Tests marked N are not UKAS accredited

Report Information

Report No.: 18-15948

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
SN	Subcontracted to approved laboratory
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis (dried at < 30°C)

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

PCB congener results may include any coeluting PCBs

Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage



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THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 22-42940

Issue: 1

Date of Issue: 06/09/2022

Contact: Daniel O'Regan

Customer Details: CC Geotechnical Ltd
Unit 1 & 2 Deltic Place
Deltic Way
Liverpool
Merseyside L33 7BA

Quotation No: Q22-02618

Order No: 18-10096

Customer Reference: 18-10096

Date Received: 30/08/2022

Date Approved: 06/09/2022

Details: Cross Lane, Whiston

Approved by:

Tim Reeve, Quality Officer

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Sample Summary

Report No.: 22-42940, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
291750	WS101 0.40	25/08/2022	30/08/2022	Sandy silty loam	
291751	WS102 0.30	25/08/2022	30/08/2022	Sandy silty loam	
291752	WS103 0.50	25/08/2022	30/08/2022	Sandy silty loam	
291753	WS104 0.40	25/08/2022	30/08/2022	Sandy silty loam	
291754	WS105 0.40	25/08/2022	30/08/2022	Sandy silty loam	
291755	WS101 2.50	25/08/2022	30/08/2022	Silty loam	
291756	WS101 3.50	25/08/2022	30/08/2022	Silty loam	
291757	WS103 1.50	25/08/2022	30/08/2022	Silty loam	
291758	WS103 2.50	25/08/2022	30/08/2022	Silty loam	
291759	WS105 1.50	25/08/2022	30/08/2022	Sandy loam	
291760	WS105 4.50	25/08/2022	30/08/2022	Silty loam	

Results Summary

Report No.: 22-42940, issue number 1

ELAB Reference	291750	291751	291752	291753
Customer Reference				
Sample ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sample Location	WS101	WS102	WS103	WS104
Sample Depth (m)	0.40	0.30	0.50	0.40
Sampling Date	25/08/2022	25/08/2022	25/08/2022	25/08/2022

Determinand	Codes	Units	LOD				
Soil sample preparation parameters							
Moisture Content	N	%	0.1	5.7	9.3	8.1	12.1
Material removed	N	%	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Description of Inert material removed	N		0	None	None	None	None
Metals							
Antimony	N	mg/kg	2.5	2.5	2.7	< 2.5	3.7
Arsenic	M	mg/kg	1	15.7	32.4	34.2	26.1
Cadmium	M	mg/kg	0.5	0.9	1.8	1.1	2.8
Chromium	M	mg/kg	5	27.8	21.3	17.9	26.6
Copper	M	mg/kg	5	181	507	499	185
Lead	M	mg/kg	5	351	128	101	286
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Molybdenum	N	mg/kg	0.5	1.3	2.3	2.9	2.8
Nickel	M	mg/kg	5	25.0	50.1	37.5	29.5
Selenium	M	mg/kg	1	< 1.0	1.6	2.0	< 1.0
Zinc	M	mg/kg	5	298	224	162	261
Anions							
Water Soluble Sulphate	M	g/l	0.02	< 0.02	0.05	< 0.02	< 0.02
Water Soluble Sulphate	M	mg/l	20	n/t	n/t	n/t	n/t
Inorganics							
Free Cyanide	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8
Total Sulphide	N	mg/kg	2	< 2	< 2	< 2	< 2
Acid Soluble Sulphate (SO4)	U	%	0.02	0.03	0.24	0.35	0.07
Water Soluble Boron	N	mg/kg	0.5	0.6	1.2	0.9	0.5
Miscellaneous							
pH	M	pH units	0.1	7.8	6.7	7.0	8.1
Soil Organic Matter	U	%	0.1	3.5	6.4	7.6	3.3
Polyaromatic hydrocarbons							
Naphthalene	M	mg/kg	0.1	< 0.1	1.2	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	0.3	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	0.2	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	1.5	< 0.1	0.2
Anthracene	M	mg/kg	0.1	< 0.1	0.3	< 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	0.3	1.1	< 0.1	0.3
Pyrene	M	mg/kg	0.1	0.5	0.9	< 0.1	0.2
Benzo(a)anthracene	M	mg/kg	0.1	0.1	0.4	< 0.1	< 0.1
Chrysene	M	mg/kg	0.1	0.1	0.4	< 0.1	< 0.1
Benzo(b)fluoranthene	M	mg/kg	0.1	0.1	0.3	< 0.1	< 0.1
Benzo(k)fluoranthene	M	mg/kg	0.1	0.1	0.3	< 0.1	< 0.1
Benzo(a)pyrene	M	mg/kg	0.1	0.1	0.4	< 0.1	0.1
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	0.2	0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	0.2	0.1	< 0.1	< 0.1
Total PAH(16)	M	mg/kg	0.4	2.0	7.7	< 0.4	1.4

Results Summary

Report No.: 22-42940, issue number 1

ELAB Reference	291750	291751	291752	291753
Customer Reference				
Sample ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sample Location	WS101	WS102	WS103	WS104
Sample Depth (m)	0.40	0.30	0.50	0.40
Sampling Date	25/08/2022	25/08/2022	25/08/2022	25/08/2022

Determinand	Codes	Units	LOD				
BTEX							
Benzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
Toluene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
Ethylbenzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
Xylenes	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
MTBE	U	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
TPH CWG							
>C5-C6 Aliphatic (HS_1D_MS)	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C6-C8 Aliphatic (HS_1D_MS)	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aliphatic (HS_1D_MS+EH_2D_AL)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
>C10-C12 Aliphatic (EH_2D_AL)	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
>C12-C16 Aliphatic (EH_2D_AL)	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
>C16-C21 Aliphatic (EH_2D_AL)	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
>C21-C35 Aliphatic (EH_2D_AL)	M	mg/kg	1	4.0	3.2	2.5	< 1.0
>C35-C40 Aliphatic (EH_2D_AL)	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
Total aliphatic hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_AL)	N	mg/kg	1	5.0	4.7	3.8	< 1.0
>C5-C7 Aromatic (HS_1D_MS)	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C7-C8 Aromatic (HS_1D_MS)	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aromatic (HS_1D_MS+EH_2D_AR)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
>C10-C12 Aromatic (EH_2D_AR)	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
>C12-C16 Aromatic (EH_2D_AR)	M	mg/kg	1	2.1	2.5	1.8	< 1.0
>C16-C21 Aromatic (EH_2D_AR)	M	mg/kg	1	1.3	2.1	1.3	< 1.0
>C21-C35 Aromatic (EH_2D_AR)	M	mg/kg	1	14.1	20.4	10.4	1.7
>C35-C40 Aromatic (EH_2D_AR)	M	mg/kg	1	4.2	3.4	1.3	< 1.0
Total aromatic hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_AR)	N	mg/kg	1	22.4	29.2	15.4	2.9
Total petroleum hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_Total)	N	mg/kg	1	27.4	33.9	19.2	3.6

Results Summary

Report No.: 22-42940, issue number 1

ELAB Reference	291754	291755	291756	291757
Customer Reference				
Sample ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sample Location	WS105	WS101	WS101	WS103
Sample Depth (m)	0.40	2.50	3.50	1.50
Sampling Date	25/08/2022	25/08/2022	25/08/2022	25/08/2022

Determinand	Codes	Units	LOD				
Soil sample preparation parameters							
Moisture Content	N	%	0.1	11.3	5.7	9.7	5.8
Material removed	N	%	0.1	< 0.1	21.5	< 0.1	< 0.1
Description of Inert material removed	N		0	None	Stones	None	None
Metals							
Antimony	N	mg/kg	2.5	4.1	n/t	n/t	n/t
Arsenic	M	mg/kg	1	17.5	n/t	n/t	n/t
Cadmium	M	mg/kg	0.5	3.4	n/t	n/t	n/t
Chromium	M	mg/kg	5	34.6	n/t	n/t	n/t
Copper	M	mg/kg	5	161	n/t	n/t	n/t
Lead	M	mg/kg	5	180	n/t	n/t	n/t
Mercury	M	mg/kg	0.5	< 0.5	n/t	n/t	n/t
Molybdenum	N	mg/kg	0.5	2.2	n/t	n/t	n/t
Nickel	M	mg/kg	5	26.5	n/t	n/t	n/t
Selenium	M	mg/kg	1	< 1.0	n/t	n/t	n/t
Zinc	M	mg/kg	5	185	n/t	n/t	n/t
Anions							
Water Soluble Sulphate	M	g/l	0.02	0.02	n/t	n/t	n/t
Water Soluble Sulphate	M	mg/l	20	n/t	26	< 20	58
Inorganics							
Free Cyanide	N	mg/kg	1	< 1.0	n/t	n/t	n/t
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	n/t	n/t	n/t
Total Sulphide	N	mg/kg	2	< 2	n/t	n/t	n/t
Acid Soluble Sulphate (SO4)	U	%	0.02	0.09	n/t	n/t	n/t
Water Soluble Boron	N	mg/kg	0.5	0.6	n/t	n/t	n/t
Miscellaneous							
pH	M	pH units	0.1	8.2	8.4	8.1	7.2
Soil Organic Matter	U	%	0.1	3.9	n/t	n/t	n/t
Polyaromatic hydrocarbons							
Naphthalene	M	mg/kg	0.1	< 0.1	n/t	n/t	n/t
Acenaphthylene	M	mg/kg	0.1	< 0.1	n/t	n/t	n/t
Acenaphthene	M	mg/kg	0.1	0.3	n/t	n/t	n/t
Fluorene	M	mg/kg	0.1	0.2	n/t	n/t	n/t
Phenanthrene	M	mg/kg	0.1	2.0	n/t	n/t	n/t
Anthracene	M	mg/kg	0.1	0.4	n/t	n/t	n/t
Fluoranthene	M	mg/kg	0.1	5.4	n/t	n/t	n/t
Pyrene	M	mg/kg	0.1	5.1	n/t	n/t	n/t
Benzo(a)anthracene	M	mg/kg	0.1	2.4	n/t	n/t	n/t
Chrysene	M	mg/kg	0.1	2.6	n/t	n/t	n/t
Benzo(b)fluoranthene	M	mg/kg	0.1	3.0	n/t	n/t	n/t
Benzo(k)fluoranthene	M	mg/kg	0.1	3.3	n/t	n/t	n/t
Benzo(a)pyrene	M	mg/kg	0.1	3.5	n/t	n/t	n/t
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	2.3	n/t	n/t	n/t
Dibenzo(a,h)anthracene	M	mg/kg	0.1	0.4	n/t	n/t	n/t
Benzo[g,h,i]perylene	M	mg/kg	0.1	2.4	n/t	n/t	n/t
Total PAH(16)	M	mg/kg	0.4	33.3	n/t	n/t	n/t

Results Summary

Report No.: 22-42940, issue number 1

ELAB Reference	291754	291755	291756	291757
Customer Reference				
Sample ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sample Location	WS105	WS101	WS101	WS103
Sample Depth (m)	0.40	2.50	3.50	1.50
Sampling Date	25/08/2022	25/08/2022	25/08/2022	25/08/2022

Determinand	Codes	Units	LOD				
BTEX							
Benzene	M	ug/kg	10	< 10.0	n/t	n/t	n/t
Toluene	M	ug/kg	10	< 10.0	n/t	n/t	n/t
Ethylbenzene	M	ug/kg	10	< 10.0	n/t	n/t	n/t
Xylenes	M	ug/kg	10	< 10.0	n/t	n/t	n/t
MTBE	U	ug/kg	10	< 10.0	n/t	n/t	n/t
TPH CWG							
>C5-C6 Aliphatic (HS_1D_MS)	N	mg/kg	0.01	< 0.01	n/t	n/t	n/t
>C6-C8 Aliphatic (HS_1D_MS)	N	mg/kg	0.01	< 0.01	n/t	n/t	n/t
>C8-C10 Aliphatic (HS_1D_MS+EH_2D_AL)	N	mg/kg	1	< 1.0	n/t	n/t	n/t
>C10-C12 Aliphatic (EH_2D_AL)	M	mg/kg	1	< 1.0	n/t	n/t	n/t
>C12-C16 Aliphatic (EH_2D_AL)	M	mg/kg	1	2.1	n/t	n/t	n/t
>C16-C21 Aliphatic (EH_2D_AL)	M	mg/kg	1	2.8	n/t	n/t	n/t
>C21-C35 Aliphatic (EH_2D_AL)	M	mg/kg	1	37.5	n/t	n/t	n/t
>C35-C40 Aliphatic (EH_2D_AL)	M	mg/kg	1	10.1	n/t	n/t	n/t
Total aliphatic hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_AL)	N	mg/kg	1	53.0	n/t	n/t	n/t
>C5-C7 Aromatic (HS_1D_MS)	N	mg/kg	0.01	< 0.01	n/t	n/t	n/t
>C7-C8 Aromatic (HS_1D_MS)	N	mg/kg	0.01	< 0.01	n/t	n/t	n/t
>C8-C10 Aromatic (HS_1D_MS+EH_2D_AR)	N	mg/kg	1	< 1.0	n/t	n/t	n/t
>C10-C12 Aromatic (EH_2D_AR)	M	mg/kg	1	1.2	n/t	n/t	n/t
>C12-C16 Aromatic (EH_2D_AR)	M	mg/kg	1	7.1	n/t	n/t	n/t
>C16-C21 Aromatic (EH_2D_AR)	M	mg/kg	1	23.4	n/t	n/t	n/t
>C21-C35 Aromatic (EH_2D_AR)	M	mg/kg	1	295	n/t	n/t	n/t
>C35-C40 Aromatic (EH_2D_AR)	M	mg/kg	1	126	n/t	n/t	n/t
Total aromatic hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_AR)	N	mg/kg	1	453	n/t	n/t	n/t
Total petroleum hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_Total)	N	mg/kg	1	506	n/t	n/t	n/t

Results Summary

Report No.: 22-42940, issue number 1

ELAB Reference	291758	291759	291760
Customer Reference			
Sample ID			
Sample Type	SOIL	SOIL	SOIL
Sample Location	WS103	WS105	WS105
Sample Depth (m)	2.50	1.50	4.50
Sampling Date	25/08/2022	25/08/2022	25/08/2022

Determinand	Codes	Units	LOD			
Soil sample preparation parameters						
Moisture Content	N	%	0.1	5.0	9.8	5.2
Material removed	N	%	0.1	< 0.1	< 0.1	< 0.1
Description of Inert material removed	N		0	None	None	None
Metals						
Antimony	N	mg/kg	2.5	n/t	n/t	n/t
Arsenic	M	mg/kg	1	n/t	n/t	n/t
Cadmium	M	mg/kg	0.5	n/t	n/t	n/t
Chromium	M	mg/kg	5	n/t	n/t	n/t
Copper	M	mg/kg	5	n/t	n/t	n/t
Lead	M	mg/kg	5	n/t	n/t	n/t
Mercury	M	mg/kg	0.5	n/t	n/t	n/t
Molybdenum	N	mg/kg	0.5	n/t	n/t	n/t
Nickel	M	mg/kg	5	n/t	n/t	n/t
Selenium	M	mg/kg	1	n/t	n/t	n/t
Zinc	M	mg/kg	5	n/t	n/t	n/t
Anions						
Water Soluble Sulphate	M	g/l	0.02	n/t	n/t	n/t
Water Soluble Sulphate	M	mg/l	20	62	< 20	< 20
Inorganics						
Free Cyanide	N	mg/kg	1	n/t	n/t	n/t
Hexavalent Chromium	N	mg/kg	0.8	n/t	n/t	n/t
Total Sulphide	N	mg/kg	2	n/t	n/t	n/t
Acid Soluble Sulphate (SO4)	U	%	0.02	n/t	n/t	n/t
Water Soluble Boron	N	mg/kg	0.5	n/t	n/t	n/t
Miscellaneous						
pH	M	pH units	0.1	7.7	7.8	7.6
Soil Organic Matter	U	%	0.1	n/t	n/t	n/t
Polyaromatic hydrocarbons						
Naphthalene	M	mg/kg	0.1	n/t	n/t	n/t
Acenaphthylene	M	mg/kg	0.1	n/t	n/t	n/t
Acenaphthene	M	mg/kg	0.1	n/t	n/t	n/t
Fluorene	M	mg/kg	0.1	n/t	n/t	n/t
Phenanthrene	M	mg/kg	0.1	n/t	n/t	n/t
Anthracene	M	mg/kg	0.1	n/t	n/t	n/t
Fluoranthene	M	mg/kg	0.1	n/t	n/t	n/t
Pyrene	M	mg/kg	0.1	n/t	n/t	n/t
Benzo(a)anthracene	M	mg/kg	0.1	n/t	n/t	n/t
Chrysene	M	mg/kg	0.1	n/t	n/t	n/t
Benzo(b)fluoranthene	M	mg/kg	0.1	n/t	n/t	n/t
Benzo(k)fluoranthene	M	mg/kg	0.1	n/t	n/t	n/t
Benzo(a)pyrene	M	mg/kg	0.1	n/t	n/t	n/t
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	n/t	n/t	n/t
Dibenzo(a,h)anthracene	M	mg/kg	0.1	n/t	n/t	n/t
Benzo[g,h,i]perylene	M	mg/kg	0.1	n/t	n/t	n/t
Total PAH(16)	M	mg/kg	0.4	n/t	n/t	n/t

Results Summary

Report No.: 22-42940, issue number 1

ELAB Reference	291758	291759	291760
Customer Reference			
Sample ID			
Sample Type	SOIL	SOIL	SOIL
Sample Location	WS103	WS105	WS105
Sample Depth (m)	2.50	1.50	4.50
Sampling Date	25/08/2022	25/08/2022	25/08/2022

Determinand	Codes	Units	LOD			
BTEX						
Benzene	M	ug/kg	10	n/t	n/t	n/t
Toluene	M	ug/kg	10	n/t	n/t	n/t
Ethylbenzene	M	ug/kg	10	n/t	n/t	n/t
Xylenes	M	ug/kg	10	n/t	n/t	n/t
MTBE	U	ug/kg	10	n/t	n/t	n/t
TPH CWG						
>C5-C6 Aliphatic (HS_1D_MS)	N	mg/kg	0.01	n/t	n/t	n/t
>C6-C8 Aliphatic (HS_1D_MS)	N	mg/kg	0.01	n/t	n/t	n/t
>C8-C10 Aliphatic (HS_1D_MS+EH_2D_AL)	N	mg/kg	1	n/t	n/t	n/t
>C10-C12 Aliphatic (EH_2D_AL)	M	mg/kg	1	n/t	n/t	n/t
>C12-C16 Aliphatic (EH_2D_AL)	M	mg/kg	1	n/t	n/t	n/t
>C16-C21 Aliphatic (EH_2D_AL)	M	mg/kg	1	n/t	n/t	n/t
>C21-C35 Aliphatic (EH_2D_AL)	M	mg/kg	1	n/t	n/t	n/t
>C35-C40 Aliphatic (EH_2D_AL)	M	mg/kg	1	n/t	n/t	n/t
Total aliphatic hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_AL)	N	mg/kg	1	n/t	n/t	n/t
>C5-C7 Aromatic (HS_1D_MS)	N	mg/kg	0.01	n/t	n/t	n/t
>C7-C8 Aromatic (HS_1D_MS)	N	mg/kg	0.01	n/t	n/t	n/t
>C8-C10 Aromatic (HS_1D_MS+EH_2D_AR)	N	mg/kg	1	n/t	n/t	n/t
>C10-C12 Aromatic (EH_2D_AR)	M	mg/kg	1	n/t	n/t	n/t
>C12-C16 Aromatic (EH_2D_AR)	M	mg/kg	1	n/t	n/t	n/t
>C16-C21 Aromatic (EH_2D_AR)	M	mg/kg	1	n/t	n/t	n/t
>C21-C35 Aromatic (EH_2D_AR)	M	mg/kg	1	n/t	n/t	n/t
>C35-C40 Aromatic (EH_2D_AR)	M	mg/kg	1	n/t	n/t	n/t
Total aromatic hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_AR)	N	mg/kg	1	n/t	n/t	n/t
Total petroleum hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_Total)	N	mg/kg	1	n/t	n/t	n/t



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Results Summary

Report No.: 22-42940, issue number 1

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type	Free Fibre Analysis (%)	Total Asbestos (%)
291750	0.40	WS101	Brown Sandy Soil, Stones, Clinker, Brick	No asbestos detected	n/t	n/t	n/t	n/t
291751	0.30	WS102	Brown Soil, Stones, Clinker	No asbestos detected	n/t	n/t	n/t	n/t
291752	0.50	WS103	Brown Soil, Stones, Clinker	No asbestos detected	n/t	n/t	n/t	n/t
291753	0.40	WS104	Brown Soil, Stones, Clinker	No asbestos detected	n/t	n/t	n/t	n/t
291754	0.40	WS105	Brown Soil, Stones, Clinker	No asbestos detected	n/t	n/t	n/t	n/t



Method Summary

Report No.: 22-42940, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Free cyanide	N	As submitted sample	31/08/2022	107	Colorimetry
Sulphide	N	As submitted sample	01/09/2022	109	Colorimetry
Hexavalent chromium	N	As submitted sample	31/08/2022	110	Colorimetry
pH	M	Air dried sample	06/09/2022	113	Electromeric
Acid Soluble Sulphate	U	Air dried sample	01/09/2022	115	Ion Chromatography
Aqua regia extractable metals	M	Air dried sample	01/09/2022	118	ICPMS
PAH (GC-FID)	M	As submitted sample	31/08/2022	133	GC-FID
Water soluble anions	M	Air dried sample	31/08/2022	172	Ion Chromatography
Low range Aliphatic hydrocarbons soil	N	As submitted sample	05/09/2022	181	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	05/09/2022	181	GC-MS
BTEX in solids	M	As submitted sample	05/09/2022	181A	GC-MS
Water soluble boron	N	Air dried sample	31/08/2022	202	Colorimetry
TPH CWG soil by gc-gc	M	As submitted sample	31/08/2022	271	
Asbestos identification	U	Air dried sample	05/09/2022	280	Microscopy
Soil organic matter	U	Air dried sample	02/09/2022	BS1377:P3	Titrimetry

Tests marked N are not UKAS accredited

Report Information

Report No.: 22-42940, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"
LOD	LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination. Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed. ELAB are unable to provide an interpretation or opinion on the content of this report. The results relate only to the sample received. PCB congener results may include any coeluting PCBs Uncertainty of measurement for the determinands tested are available upon request Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
 All water samples will be retained for 7 days following the date of the test report
 Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
2D	GC-GC - Double coil gas chromatography
#1	EH_Total but with humics mathematically subtracted
#2	EH_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry



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THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 18-15974

Issue: 1

Date of Issue: 05/02/2018

Contact: Daniel O'Regan

Customer Details: CC Geotechnical Ltd
Unit 1 & 2 Deltic Place
Deltic Way
Liverpool
Merseyside L33 7BA

Quotation No: Q14-00045

Order No: Not Supplied

Customer Reference: 18-10096

Date Received: 31/01/2018

Date Approved: 05/02/2018

Details: Cross Lane

Approved by:

Mike Varley, Technical Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



Sample Summary

Report No.: 18-15974

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
125567	WS8	30/01/2018	31/01/2018		

Results Summary

Report No.: 18-15974

ELAB Reference	125567
Customer Reference	
Sample ID	
Sample Type	WATER
Sample Location	WS8
Sample Depth (m)	
Sampling Date	30/01/2018

Determinand	Codes	Units	LOD	
Dissolved Metals				
Arsenic	U	ug/l	5	< 5
Boron	N	ug/l	5	125
Calcium	U	ug/l	100	101000
Cadmium	U	ug/l	1	< 1
Chromium	U	ug/l	5	< 5
Copper	U	ug/l	5	113
Mercury	U	ug/l	0.1	< 0.1
Magnesium	U	ug/l	100	17400
Nickel	U	ug/l	5	17
Lead	U	ug/l	1	< 1
Selenium	U	ug/l	5	< 5
Zinc	U	ug/l	5	641
Anions				
Sulphate	N	mg/l	0.5	80.4
Inorganics				
Free Cyanide	N	ug/l	5	< 5
Miscellaneous				
Dissolved organic carbon	U	mg/l	1.5	17
Hardness (CaCO ₃)	N	mg/l CaCO ₃	0.1	323
pH	U	pH units	0.1	6.6
Polyaromatic hydrocarbons				
Naphthalene GCMS	N	ug/l	0.01	0.76
Acenaphthylene GCMS	N	ug/l	0.01	0.09
Acenaphthene GCMS	N	ug/l	0.01	2.90
Fluorene GCMS	N	ug/l	0.01	2.13
Phenanthrene GCMS	N	ug/l	0.01	22.6
Anthracene GCMS	N	ug/l	0.01	4.86
Fluoranthene GCMS	N	ug/l	0.01	23.4
Pyrene GCMS	N	ug/l	0.01	18.8
Benzo (a) anthracene GCMS	N	ug/l	0.01	17.1
Chrysene GCMS	N	ug/l	0.01	12.4
Benzo (b) fluoranthene GCMS	N	ug/l	0.01	13.4
Benzo (k) fluoranthene GCMS	N	ug/l	0.01	10.5
Benzo (a) pyrene GCMS	N	ug/l	0.01	15.2
Indeno (1,2,3-cd) pyrene GCMS	N	ug/l	0.01	6.57
Dibenzo(a,h)anthracene GCMS	N	ug/l	0.01	2.06
Benzo(ghi)perylene GCMS	N	ug/l	0.01	6.74
Total PAH(16) GCMS	N	ug/l	0.01	159

Results Summary

Report No.: 18-15974

ELAB Reference	125567
Customer Reference	
Sample ID	
Sample Type	WATER
Sample Location	WS8
Sample Depth (m)	
Sampling Date	30/01/2018

Determinand	Codes	Units	LOD	
BTEX				
Benzene	U	ug/l	1	< 1.00
Toluene	U	ug/l	1	< 1.00
Ethylbenzene	U	ug/l	1	< 1.00
Xylenes	U	ug/l	1	< 1.00
MTBE	U	ug/l	1	< 1.00
TPH CWG				
>C5-C6 Aliphatic	N	ug/l	1	< 1.0
>C6-C8 Aliphatic	N	ug/l	1	< 1.0
>C8-C10 Aliphatic	N	ug/l	5	< 5.0
>C10-C12 Aliphatic	N	ug/l	5	< 5.0
>C12-C16 Aliphatic	N	ug/l	5	< 5.0
>C16-C21 Aliphatic	N	ug/l	5	6.3
>C21-C35 Aliphatic	N	ug/l	5	37.6
>C35-C40 Aliphatic	N	ug/l	5	< 5.0
Total (>C5-C40) Aliphatic	N	ug/l	5	43.8
>C5-C7 Aromatic	N	ug/l	1	< 1.0
>C7-C8 Aromatic	N	ug/l	1	< 1.0
>C8-C10 Aromatic	N	ug/l	5	< 5.0
>C10-C12 Aromatic	N	ug/l	5	< 5.0
>C12-C16 Aromatic	N	ug/l	5	< 5.0
>C16-C21 Aromatic	N	ug/l	5	18.2
>C21-C35 Aromatic	N	ug/l	5	77.3
>C35-C40 Aromatic	N	ug/l	5	6.0
Total (>C5-C40) Aromatic	N	ug/l	5	102
Total (>C5-C40) Ali/Aro	N	ug/l	5	145

Method Summary

Report No.: 18-15974

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Water					
Aliphatic/Aromatic hydrocarbons in water	N		05/02/2018		GC-FID
Aromatic hydrocarbons in water	N		05/02/2018		GC-FID
Dissolved metals by ICP in waters	U		01/02/2018	101	ICPMS
Dissolved organic carbon	U		02/02/2018	102	IR
pH of waters	U		05/02/2018	113	Electromeric
Cyanide in waters	N		01/02/2018	132	Colorimetry
PAHs and/or PCBs in waters	N		01/02/2018	135	GC-MS
BTEX in waters	U		05/02/2018	200A	GC-MS
Aliphatic hydrocarbons in water	N		01/02/2018	215	GC-FID
Aromatic hydrocarbons in water	N		01/02/2018	215	GC-FID
Low range Aliphatic hydrocarbons water	N		05/02/2018	215	GC-MS
Low range Aromatic hydrocarbons water	N		05/02/2018	215	GC-MS
Anions	N		01/02/2018	270	Ion Chromatography
Hardness in waters	N		02/02/2018	APHA	ICPMS

Tests marked N are not UKAS accredited

Report Information

Report No.: 18-15974

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
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S	Subcontracted to approved laboratory UKAS Accredited for the test
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I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis (dried at < 30°C)

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

PCB congener results may include any coeluting PCBs

Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage



APPENDIX E

CONTAMINATION ASSESSMENT WORKSHEETS

SITE: Cross Lane, Whiston
JOB NO: CCG-C-18-10096

CLIENT: CL Developments
DATE: 06/02/2018



LOCATION	DEPTH (m)	SITE SPECIFIC ASSESSMENT CRITERIA	Arsenic	Cadmium	Chromium	Lead	Mercury	Nickel	Copper	Zinc	Selenium	Boron	pH Value	Water Soluble Sulphate	Asbestos Identification
			mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹			
		Source	40	85	910	310	1.2	180	7100	40000	430	11000			
			C4SL	C4SL	S4UL	C4SL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	N/A	N/A	N/A
WS1	0.50		50.4	1.8	25.8	210	<0.5	67.8	314	281	1.3	<0.5	6.8	60	No asbestos detected
WS2	0.30		18.6	2.4	26.3	122	<0.5	21.2	148	194	<1.0	<0.5	6.7	40	No asbestos detected
WS5	0.40		23.6	3.8	27.4	144	<0.5	25.4	218	213	<1.0	<0.5	6.2	60	No asbestos detected
WS6	0.50		39.6	2.1	28.8	390	<0.5	74.9	724	827	1.5	<0.5	7.4	120	No asbestos detected
WS7	0.50		10.4	<0.5	11.2	42.9	<0.5	10.2	69.1	68.5	<1.0	<0.5	11.6	40	No asbestos detected
WS101	0.40		15.7	0.9	27.8	351	<0.5	25	181	298	<1	0.6	7.8	<20	No asbestos detected
WS102	0.30		32.4	1.8	21.3	128	<0.5	50.1	507	224	1.6	1.2	6.7	50	No asbestos detected
WS103	0.50		34.2	1.1	17.9	101	<0.5	37.5	499	162	2	0.9	7.0	<20	No asbestos detected
WS104	0.40		26.1	2.8	26.6	286	<0.5	29.5	185	261	<1	0.5	8.1	<20	No asbestos detected
WS105	0.40		17.5	3.4	34.6	180	<0.5	26.5	161	185	<1	0.6	8.2	<20	No asbestos detected

KEY

EXCEEDANCE OF THRESHOLD CRITERIA

SITE: Cross Lane, Whiston
JOB NO: CCG-C-18-10096

CLIENT: CL Developments
DATE: 06/02/2018



LOCATION	DEPTH (m)	SITE SPECIFIC ASSESSMENT CRITERIA	Naphthalene*	Acenaphthylene*	Acenaphthene*	Fluorene*	Phenanthrene*	Anthracene*	Fluoranthene*	Pyrene*	Benzo[a]anthracene*	Chrysene*	Benzo[b]fluoranthene*	Benzo[k]fluoranthene*	Benzo[a]pyrene*	Dibenzo[a,h]anthracene*	Indeno[1,2,3-cd]pyrene*	Benzo[g,h,i]perylene*	Total PAHs*
			mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹
		SOURCE	5.6	4600	4700	3800	1500	35000	1600	3800	14	31	4.0	110	3.2	0.32	46	340	N/A
			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	N/A
WS1	0.50		0.3	<0.1	0.1	<0.1	1.0	0.3	2.1	2.1	1.1	1.2	2.2	1.4	1.5	0.2	1.2	1.1	15.8
WS2	0.30		<0.1	<0.1	<0.1	<0.1	0.5	0.1	1.4	1.3	0.6	0.7	1.5	0.8	0.8	0.2	0.6	0.7	9.3
WS5	0.40		<0.1	<0.1	<0.1	<0.1	0.4	0.1	1.8	1.7	1.0	1	1.5	1.2	1.2	0.2	0.8	0.9	120
WS6	0.50		0.3	<0.1	0.7	0.4	5.6	1.4	11.8	10.5	5.2	6.2	6.8	5.8	6.2	0.8	4.2	4.6	70.7
WS7	0.50		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.1	<0.1	0.3	0.2	0.9
WS101	0.40		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	2
WS102	0.30		1.2	<0.1	0.3	0.2	1.5	0.3	1.1	0.9	0.4	0.4	0.3	0.3	0.4	0.4	0.1	0.1	7.7
WS103	0.50		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.4
WS104	0.40		<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.3	0.2	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	1.4
WS105	0.40		<0.1	<0.1	0.3	0.2	2.0	0.4	5.4	5.1	2.4	2.6	3.0	3.3	3.5	2.3	0.4	2.4	33.3

KEY

EXCEEDANCE OF THRESHOLD CRITERIA

SITE: Cross Lane, Whiston
JOB NO: CCG-C-18-10096

CLIENT: CL Developments
DATE: 06/02/2018



LOCATION	DEPTH (m)	SITE SPECIFIC ASSESSMENT CRITERIA																		Total Petroleum Hydrocarbons
		SOURCE	TPH aromatic >C5-C7	TPH aromatic >C7-C8	TPH aromatic >C8-C10	TPH aromatic >C10-C12	TPH aromatic >C12-C16	TPH aromatic >C16-C21	TPH aromatic >C21-C35	TPH aromatic >C35-C40										
			mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹										mg kg ⁻¹
			140	290	83	180	330	540	1500	1500										N/A
			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL										N/A
WS1	0.50		<0.01	<0.01	<1.0	<1.0	<1.0	3.3	30.3	5.9										59
WS2	0.30		<0.01	<0.01	<1.0	<1.0	<1.0	<1.0	3.2	<1.0										5
WS5	0.40		<0.01	<0.01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0										<1.0
WS6	0.50		<0.01	<0.01	<1.0	<1.0	3.8	18.8	205	79.8										440
WS7	0.50		<0.01	<0.01	<1.0	<1.0	<1.0	<1.0	1.5	<1.0										3
WS101	0.40		<0.01	<0.01	<1.0	<1.0	2.1	1.3	14.1	4.2										27
WS102	0.30		<0.01	<0.01	<1.0	<1.0	2.5	2.1	20.4	3.4										34
WS103	0.50		<0.01	<0.01	<1.0	<1.0	1.8	1.3	10.4	1.3										19
WS104	0.40		<0.01	<0.01	<1.0	<1.0	<1.0	<1.0	1.7	<1.0										4
WS105	0.40		<0.01	<0.01	<1.0	1.2	7.1	23.4	295	126										506

KEY

EXCEEDANCE OF THRESHOLD CRITERIA



APPENDIX F

GAS AND GROUNDWATER MONITORING DATA

GAS AND WATER MONITORING RESULTS



	Date:	30-Jan-18	14-Feb-18	26-Feb-18	09-Mar-18	26-Mar-18	28-Apr-18						
	Visit Number	1	2	3	4	5	6						
	Atmos Press mb	1023	999	1031	1003	1016	1011						
	Pressure Trend	FALLING	FALLING	STEADY	STEADY	STEADY	RISING						
	Air Temp °C	7	2	2	5	3	6						
	Cloud cover	OVERCAST	OVERCAST	OVERCAST	OVERCAST	OVERCAST	CLEAR						
	Wind velocity	LIGHT	WINDY	WINDY	LIGHT	LIGHT	LIGHT						
	Precipitation	DRY	DRY	DRY	DRY	DRY	DRY						
	State of Ground	DRY	DRY	DRY	DRY	DRY	DRY						
WS1	CH ₄ (%) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	CO ₂ (%) (max/steady):	0.8	0.8	0.7	0.9	0.8	0.7						
	O ₂ (%) (max/steady):	19.2	19.4	19.4	19.4	19.3	19.4						
	H ₂ S (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	CO (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	PID (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	Flow (l/hr) (max/steady):	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
	Water Level / depth to base (m):	DRY	DRY	DRY	DRY	DRY	DRY						
WS3	CH ₄ (%) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	CO ₂ (%) (max/steady):	0.1	0.0	0.0	0.0	0.0	0.0						
	O ₂ (%) (max/steady):	19.8	20.0	19.9	20.0	20.0	20.0						
	H ₂ S (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	CO (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	PID (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	Flow (l/hr) (max/steady):	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
	Water Level / depth to base (m):	DRY	DRY	DRY	DRY	DRY	DRY						
WS4	CH ₄ (%) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	CO ₂ (%) (max/steady):	0.1	0.0	0.0	0.0	0.0	0.0						
	O ₂ (%) (max/steady):	19.9	20.0	19.9	20.0	20.1	20.0						
	H ₂ S (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	CO (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	PID (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	Flow (l/hr) (max/steady):	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
	Water Level / depth to base (m):	DRY	DRY	DRY	DRY	DRY	DRY						
WS6	CH ₄ (%) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	CO ₂ (%) (max/steady):	2.1	1.9	1.8	1.8	1.7	1.6						
	O ₂ (%) (max/steady):	19.2	19.4	19.3	19.2	19.4	19.5						
	H ₂ S (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	CO (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	PID (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	Flow (l/hr) (max/steady):	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
	Water Level / depth to base (m):	DRY	DRY	DRY	DRY	DRY	DRY						
WS8	CH ₄ (%) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	CO ₂ (%) (max/steady):	3.2	3.0	3.0	3.1	2.9	2.8						
	O ₂ (%) (max/steady):	19.0	19.3	19.2	19.0	19.0	19.1						
	H ₂ S (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	CO (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	PID (ppm) (max/steady):	0.0	0.0	0.0	0.0	0.0	0.0						
	Flow (l/hr) (max/steady):	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
	Water Level / depth to base (m):	2.36	2.38	2.44	2.46	2.39	2.30						

CCG-CMS-FO-129

Issue 2

Job No: CCG-C-18-10096

Site: Cross Lane, Whiston

Instrument: GSXI

CCG-CMS-EO-129

Instrument: GSXI



APPENDIX G

COAL AUTHORITY REPORT

The COAL AUTHORITY

Issued by:

The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG

Website: www.groundstability.com Phone: 0845 762 6848 DX 716176 MANSFIELD 5

**CCGEOTECHNICAL
UNIT 1 DELTIC WAY
KIRKBY
LIVERPOOL
MERSEYSIDE
L33 7BA**

Our reference:	51000031815001
Your reference:	CCG-C-12-6561
Date of your enquiry:	06 February 2012
Date we received your enquiry:	06 February 2012
Date of issue:	06 February 2012

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

69 CROSS LANE, WHISTON, PRESCOT, MERSEYSIDE, L35 3QQ

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	See comments below
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

The property is in the likely zone of influence from workings in 5 seams of coal at 70m to 290m depth, and last worked in 1895.

