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GEO-ENVIRONMENTAL RISK ASSESSMENT



Land off Wango Lane, Aintree

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REPORT PREPARED FOR

MULBERRY HOMES

5 Preston New Rd
Blackburn
BB2 6AE

Project Quality Assurance Information Sheet

GEO-ENVIRONMENTAL RISK ASSESSMENT

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1. INTRODUCTION

1.1 Appointment

- 1.1.1 BEK Enviro Limited (BEK) have been commissioned by Mulberry Homes Ltd to carry out a Contamination Risk Assessment for an area of land located off Wango Lane, Aintree (hereafter referred to as 'the site').
- 1.1.2 The site location and layout is presented in BEK Drawings No 17335-1 and 17335-2, copies of which are presented in Appendix I.

1.2 Proposed Development

- 1.2.1 The proposed development is for 'erection of 53 dwellings with new access, landscaping and associated works' at Land Bounded by Wango Lane, River Alt and Leeds and Liverpool Canal, Aintree' and a planning application has been submitted to Sefton Council.
- 1.2.2 The proposed development layout is illustrated on Mullberry Homes Limited drawing entitled 'Proposed Site Plan, (Drawing No: 150 M(12 September 2018)), a copy of which is presented in Appendix I.

1.3 Objective & Scope of Work

- 1.3.1 This report provides the details of the works undertaken by BEK to assess the potential risks from contamination considering the change of use to residential.
- 1.3.2 To achieve the objective BEK will undertake the following:
- Carry out a site walkover/inspection and take photographs
 - Review the available relevant background information for the site, including:
 - Recent Ordnance Survey Map
 - BGS Web Page
 - Site Specific GroundSure Reports
 - Site Specific Historical Maps
 - Coal Authority Website
 - Develop a preliminary conceptual site model in accordance with guidance to identify potentially significant pollutant linkages specific to the proposed development
 - Establish areas of potential concern based on identified risks and/or potential risks
 - Identify any actions required to assess or reduce the risks identified
 - Carry out site investigation works to quantify the risks identified
 - Assess site investigation data as part of a quantitative risk assessment
 - Provide recommendations for remediation/mitigation works

1.4 Limitations

- 1.4.1 The conclusions and recommendations presented in this report are the result of our professional interpretation of the information currently available. BEK reserve the right to amend the conclusions and recommendations if further information becomes available.
- 1.4.2 However, it should be noted that much of the information has been derived from reports written by others and BEK takes no responsibility for the accuracy of that information. Notwithstanding the above, the reports reviewed have all been written by professional environmental consultants with a duty of care to provide relevant and accurate information.
- 1.4.3 The comments given in this report and the opinions expressed are based on review of reports provided to BEK, ground conditions encountered during site works and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigations and therefore could not be taken into account

2. SITE DESCRIPTION

2.1 Site Location

- 2.1.1 The site is located to the north of Wango Lane and to the east of Valley Close and Taunton Drive in the Aintree area of Liverpool which is approximately 6 km north-east of Liverpool City Centre and some 12 km south-west of Skelmersdale.
- 2.1.2 The National Grid Reference for the centre of the site is 338769, 398399. The site location and current layout is shown on BEK Drawing No 17335-1 in Appendix I.

2.2 Site Layout & Description

- 2.2.1 An engineer from BEK visited the site on 18 April 2018 to carry out a site inspection. The general site layout is shown on BEK Drawing No 17335-2 (see Appendix I).
- 2.2.2 The site comprises of a roughly triangular shaped plot of derelict land approximately 18,700 m². The site is vacant with the exception of overgrown grass, bushes and trees. Areas of overgrown bushes/trees prevented access to some areas of the site. There was surface water ponded over much of the site with large area of surface flooding located towards the western boundary of the site.
- 2.2.3 The exact boundary of the site to the north was difficult to determine, although the River Alt is located some 70 m north of the site at its closest point. The Leeds and Liverpool Canal is located some 25 m east of the site. The southern boundary of the site is bound by Wango Lane and the south-western and western boundaries are bound by fencing separating the site from residential gardens associated with Valley Close and Taunton Drive.
- 2.2.4 A selection of photographs illustrating the current site layout are presented within Appendix H.

2.3 Surrounding Land Use

- 2.3.1 The site is generally surrounding by residential properties to the south, south-west and west. The Leeds Liverpool Canal is located to the east with a golf course located to the east of the Canal. The River Alt is located to the north and beyond this there are agricultural fields.