Any ground movement from these coal workings should have stopped by now.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Records may be incomplete. Consequently, there may exist in the local area mine entries of which the Coal Authority has no knowledge.

Coal mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

Opencast coal mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

The property is not in an area for which a notice has been given under section 41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working facilities orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to owners of former copyhold land

The property is not in an area for which a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional Remarks

This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions 2006. The Coal Authority owns the copyright in this report. The information we have used to write this report is protected by our database right. All rights are reserved and unauthorised use is prohibited. If we provide a report for you, this does not mean that copyright and any other rights will pass to you. However, you can use the report for your own purposes.

Location map



Approximate position of property



Enquiry boundary

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Key

Approximate position of enquiry boundary shown





APPENDIX H

PETROLEUM OFFICER REPORT



Mr Daniel O'Regan
CC Geotechnical Lrd
Units 1 and 2
Deltic Place
Deltic Way
Knowsley Industrial Estate
L33 7BU

Email: daniel.oregan@ccgeotechnical.co.uk

**Merseyside Fire & Rescue Authority
Sefton Community Fire Protection**

Bootle & Netherton Community Fire Station
Fleetwoods Lane
Netherton
Merseyside
L30 0RG

Telephone: 0151 296 4000

(Calls may be recorded)

Direct Line: 0151 296 6577

Inspecting Officer: Linda Kirby

Email: Lindakirby@merseyfire.gov.uk

Web Site: www.merseyfire.gov.uk

Your ref: JERS625

Our ref: 41/00056/LK/ST

Date: 18th April 2017

Dear Sir

ENVIRONMENTAL SEARCH

PREMISES ADDRESS: 89 Cross Lane, Whiston, Merseyside, L35 3QQ

I refer to your recent communication and request for information relating to petroleum storage at the above site.

A search of the petroleum archive revealed the following information, which is summarised in chronological order below:

- 28th November 2007 – an Improvement Notice was issued to the then owner, Mr L Stockton, detailing that the underground tanks and all associated pipework were to be made safe.
- 30th July 2008 – an agreement was made with Mr L Stockton that the underground petroleum tanks would be made temporarily safe, ie water filled, by Neston Tank Cleaners Ltd. The agreement was for 12 months whilst planning approval for the site was obtained. The time allowed for works under the Improvement Notice was extended to the end of January 2009.
- 15th January 2009 - a visit to the site forecourt and the adjoining property revealed that they were unoccupied. No confirmation of water filling had been received.
- 26th February 2009 - Mr Stockton agreed to provide documentation confirming water filling of the tanks.
- 9th April 2009 – a request was made to Mr L Stockton for documentation confirming water filling of the tanks; no reply was received.
- 8th July 2009 – a request was made to Mr L Stockton for documentation confirming water filling of the tanks, no reply was received.

The above summary identified that there was a proposal to water fill the petroleum tanks as a temporary measure. There is no evidence to suggest that the tanks have been made temporarily safe. Additionally there is no evidence to confirm that the tanks have been made permanently safe.

It is recommended that the tanks are properly surveyed to determine their condition and state before any work is carried out at the site.

Please note that Merseyside Fire and Rescue Authority does not guarantee the accuracy of the information supplied to you and it will not accept responsibility for any discrepancy between the information it holds and the actual conditions on site.

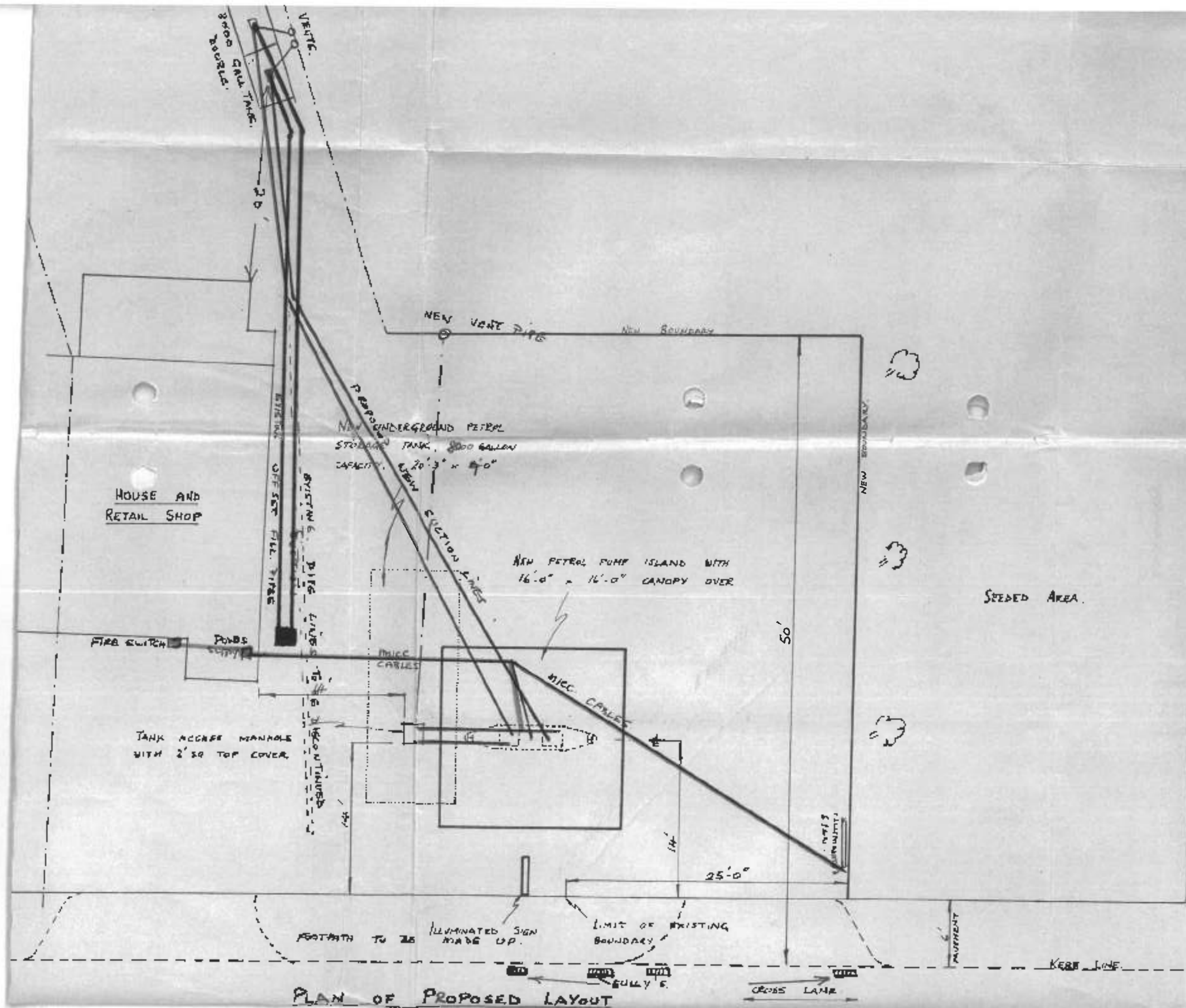
An invoice for £148.00 to cover search and administration costs will follow in due course.

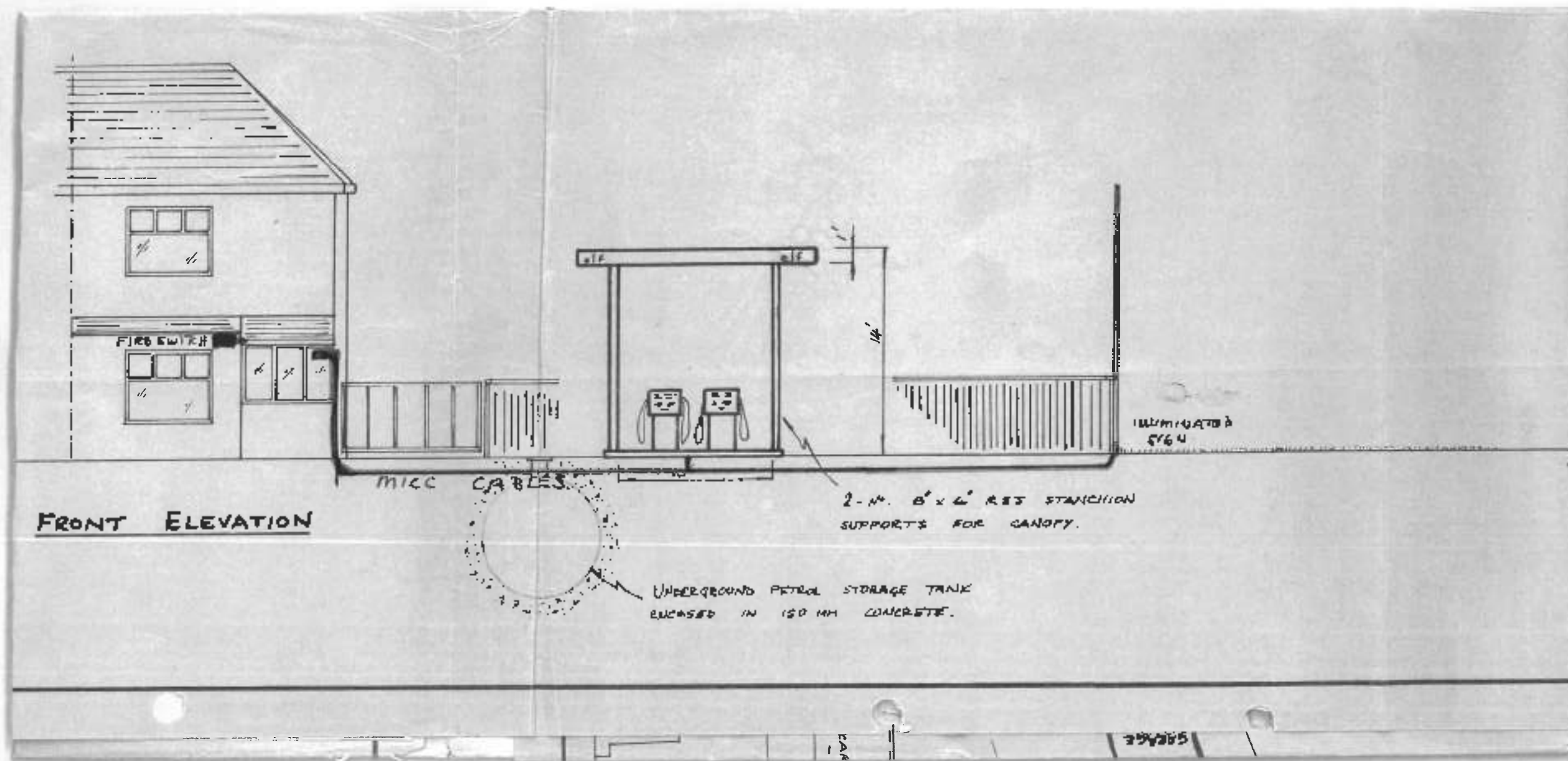
Should you require any in respect of this correspondence, please contact the officer dealing with this matter on the above telephone number.

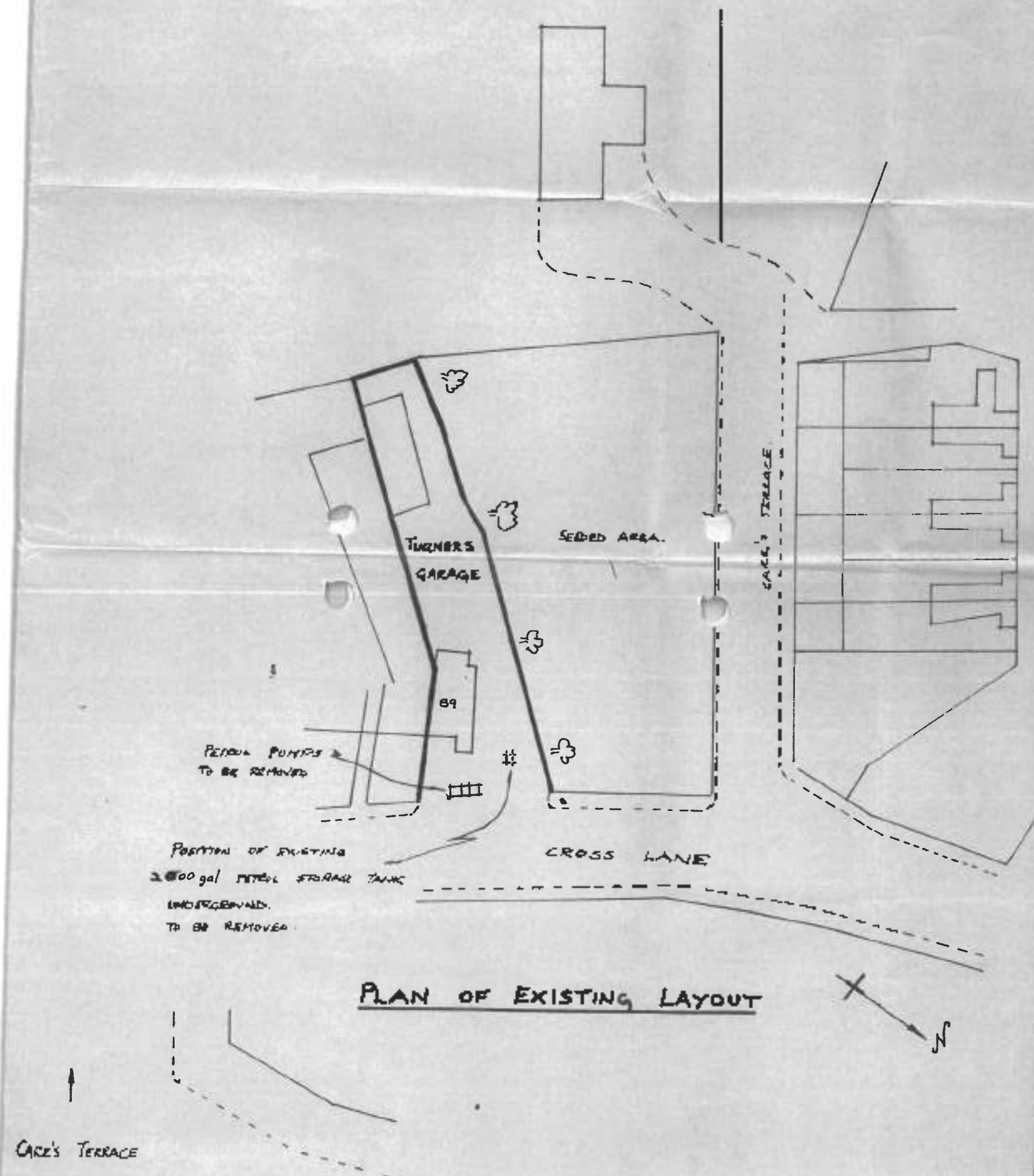
Yours faithfully

A handwritten signature in dark ink, appearing to read 'L. Kirby', is positioned above the typed name.

Linda Kirby
FOR THE CHIEF FIRE OFFICER







PLAN OF EXISTING LAYOUT



Proprietors: H. & T. M. TURNER

BUTCHERS GARAGE

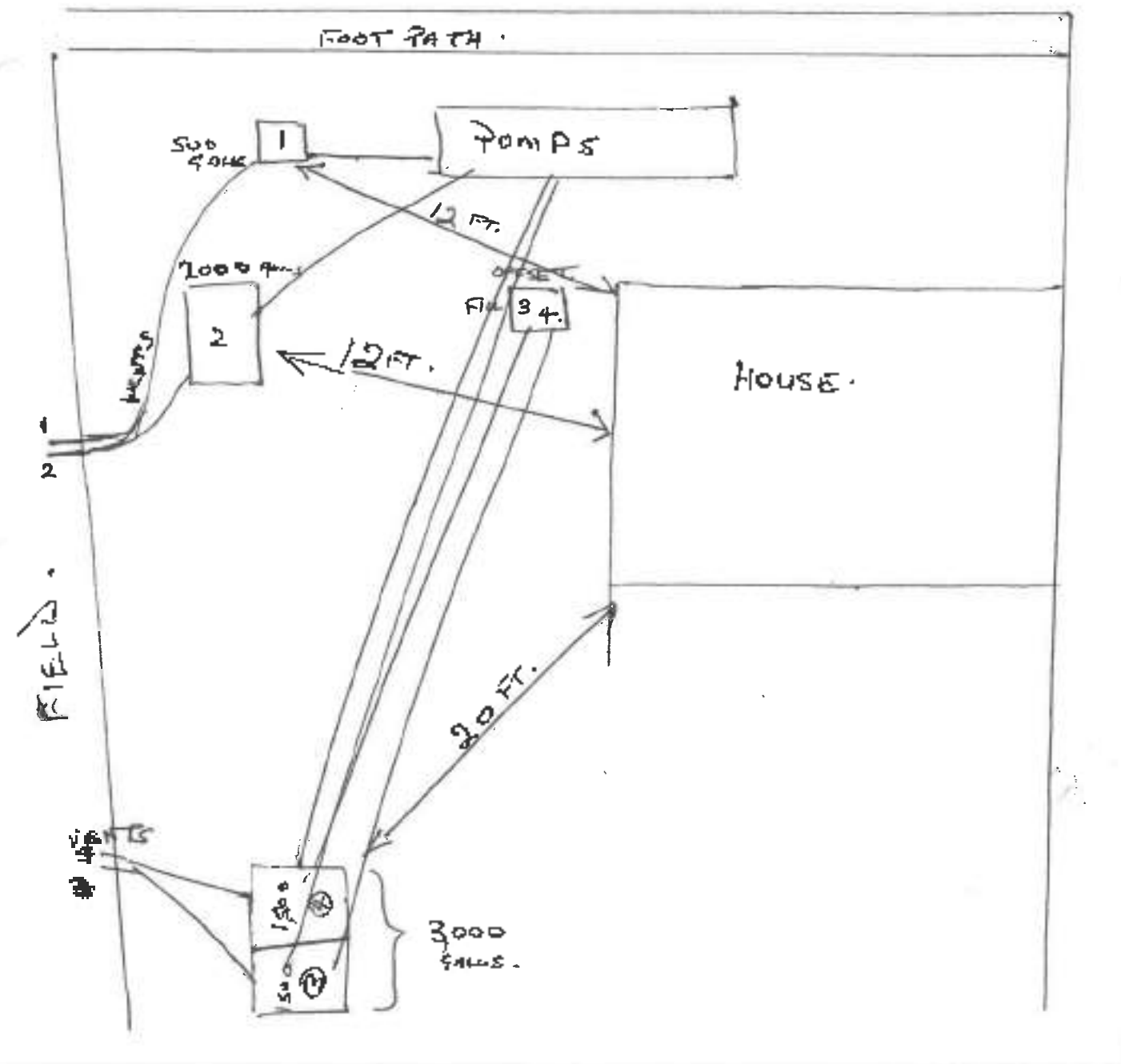
By CROSS LANE
WHISTON, LANCASHIRE

Phone: Prescot 6647

MOTOR
CYCLE
AND CAR
REPAIRS

SPARKS,
PETROL, OIL
AND BATTERY
CHARGING

CROSS LANE.





APPENDIX I

GROUNDSURE DATA



Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: County Series

Map date: 1892

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1892
Revised 1892
Edition N/A
Copyright N/A
Levelled N/A



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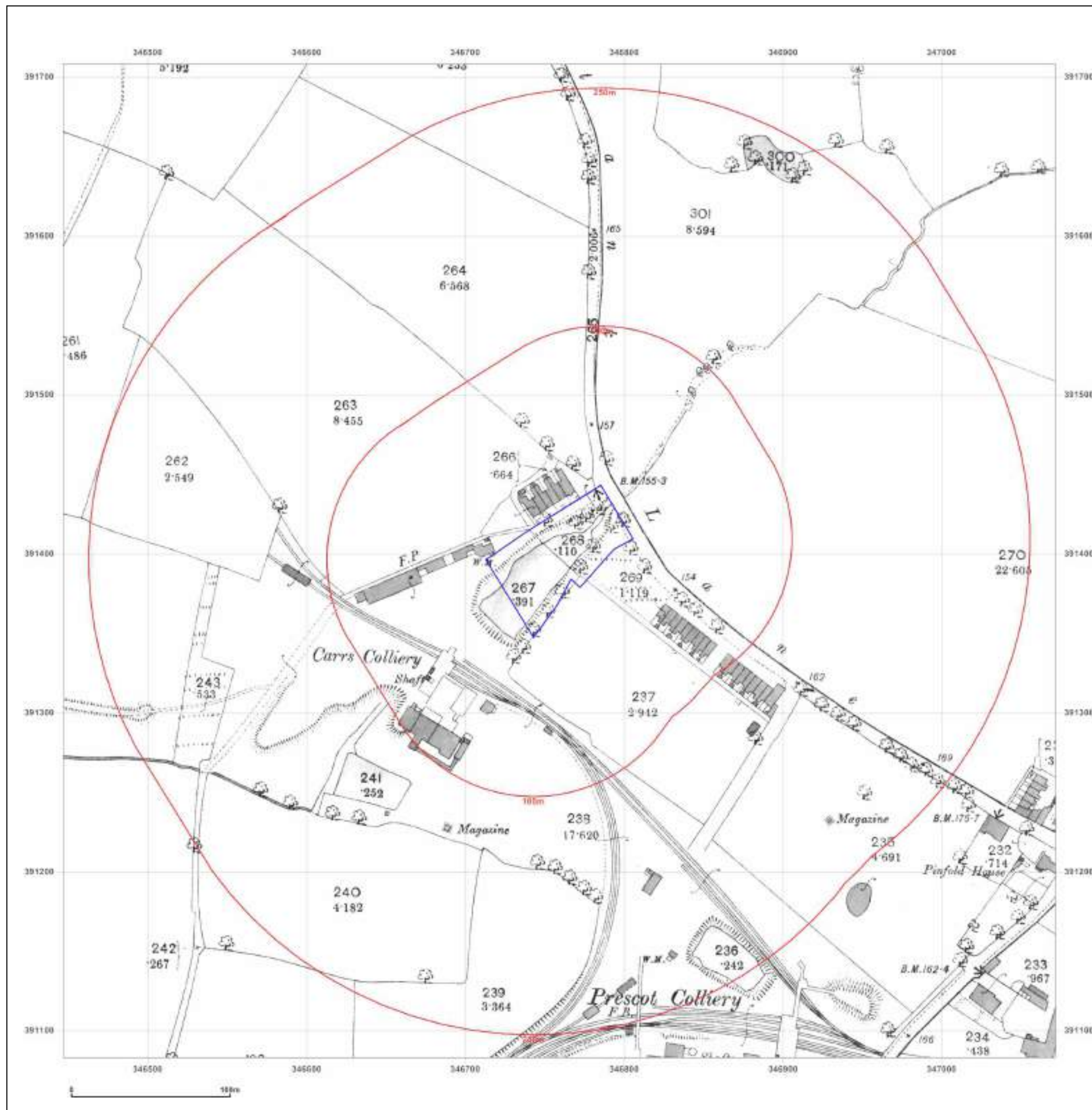


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Production date: 12 January 2018

To view map legend click here [Legend](#)





Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: County Series

Map date: 1907

Scale: 1:2,500

Printed at: 1:2,500



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



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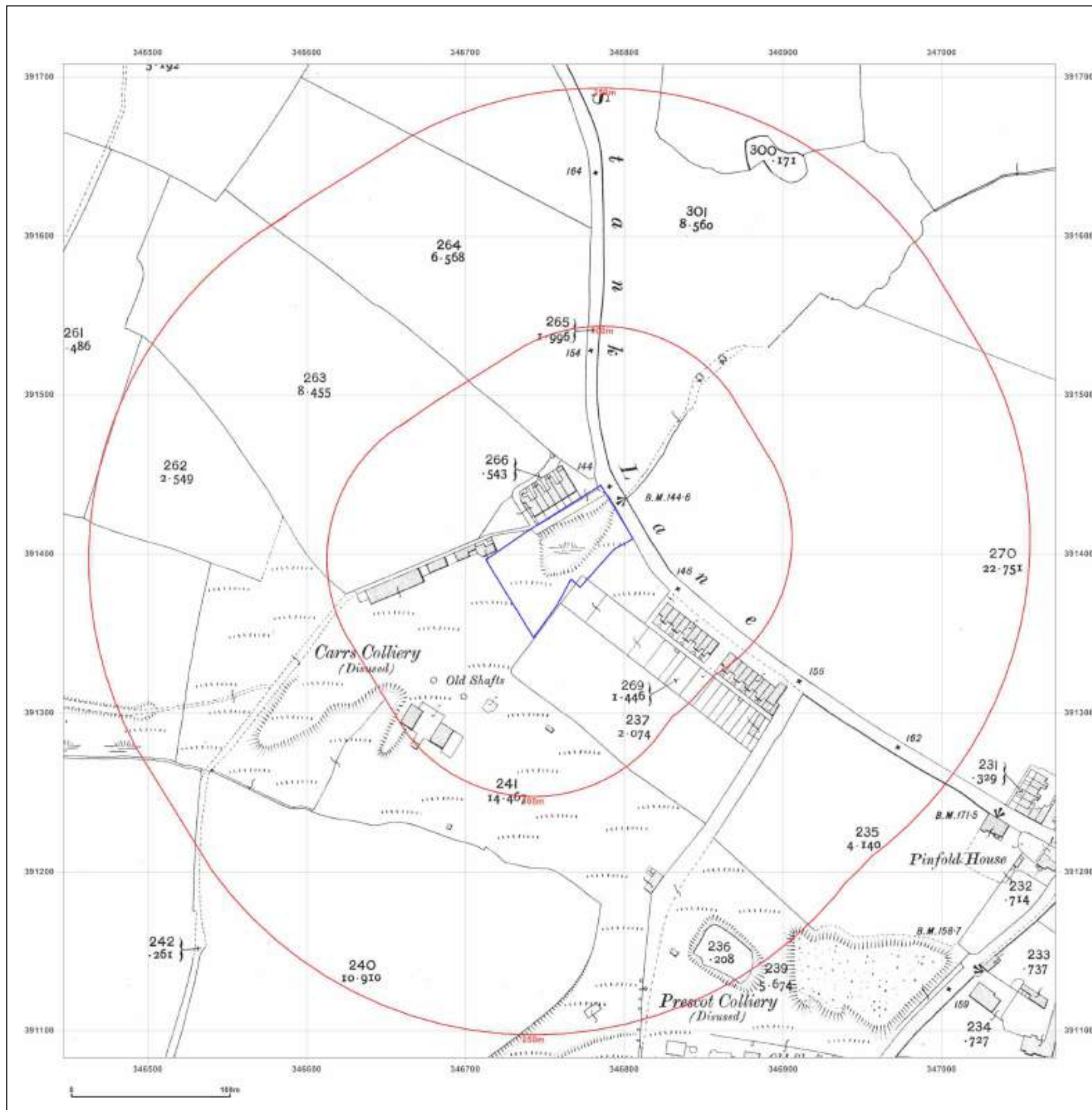


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Production date: 12 January 2018

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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: County Series

Map date: 1927

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1927
Revised 1927
Edition N/A
Copyright N/A
Levelled N/A



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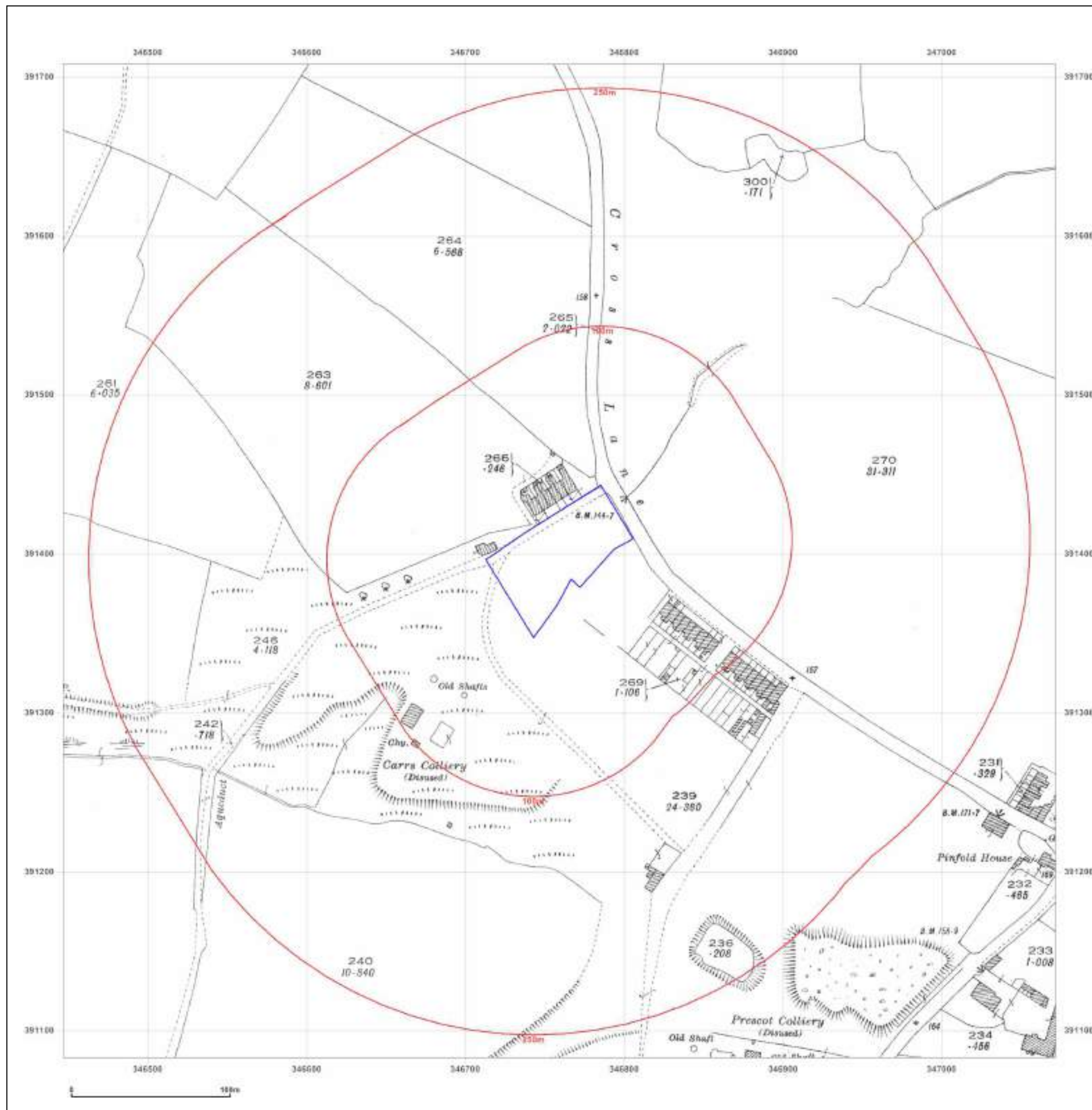


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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: County Series

Map date: 1937

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1937
Revised 1937
Edition N/A
Copyright N/A
Levelled N/A



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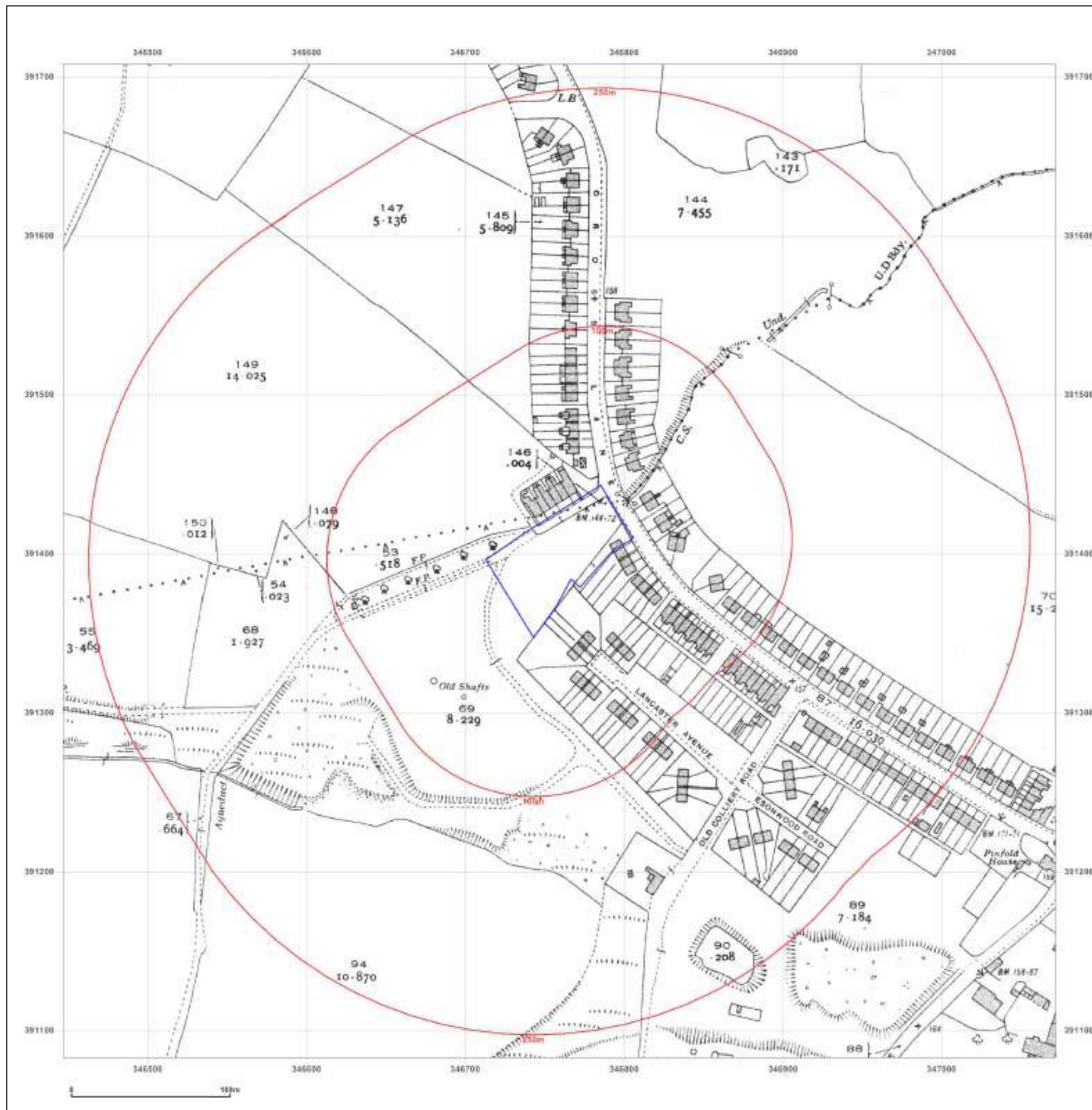


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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: National Grid

Map date: 1955

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1955
Revised 1955
Edition N/A
Copyright N/A
Levelled 1926

Surveyed 1955
Revised 1955
Edition N/A
Copyright N/A
Levelled 1946

Surveyed 1955
Revised 1955
Edition N/A
Copyright N/A
Levelled 1926

Surveyed 1955
Revised 1955
Edition N/A
Copyright N/A
Levelled 1946



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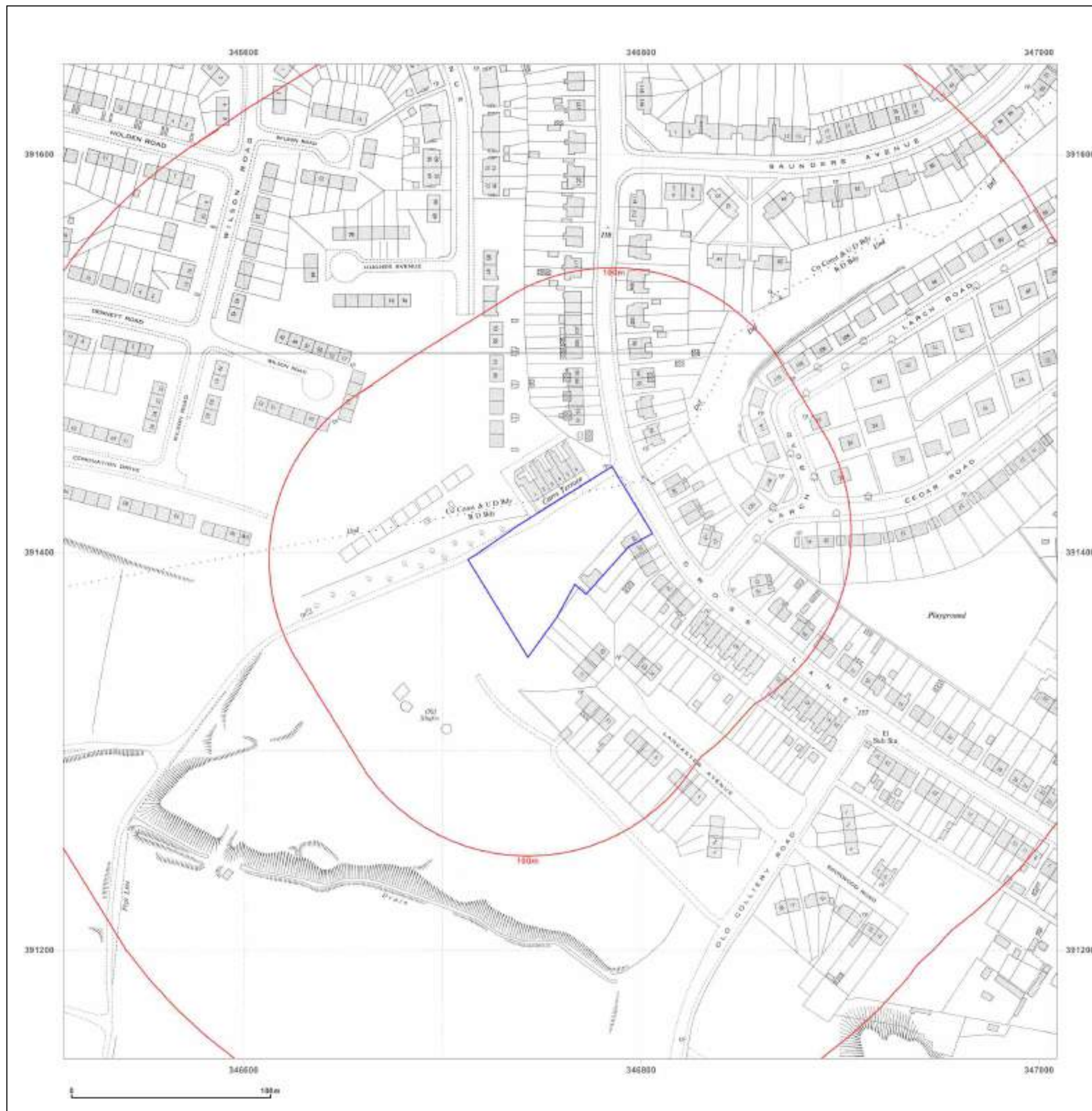


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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: National Grid

Map date: 1955

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1955
Revised 1955
Edition 1958
Copyright N/A
Levelled 1928

Surveyed 1955
Revised 1955
Edition 1958
Copyright N/A
Levelled 1946



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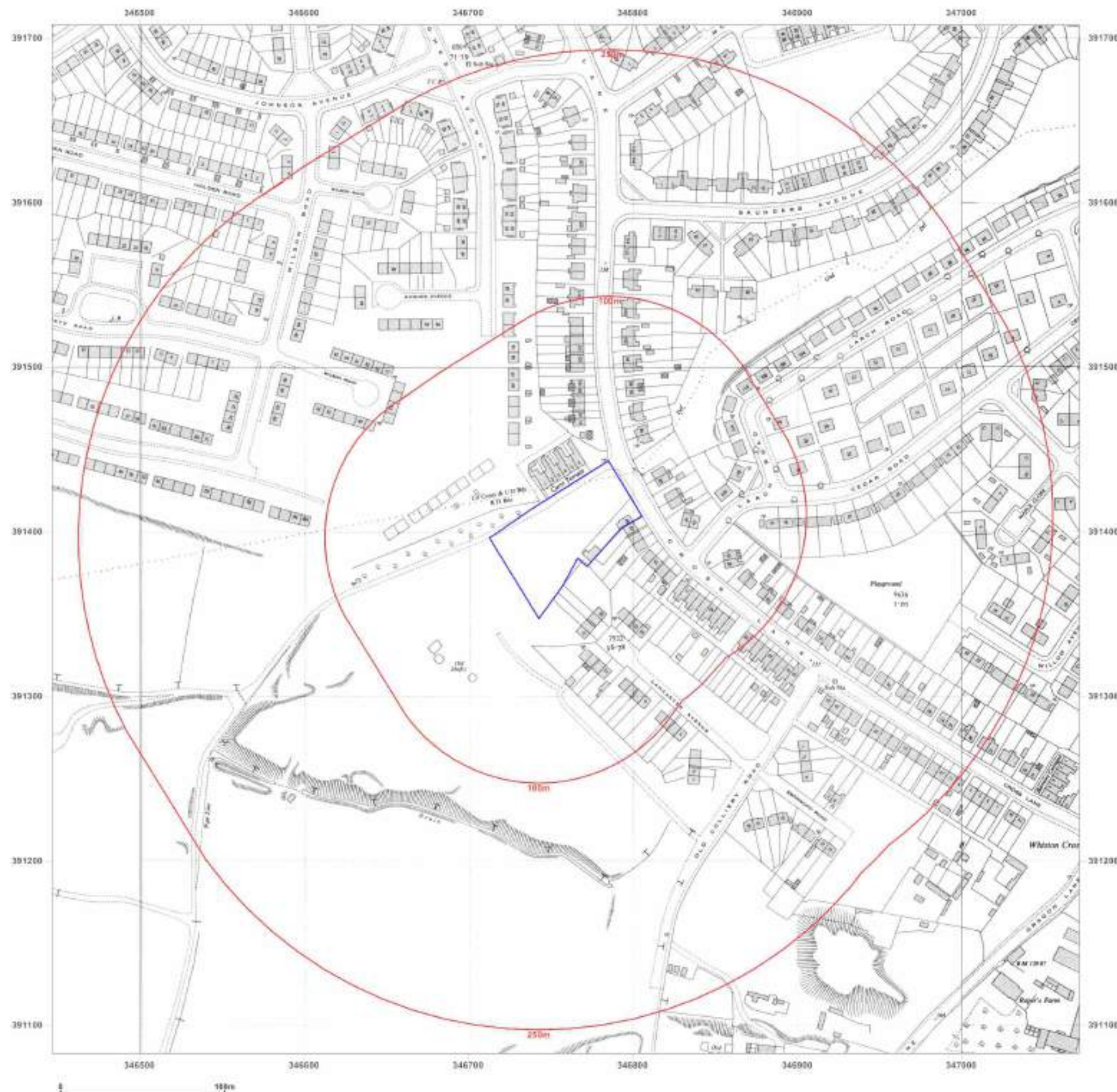


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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: National Grid

Map date: 1956-1961

Scale: 1:1,250

Printed at: 1:2,000



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

Surveyed 1960
Revised 1980
Edition N/A
Copyright 1981
Levelled 1957

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



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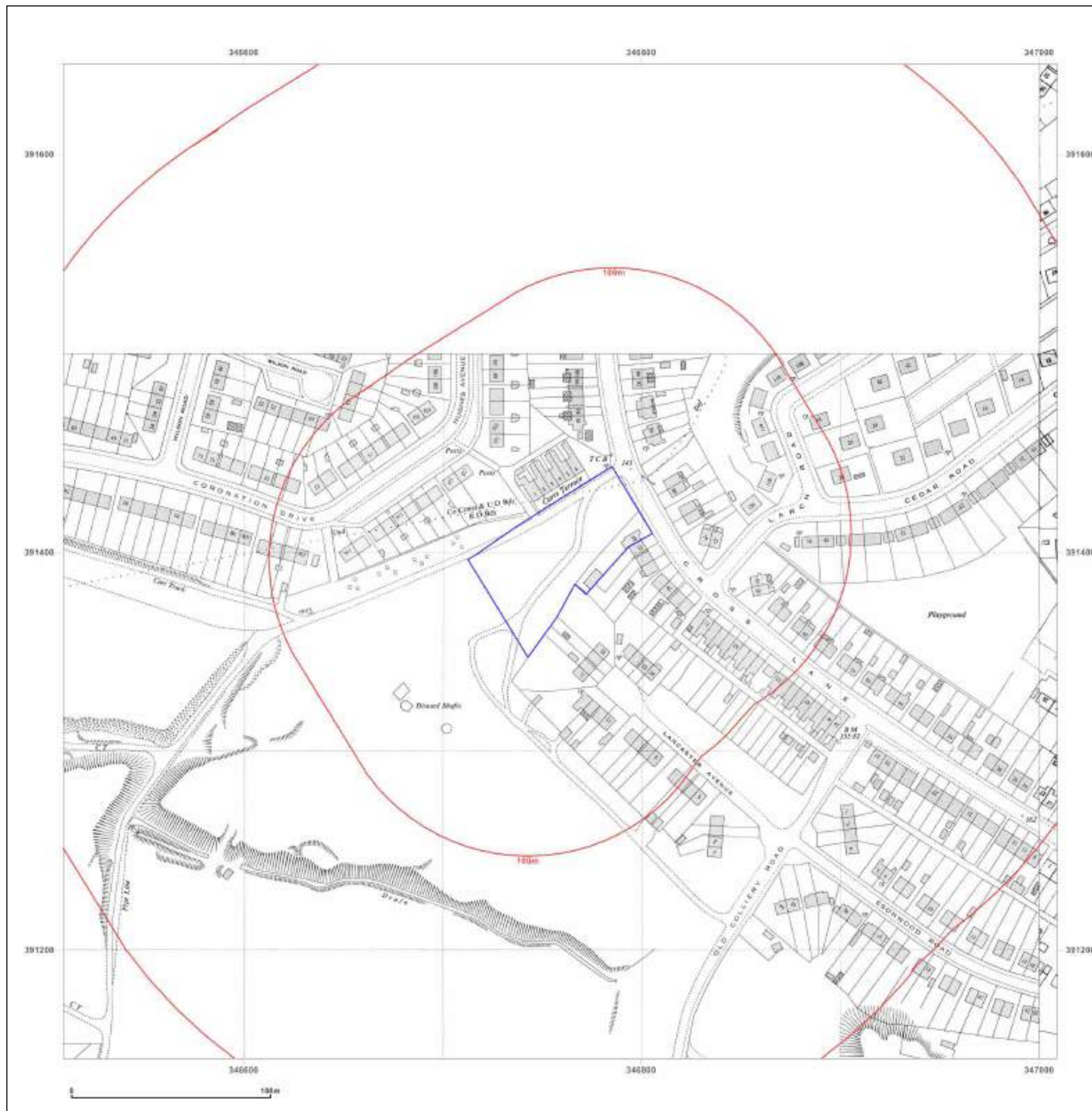


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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: National Grid

Map date: 1964

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1984
Revised 1984
Edition N/A
Copyright 1987
Levelled 1957



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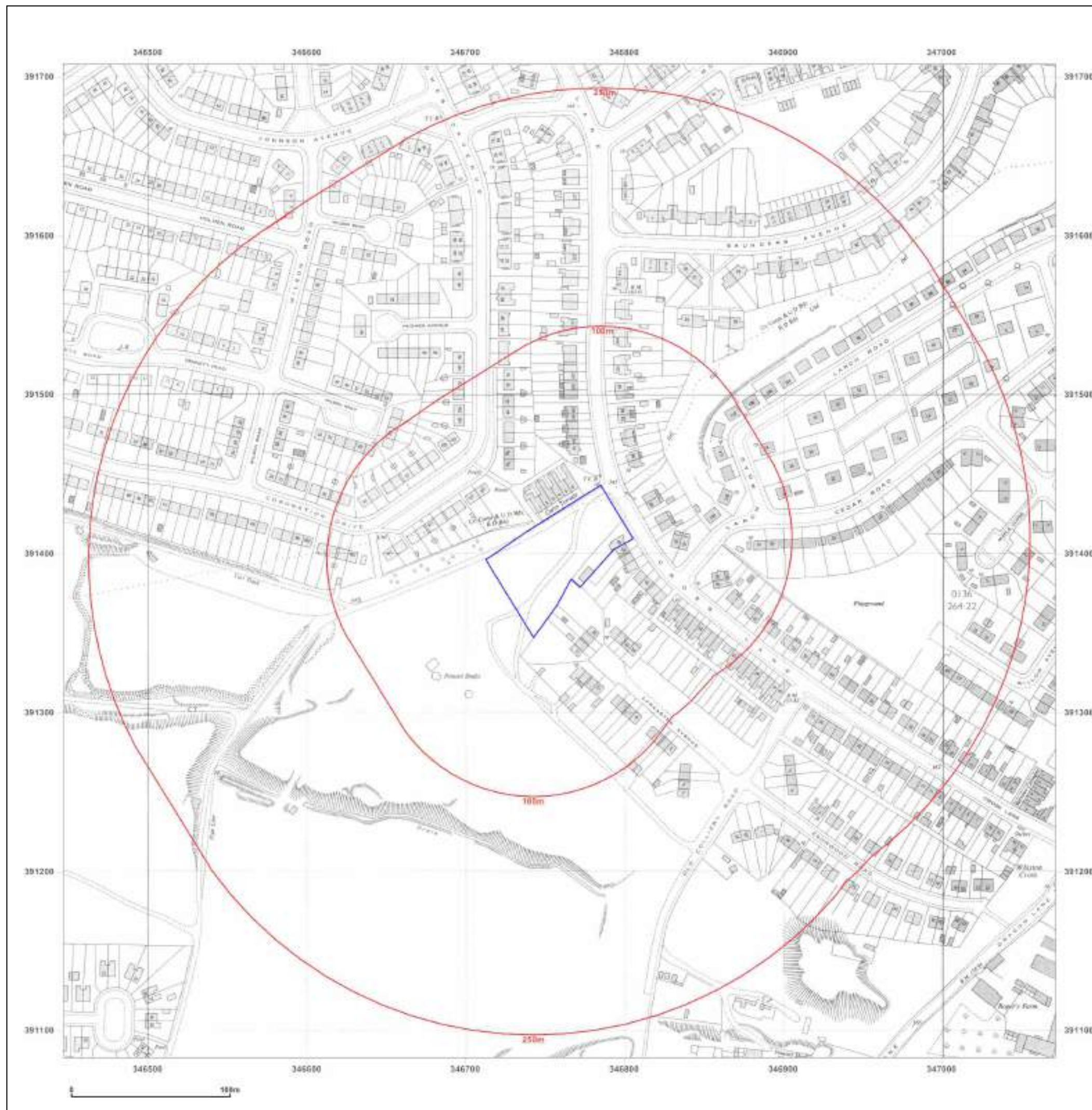


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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: National Grid

Map date: 1962-1965

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1955
Revised 1962
Edition N/A
Copyright 1962
Levelled 1957



Surveyed 1955
Revised 1964
Edition N/A
Copyright 1965
Levelled 1957



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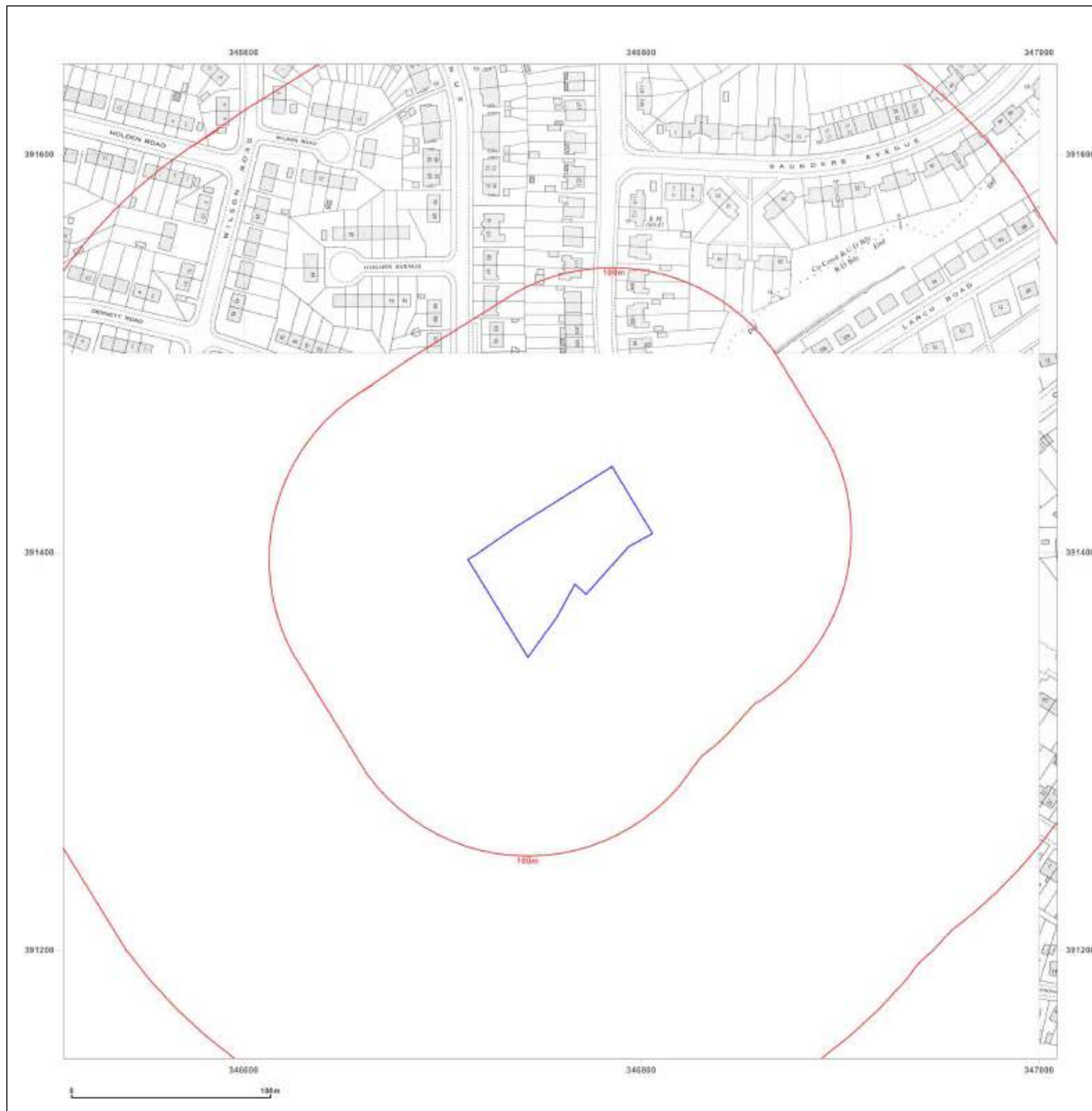


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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: National Grid

Map date: 1969-1972

Scale: 1:1,250

Printed at: 1:2,000



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

Surveyed 1955
Revised 1970
Edition N/A
Copyright 1970
Levelled 1957

Surveyed 1955
Revised 1971
Edition N/A
Copyright 1972
Levelled 1957

Surveyed 1969
Revised 1969
Edition N/A
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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: National Grid

Map date: 1983-1984

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1957
Revised 1983
Edition N/A
Copyright 1983
Levelled 1957

Surveyed 1957
Revised 1984
Edition N/A
Copyright 1984
Levelled 1957

Surveyed N/A
Revised N/A
Edition N/A
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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: National Grid

Map date: 1988-1993

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1993
Revised 1993
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1993
Revised 1993
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

Surveyed 1957
Revised 1988
Edition N/A
Copyright 1988
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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: County Series

Map date: 1850

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1847
Revised N/A
Edition 1850
Copyright N/A
Levelled N/A



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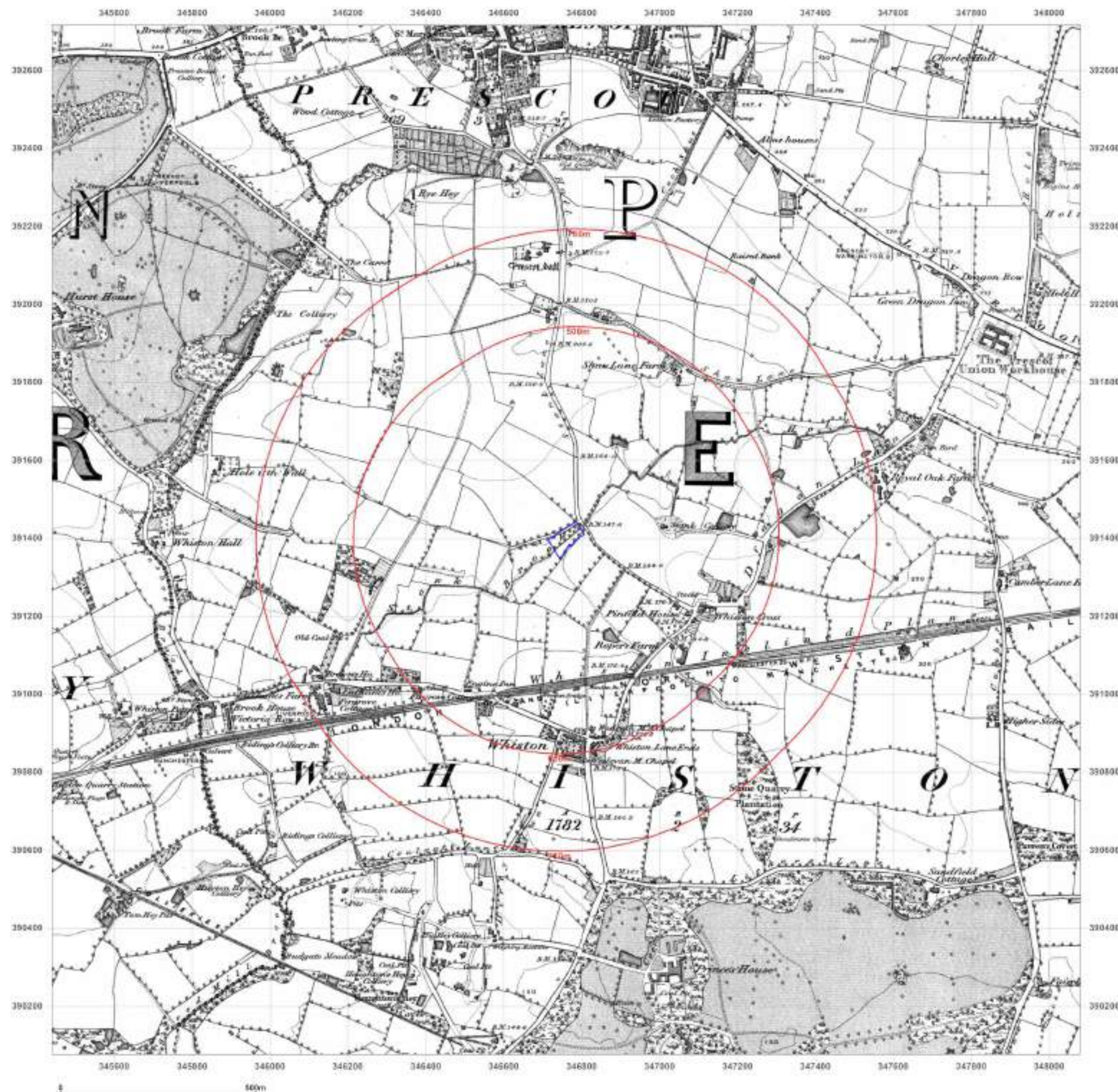


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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: County Series

Map date: 1891

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1891
Revised 1891
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1891
Revised 1891
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1891
Revised 1891
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1891
Revised 1891
Edition N/A
Copyright N/A
Levelled N/A



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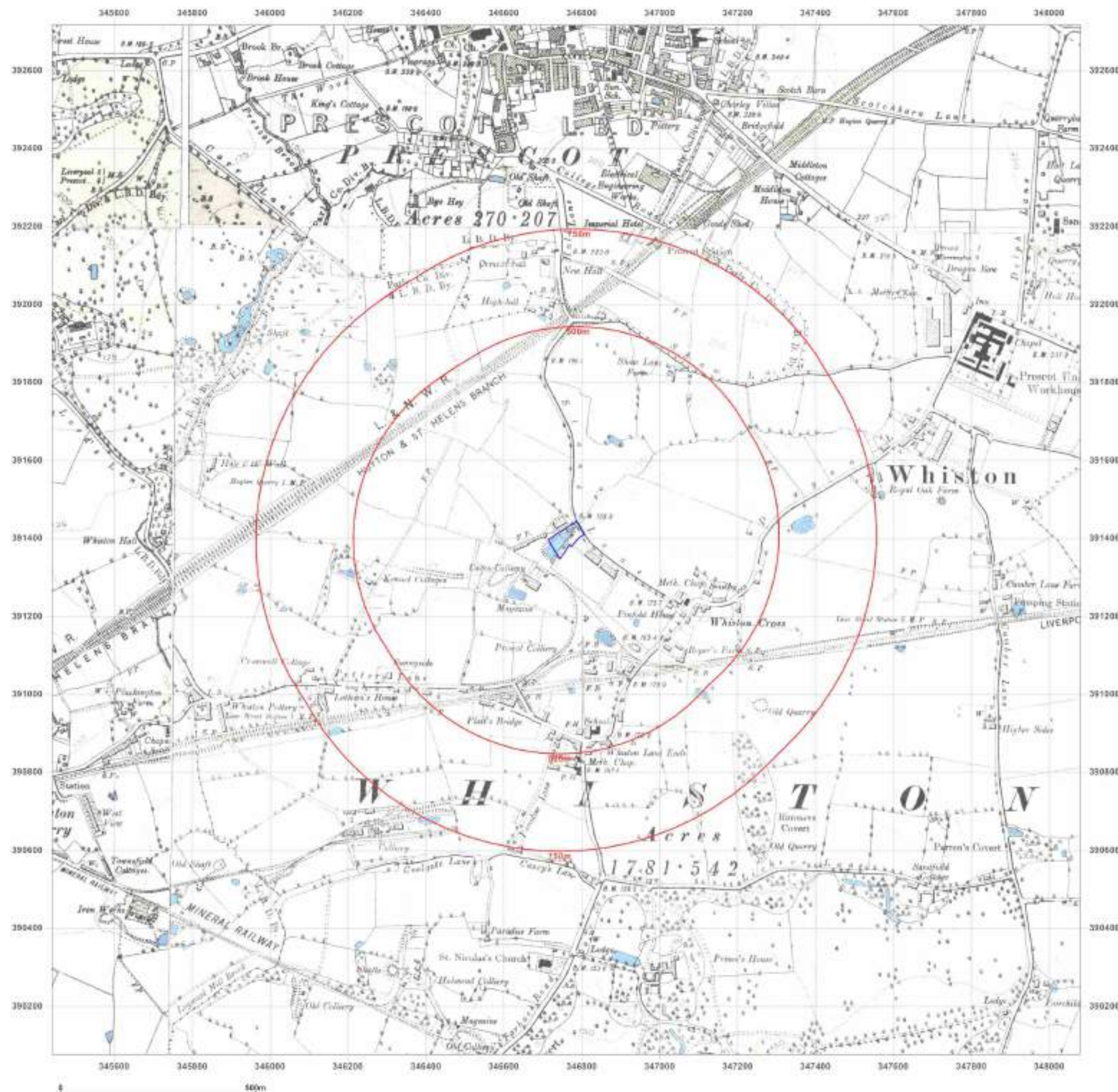


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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: County Series

Map date: 1906

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1891
Revised 1906
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1891
Revised 1906
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1891
Revised 1906
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1891
Revised 1906
Edition N/A
Copyright N/A
Levelled N/A



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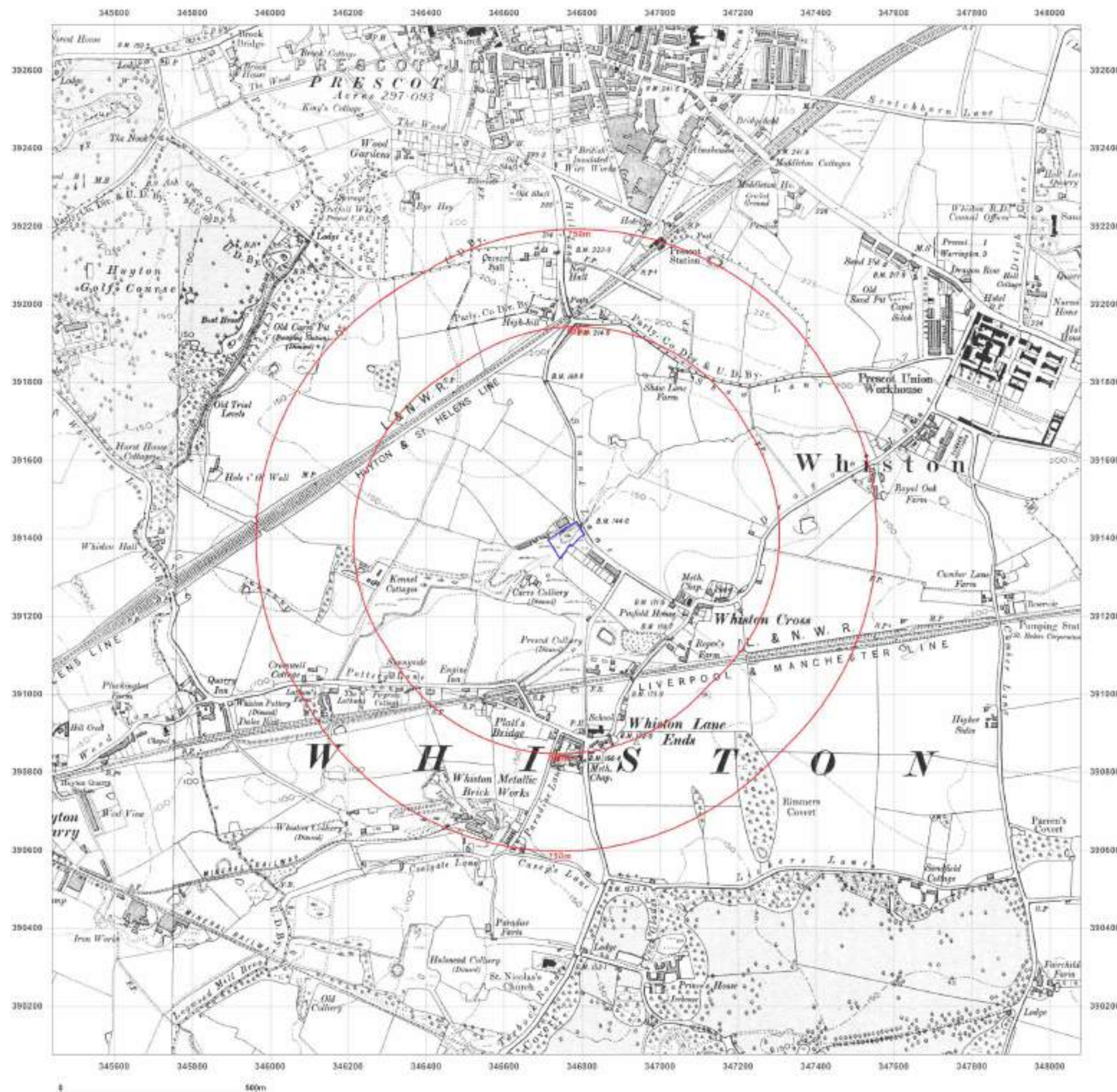


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Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: County Series

Map date: 1925

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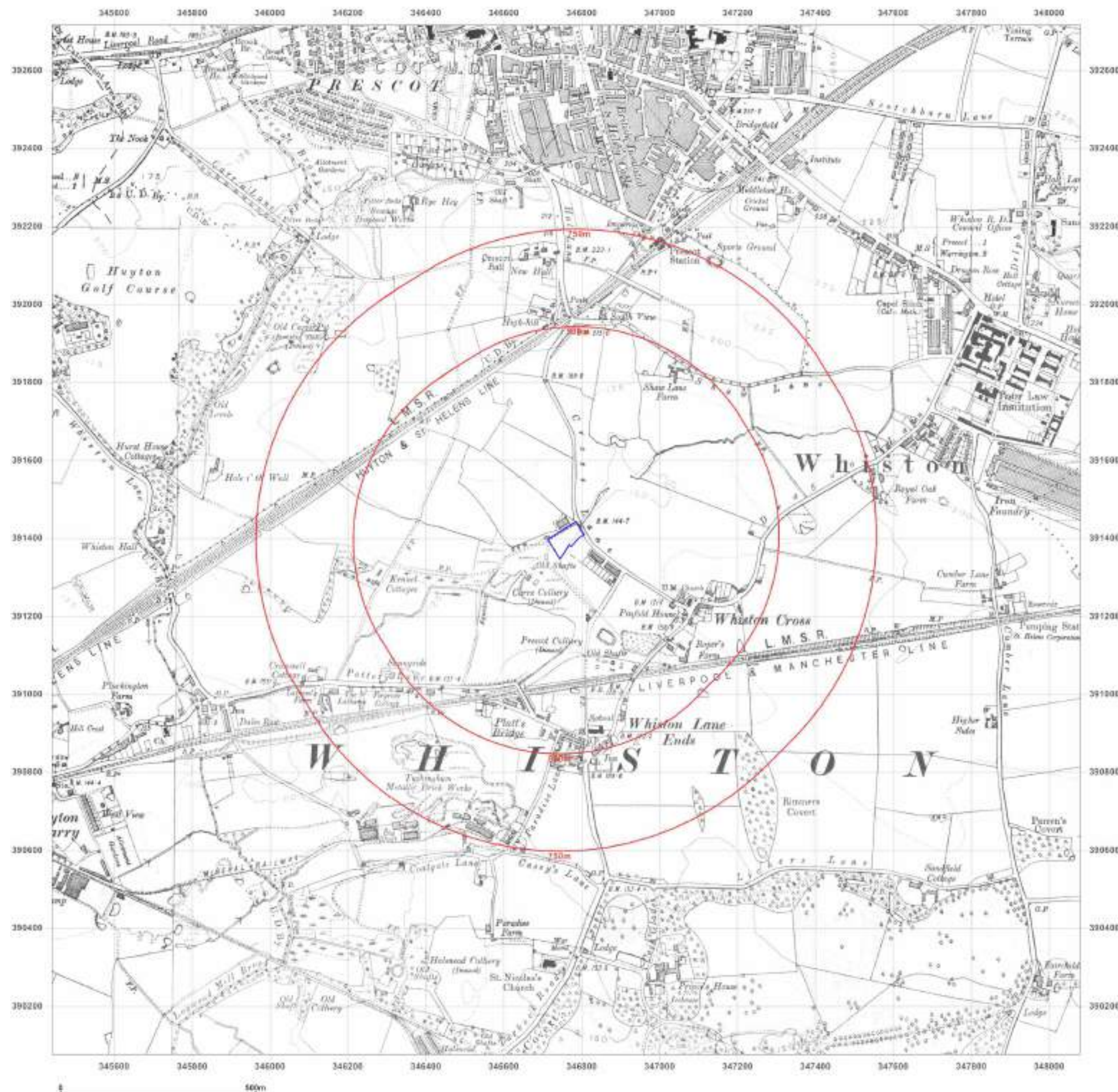