3. SITE HISTORY

- 3.1 The history of the site has been established using historical OS maps supplied by Groundsure. A selection of the maps reviewed is presented in Appendix A.

1893

- 3.2 The earliest available maps show the site to be vacant with a building known as Valley Farm (with associated buildings) located some 10 m to the west of the site. There is a woodland area surrounding the Valley Farm buildings and a marshy area located north-west of the site. The Leeds and Liverpool Canal is located some 25 m east of the site and the River Alt is located some 70 m north of the site. A railway track labelled as 'Liverpool Bolton and Bury Line' is located some 150 m south-east of the site.

1908

- 3.3 The 1908 maps shows the site remains vacant. The Valley Farm buildings to the west are still present, however the marshland located to the north is no longer marked. Handcocks Bridge (Swing) is located some 20 m south-east of the site over the canal.

1927

- 3.4 The site remains vacant on the 1927 map and the Valley Farm buildings appear to remain unchanged. The railway tracks some 150 m south-east of the site have been widened to form a number of additional tracks some 120 m south of the site.

1937-1939

- 3.5 The site remains unchanged and vacant on the 1937 and 1939 maps and the Valley Farm buildings remain unaltered. Four unspecified buildings have been constructed adjacent to the Leeds and Liverpool Canal towpath some 2 m south-east of the site.

1958

- 3.6 The 1958 map shows that the site largely remains vacant although a drain is now located in the west of the site adjacent to the site boundary. There are a number of new buildings constructed as part of Valley Farm to the west and the woodland area surrounding the main Valley Farm building has been reduced in size.

1960

- 3.7 There are no significant changes to the site or the surrounding area.

1958 – 1961

- 3.8 There are no significant changes to the site or the surrounding area.

1964

- 3.9 The 1964 map shows that the site remains unchanged. Valley Farm remains to the west of the site although only the main farm building remains with all other associated buildings removed and replaced by several semi-detached residential properties. Several other of residential dwellings are located to the west of the site. There are no significant changes to the areas in the vicinity of the site to the north, east and south of the site.

1971-1973

- 3.10 There are no significant changes to the site. Additional residential development has been constructed to the south of Wango Lane and to the south-west of the site. Two electrical substations are located some 70 m west and some 100 m south-east of the site.

1981

- 3.11 There are no significant changes to the site. The buildings located on the towpath adjacent to the south-eastern site boundary are absent.

1993

- 3.12 There are no significant changes to the site and the surrounding areas.

2002-2010-2014

- 3.13 These maps indicate that there are no significant changes to the site or the surrounding area with the site remaining vacant.

4. ENVIRONMENTAL SETTING

- 4.0.1 GeolInsight and EnvirolInsight Reports have been obtained from Groundsure and information provided in this report has been used within this section. Copies of these reports are presented in Appendix B and C, respectively.

4.1 Published Geology

- 4.1.1 The site geology is illustrated in the GeolInsight Report which has sourced data from several sources including British Geological Society (BGS), BRITPITS database and the Coal Authority. A copy of the GeolInsight Report is presented in Appendix B.

- 4.1.2 In addition, BEK has sought site investigation information from the BGS website. There are 2 BGS Boreholes located within 250 m of the site. The boreholes are labelled as Headcocks Bridge Aintree 1 and 2 and are located some 38 m and 50 m south of the site. The boreholes generally describe made ground above sands and clays.

Made Ground

- 4.1.3 According to the GeolInsight report there is no artificial ground (made ground) present beneath the site.

Superficial Geology

- 4.1.4 The GeolInsight Report states that the superficial geology overlying the site comprise of the Shirdley Sandstone Group which typically consists of fine to coarse sands with silts and clays.

Bedrock

- 4.1.5 The underlying solid geology comprises of the Wilmslow Sandstone Formation which generally comprises 'sedimentary rocks which are fluvial, lacustrine and marine in origin'.

Faults

- 4.1.6 There is one fault located within 250 m of the site which is located some 188 m north-east of the site which is described as 'Fault, inferred'.

4.2 Mining & Ground Stability

- 4.2.1 Information in the GeolInsight report indicates that the site is not in an area that may have been affected by coal mining. Furthermore, the Coal Authority website does not indicate that the site is located within a coal mining development high risk area.