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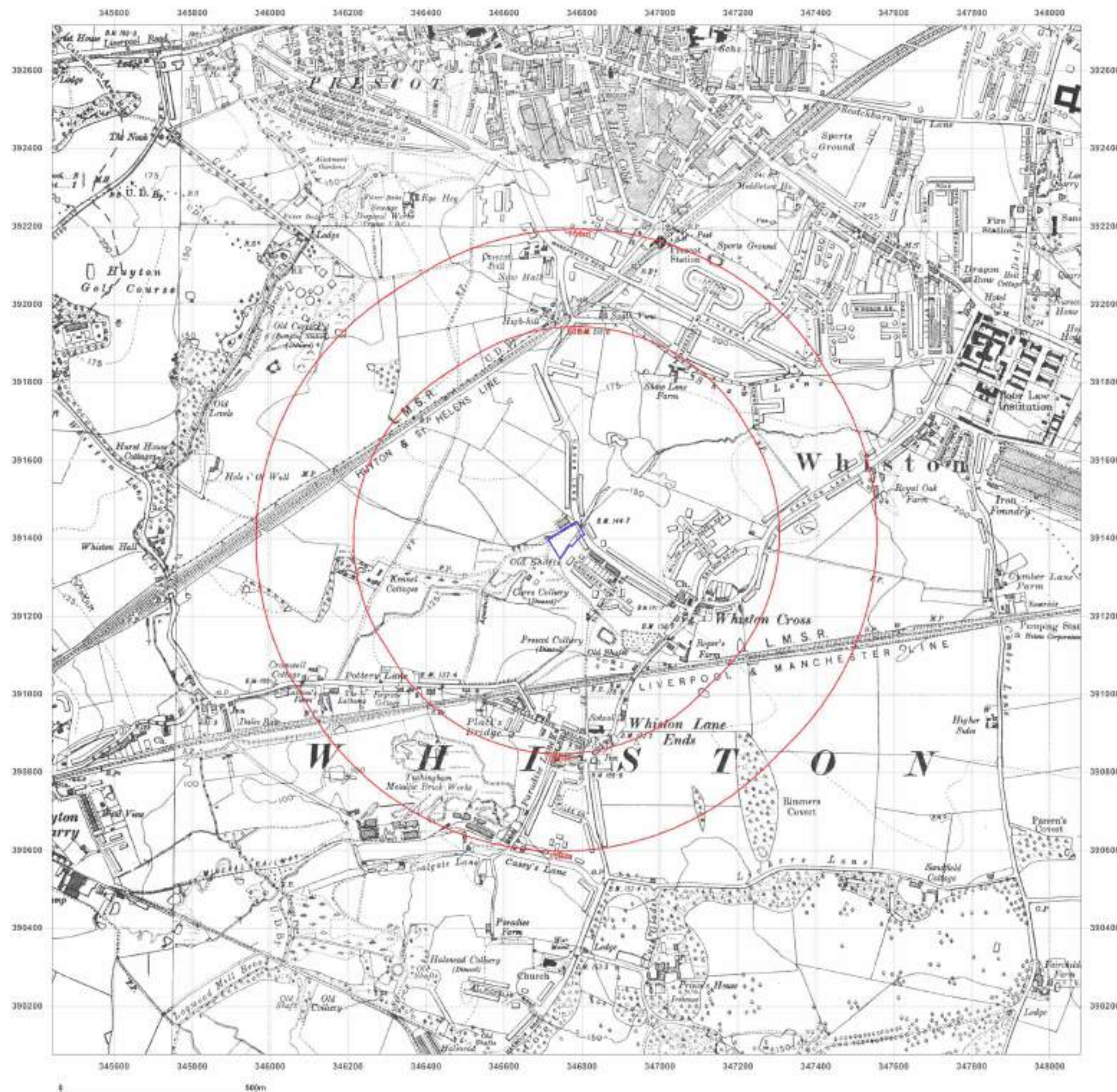


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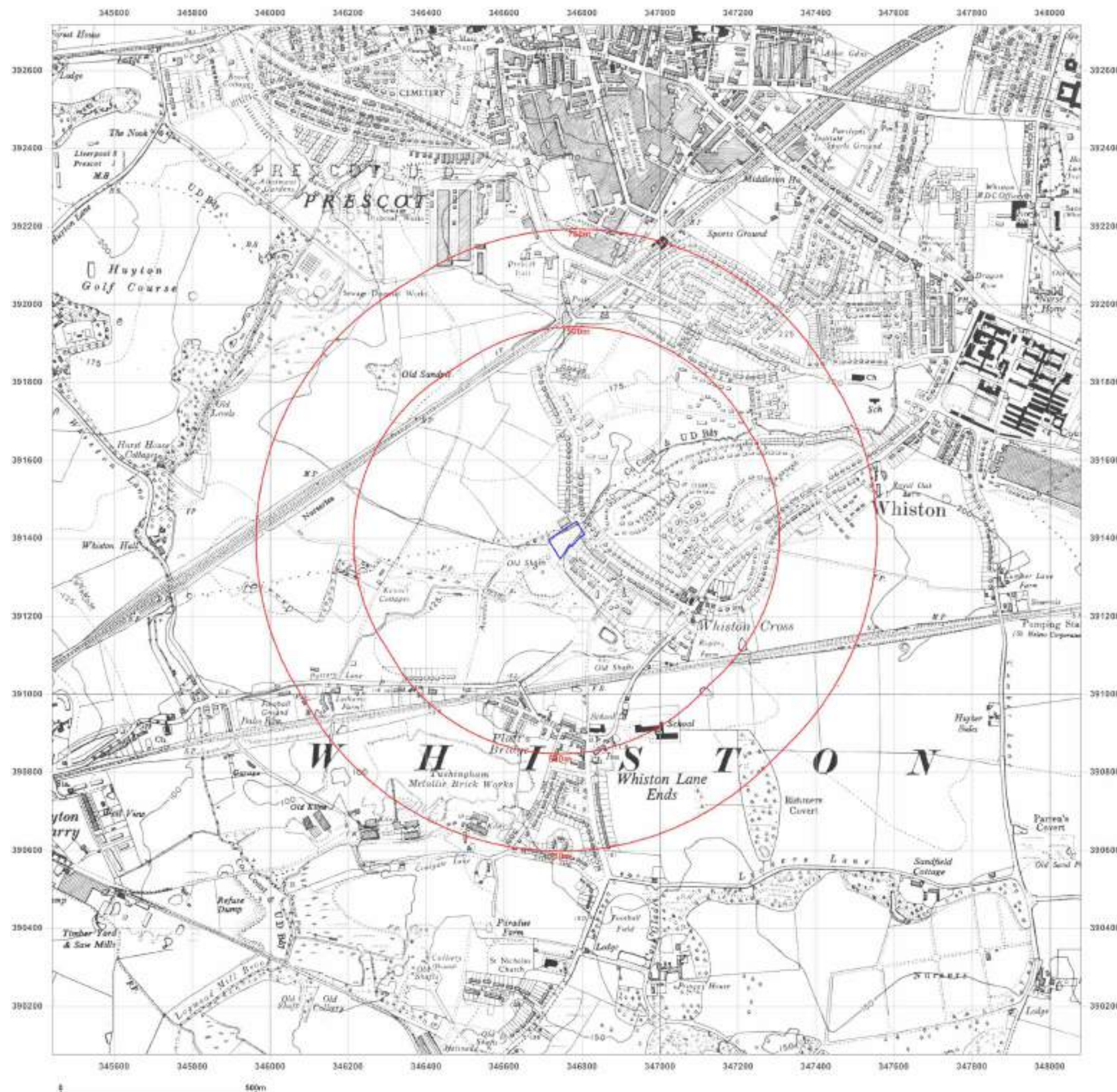


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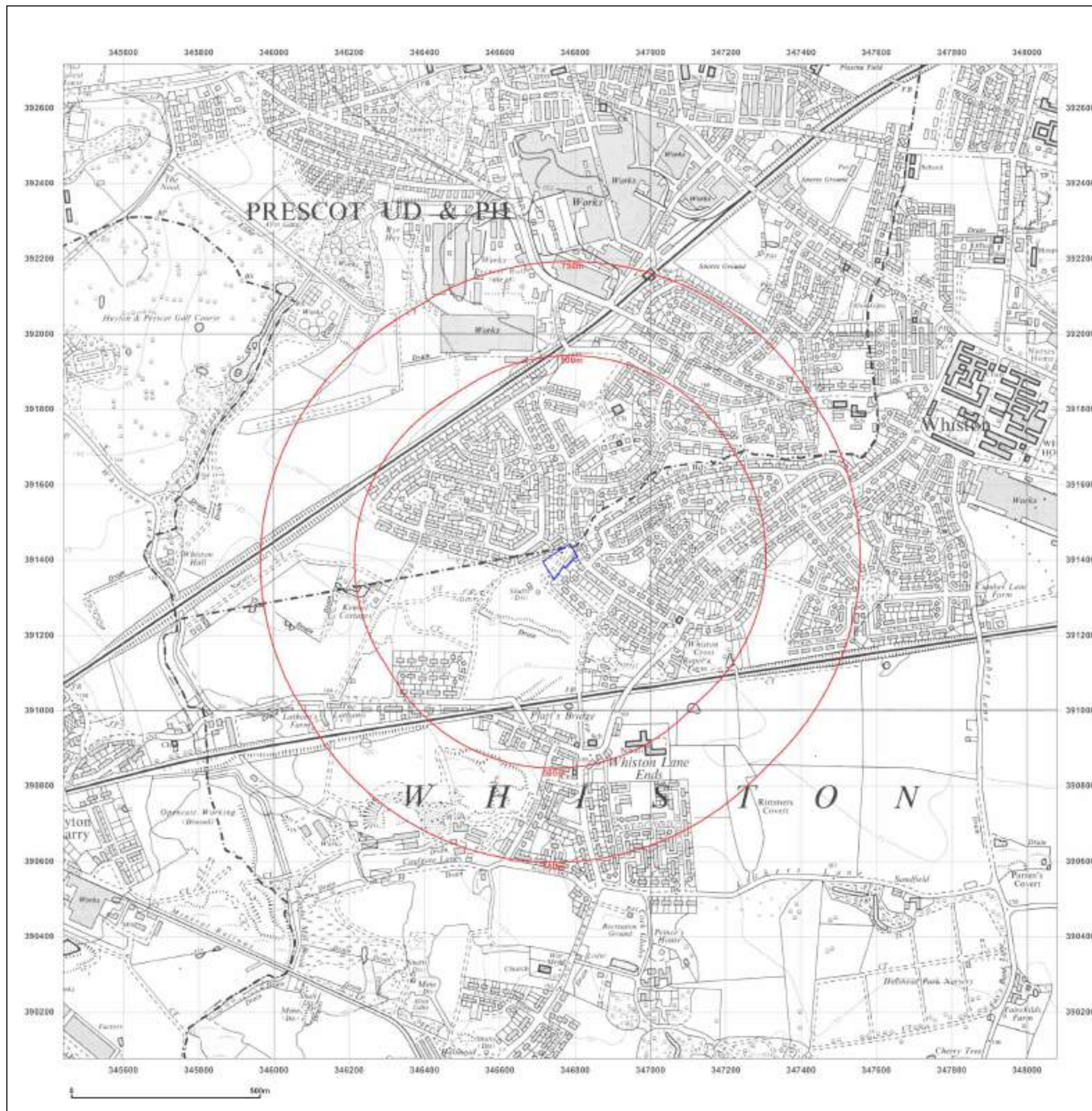


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Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: National Grid

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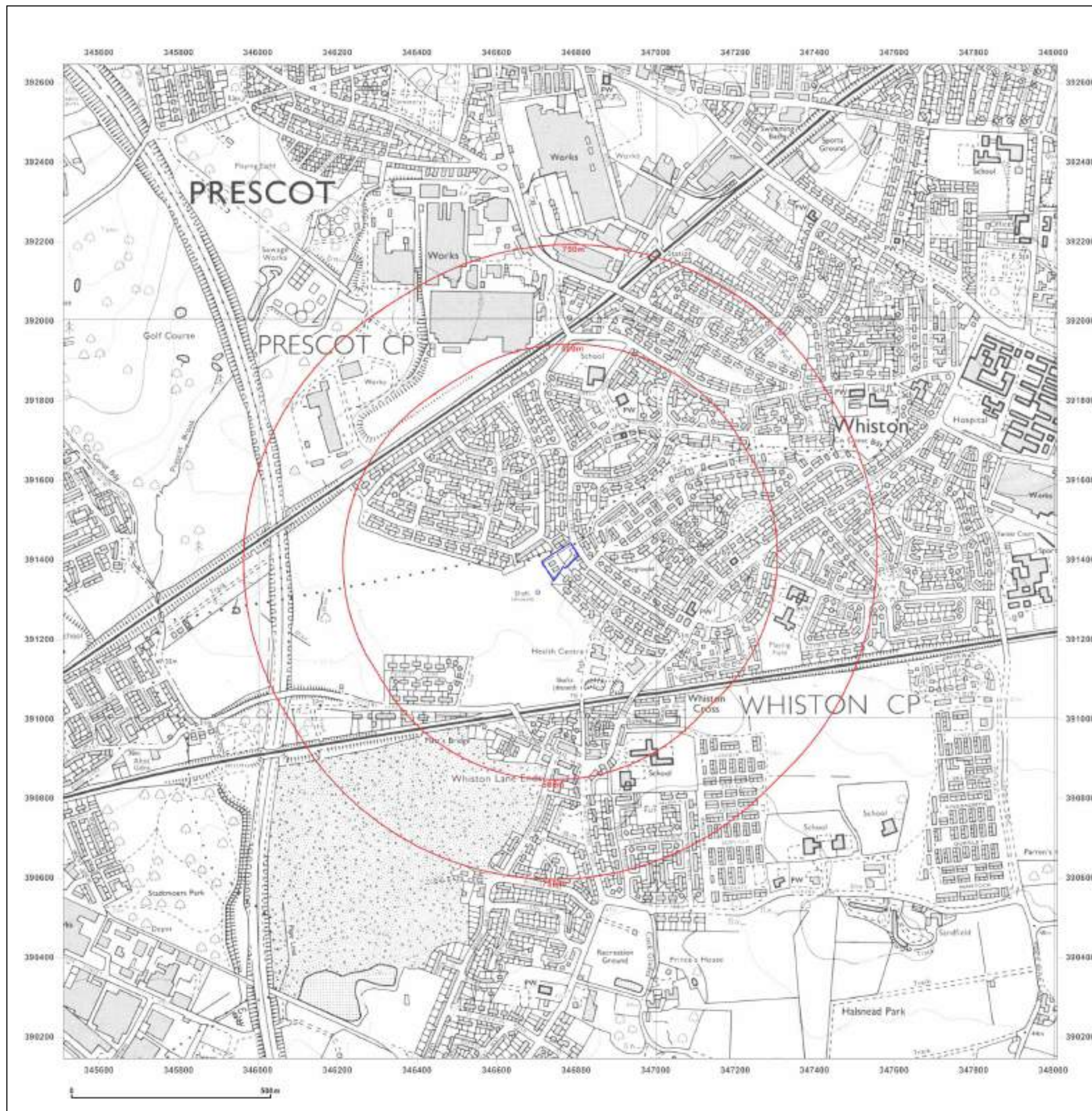


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Client Ref: 4165
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Grid Ref: 346759, 391395

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

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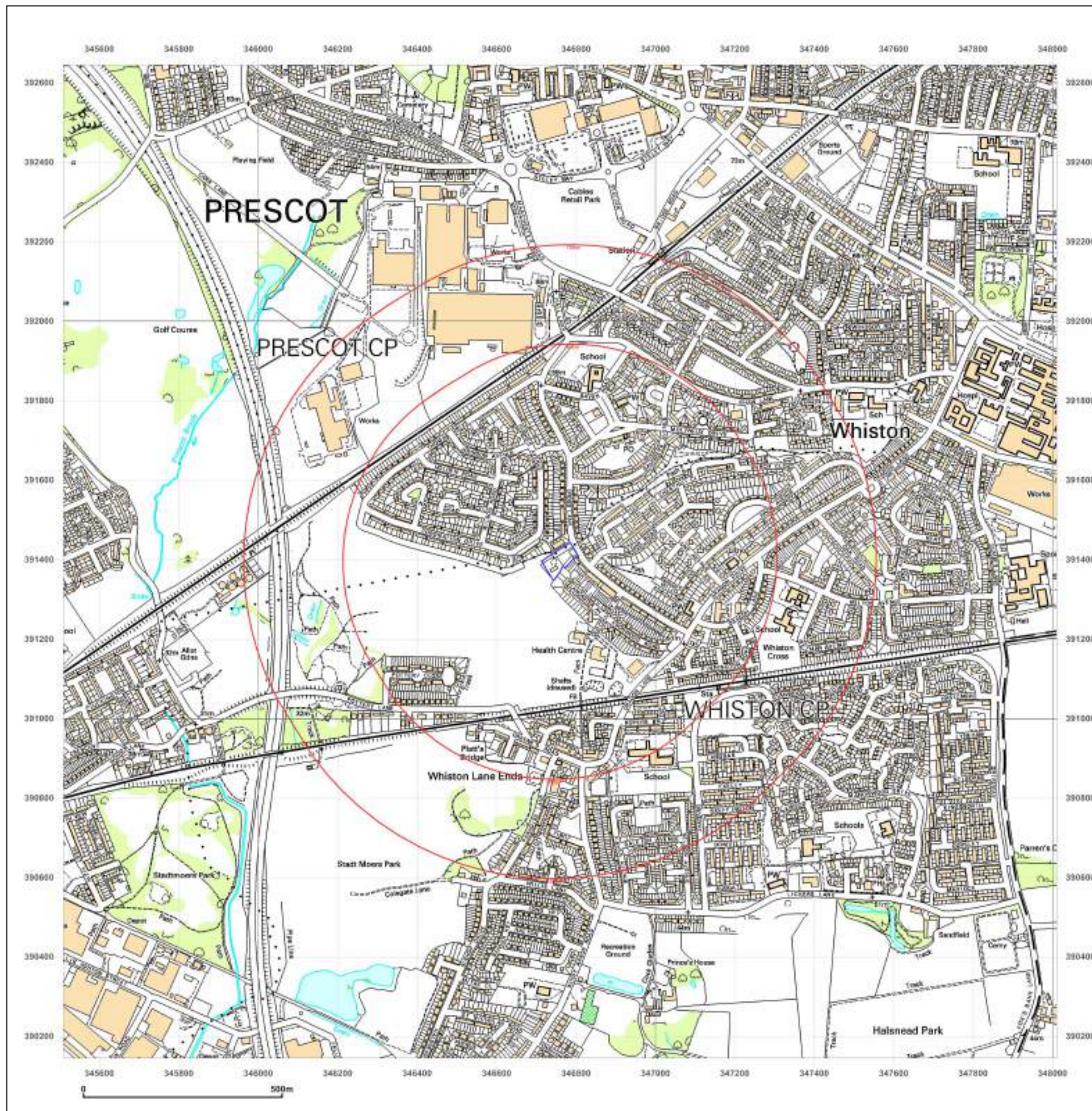


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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



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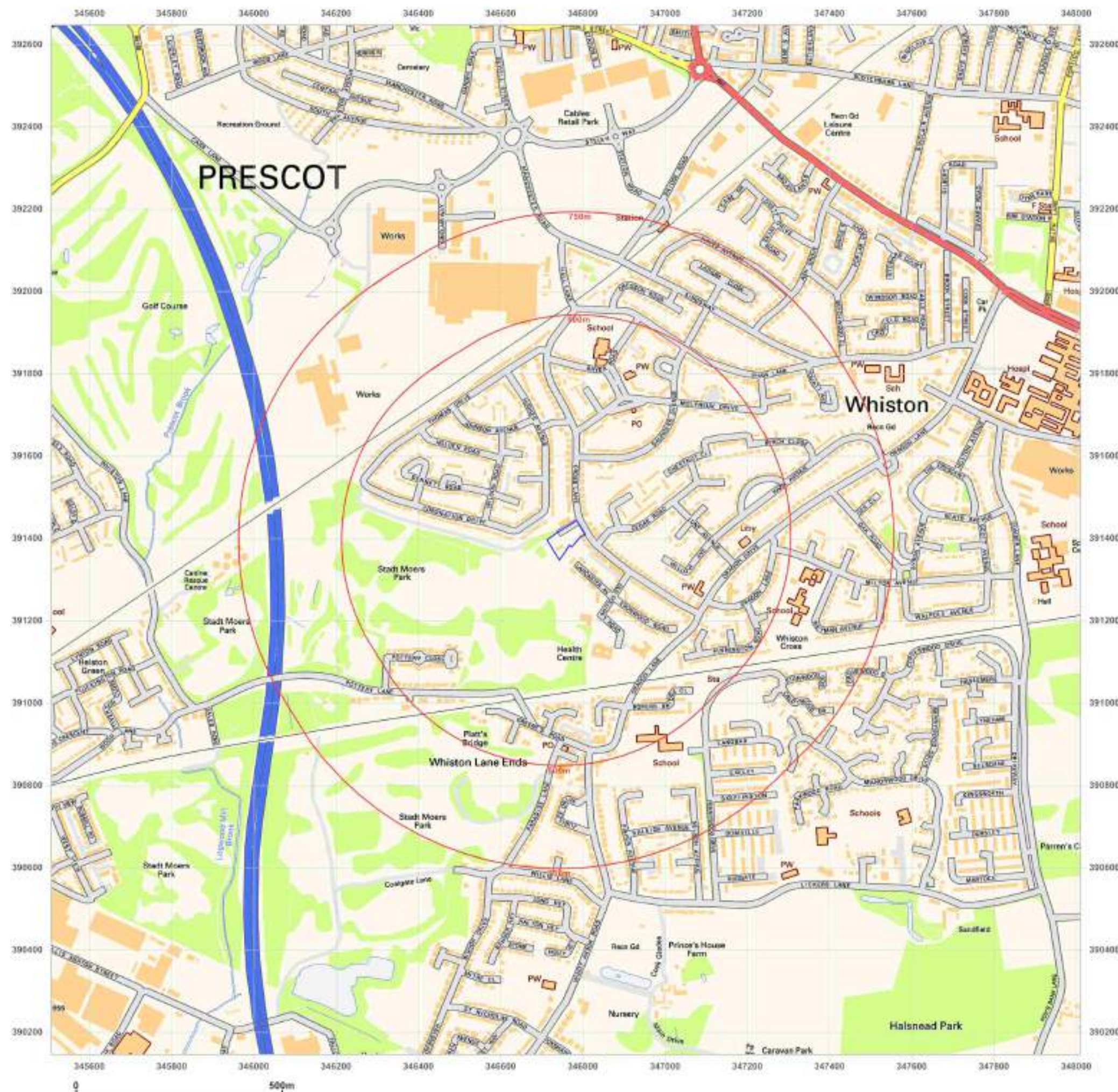


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Site Details:

Cross Lane (Whiston, Liverpool)

Client Ref: 4165
Report Ref: CMAPS-AAG-682480-4165-120118HIS
Grid Ref: 346759, 391395

Map Name: National Grid

Map date: 2014

Scale: 1:10,000

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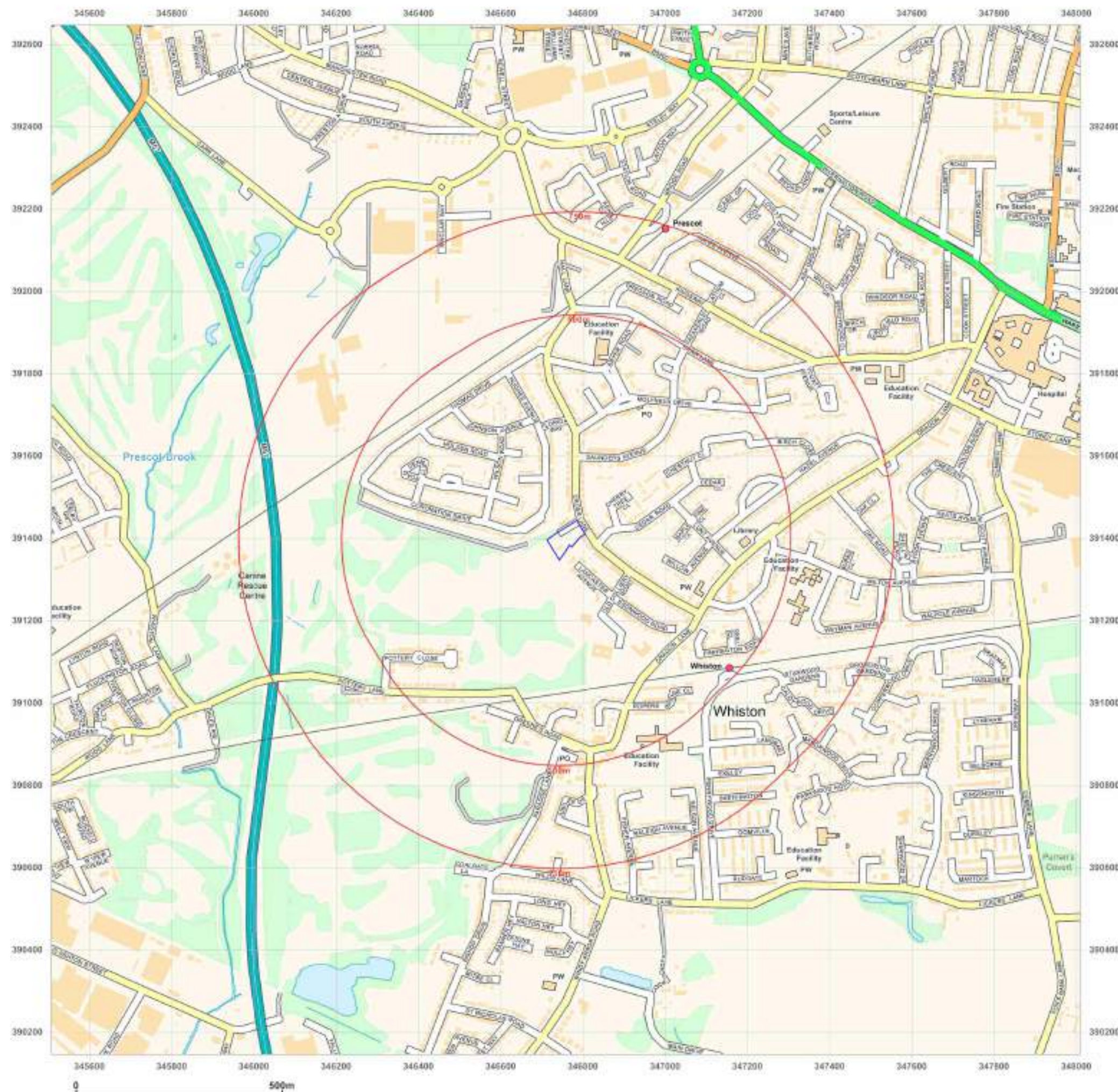


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Open Space, Upper Interfields,
Worcester, WR14 1UT

Groundsure Reference: CMAPS-AAG-682480-4165-120118EDR

Your Reference: 4165

Report Date 12 Jan 2018

Report Delivery Method: Email - pdf

Enviro Insight

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Dear Sir/ Madam,

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Yours faithfully,

CENTREMAPS

Enc.
Groundsure Enviroinsight

Address: Cross Lane Whiston, Liverpool,
Date: 12 Jan 2018
Reference: CMAPS-AAG-682480-4165-120118EDR
Client: CENTREMAPS



Aerial Photograph Capture date: 11-Jun-2015
Grid Reference: 346759,391395
Site Size: 0.39ha

Report Reference: CMAPS-AAG-682480-4165-120118EDR
Client Reference: 4165

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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	5	5	54	62
1.2 Additional Information – Historical Tank Database	0	0	0	3
1.3 Additional Information – Historical Energy Features Database	0	0	7	27
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 Potentially Infilled Land	6	4	62	66
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 NIHS sites	0	0	0	1
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	0
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	1	0	0	4	3	5
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	2	1
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	3	0

3.2 Landfill and Other Waste Sites Findings

3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	3	1

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
-----------------------------	---------	-------	--------	---------

4.1 Current Industrial Sites Data	0	0	1	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	1	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 Are there any records of Artificial Ground and Made Ground present beneath the study site?

No

5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?

Yes

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 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?

Yes

6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?

Yes

	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	7
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	2
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	3
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	1	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)	1	0	0	1	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 Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site?	No	No	No	No	No	Yes
6.10 Detailed River Network entries within 500m of the site	0	0	0	0	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 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	No					
7.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	No					
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Very Low					
7.4 Are there any Flood Defences within 250m of the study site?	No					
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No					
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No					
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential at Surface					
7.8 What is the 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	2
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
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	1	0	0	0	0	3
8.14 Records of Green Belt land	1	0	0	0	0	6

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?	Very Low
9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Very Low
9.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Negligible
9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
9.1.6 What is the 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 property 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 Are there any coal mining areas within 75m of the study site?	Yes
10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?	No
10.3 Are there any brine affected areas within 75m of the study site?	No

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 licenses, 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).

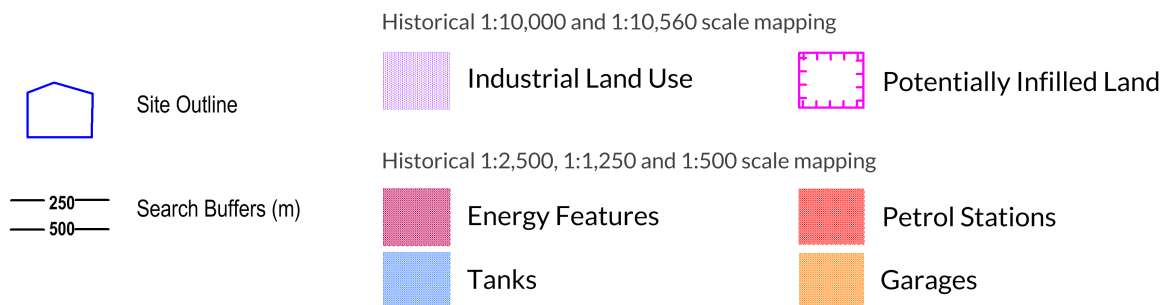
Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

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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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: 126

ID	Distance [m]	Direction	Use	Date
1AN	0	On Site	Unspecified Pit	1906
2AM	0	On Site	Colliery	1891
3AL	0	On Site	Disused Colliery	1906
4A	0	On Site	Disused Colliery	1938
5A	0	On Site	Disused Colliery	1938
6E	2	SW	Colliery	1925
7F	32	SW	Railway Sidings	1891
8B	48	SW	Unspecified Disused Shaft	1990
9B	48	SW	Unspecified Disused Shaft	1975
10B	50	SW	Unspecified Disused Shaft	1966
11B	53	SW	Unspecified Old Shafts	1955
12C	54	S	Colliery	1891
13C	54	S	Railway Sidings	1891
14B	57	SW	Unspecified Old Shafts	1938
15B	57	SW	Unspecified Old Shafts	1938
16B	58	SW	Unspecified Old Shafts	1947
17B	58	SW	Unspecified Old Shafts	1925
18D	59	SW	Unspecified Disused Shaft	1966
19D	64	SW	Unspecified Old Shafts	1955
20D	68	SW	Unspecified Old Shafts	1938
21D	68	SW	Unspecified Old Shafts	1938
22D	69	SW	Unspecified Old Shafts	1925
23D	69	SW	Unspecified Old Shafts	1947
24E	74	SW	Unspecified Heap	1955
25F	87	SW	Unspecified Old Shafts	1947
26AO	88	SW	Unspecified Ground Workings	1925
27G	89	SW	Unspecified Ground Workings	1906
28G	89	SW	Unspecified Ground Workings	1938
29G	89	SW	Unspecified Ground Workings	1938
30G	91	SW	Unspecified Heap	1891
31H	97	S	Unspecified Ground Workings	1938

32H	97	S	Unspecified Ground Workings	1938
33I	111	S	Unspecified Ground Workings	1955
34I	115	S	Unspecified Ground Workings	1947
35J	117	SW	Unspecified Ground Workings	1966
36	121	SW	Refuse Heap	1947
37J	132	SW	Magazine	1891
38G	135	SW	Unspecified Old Shafts	1955
39AP	139	SW	Refuse Heap	1966
40K	150	SE	Disused Colliery	1938
41K	150	SE	Disused Colliery	1938
42AQ	150	SW	Unspecified Heap	1955
43L	163	SE	Hospital	1975
44L	163	SE	Hospital	1990
45M	167	SE	Disused Colliery	1925
46AR	169	SE	Disused Colliery	1906
47AS	182	E	Colliery	1851
48	182	E	Shale Tip	1851
49M	197	SE	Unspecified Disused Shafts	1975
50AT	203	SW	Unspecified Heap	1966
51N	210	S	Unspecified Pit	1955
52N	213	S	Cuttings	1925
53N	213	S	Unspecified Pit	1906
54N	213	S	Cuttings	1947
55N	213	S	Cuttings	1891
56AX	220	W	Unspecified Ground Workings	1966
57M	235	SE	Unspecified Tank	1990
58O	238	SE	Unspecified Heap	1966
59O	241	SE	Unspecified Heap	1938
60O	241	SE	Unspecified Heap	1938
61P	242	SE	Unspecified Heap	1947
62P	242	SE	Refuse Heap	1906
63P	242	SE	Unspecified Heap	1925
64P	243	SE	Unspecified Heap	1955
65M	253	S	Unspecified Ground Workings	1966
66Q	255	S	Unspecified Ground Workings	1955
67P	257	SE	Refuse Heap	1955
68AV	257	S	Unspecified Pit	1966
69Q	260	S	Unspecified Ground Workings	1947
70Q	261	S	Unspecified Disused Shafts	1990

71L	263	S	Unspecified Ground Workings	1975
72R	270	S	Unspecified Heap	1975
73R	273	S	Unspecified Old Shafts	1938
74R	273	S	Unspecified Old Shafts	1938
75R	276	S	Unspecified Old Shafts	1955
76R	278	S	Unspecified Old Shafts	1925
77R	278	S	Unspecified Old Shafts	1947
78O	280	SE	Unspecified Heap	1891
79S	296	SE	Unspecified Disused Shafts	1990
80T	299	S	Unspecified Ground Workings	1906
81S	301	SE	Unspecified Heap	1975
82T	306	S	Unspecified Heap	1891
83S	308	SE	Unspecified Old Shafts	1938
84S	308	SE	Unspecified Old Shafts	1938
85S	311	SE	Unspecified Old Shafts	1925
86AY	312	S	Cuttings	1851
87S	317	SE	Unspecified Old Shafts	1938
88S	317	SE	Unspecified Old Shafts	1938
89S	318	SE	Unspecified Old Shafts	1925
90	337	W	Nursery	1966
91	339	W	Nurseries	1955
92U	343	SE	Smithy	1906
93U	356	E	Smithy	1891
94AZ	356	SE	Unspecified Old Shafts	1955
95V	363	SW	Cuttings	1938
96V	366	SW	Cuttings	1947
97V	366	SW	Cuttings	1925
98V	366	SW	Cuttings	1906
99V	368	SW	Cuttings	1891
100V	370	S	Railway Building	1851
101W	379	SE	Unspecified Old Shafts	1955
102W	390	SE	Unspecified Old Shafts	1955
103X	407	W	Unspecified Ground Workings	1966
104Y	415	SW	Brick Works	1955
105X	422	W	Unspecified Ground Workings	1975
106BA	422	SW	Refuse Heap	1990
107Y	425	SW	Unspecified Works	1966
108Z	427	SW	Brick Works	1925
109Z	427	SW	Brick Works	1947
110AA	437	NW	Cuttings	1966
111AA	437	NW	Cuttings	1990
112AA	437	NW	Cuttings	1975

113AA	442	NW	Cuttings	1891
114BB	449	SW	Unspecified Pit	1966
115BC	473	N	Unspecified Ground Workings	1966
116BE	475	NW	Unspecified Heap	1990
117BF	478	NW	Unspecified Heap	1975
118AB	480	SE	Cuttings	1947
119AB	480	SE	Cuttings	1925
120BH	482	SE	Cuttings	1955
121AB	482	SE	Cuttings	1938
122AB	487	SE	Cuttings	1851
123BJ	490	S	Unspecified Ground Workings	1966
124AC	494	N	Unspecified Works	1975
125AC	494	N	Unspecified Works	1990
126BK	498	S	Unspecified Disused Pit	1975

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:

3

ID	Distance (m)	Direction	Use	Date
127S	317	SE	Unspecified Tank	1892
128S	317	SE	Unspecified Tank	1907
129	442	NE	Unspecified Tank	1983

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:

34

ID	Distance (m)	Direction	Use	Date
130AD	86	SE	Electricity Substation	1972
131AD	87	SE	Electricity Substation	1984
132AE	150	SE	Electricity Substation	1955
133AE	151	SE	Electricity Substation	1955
134AF	248	N	Electricity Substation	1993
135AF	249	N	Electricity Substation	1955

136AF	249	N	Electricity Substation	1955
137AG	268	E	Electricity Substation	1989
138AG	268	E	Electricity Substation	1989
139AG	268	E	Electricity Substation	1989
140AG	268	E	Electricity Substation	1969
141AG	268	E	Electricity Substation	1988
142AG	268	E	Electricity Substation	1988
143AG	268	E	Electricity Substation	1989
144AG	268	E	Electricity Substation	1984
145AG	268	E	Electricity Substation	1995
146AG	268	E	Electricity Substation	1996
147AH	276	NE	Electricity Substation	1993
148AH	276	NE	Electricity Substation	1970
149AH	276	NE	Electricity Substation	1983
150	319	W	Electricity Substation	1994
151	379	NW	Electricity Substation	1993
152AI	397	NE	Electricity Substation	1970
153AI	398	NE	Electricity Substation	1983
154AJ	400	E	Electricity Substation	1969
155AI	401	NE	Electricity Substation	1993
156AJ	401	E	Electricity Substation	1984
157AJ	401	E	Electricity Substation	1988
158AJ	402	E	Electricity Substation	1995
159AJ	402	E	Electricity Substation	1996
160AJ	402	E	Electricity Substation	1989
161AJ	404	E	Electricity Substation	1989
162AK	425	SE	Electricity Substation	1995
163AK	425	SE	Electricity Substation	1996

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 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 138

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

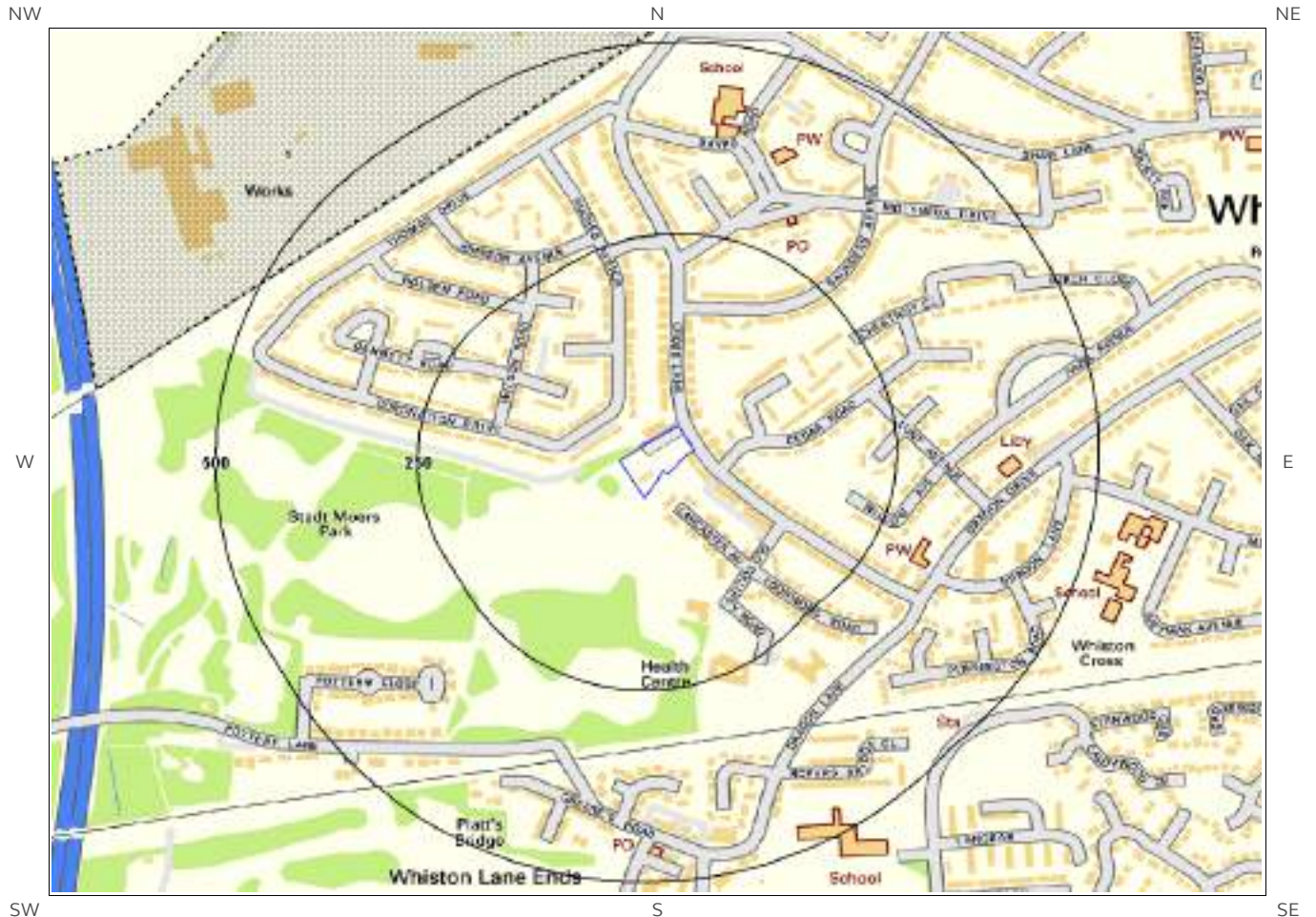
ID	Distance(m)	Direction	Use	Date
164AL	0	On Site	Disused Colliery	1906
165E	0	On Site	Disused Colliery	1938
166E	0	On Site	Disused Colliery	1938
167AM	0	On Site	Colliery	1891
168	0	On Site	Pond	1891
169AN	0	On Site	Unspecified Pit	1906
170E	2	SW	Colliery	1925
171D	48	SW	Unspecified Disused Shaft	1975
172D	48	SW	Unspecified Disused Shaft	1990
173D	50	SW	Unspecified Disused Shaft	1966
174D	53	SW	Unspecified Old Shafts	1955
175M	54	S	Colliery	1891
176B	57	SW	Unspecified Old Shafts	1938
177B	57	SW	Unspecified Old Shafts	1938
178B	58	SW	Unspecified Old Shafts	1925
179B	58	SW	Unspecified Old Shafts	1947
180D	59	SW	Unspecified Disused Shaft	1966
181D	64	SW	Unspecified Old Shafts	1955
182D	68	SW	Unspecified Old Shafts	1938
183D	68	SW	Unspecified Old Shafts	1938
184D	69	SW	Unspecified Old Shafts	1925
185D	69	SW	Unspecified Old Shafts	1947
186E	74	SW	Unspecified Heap	1955
187F	87	SW	Unspecified Old Shafts	1947
188AO	88	SW	Unspecified Ground Workings	1925
189G	89	SW	Unspecified Ground Workings	1906
190G	89	SW	Unspecified Ground Workings	1938
191G	89	SW	Unspecified Ground Workings	1938
192G	91	SW	Unspecified Heap	1891
193H	97	S	Unspecified Ground Workings	1938
194H	97	S	Unspecified Ground Workings	1938
195I	111	S	Unspecified Ground Workings	1955

196I	115	S	Unspecified Ground Workings	1947
197J	117	SW	Unspecified Ground Workings	1966
198AO	121	SW	Refuse Heap	1947
199AO	124	SW	Pond	1891
200G	135	SW	Unspecified Old Shafts	1955
201AP	139	SW	Refuse Heap	1966
202K	150	SE	Disused Colliery	1938
203K	150	SE	Disused Colliery	1938
204AQ	150	SW	Unspecified Heap	1955
205M	167	SE	Disused Colliery	1925
206AR	169	SE	Disused Colliery	1906
207AS	182	E	Colliery	1851
208AS	182	E	Shale Tip	1851
209M	197	SE	Unspecified Disused Shafts	1975
210AT	203	SW	Unspecified Heap	1966
211AU	206	SE	Pond	1938
212AU	207	SE	Pond	1891
213AU	207	SE	Pond	1925
214AU	207	SE	Pond	1947
215AU	207	SE	Pond	1906
216AV	210	S	Unspecified Pit	1955
217AR	213	SE	Pond	1955
218AV	213	S	Cuttings	1925
219AV	213	S	Unspecified Pit	1906
220AV	213	S	Cuttings	1947
221AV	213	S	Cuttings	1891
222AW	214	NE	Pond	1891
223AW	214	NE	Pond	1851
224AW	217	NE	Pond	1906
225AR	218	SE	Pond	1851
226AW	218	NE	Pond	1925
227AX	220	W	Unspecified Ground Workings	1966
228AW	220	NE	Pond	1938
229AR	238	SE	Unspecified Heap	1966
230O	241	SE	Unspecified Heap	1938
231O	241	SE	Unspecified Heap	1938
232O	242	SE	Refuse Heap	1906
233O	242	SE	Unspecified Heap	1947
234O	242	SE	Unspecified Heap	1925
235O	243	SE	Unspecified Heap	1955
236M	253	S	Unspecified Ground Workings	1966
237Q	255	S	Unspecified Ground Workings	1955

238P	257	SE	Refuse Heap	1955
239N	257	S	Unspecified Pit	1966
240Q	260	S	Unspecified Ground Workings	1947
241Q	261	S	Unspecified Disused Shafts	1990
242Q	263	S	Unspecified Ground Workings	1975
243R	270	S	Unspecified Heap	1975
244R	273	S	Unspecified Old Shafts	1938
245R	273	S	Unspecified Old Shafts	1938
246R	276	S	Unspecified Old Shafts	1955
247R	278	S	Unspecified Old Shafts	1925
248R	278	S	Unspecified Old Shafts	1947
249O	280	SE	Unspecified Heap	1891
250S	296	SE	Unspecified Disused Shafts	1990
251T	299	S	Unspecified Ground Workings	1906
252S	301	SE	Unspecified Heap	1975
253T	306	S	Unspecified Heap	1891
254S	308	SE	Unspecified Old Shafts	1938
255S	308	SE	Unspecified Old Shafts	1938
256S	311	SE	Unspecified Old Shafts	1925
257AY	312	S	Cuttings	1851
258S	317	SE	Unspecified Old Shafts	1938
259S	317	SE	Unspecified Old Shafts	1938
260S	318	SE	Unspecified Old Shafts	1925
261	340	E	Pond	1851
262AZ	356	SE	Unspecified Old Shafts	1955
263V	363	SW	Cuttings	1938
264V	366	SW	Cuttings	1947
265V	366	SW	Cuttings	1925
266V	366	SW	Cuttings	1906
267V	368	SW	Cuttings	1891
268W	379	SE	Unspecified Old Shafts	1955
269W	390	SE	Unspecified Old Shafts	1955
270X	407	W	Unspecified Ground Workings	1966
271Y	415	SW	Brick Works	1955
272X	422	W	Unspecified Ground Workings	1975
273BA	422	SW	Refuse Heap	1990
274Z	427	SW	Brick Works	1947
275Z	427	SW	Brick Works	1925
276AA	437	NW	Cuttings	1975
277AA	437	NW	Cuttings	1966
278AA	437	NW	Cuttings	1990

279AA	442	NW	Cuttings	1891
280BB	449	SW	Unspecified Pit	1966
281BD	467	W	Ponds	1966
282BC	473	N	Unspecified Ground Workings	1966
283BD	473	W	Ponds	1955
284BE	475	NW	Unspecified Heap	1990
285BD	477	W	Ponds	1925
286BD	477	W	Ponds	1947
287BD	477	W	Ponds	1906
288BF	478	NW	Unspecified Heap	1975
289BG	479	SE	Pond	1975
290BG	479	SE	Pond	1966
291AB	480	SE	Cuttings	1925
292AB	480	SE	Cuttings	1947
293BH	482	SE	Cuttings	1955
294AB	482	SE	Cuttings	1938
295BI	485	SE	Pond	1891
296BI	486	SE	Pond	1851
297AB	487	SE	Cuttings	1851
298BI	488	SE	Pond	1966
299BJ	490	S	Unspecified Ground Workings	1966
300BD	496	W	Ponds	1938
301BK	498	S	Unspecified Disused Pit	1975

2. Environmental Permits, Incidents and Registers Map



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- | | | |
|-------------------------------|---|--|
| Site Outline | Recorded Pollution Incident | RAS 3 & 4 Authorisations |
| Dangerous Substances (List 1) | Dangerous Substances (List 2) | Part A(1) Authorised Processes and Historic IPC Authorisations |
| Water Industry Referrals | Licenced Discharge Consents | Part A(2) and Part B Authorised Processes |
| Red List Discharge Consents | Sites Determined as Contaminated Land | COMAH / NIHS Sites |
| | 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:

1

The following COMAH & NIHHS Authorisation records provided by the Health and Safety Executive are represented as polygons or buffered points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	Company	Address	Operational Status	Tier
1	442	NW	Bicc Metals Ltd	Bicc Metals Ltd, Carr Lane, Prescott, L34 1PD	Historical NIHHS Site	-

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:

0

Database searched and no data found.

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

0

Database searched and no data found.

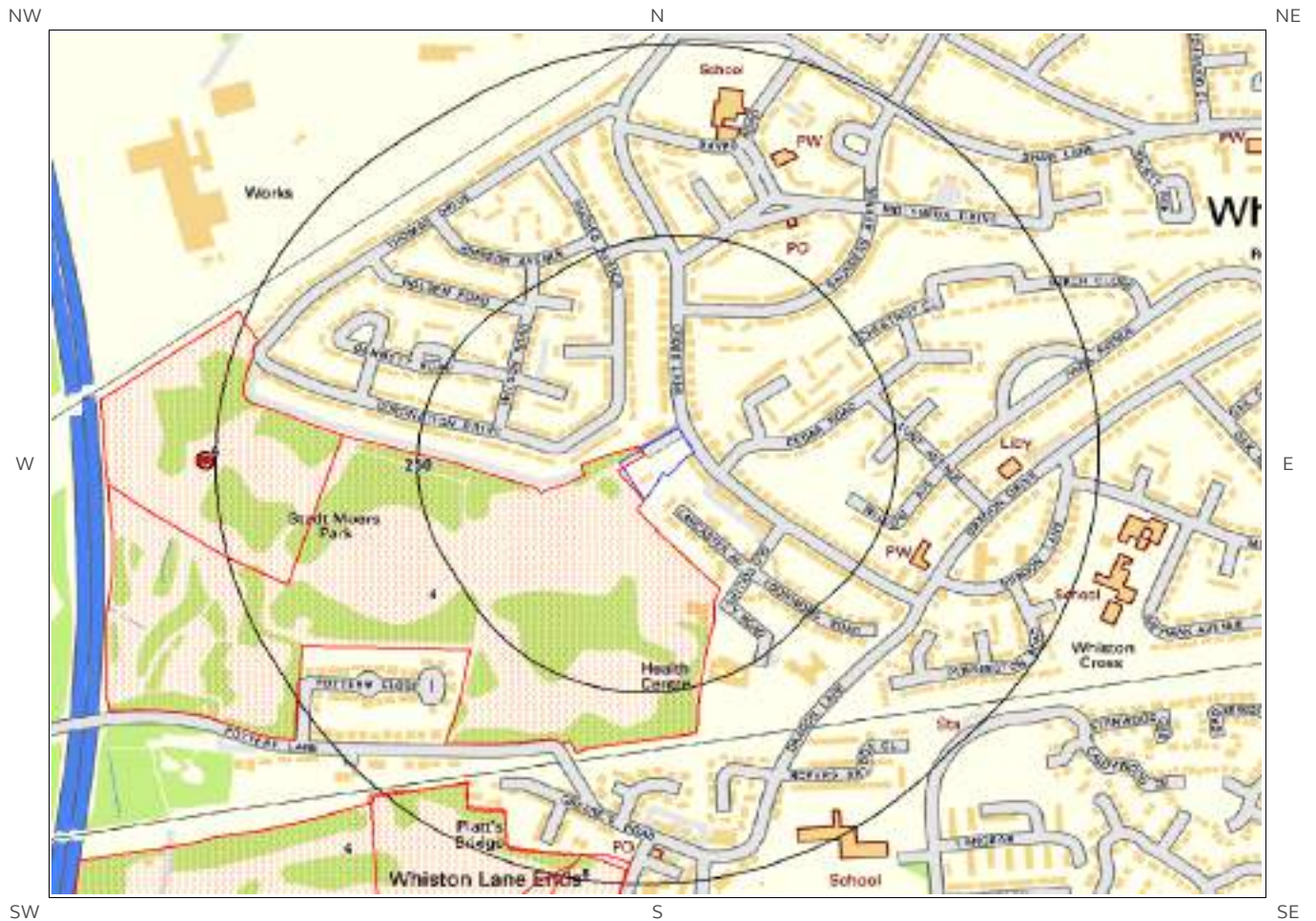
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

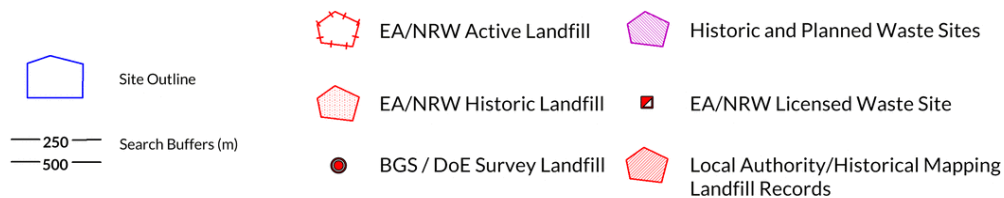
0

Database searched and no data found.

3. Landfill and Other Waste Sites Map



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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:

13

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
4	0	On Site		Site Address: Whiston Tip, Knowsley, Merseyside Waste Licence: - Site Reference: 088 Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: Whiston Rural District Council - Prescott Urban District Council - Huyton Urban District Council First Recorded: - Last Recorded: -
5A	344	W		Site Address: Whiston Tip, Knowsley, Merseyside Waste Licence: - Site Reference: GDO M088 Waste Type: Industrial, Commercial, Household, Liquid sludge Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: Whiston Rural District Council, Prescott Urban District Council, Huyton U District Council Licence Holder: Whiston Rural District Council - Prescott Urban District Council - Huyton Urban District Council First Recorded: - Last Recorded: 01-Jan-1973
6	426	SW		Site Address: Coalgate Lane Landfill Site, Ellis Ashton Street, Huyton, Knowsley, Merseyside Waste Licence: - Site Reference: R13/01, GDO 017, GDO M019, GDO 020 Waste Type: Inert, Industrial, Commercial, Household, Liquid sludge Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: Huyton Urban District Council and Merseyside County Council Licence Holder: Huyton Urban District Council and Merseyside County Council First Recorded: 01-Jan-1972 Last Recorded: 01-Jan-1983

ID	Distance (m)	Direction	NGR	Details
7	428	SW		Site Address: Whiston Tip, St Helens, Lancashire Waste Licence: - Site Reference: - Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: Central Electricity Generating Board - North Western Region Licence Holder: - First Recorded: 07-Jan-1967 Last Recorded: -
8	467	S		Site Address: Tushingham's Quarry, Coalgate Lane, Paradise Lane, Stadt-Moers Park, Whiston, Merseyside, Knowsley Waste Licence: Yes Site Reference: 026/01,GDO 020 Waste Type: Commercial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 27-May-1977 Licence Surrendered: Licence Holder Address: Bridle Road, Bootle, Merseyside Operator: W F Doyle and Company Limited Licence Holder: George Wimpey and Company Limited First Recorded: 01-Apr-1976 Last Recorded: 31-Dec-1979
Not shown	608	S		Site Address: Coalgate Lane Wimpeym, Tushingham's Quarry, Paradise Lane, Stadt-Moers Park, Knowsley, Merseyside Waste Licence: - Site Reference: GDO M017, 026/01 Waste Type: Industrial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: Bridle Road, Bootle Operator: G Wimpey and Company Limited Licence Holder: G Wimpey and Company Limited First Recorded: 31-Dec-1976 Last Recorded: 01-Jan-1979
Not shown	809	NW		Site Address: Prescott WWTW, Carr Lane, Prescott Waste Licence: - Site Reference: GDO 271 Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: North West Water (Peter Hindle, Project Manager) Licence Holder: - First Recorded: - Last Recorded: -
Not shown	867	NW		Site Address: Prescott WWTW, Carr Lane, Prescott Waste Licence: - Site Reference: GDO M271 Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -
Not shown	1088	SW		Site Address: West View Tip, Knowsley, Merseyside Waste Licence: - Site Reference: GDO M194 Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: Hoyton with Roby Urban District Council Licence Holder: - First Recorded: 31-Jan-1971 Last Recorded: 01-Jan-1978
Not shown	1380	SW		Site Address: Huyton Quarry, Knowsley, Merseyside Waste Licence: - Site Reference: GDO M087 Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: 01-Oct-1971 Last Recorded: -

ID	Distance (m)	Direction	NGR	Details
Not shown	1444	NE		Site Address: Holt Lane Quarry Landfill Site, Delph Lane, Prescott, Whiston, Merseyside Waste Licence: Yes Site Reference: - Waste Type: - Environmental Permitting Regulations (Waste) Reference: YO1/L/TEN001 Licence Issue: 30-Jan-1987 Licence Surrendered: 07-Jun-2011 Licence Holder Address: 130 Wilton Road, London, , Operator: Holt Lane Quarry Landfill Site Licence Holder: Balfour Beatty Plc First Recorded: - Last Recorded: -
Not shown	1453	NE		Site Address: Holt Lane Quarry, Whiston, Wirral Waste Licence: - Site Reference: GDO 018, 038/01 Waste Type: Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: Holt Lane Transport Licence Holder: - First Recorded: 31-Dec-1942 Last Recorded: -
Not shown	1467	SW		Site Address: Brickfields, Knowsley, Merseyside Waste Licence: - Site Reference: GDO M209 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: Tushingham Metallic Brick Works Licence Holder: Tushingham Metallic Brick Works First Recorded: - Last Recorded: -

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

3

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
1A	513	W	346200.0 391400.0	Address: Whiston Tip, Pottery Lane, Prescott, M'Side BGS Number: 626.0 Risk: No risk to aquifer Waste Type: N/A
Not shown	566	S	346600.0 390800.0	Address: Whiston Tip, St Helens, Lancs BGS Number: 2786.0 Risk: No risk to aquifer Waste Type: N/A
Not shown	1227	SW	345700.0 390700.0	Address: West View Tip, Huyton Quarry, Liverpool, M'Side BGS Number: 197.0 Risk: No risk to aquifer Waste Type: N/A

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

3

The following landfill records are represented as points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
Not shown	759	NW	346224 392036	Refuse Tip	1971 mapping	Polygon

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
Not shown	852	S	346511 390514	Refuse Tip	1994 mapping	Polygon
Not shown	875	S	346511 390465	Refuse Tip	1997 mapping	Polygon

3.2 Other Waste Sites

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

0

Database searched and no data found.

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

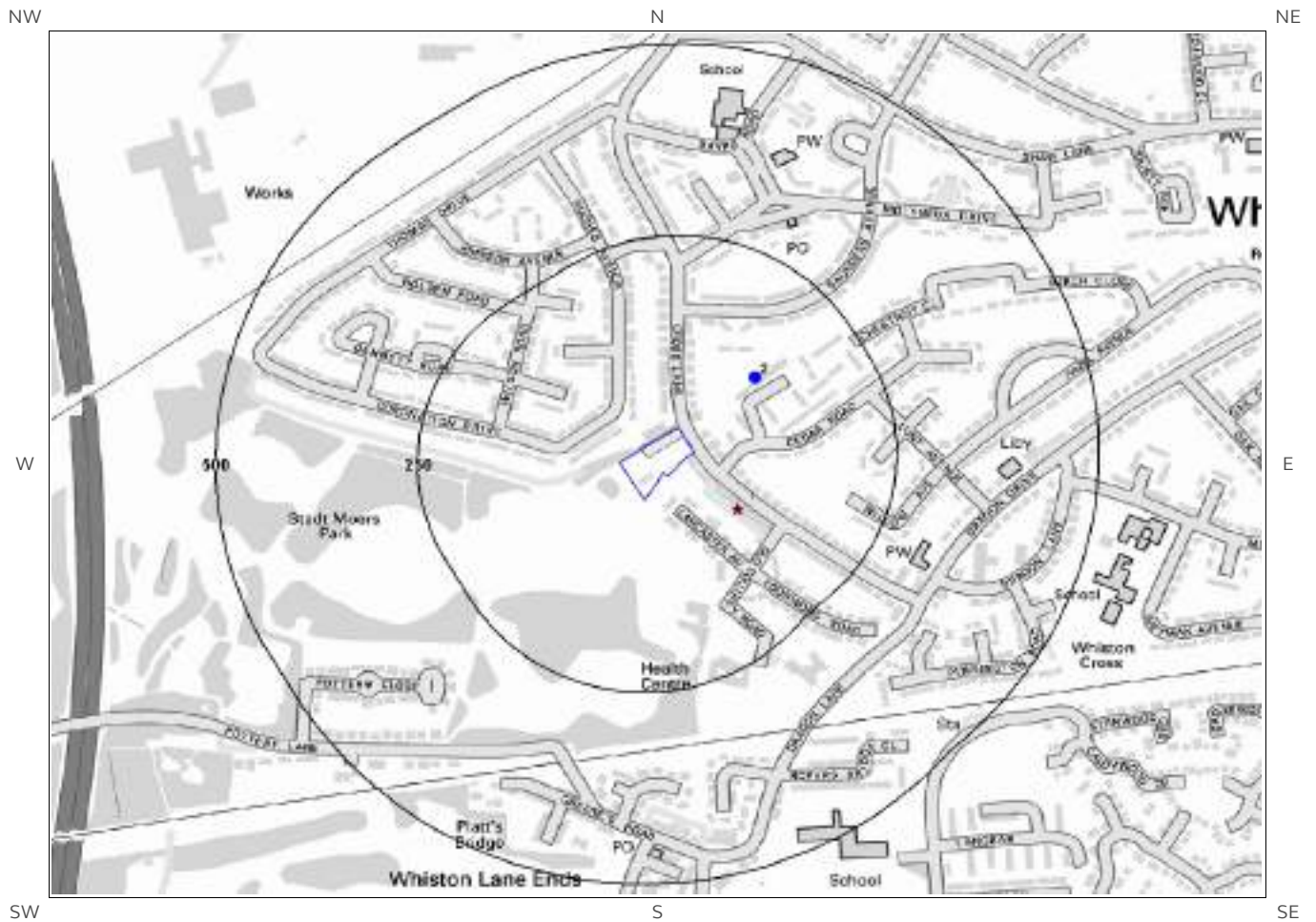
4

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	814	NW	346339 392124	Site Address: B I C C Site, Carr Lane, Prescott, Merseyside, L34 1NZ Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ALT001 EPR reference: EA/EPR/CP3698CJ/S002 Operator: Alleena Ltd Waste Management licence No: 50023 Annual Tonnage: 0.0 Issue Date: 30/07/1999 Effective Date: - Modified: - Surrendered Date: 23/07/2008 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Bicc Site, Carr Lane Correspondence Address: B I C C Site, Carr Lane, Prescott, Merseyside, L34
Not shown	835	NW	346340 392150	Site Address: Carr Lane Recycling & Treatment Facility, Carr Lane, Prescott, Knowsley, Merseyside, L34 1PD Type: Special Waste Transfer Station Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: REM045 EPR reference: EA/EPR/UP3134HY/A001 Operator: Remondis U K Limited Waste Management licence No: 103346 Annual Tonnage: 69000.0 Issue Date: 27/03/2012 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Carr Lane Recycling & Treatment Facility Correspondence Address: Carr Lane Recycling & Treatment Facility, Carr Lane, Prescott, Knowsley, Merseyside, L34

ID	Distance (m)	Direction	NGR	Details
Not shown	835	NW	346340 392150	Site Address: Carr Lane Recycling & Treatment Facility, Carr Lane, Prescot, Knowsley, Merseyside, L34 1PD Type: Special Waste Transfer Station Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: REM045 EPR reference: EA/EPR/UP3134HY/V004 Operator: Remondis U K Ltd Waste Management licence No: 103346 Annual Tonnage: 69000.0 Issue Date: 27/03/2012 Effective Date: - Modified: 09/10/2015 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Carr Lane Recycling & Treatment Facility Correspondence Address: Carr Lane Recycling & Treatment Facility, Carr Lane, Prescot, Knowsley, Merseyside, L34
Not shown	1420	SW	345848 390245	Site Address: Huyton W T S, Ellis Ashton Street, Huyton Ind Est, Liverpool, Merseyside, L36 6BN Type: Household, Commercial & Industrial Waste T Stn Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: VEO092 EPR reference: EA/EPR/EP3695SH/V006 Operator: Veolia Environmental Services Merseyside & Halton Ltd Waste Management licence No: 53645 Annual Tonnage: 500000.0 Issue Date: 15/09/1995 Effective Date: 11/11/2009 Modified: 15/05/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Huyton Waste Transfer Station Correspondence Address: Huyton W T S, Ellis Ashton Street, Huyton Ind Est, Liverpool, Merseyside, L36

4. Current Land Use Map



4. Current Land Uses

4.1 Current Industrial Data

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

1

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	89	SE	Electricity Sub Station	346859 391338	L35	Electrical Features	Infrastructure and Facilities

4.2 Petrol and Fuel Sites

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

1

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance (m)	Direction	NGR	Company	Address	LPG	Status
2	115	NE	346880 391508	Obsolete	Wilsons Garage, 89, Cross Lane, Cross Lane, Whiston, Prescot, Merseyside, L35 3QQ	Not Applicable	Obsolete

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

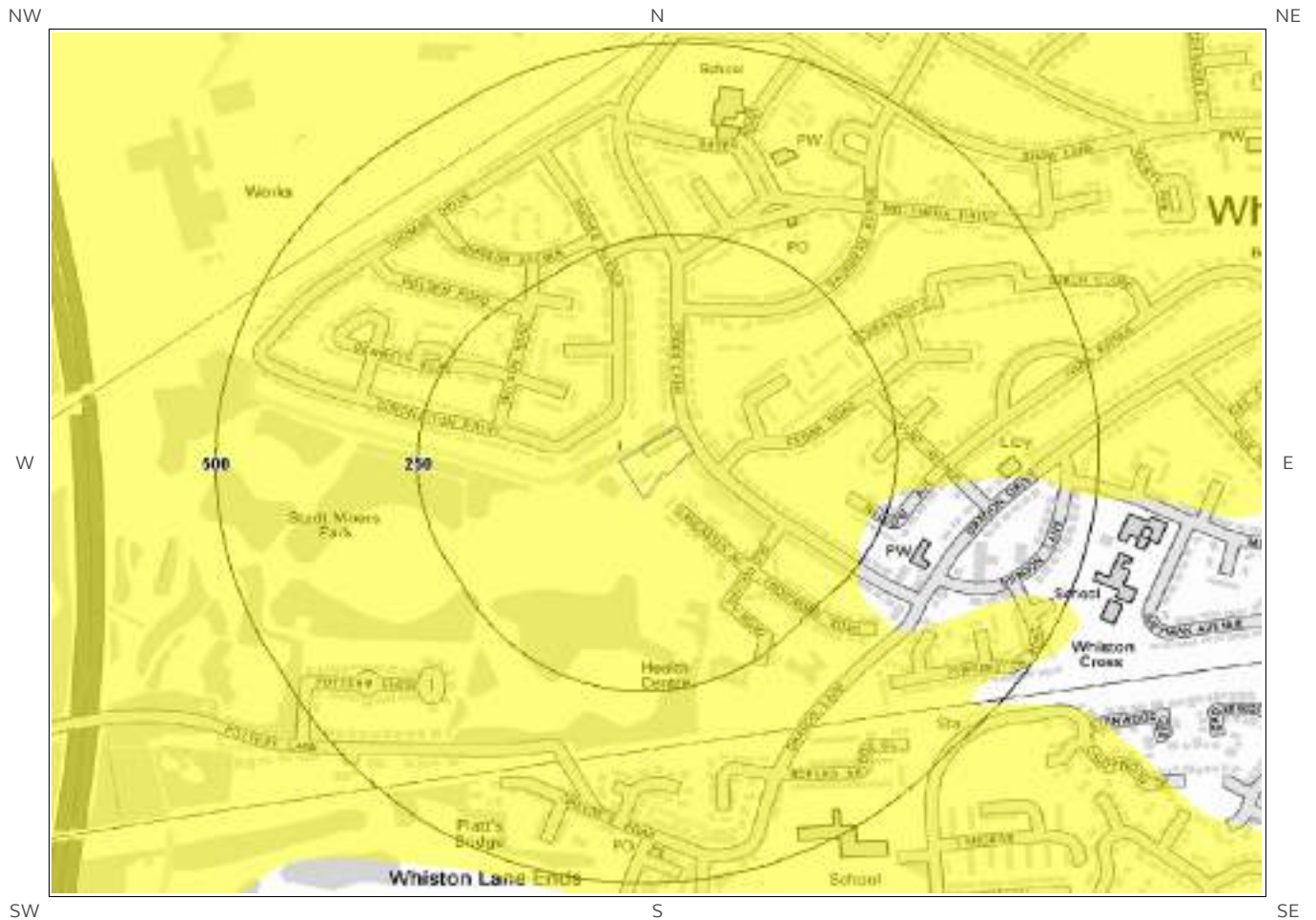
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE
RHR-SDST	RAVENHEAD ROCK	SANDSTONE
PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE

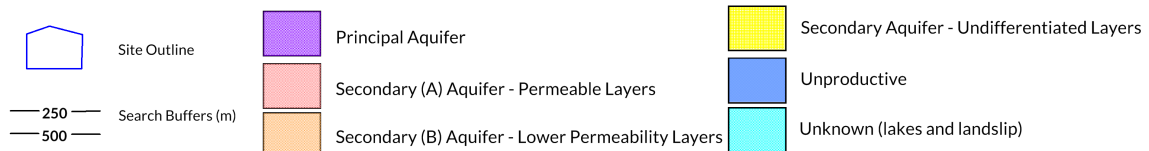
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