- 4.2.2 In addition to the above, the GeoInsight Report provides hazard ratings associated with ground subsidence at the site, as summarised below:

Shrink-Swell Clay:	Negligible
Landslides:	Very Low
Ground Dissolution of Soluble Rocks:	Negligible
Compressible Deposits:	Negligible
Collapsible Deposits:	Very Low
Running Sands:	Low

- 4.2.3 It can be seen from the above that the site is unlikely to be affected by ground instability.

4.3 Hydrogeology

- 4.3.1 The superficial deposits which overlie the site is classified by the EA as a 'Secondary A Aquifer'. These formations are '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'.

- 4.3.2 The underlying Wilmslow Sandstone formation is classified by the EA as Principal Aquifer. These formations are described as having a '*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.*'

- 4.3.3 The EnviroInsight Report indicates the site is not located within a Source Protection Zone (SPZ) and there are no groundwater abstraction licences within 250 m of the site.

4.4 Hydrology

- 4.4.1 The EnviroInsight Report indicates that there are 7 significant surface water features at the site including a drain located in the west of the site, the River Alt to the north of the site and the Leeds and Liverpool Canal in the east of the site.

- 4.4.2 There are two licensed water discharge consents located within 250 m of the site, however they relate to the same permit. The consent is located some 112 m north-east of the site and is labelled as 'Wango Lane PS, Aintree' with an effluent type of sewage discharges. The effective date is from 1 January 1995. There are no surface water abstraction licences within 250 m of the site.

- 4.4.3 In addition, the risks from surface water flooding at the site are considered to be low.

4.5 Contaminated Land & Landfill Activities

4.5.1 The information presented in the EnviroInsight Report indicates that there are no current landfill or waste management facilities located within 250 m of the site.

4.5.2 There are 8 EA recorded pollution incidents located within 250 m of the site, however 5 of the pollution incidents relate to the same incident. The 3 separate incidents are summarised in the table below:

Distance	Direction	Details
0	-	Incident Date: 18-June-2002
		Pollutant: Specific Waste Materials
		Pollutant Description: Household Waste
		Water Impact: Category 4 (No Impact)
		Land Impact: Category 3 (Minor)
		Air Impact: Category 4 (No Impact)
65	SE	Incident Date: 02-April-2002
		Pollutant: Specific Waste Materials
		Pollutant Description: Household Waste
		Water Impact: Category 4 (No Impact)
		Land Impact: Category 3 (Minor)
		Air Impact: Category 4 (No Impact)
120	SE	Incident Date: 15-Nov-2004
		Pollutant: General Biodegradable Materials/Inert Materials and Wastes/Specific Waste Materials
		Pollutant Description: Natural Organic Material/Construction and Demolition Materials and Wastes/Household Waste/Tyres
		Water Impact: Category 4 (No Impact)
		Land Impact: Category 2 (Significant)
		Air Impact: Category 4 (No Impact)

Table 1: EA Recorded Pollution Incidents

4.5.3 There are no Part A(2), Part B or IPPC Authorised Activities within 250 m of the study site.

4.5.4 There are 11 potentially significant contaminative industrial sites located within 250 m of the site, the closest of which refers to a pump located some 21 m south-west of the site dating from 1851. A number of the contaminative industrial sites are labelled as railway sidings and an electrical substation located 133 m south of the site dating from 1987. These are unlikely to have impacted on the site.

4.6 Sensitive Land Uses

- 4.6.1 The site is not affected by any of the ecological systems identified as a statutory receptor in the DETR Circular 01/2006.

4.7 Radon

- 4.7.1 Groundsure reports that the property is not located in a Radon Affected Area, as '<1% of properties are above the Action Level.'
- 4.7.2 Therefore, no radon protection measures are required.

5. POTENTIAL POLLUTANT LINKAGES

5.1 General

5.1.1 This section identifies the potential contaminants of concern, sources, pathways and receptors that may be associated with the site based on its known history and the current condition and with respect to the re-development of the site for residential use.

5.1.2 This information is used to develop a conceptual model which is a qualitative description of potential sources of environmental pollutants, the pathways by which they are transported and the receptors:

- i) Potential sources of contamination: these include any actual or potentially contaminating materials and activities, located either on or in the vicinity of the site
- ii) Potential pathways for contamination migration: these comprise the routes or mechanisms by which contaminants may migrate from the source to the receptor including environmental migration pathways and human health exposure pathways
- iii) Potential receptors of contamination: these include future land users, ecological systems, water resources and property.