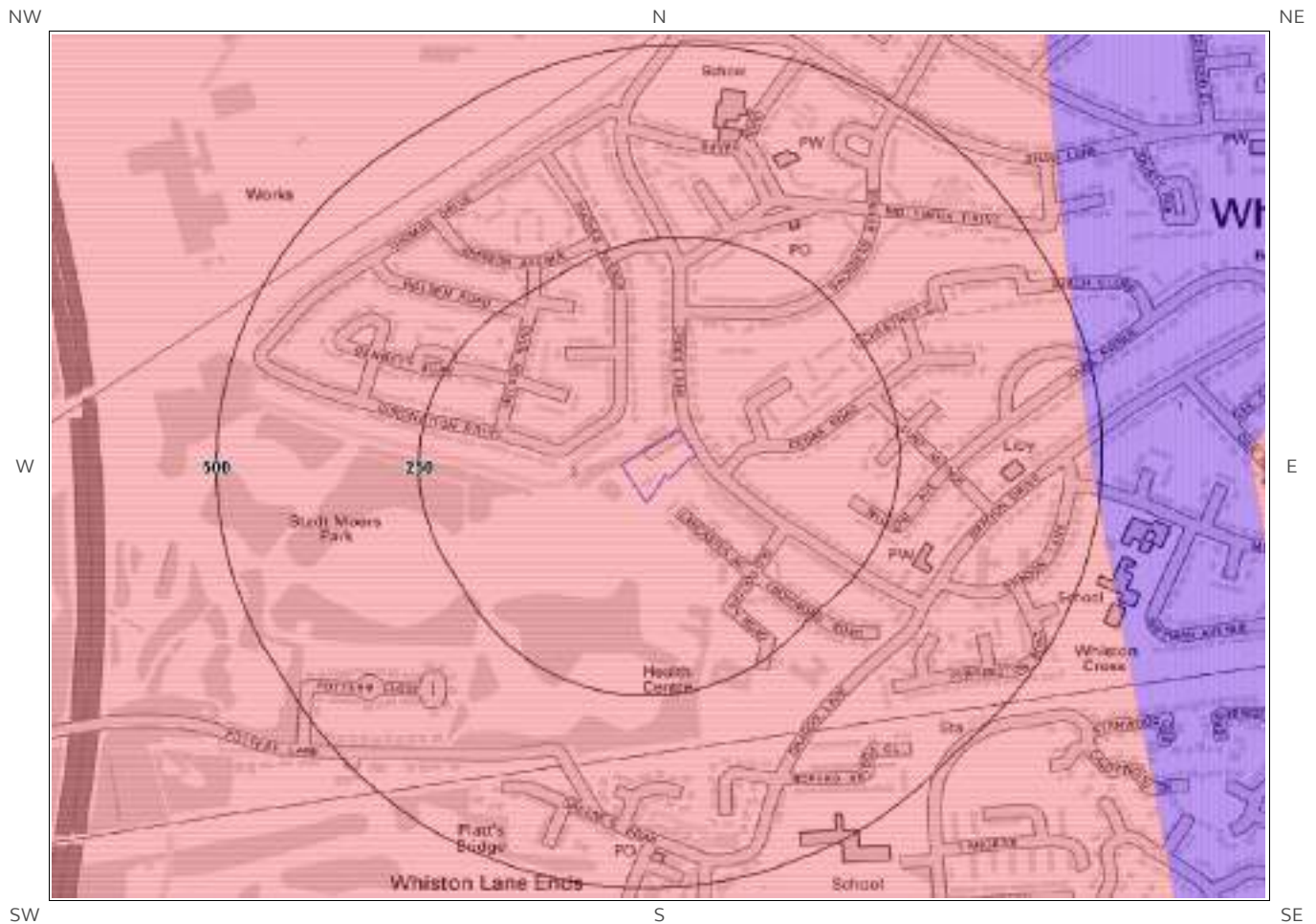
6a. Aquifer Within Superficial Geology



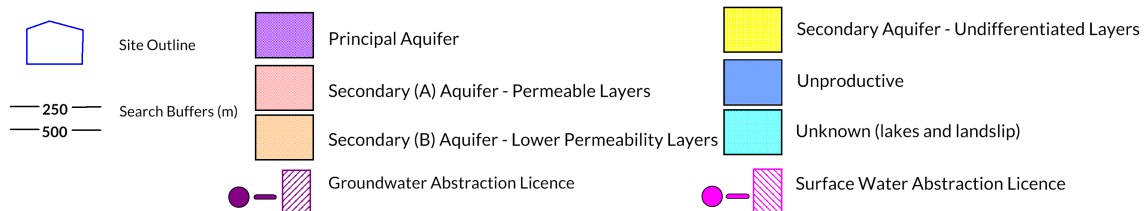
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6b. Aquifer Within Bedrock Geology and Abstraction Licenses



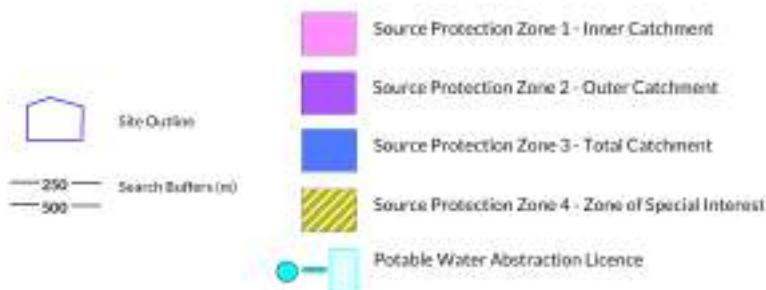
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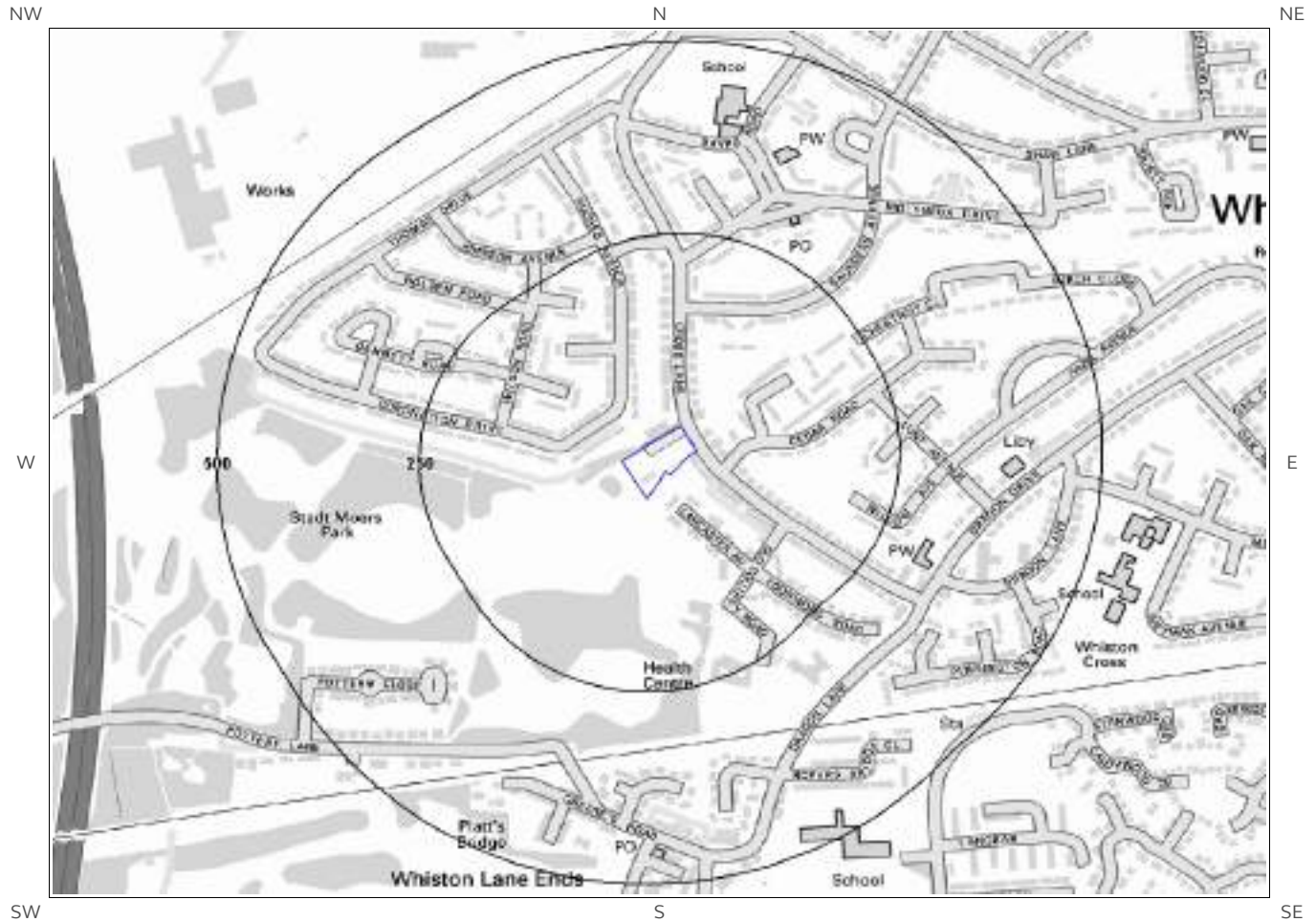
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



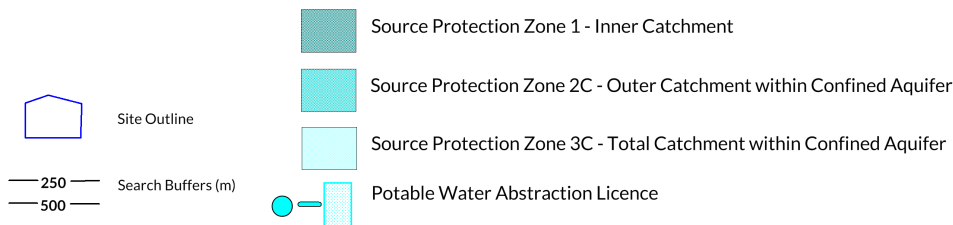
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6d. Hydrogeology – Source Protection Zones within confined aquifer



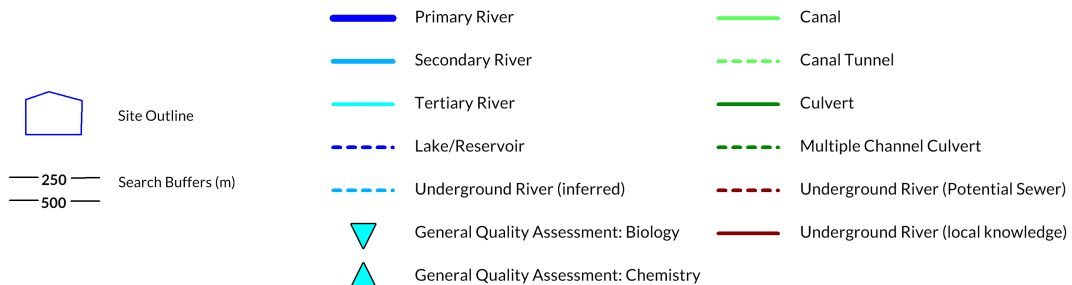
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6e. Hydrology – Detailed River Network and River Quality



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6. Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Are there 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

6.2 Aquifer within Bedrock Deposits

Are there 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
2	0	On Site	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
1	482	E	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site?

Yes

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	1295	E	348100 391400	Status: Historical Licence No: 2569028020 Details: Laundry Use Direct Source: Ground Water - North West Region Point: "borehole At Stoney Lane, Rainhill" Data Type: Point Name: THE SUNLIGHT SERVICES GROUP LTD Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: S 7174 Original Start Date: 1/6/1993 Expiry Date: - Issue No: 101 Version Start Date: 24/10/1996 Version End Date:
Not shown	1295	E	348100 391400	Status: Active Licence No: 2569028020 Details: Laundry Use Direct Source: Ground Water - North West Region Point: Borehole At Stoney Lane, Rainhill Data Type: Point Name: Berendsen UK Limited Annual Volume (m³): 118181.82 Max Daily Volume (m³): 545.46 Original Application No: NPS/WR/013874 Original Start Date: 1/6/1993 Expiry Date: - Issue No: 102 Version Start Date: 22/7/2013 Version End Date:
Not shown	1299	E	348100 391300	Status: Historical Licence No: 2569028008 Details: Potable Water Supply - Direct Direct Source: Ground Water - North West Region Point: 2 Wells + Connecting B/holes, Cumber La, Whiston, Merseyside Data Type: Point Name: NORTH WEST WATER LTD Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 1599 Original Start Date: 16/3/1966 Expiry Date: - Issue No: 100 Version Start Date: 16/3/1966 Version End Date:
Not shown	1380	NE	348000 392100	Status: Historical Licence No: 2569025072 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "two Boreholes At Whiston Hospital, Prescott, Merseyside" Data Type: Point Name: ST HELENS AND KNOWSLEY HOSPITALS Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 7122 Original Start Date: 13/8/1992 Expiry Date: - Issue No: 100 Version Start Date: 13/8/1992 Version End Date:
Not shown	1380	NE	348000 392100	Status: Historical Licence No: 2569025072 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: Two Boreholes At Whiston Hospital, Prescott, Merseyside Data Type: Point Name: ST HELENS AND KNOWSLEY HOSPITALS Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 7122 Original Start Date: 13/8/1992 Expiry Date: - Issue No: 100 Version Start Date: 13/8/1992 Version End Date:

ID	Distance (m)	Direction	NGR	Details
Not shown	1380	NE	348000 392100	Status: Historical Licence No: 2569025072 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Two Boreholes At Whiston Hospital, Prescot, Merseyside Data Type: Point Name: ST HELENS AND KNOWSLEY HOSPITALS Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 7122 Original Start Date: 13/8/1992 Expiry Date: - Issue No: 100 Version Start Date: 13/8/1992 Version End Date:
Not shown	1380	NE	348000 392100	Status: Historical Licence No: 2569025072 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: "two Boreholes At Whiston Hospital, Prescot, Merseyside" Data Type: Point Name: ST HELENS AND KNOWSLEY HOSPITALS Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 7122 Original Start Date: 13/8/1992 Expiry Date: - Issue No: 100 Version Start Date: 13/8/1992 Version End Date:

6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? Yes

The following Surface Water 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	1535	NW	345900 392700	Status: Historical Licence No: 2569028003 Details: Spray Irrigation - Direct Direct Source: "surface, Non-tidal - North West Region" Point: "logwood Mill Brook At Lh's Premises, Prescot, Merseyside" Data Type: Point Name: JAMES WHITAKER & SONS NURSERYMEN LTD Annual Volume (m³): - Max Daily Volume (m³): - Application No: 1319 Original Start Date: 4/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/3/1999 Version End Date:
Not shown	1535	NW	345900 392700	Status: Historical Licence No: 2569028003 Details: Spray Irrigation - Direct Direct Source: Surface, Non-tidal - North West Region Point: Logwood Mill Brook At Lh's Premises, Prescot, Merseyside Data Type: Point Name: JAMES WHITAKER & SONS NURSERYMEN LTD Annual Volume (m³): 772.82 Max Daily Volume (m³): 77.282 Application No: 1319 Original Start Date: 4/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/3/1999 Version End Date:

6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site?

Yes

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Licences Map (6c):

ID	Distance (m)	Direction	NGR	Details
Not shown	1299	E	348100 391300	Status: Historical Licence No: 2569028008 Details: Potable Water Supply - Direct Direct Source: Ground Water - North West Region Point: 2 Wells + Connecting B/holes, Cumber La, Whiston, Merseyside Data Type: Point Name: NORTH WEST WATER LTD Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 1599 Original Start Date: 16/3/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1380	NE	348000 392100	Status: Historical Licence No: 2569025072 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Two Boreholes At Whiston Hospital, Prescott, Merseyside Data Type: Point Name: ST HELENS AND KNOWSLEY HOSPITALS Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 7122 Original Start Date: 13/8/1992 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1380	NE	348000 392100	Status: Historical Licence No: 2569025072 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "two Boreholes At Whiston Hospital, Prescott, Merseyside" Data Type: Point Name: ST HELENS AND KNOWSLEY HOSPITALS Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 7122 Original Start Date: 13/8/1992 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site?

Yes

The following Source Protection Zones records are represented on the SPZ and Potable Water Abstraction Map (6c):

ID	Distance (m)	Direction	Zone	Description
1	483	E	3	Total catchment

6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site? No

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

Is there any Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	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.
480	E	Major 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

Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site? Yes

6.9.1 Biological Quality:

Biological Quality data describes water quality in terms of 83 groups of macroinvertebrates, some of which are pollution sensitive. The results are graded from A ('Very Good') to F ('Bad').

The following Biological Quality records are shown on the Hydrology Map (6e):

ID	Distance (m)	Direction	NGR	River Quality Grade	Biological Quality Grade				
					2005	2006	2007	2008	2009
Not shown	1001	NW	346000 392100	River Name: Ditton Bk Reach: Prescott Stw To Fox's Bank Bk. End/Start of Stretch: Start of Stretch NGR	E	E	E	E	E
Not shown	1001	NW	346000 392100	River Name: Ditton Bk Reach: Qsl At Knowsley Park To Prescott Stw End/Start of Stretch: End of Stretch NGR	C	C	C	C	C

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site?

No

Database searched and no data found.

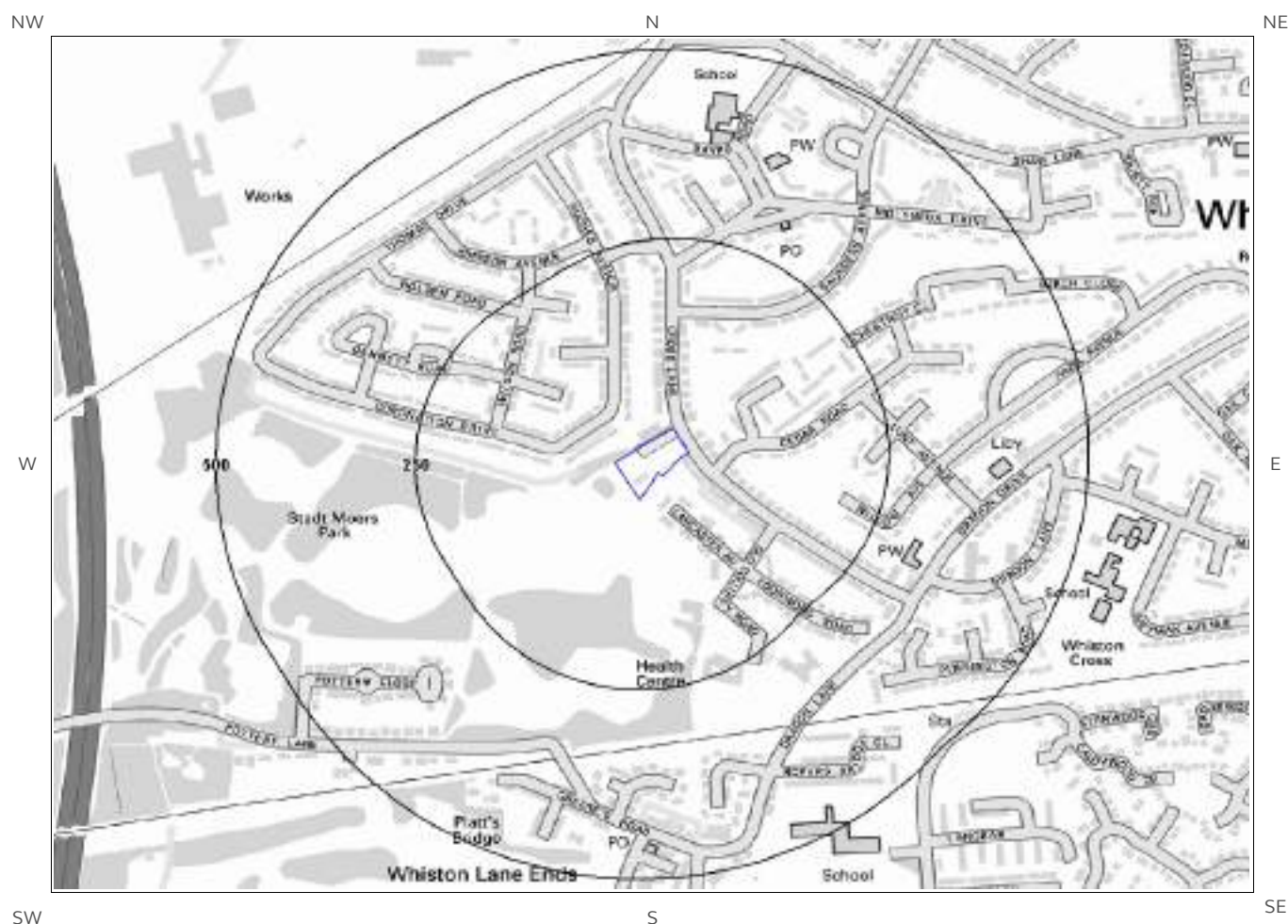
6.11 Surface Water Features

Are there any surface water features within 250m of the study site?

No

Database searched and no data found.

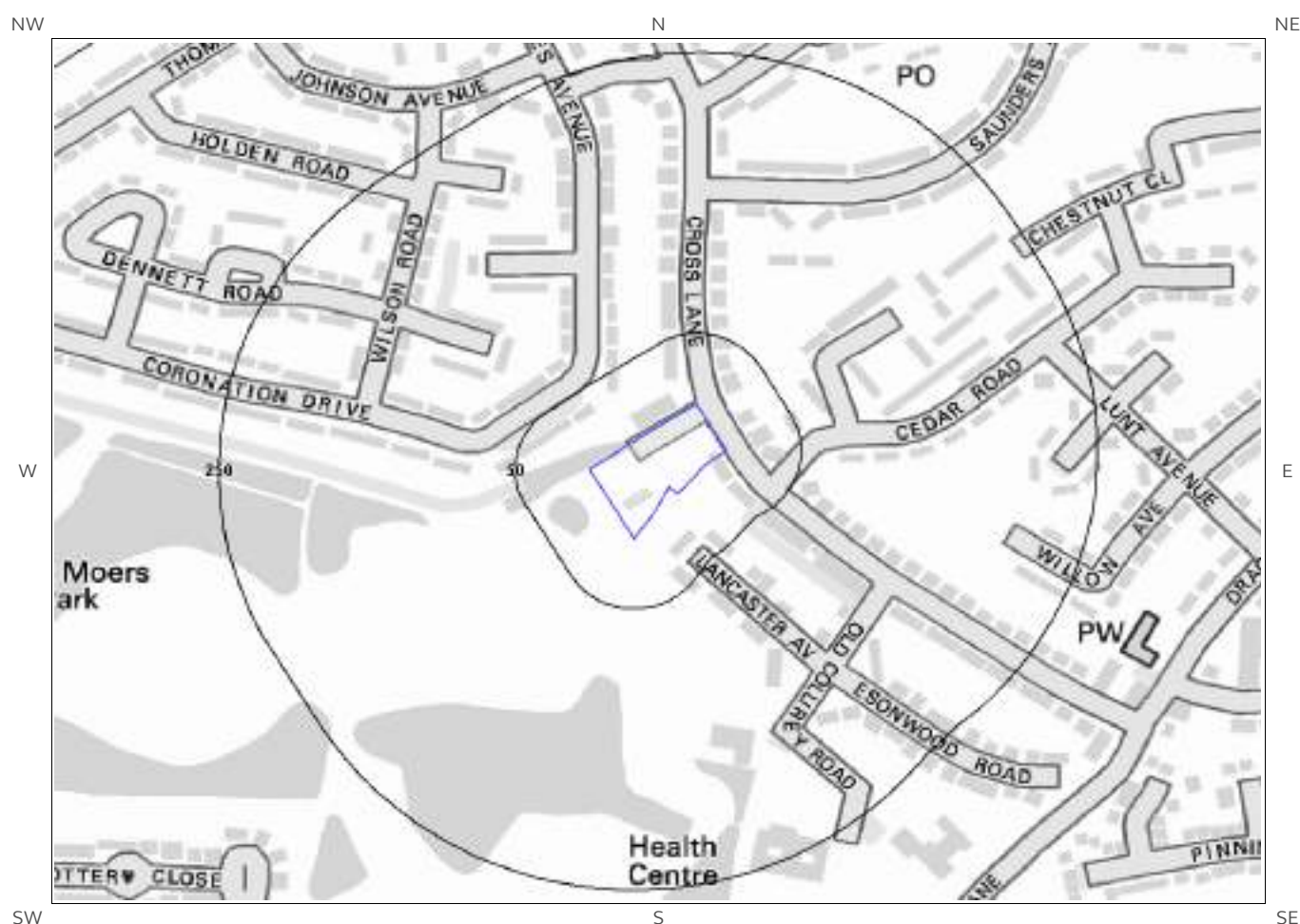
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



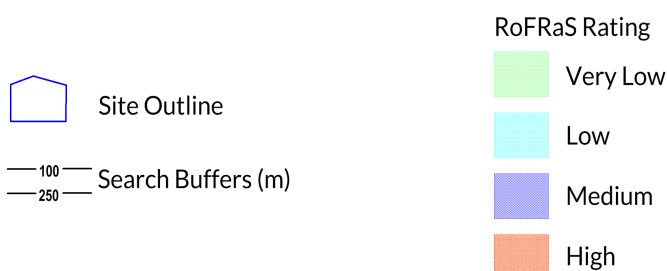
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7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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7 Flooding

7.1 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 7a – Flood Map for Planning:

Database searched and no data found.

7.2 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 7a – Flood Map for Planning.

Database searched and no data found.

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

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.

7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? No
Database searched and no data found.

7.5 Areas benefiting from Flood Defences

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

7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site?

No

7.7 Groundwater Flooding Susceptibility Areas

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

Does this relate to Clearwater Flooding or Superficial Deposits Flooding?

Clearwater 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 What is the 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

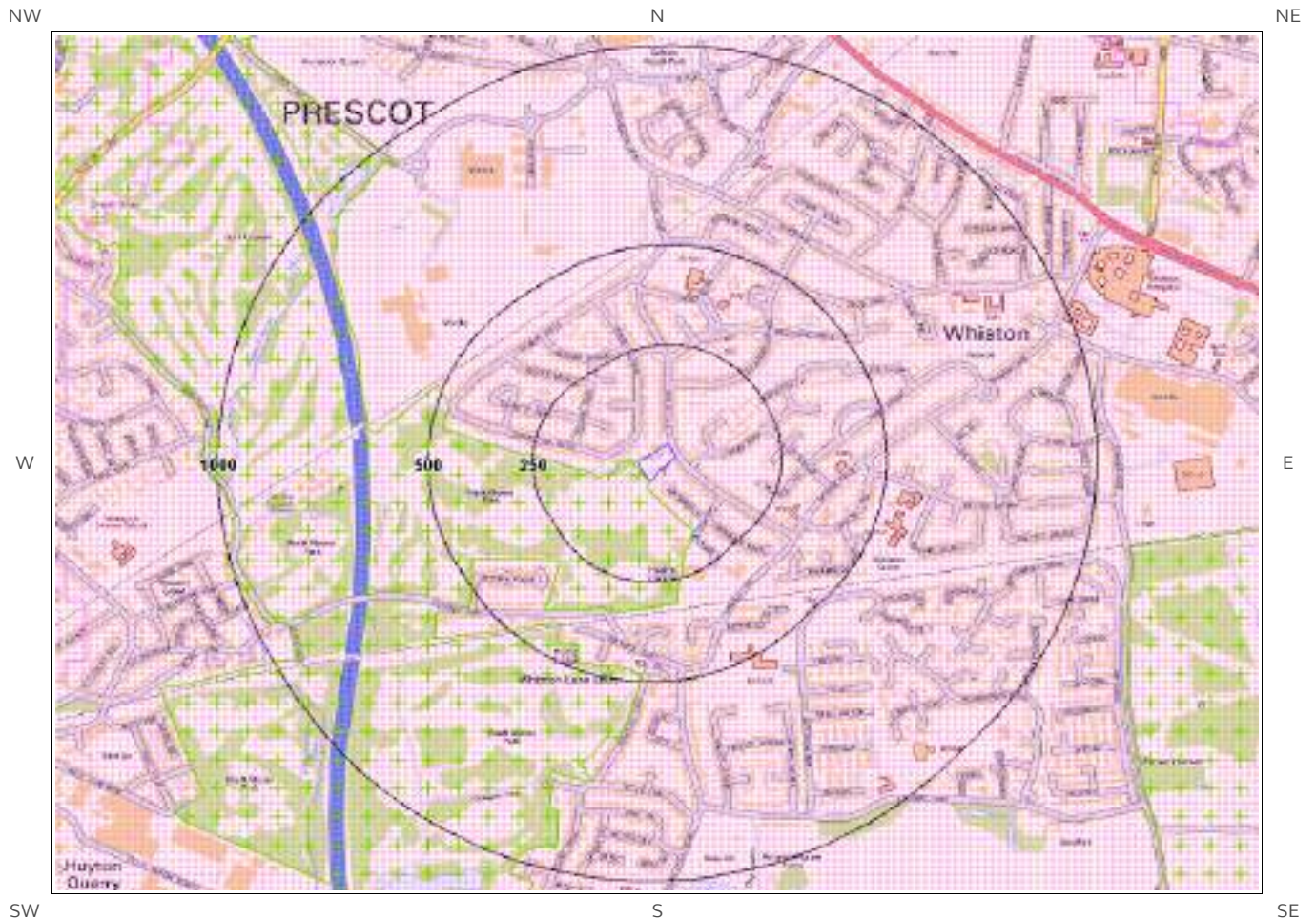
What is the British Geological Survey confidence rating in this result?

Moderate

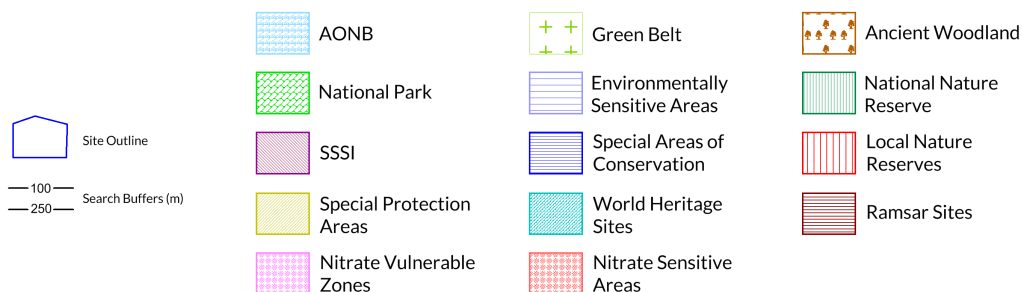
Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

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



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8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site?

Yes

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:

2

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
Not shown	1581	S	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1807	S	UNKNOWN	Ancient and Semi-Natural Woodland

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

0

Database searched and no data found.

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:

4

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
1	0	On Site	Existing	DEFRA
2	1303	NW	Existing	DEFRA
Not shown	1347	S	Existing	DEFRA
4	1406	NE	Existing	DEFRA

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

7

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

ID	Distance	Direction	Green Belt Name	Local Authority Name
7	0	On Site	Liverpool, Manchester and West Yorks Greenbelt	Knowsley
8	1100	E	Liverpool, Manchester and West Yorks Greenbelt	St. Helens District (B)
Not shown	1625	S	Liverpool, Manchester and West Yorks Greenbelt	Knowsley
Not shown	1734	NE	Liverpool, Manchester and West Yorks Greenbelt	Knowsley
Not shown	1752	SE	Liverpool, Manchester and West Yorks Greenbelt	St. Helens District (B)
Not shown	1851	NE	Liverpool, Manchester and West Yorks Greenbelt	St. Helens District (B)
Not shown	1861	N	Liverpool, Manchester and West Yorks Greenbelt	St. Helens 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

What is the 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

What is the 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

What is the 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

What is the 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

What is the 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

What is the 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 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.

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

Are there any coal mining areas within 75m of the study site? Yes

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary? No

Database searched and no data found.

10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No

Guidance: No Guidance Required.

Contact Details

CENTREMAPS

Telephone: #CustomerHelpLine#
Groundsure@centremaps.co.uk



British Geological Survey Enquiries

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Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
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Email:

Web: www.bgs.ac.uk

BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

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Email: enquiries@environment-agency.gov.uk



Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
www.gov.uk/phe

Email: enquiries@phe.gov.uk
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The Coal Authority

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Ordnance Survey

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Local Authority

Authority: Knowsley Metropolitan Borough Council
Phone: 0151 489 6000

Web: <http://www.knowsley.gov.uk/>

Address: Municipal Buildings, Cherryfield Drive, Knowsley, L32 1TX

Gemapping PLC

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<https://www.groundsure.com/terms-and-conditions-sept-2016>



CENTREMAPS

Open Space, Upper Interfields,
Worcester, WR14 1UT

Report Reference: CMAPS-AAG-682480-4165-
120118GEO

Your Reference: 4165

Report Date 12 Jan 2018

Report Delivery Email - pdf
Method:

Geo Insight

Address: Cross Lane Whiston, Liverpool,

Dear Sir/ Madam,

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

If you need further assistance, please do not hesitate to contact our helpline on 01886 832972 quoting the above CENTREMAPS reference number.

Yours faithfully,

CENTREMAPS

Enc.
Groundsure Geo Insight

Address: Cross Lane Whiston, Liverpool,
Date: 12 Jan 2018
Reference: CMAPS-AAG-682480-4165-120118GEO
Client: CENTREMAPS



Aerial Photograph Capture date: 11-Jun-2015
Grid Reference: 346759,391395
Site Size: 0.39ha

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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?*	No
	1.2.2 Are there any records of landslide 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 landslide 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?

Yes

Section 3: Radon

3. Radon

3.1 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 property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

3.2 Radon Protection

No radon protective measures are necessary.