5.2 Potential Contaminants of Concern

5.2.1 Based on the earliest available historical maps dating from 1893, the site has been vacant with no development occurring on the site throughout the available site history.

5.2.2 The historical use of the site is not considered to have resulted in significant contamination to the shallow ground, however, there is evidence for fly-tipped waste (including household waste) having been deposited at the site.

5.2.3 The potential contaminants of concern that may be present at the site are summarised below:

Contaminants associated with made ground	
Arsenic	Zinc
Cadmium	Sulphate
Chromium	Cyanide
Copper	Phenols
Lead	Polycyclic Aromatic Hydrocarbons (PAHs)
Mercury	Asbestos
Nickel	pH
Selenium	

Table 2: Potential Contaminants of Concern

5.2.4 It should be noted that the above list represents a broad range of potential contaminants of concern. Additional contaminants of concern should be considered if ground conditions differ from those anticipated.

5.3 Potential Pathways

5.3.1 The pathways through which contaminants may reach receptors are in part dependent by the nature and behaviour of the contaminant and the intended end use of the site.

5.3.2 The following potential pathways have been identified with respect to the existing site condition, the environmental setting and the re-development of the site to residential apartments, communal landscaped areas and associated infrastructure; all of which are assessed in the conceptual model:

- Ingestion of contaminated soil
- Inhalation of contaminative dust including asbestos fibres
- Dermal contact
- Dissolution or suspension (leaching) of contaminants into pore waters affecting plant growth
- Dissolution or suspension (leaching) of contaminants from site soils leading to lateral migration within perched waters to off-site receptors. Potential significant pathways include more permeable layers within the made ground/natural strata, underground services and piles/foundations
- Dissolution or suspension (leaching) of contaminants from site soils leading to contamination of surface water and/or groundwater
- Contamination affecting the integrity of service pipelines by direct contact

- Buildings affected by direct contact with elevated concentrations of sulphate and/or extreme pH

5.4 Receptors

- 5.4.1 Potential site specific receptors that may be affected by contamination at the site are listed below:

Future Site Users

- 5.4.2 Future occupants of the site could be at risk from contamination present at the site.
- 5.4.3 Potential risks are associated with ingestion of soil as well as inhalation of contaminated dust (including asbestos) and dermal contact with contaminants of concern. These risks are all associated with the garden areas of the new development.

Construction Workers

- 5.4.4 The primary risks to construction workers are associated with shallow excavations as asbestos could be present. Asbestos fibres (if present) can be released into the atmosphere during earthworks.
- 5.4.5 Standard personal protective equipment and site specific risk assessments and method statements should reduce risks associated with other contaminants of concern due to short exposure duration.

Off Site Receptors

- 5.4.6 Off site receptors include nearby home owners. Human health could be at risk if asbestos fibres are released during the re-development.

Flora

- 5.4.7 Heavy metals can be phytotoxic and if present can represent a potential risk to flora in the landscaped/garden areas.

Buildings & Services

- 5.4.8 Concrete used for the construction of buildings can be affected by high levels of sulphate and extreme pH.
- 5.4.9 The integrity of service pipes can be affected by concentrations of organic contamination.

Controlled Waters

- 5.4.10 The Enviroinsight report indicates that there are no significant surface water features on site with the exception of a drain located in the west of the site. The River Alt is located some 60 m north of the site at its closest point and the Leeds and Liverpool Canal is located some 25 m east of the site. These both represent sensitive receptors.
- 5.4.11 The superficial strata comprises of the Shirley Sandstone Group which are classified by the EA as a 'Secondary A Aquifer'. The Secondary A Aquifer also represents a potential receptor.
- 5.4.12 The underlying bedrock is classified as a Principal Aquifer and therefore the bedrock geology is also a potential receptor.

5.5 Preliminary Conceptual Model

- 5.5.1 The identified potential sources of contaminants, pathways and receptors have been assessed to establish plausible pollutant linkages. All potentially significant pollutant linkages are detailed in Table B, in Appendix D.