Section 4: Ground Workings

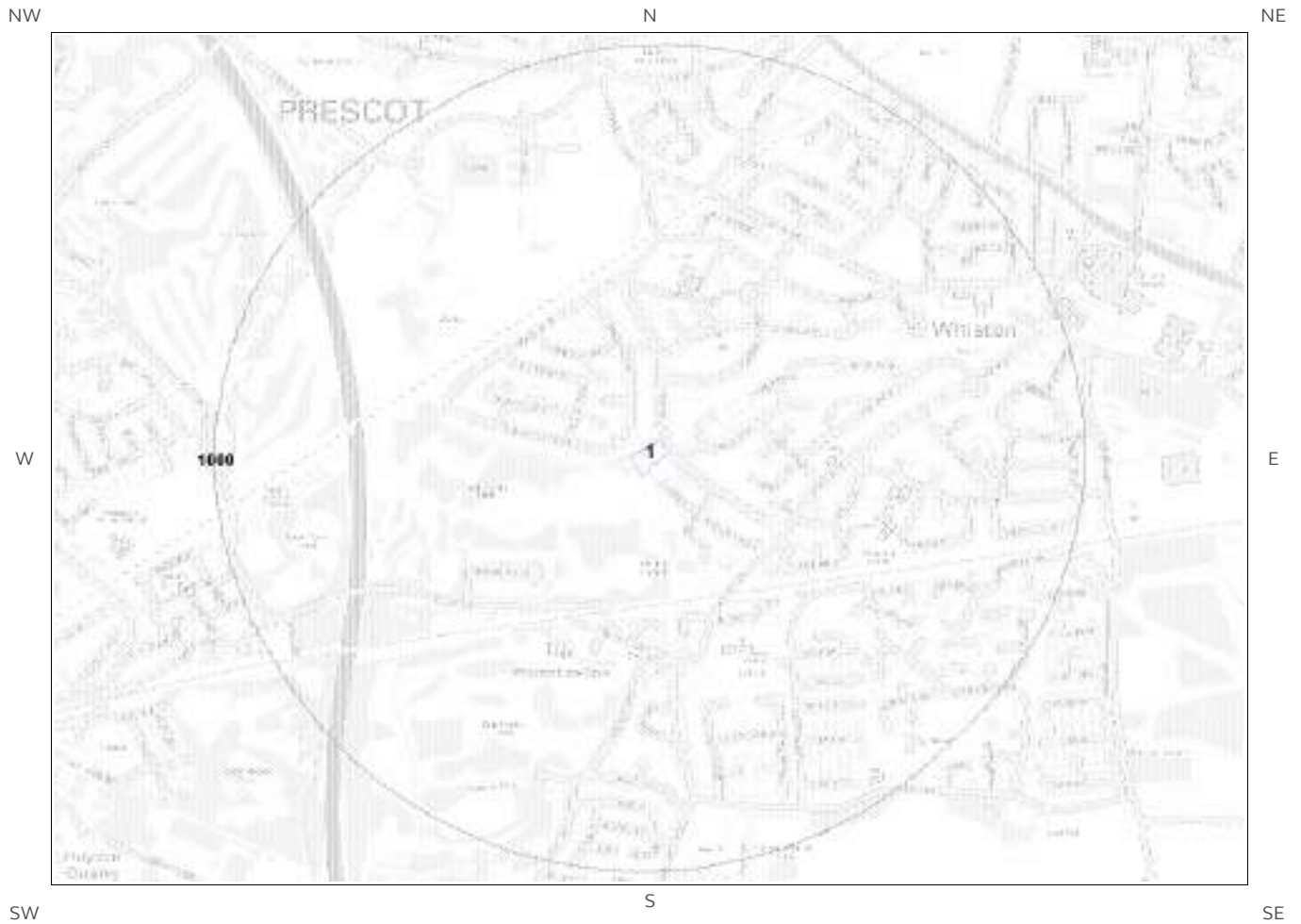
	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	4	1	34	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	2	4	12	10	21
4.3 Current Ground Workings	0	0	0	0	8

Section 5: Mining, Extraction & Natural Cavities

	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	2	4	12	10	21
5.2 Coal Mining	1	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	1
5.5 Non-Coal Mining Cavities	0	0	0	0	0
5.5 Natural Cavities	0	0	0	0	0

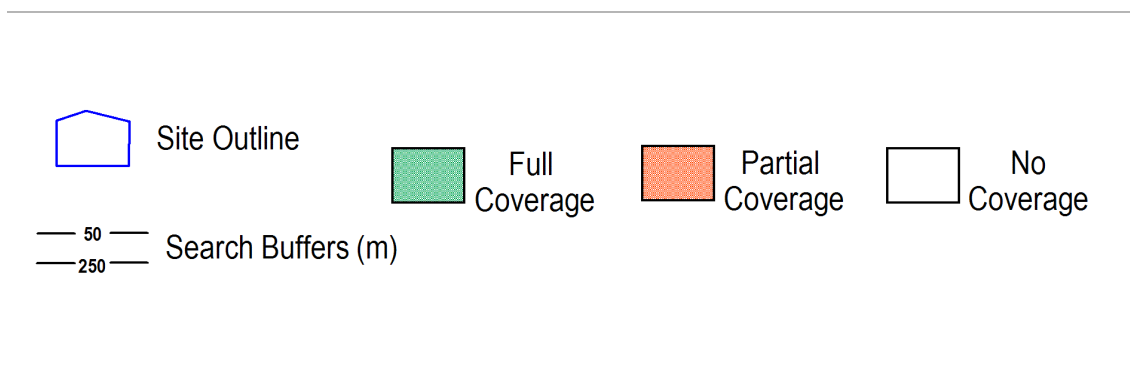
Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0
Section 6: Natural Ground Subsidence	On-site				
6.1 Shrink-Swell Clay	Very Low				
6.2 Landslides	Very 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	1		
Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250		
8 Records of Background Soil Chemistry	2	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	2	1	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	No coverage	No coverage	No coverage
N2	1347.0	No deposits are mapped	Full	Full	No coverage

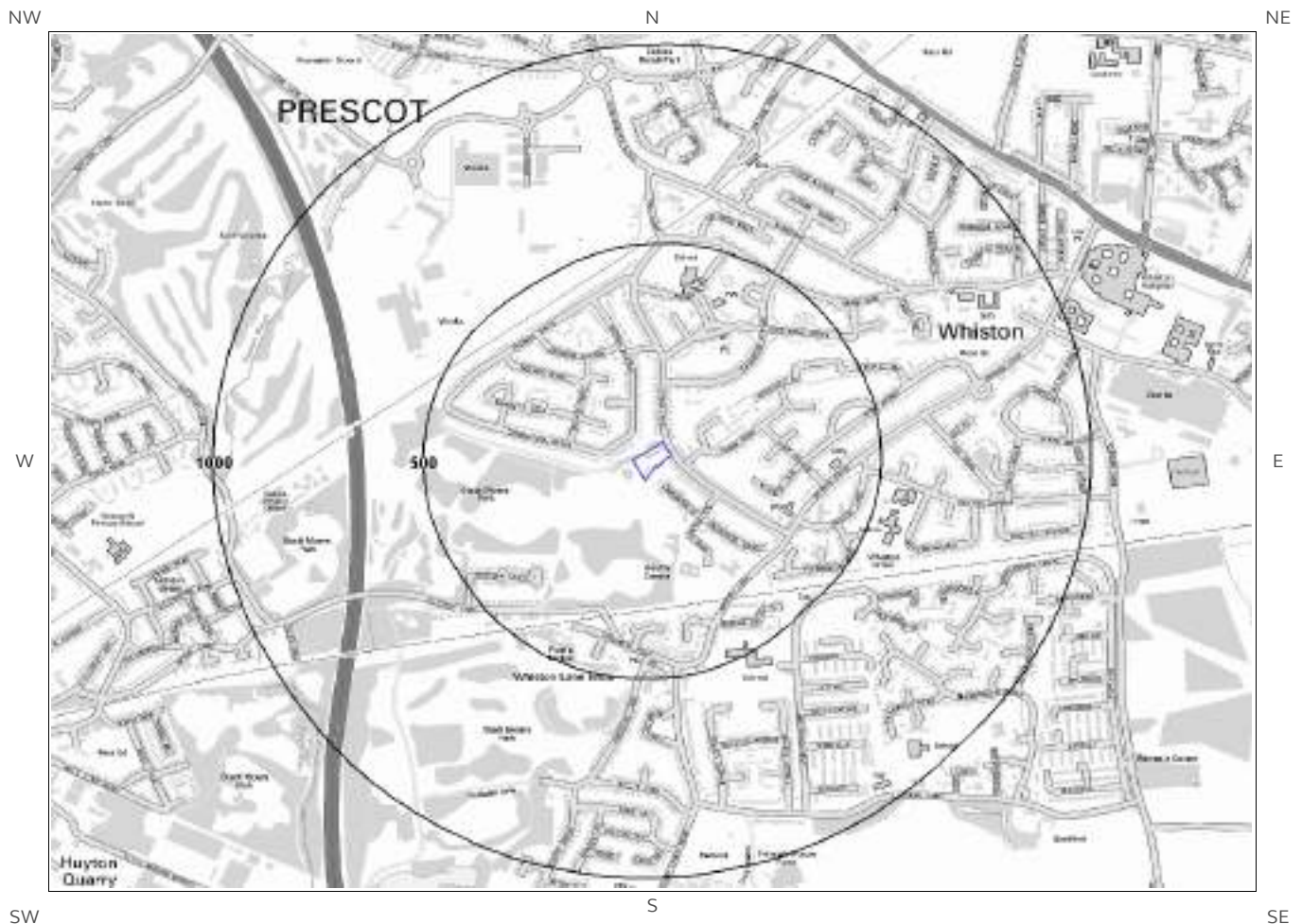
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not 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

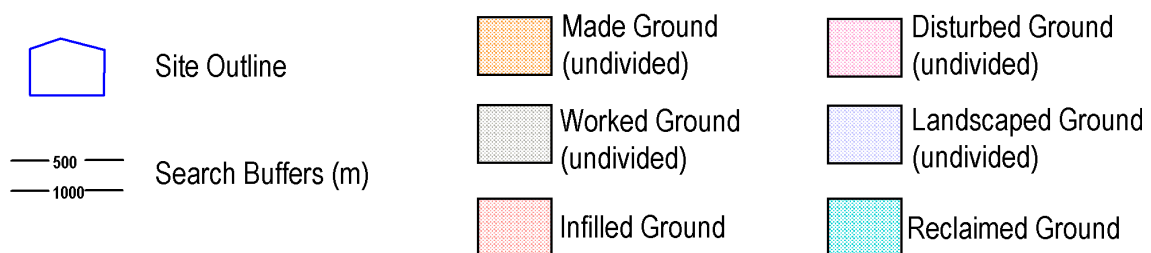
1 Geology (1:10,000 scale).

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



Artificial Ground Legend

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1. Geology 1:10,000 scale

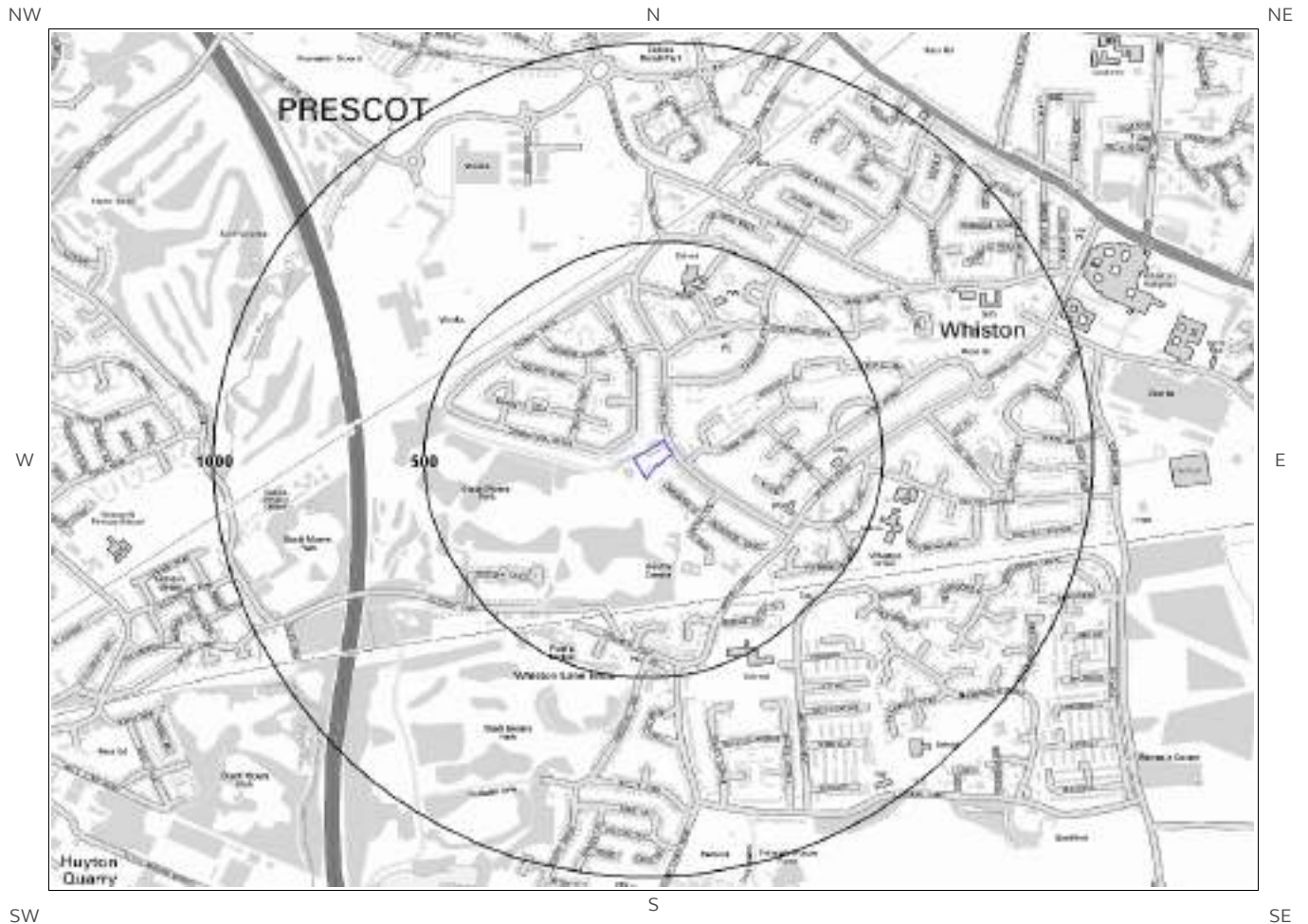
1.1 Artificial Ground

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

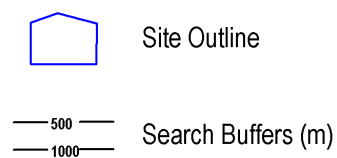
Database searched and no data found.

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



Artificial Ground Legend

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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? No

Database searched and no data found.

1.2.2 Landslip

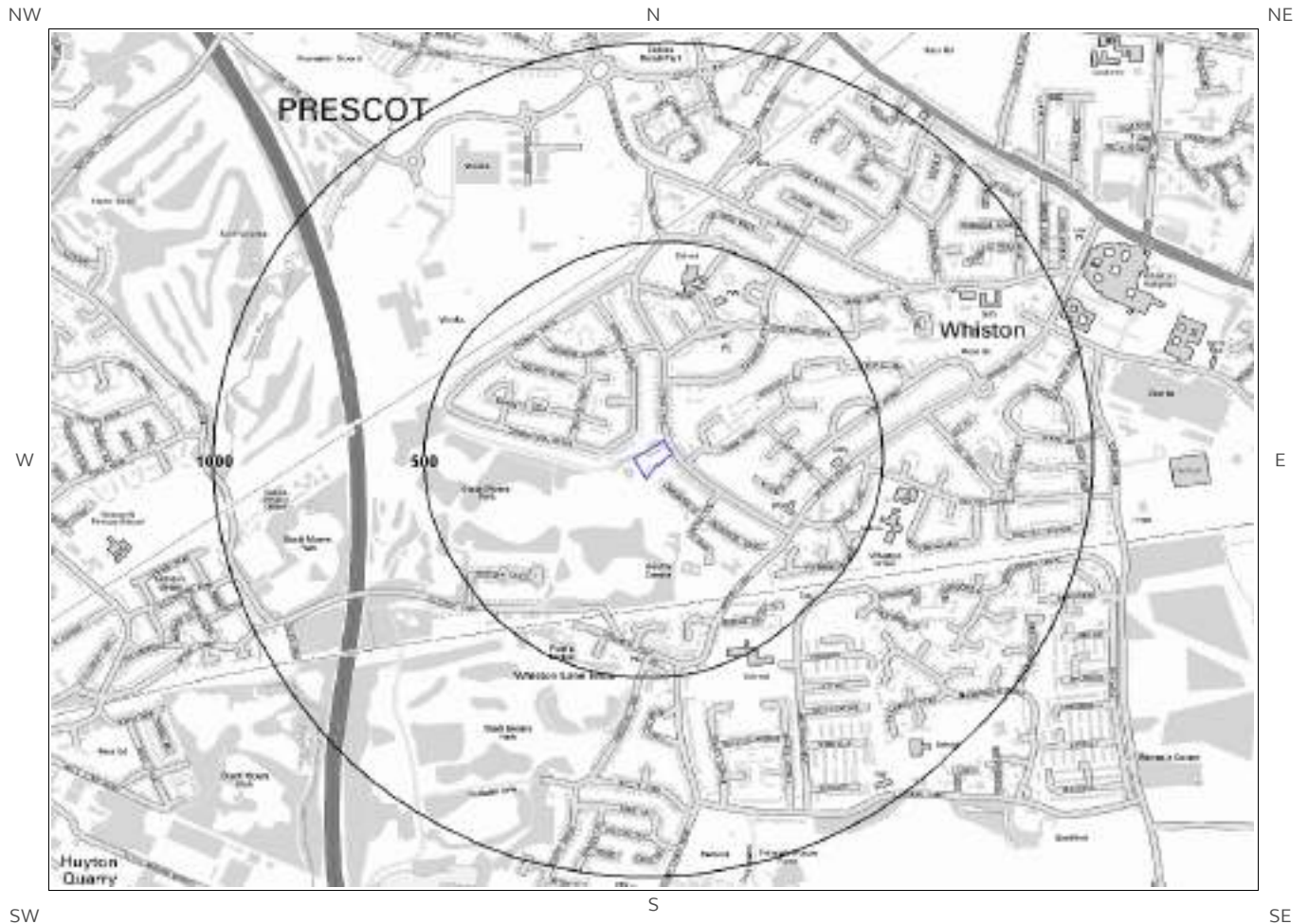
Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale? No

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

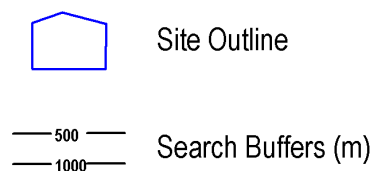
This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

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



Bedrock and linear features Legend

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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.

Database searched and no data found at this scale.

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

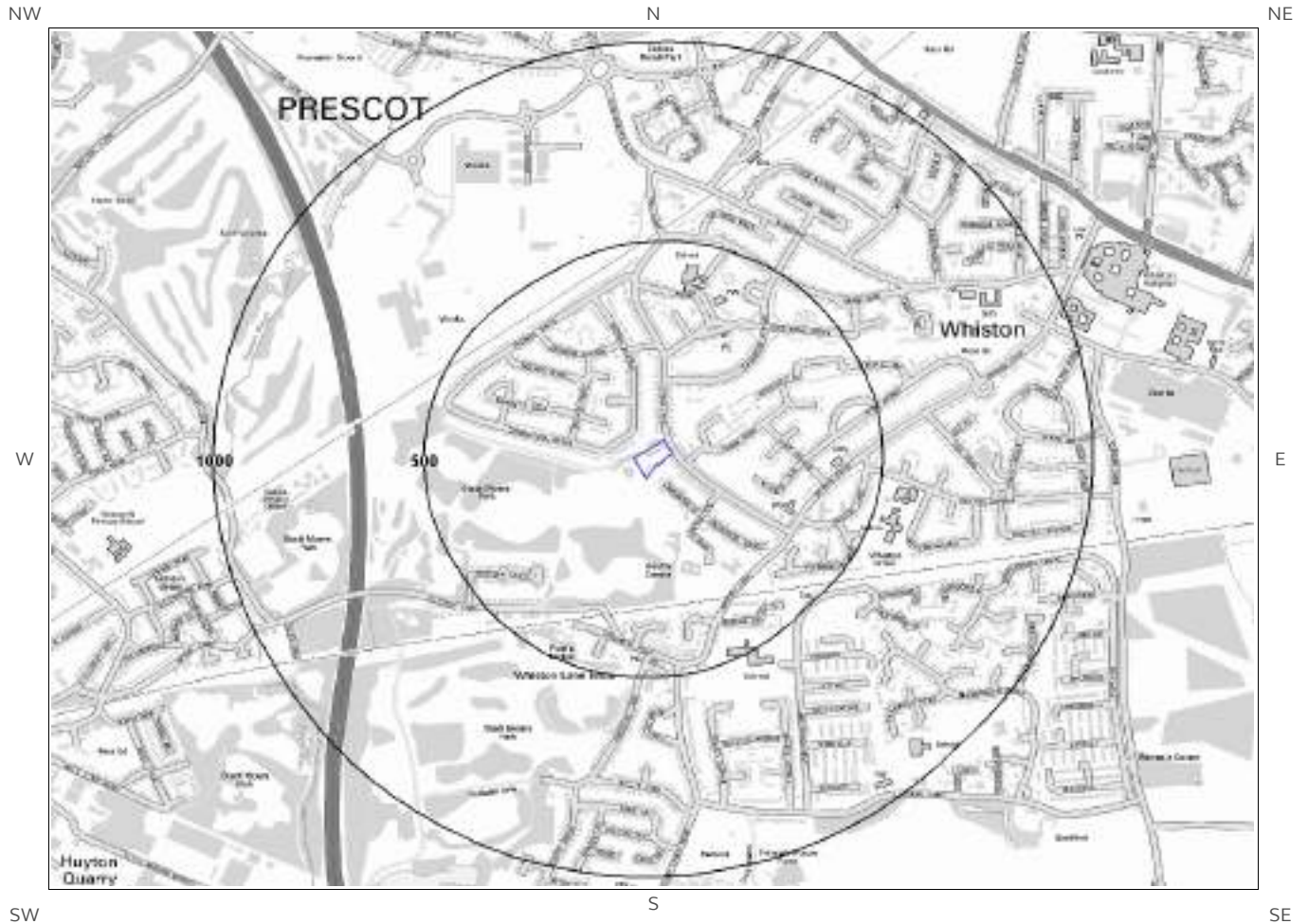
Database searched and no data found at this scale.

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.

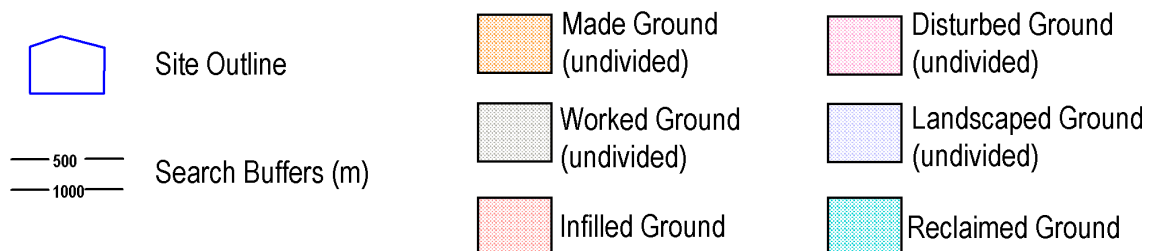
This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2 Geology 1:50,000 Scale

2.1 Artificial Ground map



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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: 097

2.1.1 Artificial/ Made Ground

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

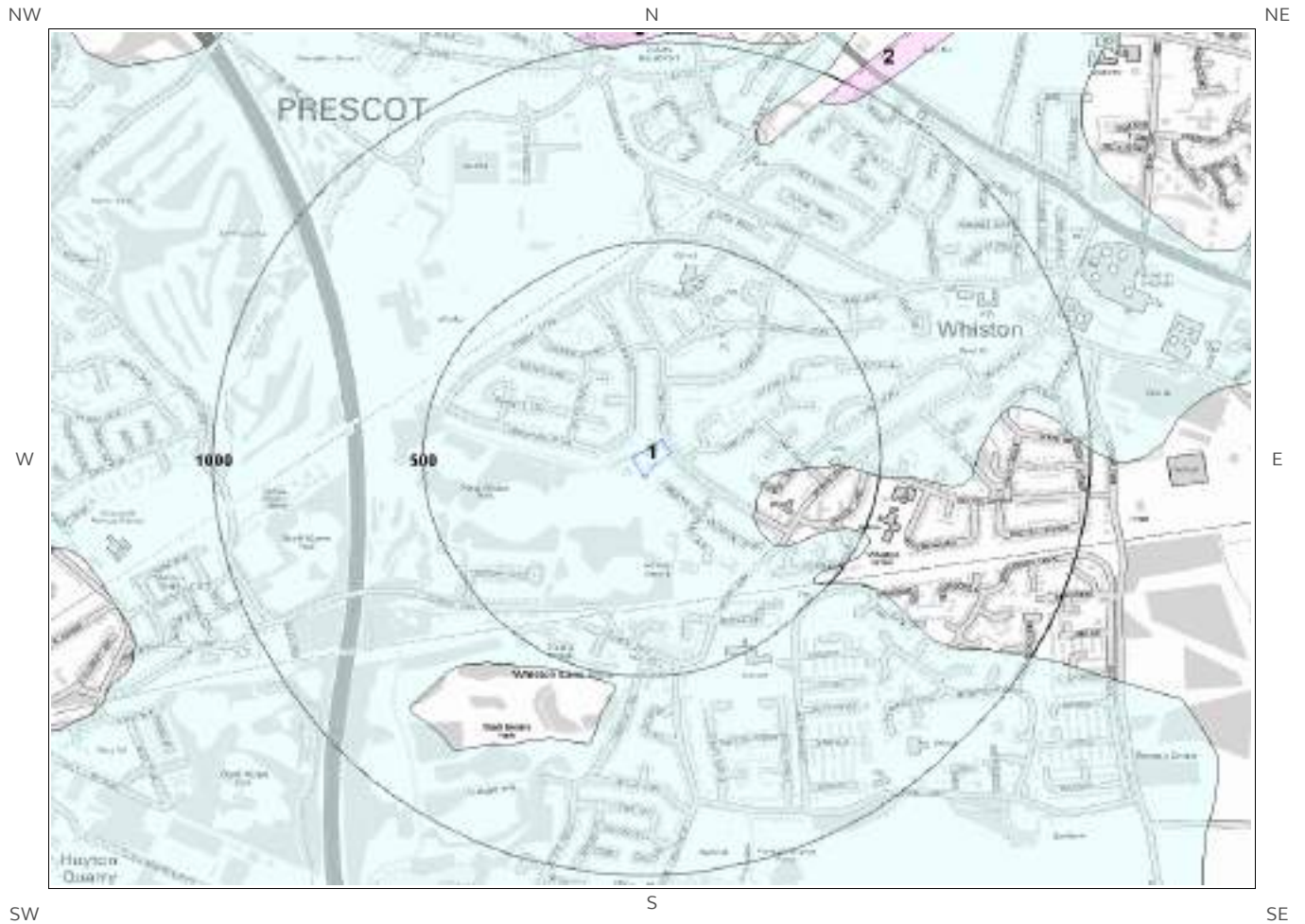
Database searched and no data found.

2.1.2 Permeability of Artificial Ground

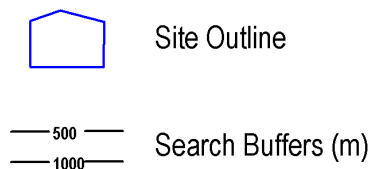
Are there any records relating to permeability of artificial ground within the study site boundary? No

Database searched and no data found.

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



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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

2.2.2 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.

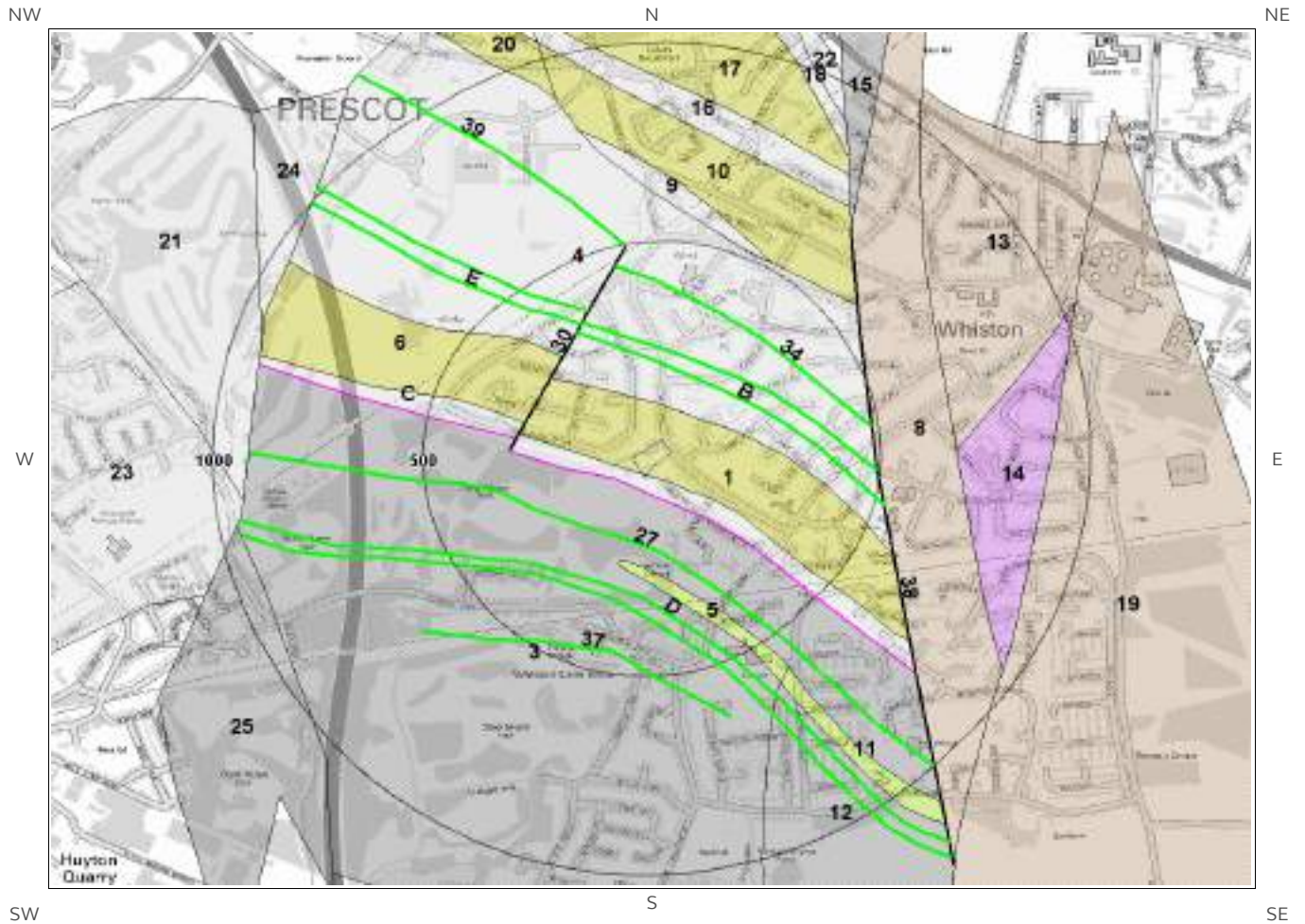
This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

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.

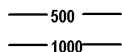
2.3 Bedrock and linear features map (1:50,000 scale)



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Site Outline



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: 097

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	RHR-SDST	RAVENHEAD ROCK - SANDSTONE	WESTPHALIAN
2A	0.0	On Site	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
3	32.0	SW	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
4	82.0	N	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
5	213.0	S	PMR-SDST	PEMBERTON ROCK - SANDSTONE	WESTPHALIAN
6	267.0	NW	RHR-SDST	RAVENHEAD ROCK - SANDSTONE	WESTPHALIAN
7C	270.0	W	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
8	482.0	E	KNSF-SDST	KINNERTON SANDSTONE FORMATION - SANDSTONE	-

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	High	Moderate
0.0	On Site	Fracture	High	Low
32.0	SW	Fracture	Moderate	Low

2.3.3 Linear features

Are there any records of linear features within 500m of the study site boundary? Yes

ID	Distance	Direction	Category Description	Feature Description
26A	32.0	SW	FOSSIL_HORIZON	Marine band
27	161.0	S	ROCK	Coal seam, inferred
28B	174.0	NE	ROCK	Coal seam, inferred

ID	Distance	Direction	Category Description	Feature Description
29B	214.0	NE	ROCK	Coal seam, inferred
30	267.0	NW	FAULT	Fault, observed
31C	280.0	W	FOSSIL_HORIZON	Marine band
32D	285.0	S	ROCK	Coal seam, inferred
33D	314.0	S	ROCK	Coal seam, inferred
34	342.0	NE	ROCK	Coal seam, inferred
35E	350.0	NW	ROCK	Coal seam, inferred
36E	369.0	NW	ROCK	Coal seam, inferred
37	443.0	S	ROCK	Coal seam, inferred
38	482.0	E	FAULT	Fault, observed
39	497.0	N	ROCK	Coal seam, inferred

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

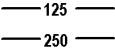
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

4 Ground Workings map



Ground Workings Legend

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-  Site Outline
-  Historic Surface Ground Workings
-  Historic Underground Workings
-  Current Ground Workings
-  Search Buffers (m)

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
1H	0.0	On Site	346655 391327	Colliery	1891
2I	0.0	On Site	346712 391226	Disused Colliery	1906
3	0.0	On Site	346764 391408	Unspecified Pit	1906
4	0.0	On Site	346739 391387	Pond	1891
5A	2.0	SW	346689 391286	Colliery	1925
6K	54.0	S	346849 391154	Colliery	1891
7A	74.0	SW	346689 391283	Unspecified Heap	1947
8	88.0	SW	346578 391281	Unspecified Ground Workings	1925
9B	89.0	SW	346608 391297	Unspecified Ground Workings	1906
10B	91.0	SW	346605 391297	Unspecified Heap	1891
11C	111.0	S	346701 391227	Unspecified Ground Workings	1947
12C	115.0	S	346699 391222	Unspecified Ground Workings	1947
13	117.0	SW	346669 391244	Unspecified Ground Workings	1966
14	121.0	SW	346612 391277	Refuse Heap	1947
15	124.0	SW	346632 391258	Pond	1891
16	139.0	SW	346568 391323	Refuse Heap	1966
17	150.0	SW	346574 391282	Unspecified Heap	1947
18M	167.0	SE	346824 391125	Disused Colliery	1925
19N	169.0	SE	346913 391137	Disused Colliery	1906
20	203.0	SW	346506 391274	Unspecified Heap	1966
21D	207.0	SE	346862 391145	Pond	1906

ID	Distance (m)	Direction	NGR	Use	Date
22D	207.0	SE	346862 391145	Pond	1891
23D	207.0	SE	346862 391145	Pond	1947
24D	207.0	SE	346862 391145	Pond	1925
25E	210.0	S	346723 391082	Unspecified Pit	1947
26D	213.0	SE	346868 391148	Pond	1947
27E	213.0	S	346727 391078	Unspecified Pit	1906
28E	213.0	S	346727 391078	Cuttings	1947
29E	213.0	S	346727 391078	Cuttings	1925
30E	213.0	S	346727 391078	Cuttings	1891
31F	214.0	NE	346886 391649	Pond	1891
32F	217.0	NE	346891 391647	Pond	1906
33F	218.0	NE	346893 391646	Pond	1925
34	220.0	W	346474 391406	Unspecified Ground Workings	1966
35	238.0	SE	346932 391142	Unspecified Heap	1966
36G	242.0	SE	346951 391129	Unspecified Heap	1947
37G	242.0	SE	346951 391129	Unspecified Heap	1925
38G	242.0	SE	346951 391129	Refuse Heap	1906
39G	243.0	SE	346956 391133	Unspecified Heap	1947

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? Yes

The following Historical Underground Working Features are provided by Groundsure:

ID	Distance (m)	Direction	NGR	Use	Date
40H	0.0	On Site	346655 391327	Colliery	1891
41I	0.0	On Site	346712 391226	Disused Colliery	1906

ID	Distance (m)	Direction	NGR	Use	Date
42A	2.0	SW	346689 391286	Colliery	1925
43J	48.0	SW	346703 391313	Unspecified Disused Shaft	1990
44J	48.0	SW	346703 391313	Unspecified Disused Shaft	1975
45J	50.0	SW	346699 391314	Unspecified Disused Shaft	1966
46J	53.0	SW	346699 391312	Unspecified Old Shafts	1947
47K	54.0	S	346849 391154	Colliery	1891
48J	58.0	SW	346696 391308	Unspecified Old Shafts	1925
49J	58.0	SW	346696 391308	Unspecified Old Shafts	1947
50L	59.0	SW	346678 391330	Unspecified Disused Shaft	1966
51L	64.0	SW	346679 391323	Unspecified Old Shafts	1947
52L	69.0	SW	346675 391319	Unspecified Old Shafts	1925
53L	69.0	SW	346675 391319	Unspecified Old Shafts	1947
54	87.0	SW	346638 391348	Unspecified Old Shafts	1947
55B	135.0	SW	346606 391305	Unspecified Old Shafts	1947
56M	167.0	SE	346824 391125	Disused Colliery	1925
57N	169.0	SE	346913 391137	Disused Colliery	1906
58	261.0	S	346866 391101	Unspecified Disused Shafts	1990
59	276.0	S	346845 391087	Unspecified Old Shafts	1947
Not shown	278.0	S	346840 391084	Unspecified Old Shafts	1925
Not shown	278.0	S	346840 391084	Unspecified Old Shafts	1947
62	296.0	SE	346902 391080	Unspecified Disused Shafts	1990
Not shown	311.0	SE	346902 391077	Unspecified Old Shafts	1925
Not shown	318.0	SE	346900 391068	Unspecified Old Shafts	1925
Not shown	356.0	SE	346970 391070	Unspecified Old Shafts	1947
Not shown	379.0	SE	347016 391079	Unspecified Old Shafts	1947
Not shown	390.0	SE	347028 391075	Unspecified Old Shafts	1947
Not shown	680.0	SW	346322 390666	Colliery	1891
Not shown	823.0	SW	346295 390653	Unspecified Old Shaft	1925
Not shown	845.0	N	346629 392277	Unspecified Old Shaft	1891

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	851.0	N	346618 392281	Unspecified Old Shaft	1925
Not shown	854.0	N	346619 392284	Unspecified Old Shaft	1906
Not shown	867.0	SW	346049 390644	Disused Colliery	1906
Not shown	900.0	NW	345979 391922	Unspecified Shaft	1891
Not shown	900.0	N	346652 392337	Unspecified Old Shaft	1891
Not shown	915.0	N	346641 392350	Unspecified Old Shaft	1925
Not shown	919.0	N	346642 392354	Unspecified Old Shaft	1906
Not shown	940.0	NW	345848 391771	Unspecified Old Level	1947
Not shown	958.0	W	345825 391774	Old Trial Levels	1906
Not shown	958.0	W	345825 391774	Unspecified Old Levels	1947
Not shown	958.0	W	345825 391774	Unspecified Old Levels	1925
Not shown	973.0	W	345781 391710	Unspecified Old Levels	1947
Not shown	973.0	W	345781 391710	Old Trial Levels	1906
Not shown	973.0	W	345781 391710	Unspecified Old Levels	1925
Not shown	997.0	S	346361 390283	Disused Colliery	1906
Not shown	997.0	S	346351 390316	Unspecified Disused Mine	1966
Not shown	998.0	S	346260 390259	Disused Colliery	1947
Not shown	998.0	S	346260 390259	Disused Colliery	1925

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.

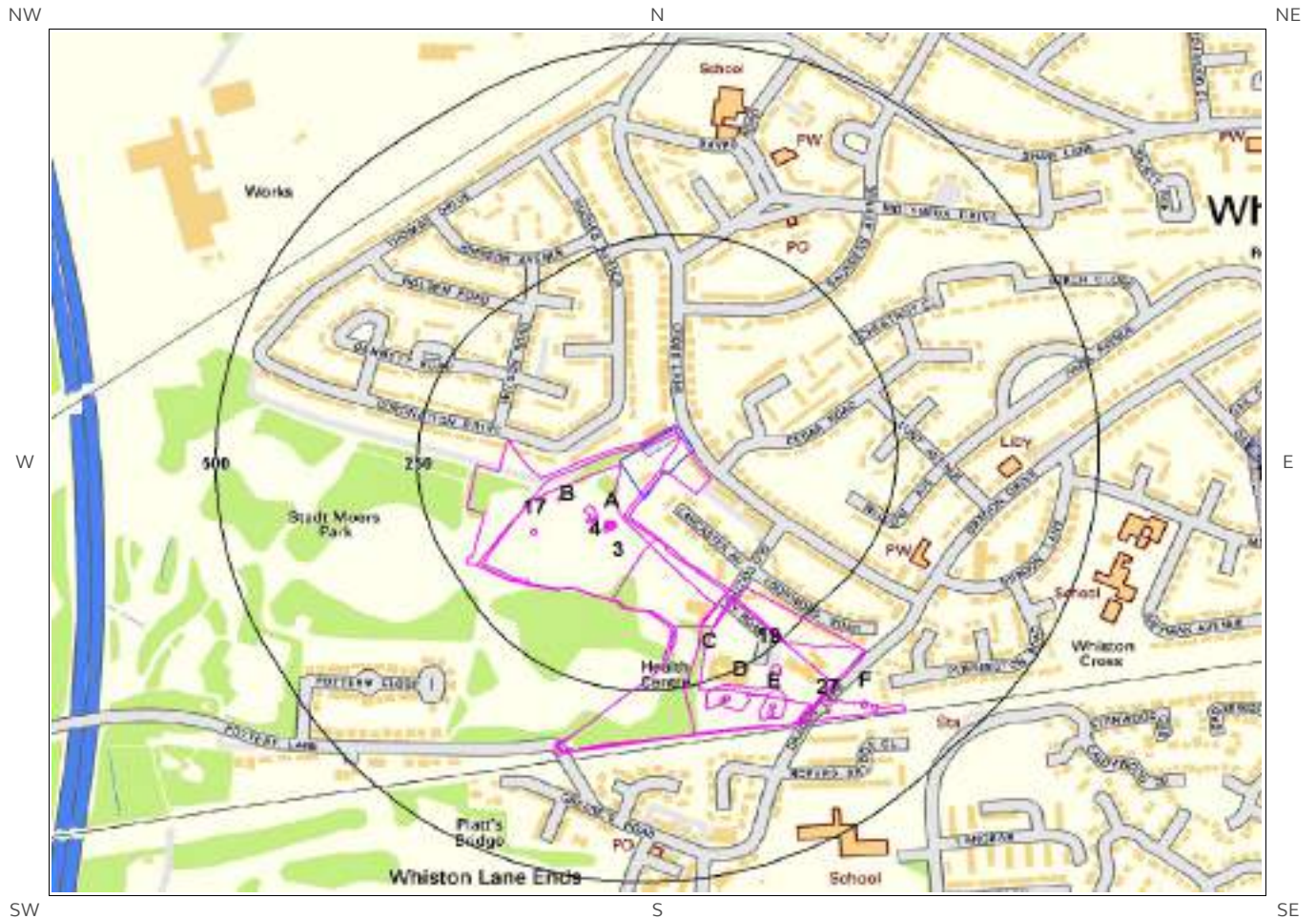
Are there any BGS Current Ground Workings within 1000m of the study site boundary? Yes

The following Current Ground Workings information is provided by British Geological Survey:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	643.0	SE	347275 390971	Sandstone	Whiston Cross	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	679.0	SW	346335 390805	Clay & Shale	Coolgate Lane	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

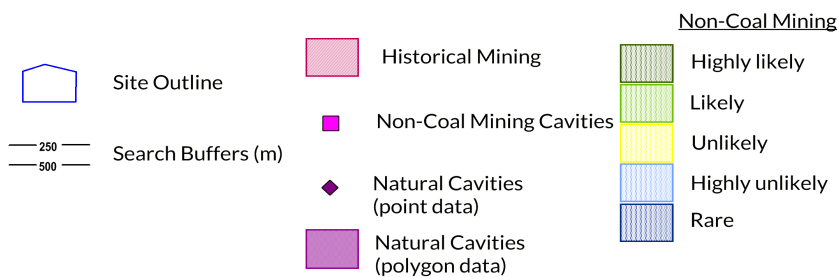
ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	679.0	SW	346335 390805	Sandstone	Coolgate Lane	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	679.0	S	346573 390690	Clay & Shale	Whiston Metallic Brick Works	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	822.0	SW	346302 390654	Coal, Deep	Whiston Colliery Shaft	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	841.0	SW	346270 390652	Coal, Deep	Whiston Colliery Shaft	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	906.0	SE	347261 390604	Sandstone	Stone Quarry Plantation	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	940.0	N	346839 392382	Sandstone	Prescot	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

5 Mining, Extraction & Natural Cavities map



Mining, Extraction and Natural Cavities Legend

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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? Yes

The following Historical Mining information is provided by Groundsure:

ID	Distance (m)	Direction	NGR	Details	Date
2B	0.0	On Site	346655 391327	Colliery	1891
3	0.0	On Site	346712 391226	Disused Colliery	1906
4	2.0	SW	346689 391286	Colliery	1925
5A	48.0	SW	346703 391313	Unspecified Disused Shaft	1990
6A	48.0	SW	346703 391313	Unspecified Disused Shaft	1975
7A	50.0	SW	346699 391314	Unspecified Disused Shaft	1966
8A	53.0	SW	346699 391312	Unspecified Old Shafts	1947
9C	54.0	S	346849 391154	Colliery	1891
10A	58.0	SW	346696 391308	Unspecified Old Shafts	1925
11A	58.0	SW	346696 391308	Unspecified Old Shafts	1947
12A	59.0	SW	346678 391330	Unspecified Disused Shaft	1966
13A	64.0	SW	346679 391323	Unspecified Old Shafts	1947
14B	69.0	SW	346675 391319	Unspecified Old Shafts	1947
15B	69.0	SW	346675 391319	Unspecified Old Shafts	1925
16B	87.0	SW	346638 391348	Unspecified Old Shafts	1947
17	135.0	SW	346606 391305	Unspecified Old Shafts	1947
18C	167.0	SE	346824 391125	Disused Colliery	1925
19	169.0	SE	346913 391137	Disused Colliery	1906
20D	261.0	S	346866 391101	Unspecified Disused Shafts	1990
21D	276.0	S	346845 391087	Unspecified Old Shafts	1947

ID	Distance (m)	Direction	NGR	Details	Date
22D	278.0	S	346840 391084	Unspecified Old Shafts	1947
23D	278.0	S	346840 391084	Unspecified Old Shafts	1925
24E	296.0	SE	346902 391080	Unspecified Disused Shafts	1990
25E	311.0	SE	346902 391077	Unspecified Old Shafts	1925
26E	318.0	SE	346900 391068	Unspecified Old Shafts	1925
27	356.0	SE	346970 391070	Unspecified Old Shafts	1947
28F	379.0	SE	347016 391079	Unspecified Old Shafts	1947
29F	390.0	SE	347028 391075	Unspecified Old Shafts	1947
Not shown	680.0	SW	346322 390666	Colliery	1891
Not shown	823.0	SW	346295 390653	Unspecified Old Shaft	1925
Not shown	845.0	N	346629 392277	Unspecified Old Shaft	1891
Not shown	851.0	N	346618 392281	Unspecified Old Shaft	1925
Not shown	854.0	N	346619 392284	Unspecified Old Shaft	1906
Not shown	867.0	SW	346049 390644	Disused Colliery	1906
Not shown	900.0	NW	345979 391922	Unspecified Shaft	1891
Not shown	900.0	N	346652 392337	Unspecified Old Shaft	1891
Not shown	915.0	N	346641 392350	Unspecified Old Shaft	1925
Not shown	919.0	N	346642 392354	Unspecified Old Shaft	1906
Not shown	940.0	NW	345848 391771	Unspecified Old Level	1947
Not shown	958.0	W	345825 391774	Old Trial Levels	1906
Not shown	958.0	W	345825 391774	Unspecified Old Levels	1947
Not shown	958.0	W	345825 391774	Unspecified Old Levels	1925
Not shown	973.0	W	345781 391710	Old Trial Levels	1906
Not shown	973.0	W	345781 391710	Unspecified Old Levels	1947
Not shown	973.0	W	345781 391710	Unspecified Old Levels	1925
Not shown	997.0	S	346361 390283	Disused Colliery	1906
Not shown	997.0	S	346351 390316	Unspecified Disused Mine	1966
Not shown	998.0	S	346260 390259	Disused Colliery	1925
Not shown	998.0	S	346260 390259	Disused Colliery	1947

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? Yes

The following Coal Mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0.0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

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? Yes

The following non-coal mining information is provided by the BGS:

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
1	681.0	E	Not available	Vein Mineral	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

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 Coal Authority issued on behalf of 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

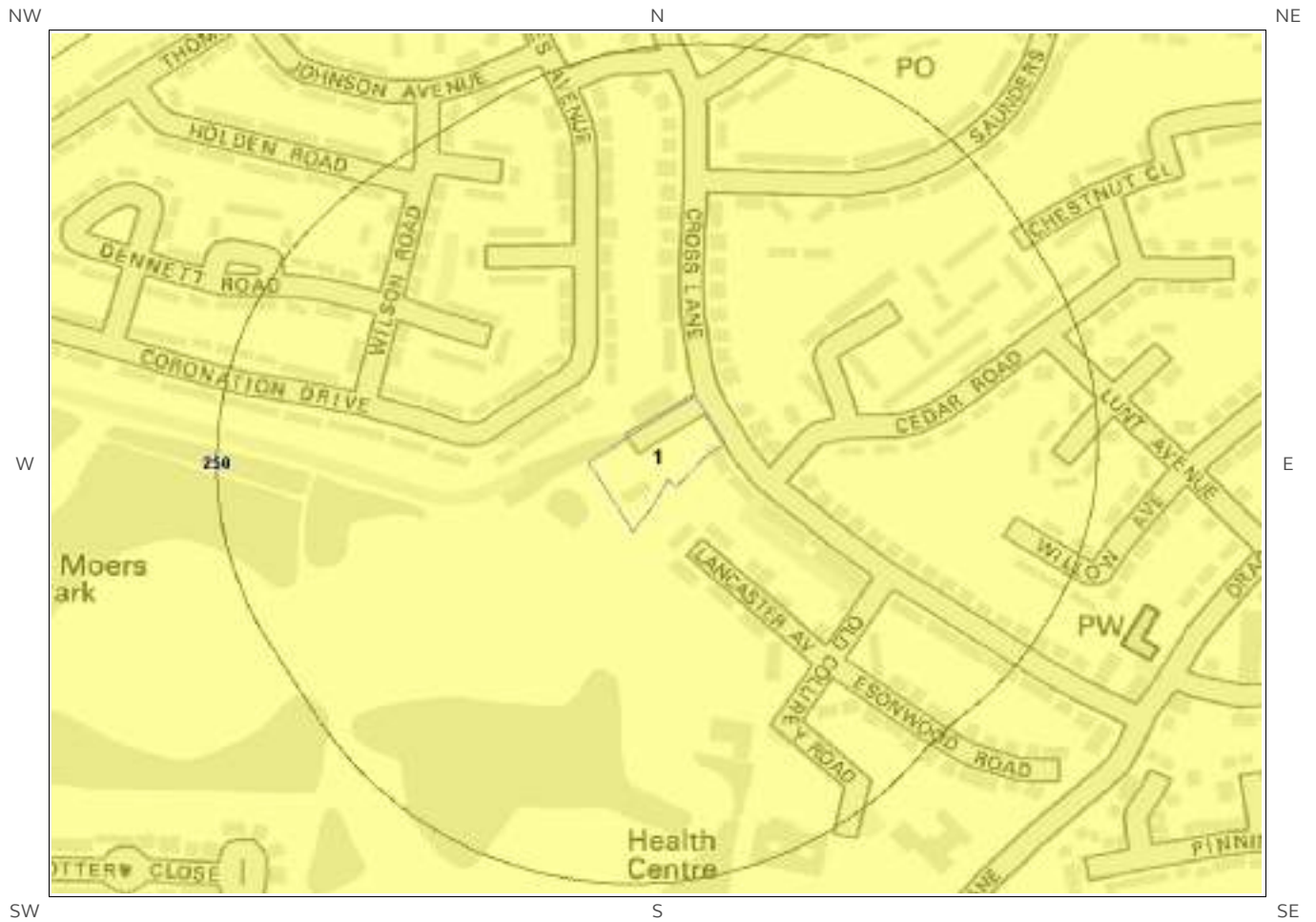


Shrink Swell Clay Legend

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6.2 Landslides map

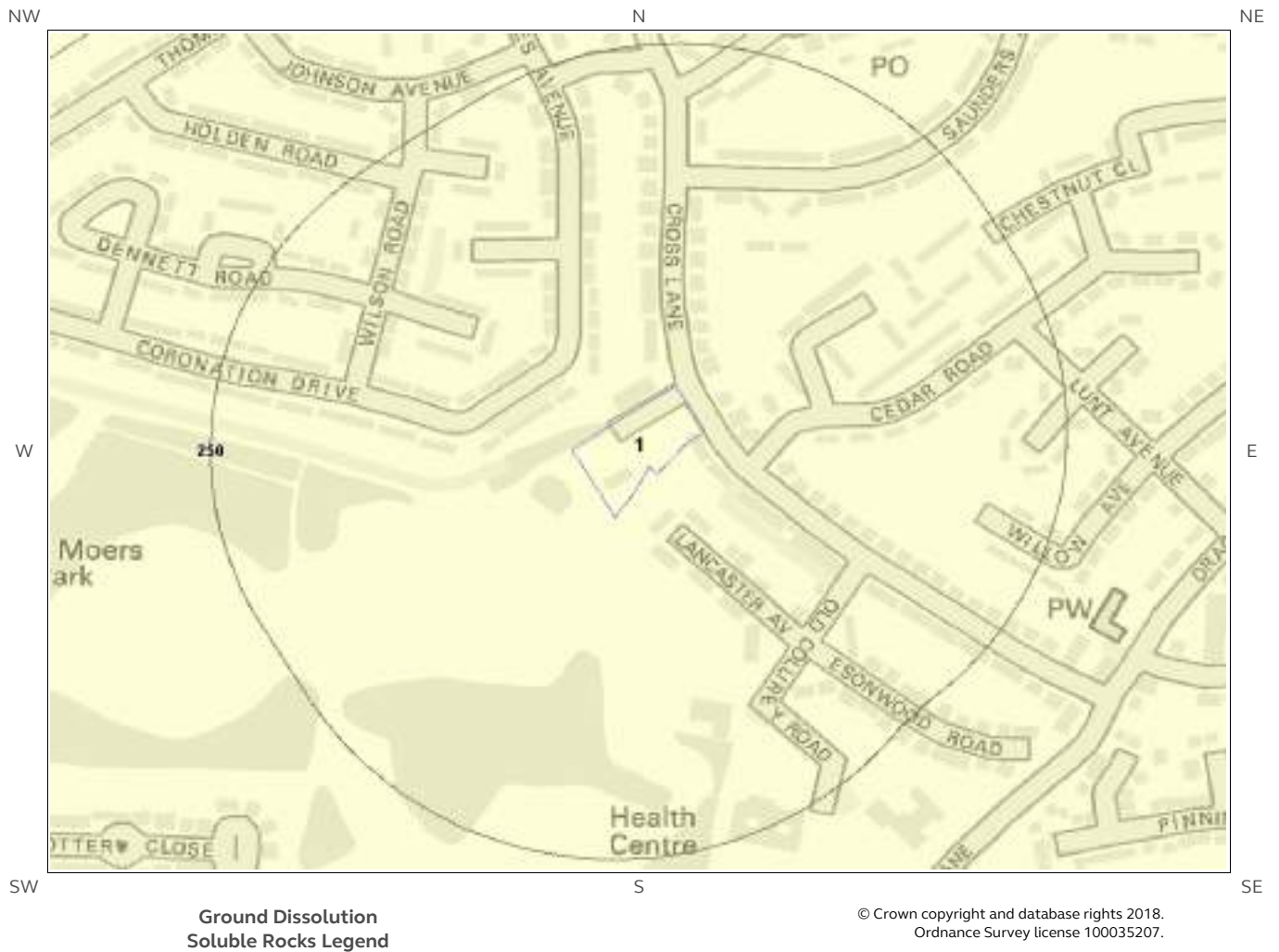


Landslides Legend

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6.3 Ground Dissolution of Soluble Rocks map



6.4 Compressible Deposits map



Compressible Deposits Legend

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6.5 Collapsible Deposits map

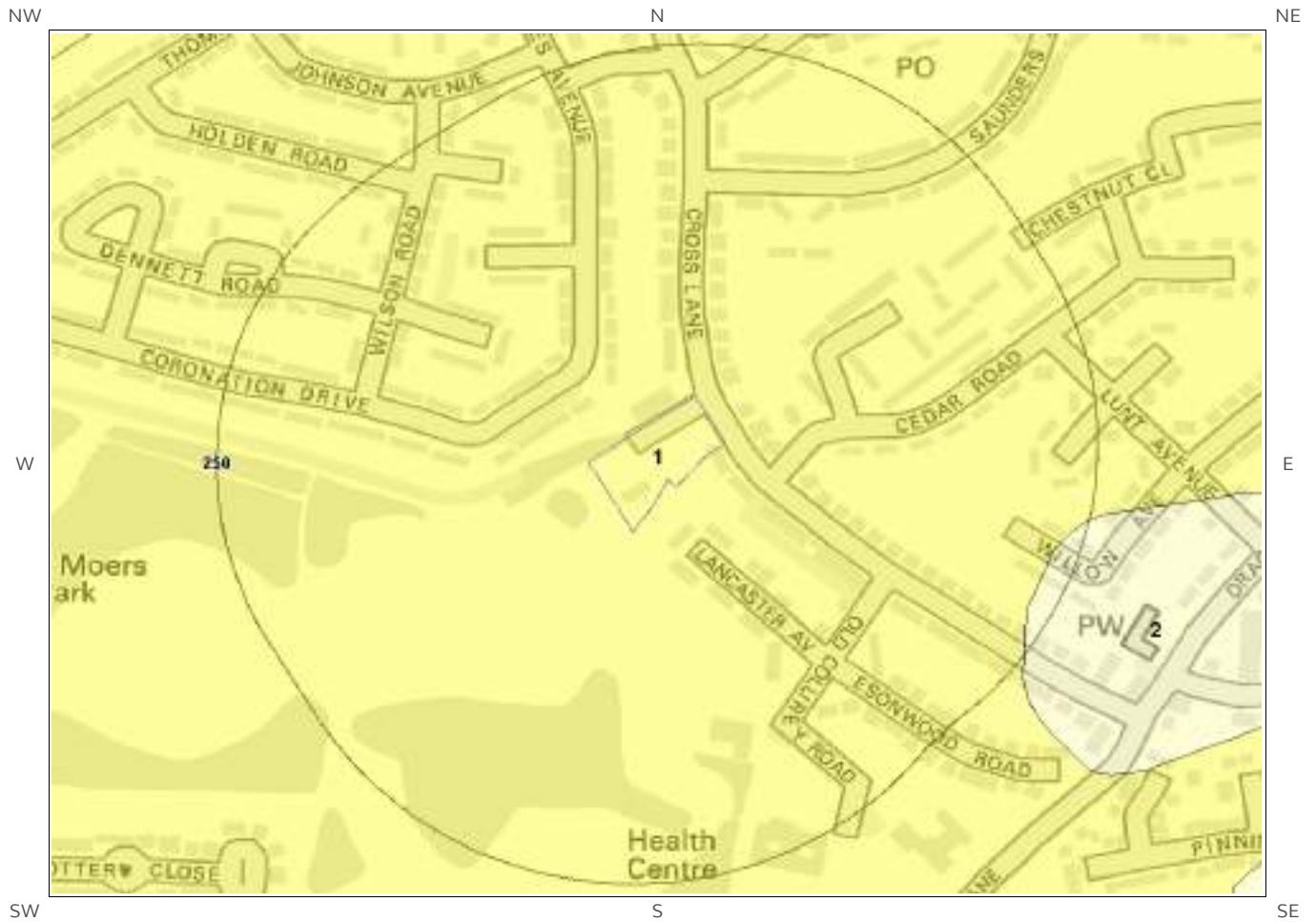


Collapsible Deposits Legend

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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:

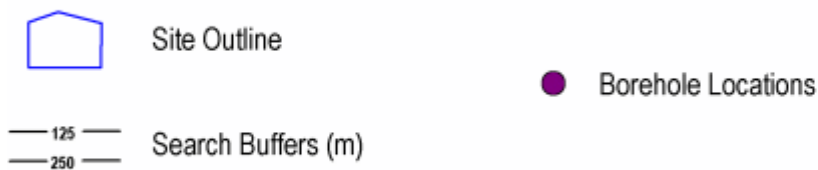
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased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

1

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	51.0	SW	346700 391320	SJ49SE8	156.36	CARRS COLLIERY 1 PIT

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/165629

8 Estimated Background Soil Chemistry

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

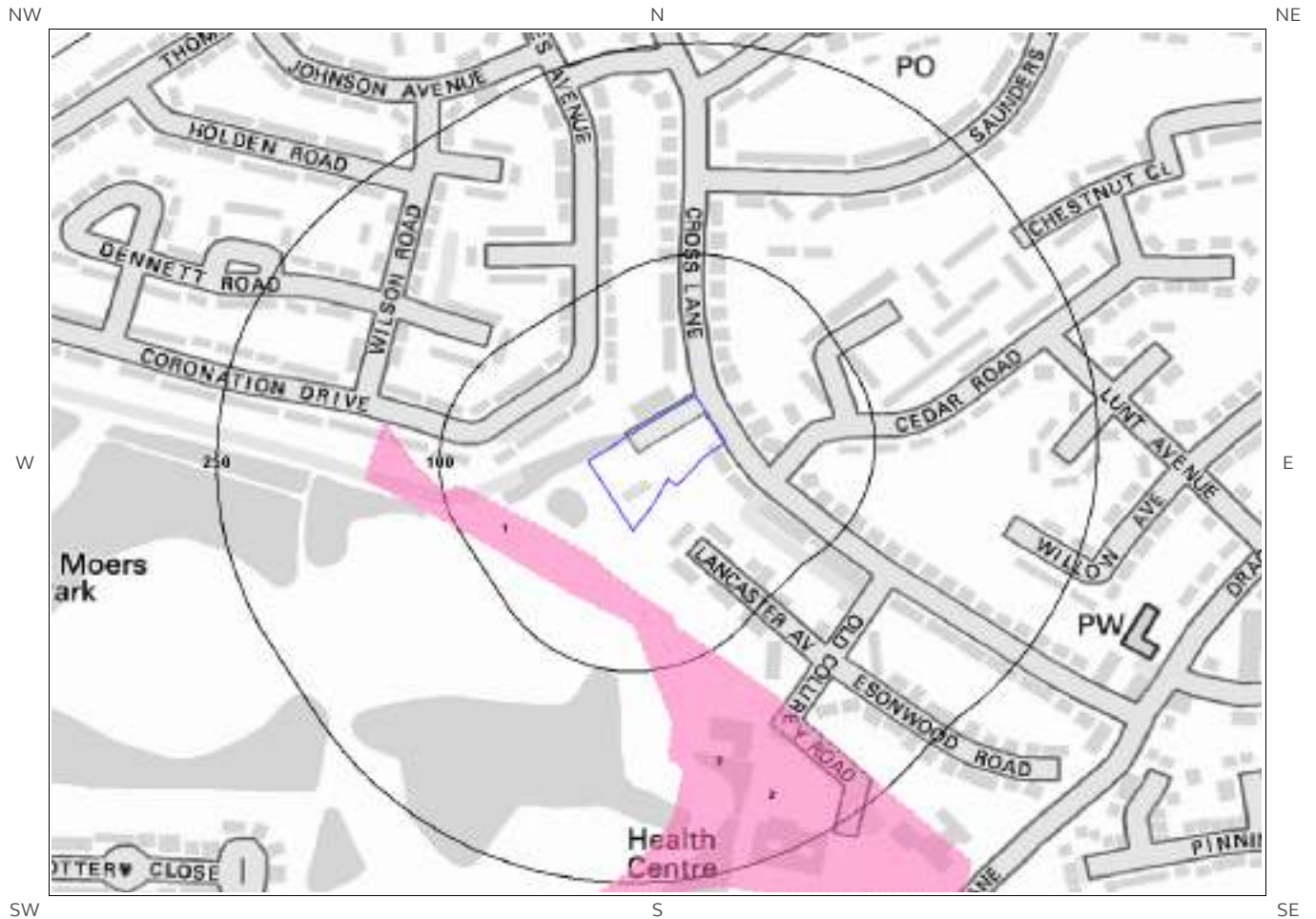
3

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 - 25 mg/kg	2.2 - 3.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	2.2 - 3.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
32.0	SW	RuralSoil	15 - 25 mg/kg	2.2 - 3.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	300 - 600 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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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? Yes

ID	Distance (m)	Direction	NGR	Details	Date
1	32	SW	346660 391353	Railway Sidings	1891
3	36	SW	346802 391224	Railway Sidings	1892
2	54	S	346849 391154	Railway Sidings	1891

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? No

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.

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BGS Geological Hazards Reports and general geological enquiries



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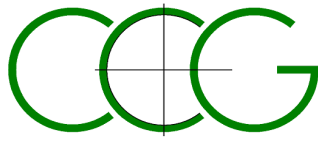
Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:
<https://www.groundsure.com/terms-and-conditions-sept-2016/>



APPENDIX J

SAMPLING & RISK ASSESSMENT METHODOLOGIES



SAMPLING, SAMPLE TRANSPORTATION, AND FIELD MONITORING PROTOCOLS

Soil, water and gas sampling and monitoring methodologies employed by **CC GEOTECHNICAL LTD** are presented hereunder.

SAMPLING OF SOIL FOR CHEMICAL ANALYSIS

Soil samples may be recovered from a variety of intrusive investigation methods including *inter alia* dynamic sampling boreholes, cable percussion boreholes, machine or manual excavation of trial pits.

All equipment which has the potential to introduce extraneous materials into soils – borehole casings, sampling drilling rods, borehole sampling tools, hand tools such as trowels and spades etc. – must be cleaned by jet washing before initial use and between sampling positions.

Cable Percussion Boreholes

In this method of investigation disturbed bulk and small disturbed samples are recovered at regular depth increments throughout the length of the borehole. Each bulk/small disturbed sample is uniquely labelled with the Project Name / Project No / Borehole No / Depth / Date. Where possible, samples are immediately scanned by PID.

Light Dynamic Sampling Boreholes

In this method of investigation samples are recovered in relatively undisturbed 1m long Perspex liners. Each liner is uniquely labelled with the Project Name / Project No / Borehole No / Depth / Date. The liner tubes are sealed by air tight caps fitted at each end, and are temporarily stored out of sunlight. Where possible, samples are immediately split, scanned by PID, logged and subsampled. In the event that splitting and logging on site is not practicable, then the liners are immediately transported to the laboratory where they are immediately split, scanned by PID, logged and subsampled.

Trial Pits

Samples are to be taken from the bucket of an excavator and placed in appropriate airtight containers. Each container is uniquely labelled with the Project No / Trial Pit No / Depth / Date. The samples are then immediately placed in a cool box chilled by ice packs, and the boxes are sealed for transportation to the chemical laboratory.

Sampling Containers

Containers used to store soil samples are selected dependant on the required analysis. The testing laboratory will be consulted should there be any doubt as to the correct sampling container. Typically, a minimum of 1nr 1kg plastic tub, 1nr 500g plastic tub, 1nr 250g amber glass jar and 2nr glass vials are taken at each sample depth. Samples held on site awaiting same day courier collection are stored at 4°C in a cool box. Only in circumstances where same day collection cannot be arranged are samples held overnight, and in this event all samples are refrigerated at 4 °C either on site (if a refrigerator is available) or at CC GEOTECHNICAL soil laboratory. Courier collection is then arranged for immediate pick up the following day.

Chain of Custody records

A Chain of Custody Record (CoC) is to be sent with each batch of samples submitted to the testing laboratory. A copy of the CoC will be made available for inspection by the client, their agents, or any requesting regulatory authority.

HEADSPACE ANALYSES

Duplicate subsamples of all soil samples selected for laboratory analysis may be taken for headspace analyses.

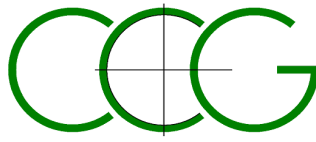
Headspace analysis is undertaken using a MiniRae 2000 Photo Ionisation Detector (PID). In the test method, an amber glass jar is half filled with soil, and the lid is sealed with aluminium foil secured by an elastic band. The jar and contents are agitated for 30 seconds and left for a minimum of 30 minutes out of direct sunlight for the headspace to achieve equilibrium. The PID then pierces the seal and the maximum reading is recorded. Prevailing weather conditions and ambient air temperature are also recorded.

The PID headspace results are recorded on the exploratory borehole or trial pit logs.

PID headspace data is then used to inform the chemical testing schedule for volatile organic compounds analyses.

SAMPLING OF GROUNDWATER FOR CHEMICAL ANALYSIS

Groundwater is sampled from standpipes or piezometers installed during borehole drilling. On completion of the construction of the standpipe, the installation is initially developed by removing up to 10 x the internal volume of the installation. The volume of water purged is recorded. The installation is then typically left for a week for hydraulic equilibrium to be restored.



Prior to sampling the standpipe, the depth to the water table, and the depth to the base of the installation are monitored using an electronic dipmeter. In circumstances where free phase product is suspected to be present, then an 'Interface Meter' is used to determine the free phase film thickness.

A minimum of 3 x the installation volume is then removed. The pH of the water is then monitored and the sample is taken when the change in pH between any two consecutive extracts is less than 10%. The volume of water removed is recorded.

A sample comprises of a minimum of 3 litres. Two litres are taken in amber glass bottles, and one litre in a plastic bottle.

To avoid cross-contamination one bailer is used per position.

The samples are uniquely labelled with Project Name / Project No / Borehole No / Depth / Date Sampled. They are placed in a cool box chilled by ice packs, and the containers are sealed for transportation to the laboratory.

Once the samples are received in the **CC GEOTECHNICAL LTD** laboratory, the samples are stored in a refrigerator and returned to the cool boxes once collected.

Water taken from the installations are taken back to the **CC GEOTECHNICAL LTD** laboratory and disposed.

Other data recorded in the sampling comprises:

- Volume of water removed during development of well
- Volume of water removed during purging of the well
- Results of on-site pH analyses
- Sample appearance – colour, suspended solids

MONITORING OF GAS

Prior to embarking on a gas-monitoring round, all equipment is checked for functionality and the calibration status is confirmed.

At the commencement of the monitoring round, the prevailing weather conditions, air temperature, barometric pressure and direction of movement of barometric pressure are recorded.

The flow meter is first attached to the standpipe valve, and the flow rate is measured (peak and steady flow) for 1 minute. The results are recorded in l.hr^{-1} . The flow meter tube is protected from the effects of wind by aligning the exhaust downwind.

Following measurement of borehole flow rate, the installation is left for a minimum of 10 minutes for the headspace to restore equilibrium.

Once the gas in the installation has regained equilibrium, the gas analyser is connected and monitoring commences. The peak and steady state readings for CH_4 , CO_2 , CO , H_2S and CO are recorded. The steady state is monitored for a minimum of one minute, and possibly up to a maximum of 10 minutes where fluctuations continue.

When the monitoring is complete, the depth to the water table, and the depth to the base of the well are monitored using an electronic dipmeter. In circumstances where free phase product is suspected to be present, then an 'Interface Meter' is used to determine the free phase film thickness.



APPENDIX K

NOTES ON LIMITATIONS

Notes on Limitations For Geoenvironmental and Geotechnical Consultancy Services

General

This document has been prepared by CC GEOTECHNICAL LTD within the terms of the contract, scope of work, and resources agreed in writing with the client. The limitations of liability of CC GEOTECHNICAL LTD for the contents of this document have been agreed with the Client, as set out in the terms and conditions of offer and related contract documentation.

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The findings and opinions provided in this document are made in good faith and are subject to the limitations imposed by employing site assessment methods and techniques, appropriate to the time of investigation and within the limitations and constraints defined in this document.

The findings and opinions are relevant to the dates when the assessment was undertaken, but should not necessarily be relied upon to represent conditions at a substantially later date. In particular, seasonal groundwater levels, with the effects of precipitation, may affect the conditions found during the investigation. The report should be read in conjunction with the further Notes on Limitations included in Appendix A.

Where opinions expressed in this report are based on current available guidance and legislation, no liability can be accepted by CC GEOTECHNICAL LTD for the effects of any future changes to such guidelines and legislation. Additional information, improved practices, new guidance, changes in legislation, or amendments to design proposals, may necessitate this report having to be reviewed in whole or in part after that date. Opinions and interpretations are not accredited by UKAS.

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1. the consequences of this document being used for any purpose or project other than for which it was commissioned
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2. the consequences of use of this document by any party with whom an agreement has not been executed.

Phase I Environmental Audits / Desk Studies

The work undertaken to provide the basis of a Phase 1 Desk Study report comprises a study of available documented information from a variety of sources (including the client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in a Desk Study report have been dictated by finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in the report, CC GEOTECHNICAL LTD reserves the right to review such information and to modify the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Factual Ground Investigations

The investigation of the site has been carried out in accordance with the scope and specification instructed by the Client. No interpretations of the data generated by the investigation have been provided or implied. The exploratory holes undertaken in this commission, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of site conditions. Conditions may exist on the site which have not been detected by the works undertaken. Furthermore, the number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" or more widespread contamination where concentrations may be significantly higher than those actually encountered.

Interpretative Phase II Environmental Audits

The investigation of the site has been carried out with the intention of providing sufficient information concerning the type and degree of contamination, and ground and groundwater conditions to allow a reasonable risk assessment to be made. The objectives of the investigation have been limited to establishing the risks associated to potential human targets, building materials, the environment (including adjacent land), and surface and groundwater.

The amount of exploratory work and chemical testing undertaken may have been restricted by factors including inter alia the Clients budget, the available timescale, access to all parts of the site, the existence of buried services etc., and where this is the case, a more comprehensive investigation may be required if the site is to be redeveloped, since a number of important engineering and environmental issues may need further assessment.

For those reasons, if costs have been included in relation to site remediation these must be considered as tentative only and must, in any event, be confirmed by a qualified quantity surveyor.

It must be borne in mind, that the exploratory holes undertaken, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be ground conditions present on the site which have not been disclosed by this investigation, and which have therefore not been taken into account in this report. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" or more widespread contamination where concentrations may be significantly higher than those actually encountered. The findings of the investigation are valid for the time of investigation and the passage of time may result in changes to the contamination status of the site, and a reassessment of the site may be required where significant time has elapsed.

Geoenvironmental Ground Investigations

The investigation of the site has been carried out within the constraints of Client budget, available timeframe, access to all parts of the site, the existence of buried services and a more comprehensive investigation may be required to provide sufficient information regarding the type and degree of contamination, geotechnical characteristics, and ground and groundwater conditions, to formulate a reasonable assessment of the environmental risks together with engineering and development implications.

If costs have been included in relation to the site remediation, these must be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of the site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be ground conditions present on the site which have not been disclosed by this investigation, and which have therefore not been taken into account in this report. The findings of the investigation are valid for the time of investigation and the passage of time may result in changes to the contamination status of the site, and a reassessment of the site may be required where significant time has elapsed.

The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that groundwater levels will vary owing to seasonal, tidal, weather, or other effects.

The risk assessment and opinions provided, inter alia, take into consideration currently available guidance relating to acceptable contamination concentrations and no liability can be accepted for the retrospective effects of any future changes or amendments to these values.