5.6 Potentially Significant Pollutant Linkages

- 5.6.1 A number of possible 'significant pollutant linkages' have been identified associated with the site.
- 5.6.2 Potential risks relating to the potential harm to the health of humans and/or domestic pets both on and off site due to the potential for direct contact with contaminants in the made ground and the ingestion of contaminated soil/dust (**Link 1**). Human health could also be affected by ingestion of home grown produce due to the uptake of contaminants of concern (**Link 2**). This pollutant linkage is only applicable to the landscaped/garden areas of the site.
- 5.6.3 There is also the possibility of windblown particulates being inhaled by people/animals both on site and off site (**Link 3**).
- 5.6.4 Dissolution or suspension (leaching) of contaminants from site soils leading to lateral migration within perched water to off-site receptors. Potential significant pathways include more permeable layers within the made ground/natural strata, underground services and piles/foundations. Flora (**Link 4**) and property (including services) (**Link 5**) could be affected by direct contact to high concentrations of contaminants.
- 5.6.5 Pollution of surface watercourse by the leaching of contaminants of concern (**Link 6**).

- 5.6.6 Dissolution or suspension (leaching) of contaminants from site soils leading to vertical migration of contaminants to the underlying groundwater ([Link 7](#)).

- 5.6.7 Site investigation is required to identify site specific conditions and assess the risks associated with each identified plausible pollutant linkage.

6. SITE INVESTIGATION

6.1 General

- 6.1.1 This section provides a summary of the site investigation works undertaken by BEK during April 2018.
- 6.1.2 The site investigation has been designed to provide indicative information for the ground conditions across the site with respect to the quantitative assessment of the potential risks associated with contamination and to provide geotechnical information for foundation design.
- 6.1.3 Eleven exploratory locations were set out by the site engineer. The site engineer selected the trial pit locations based on the information presented in Sections 1 to 5 of this report and the ground conditions encountered in order to establish representative conditions at the site.
- 6.1.4 The exploratory locations are illustrated on BEK Drawing No 17335-3 presented in Appendix I.

6.2 Trial Pits

- 6.2.1 A total of eleven trial pits were excavated across the site using a Kubota KX080 Excavator to a maximum depth of 2.3 m to prove natural strata at each location.
- 6.2.2 The ground conditions were recorded by an engineer from BEK and representative samples were recovered for chemical testing.
- 6.2.3 Copies of the Trial Pit records are presented in Appendix E and a Trial Pit Location Plan is presented in Appendix I. A selection of photographs showing the trial pits are presented in Appendix H.
- 6.2.4 In-situ testing (shear vane) was carried out within every trial pit excavated at the site. The findings are presented on the trial pit records.

6.3 Laboratory Testing

Soil Chemical Testing

- 6.3.1 Following a review of the ground conditions encountered, BEK selected ten samples for chemical testing. Six of the samples tested were recovered from the topsoil at the site and the remaining four samples tested comprised of clay samples beneath the topsoil.
- 6.3.2 Samples for chemical testing were submitted to the laboratory of Exova for the selected analysis. All testing was undertaken to MCERTS standard (where available).

6.3.3 The test schedule for the samples was based on Table 1 of this report and observations made during the investigation.

6.3.4 Copies of the chemical test results are presented in Appendix F.

Geotechnical Testing

6.3.5 Selected bulk clay samples were submitted to the UKAS accredited laboratory of TestConsult and tested for Plasticity Index and Moisture Content.

6.3.6 The geotechnical test results are presented in Appendix G.

6.4 Ground Conditions

6.4.1 The site investigation encountered laterally continuous homogeneous topsoil at each location. The topsoil varied in depth from 0.2 m (Trial Pit No TP11) to 0.6 m (Trial Pit No TP2 and TP5) and is described as 'dark brown soft sandy clay with much rootlets'.

6.4.2 A horizon of sand was identified beneath the topsoil in six of the trial pits located towards the south-western half of the site. The sand horizon varied in thickness from 0.2 m (Trial Pit No TP8, TP9 and TP10) to 0.4 m (Trial Pit No TP7). The sand is described as 'light brown/yellow fine to medium sand'.

6.4.3 Clay was identified within every exploratory location which varied in depth from 0.5 m (Trial Pit No TP4, TP5 and TP11) to 0.7 m (Trial Pit No TP7) to the base of each trial pit. The clay was generally described as 'stiff orange/light brown clay with rare sand pockets and rare fine to coarse gravels'.

6.4.4 The bedrock geology was not encountered in any of the trial holes excavated on site.

6.4.5 There was no visual or olfactory evidence of contamination identified within any of the trial pits and groundwater was not encountered.

7. QUANTITATIVE RISK ASSESSMENT

7.1 Potentially Significant Pollutant Linkages

7.1.1 Potentially significant pollutant linkages have been identified within the preliminary conceptual model developed by BEK. These risks include:

- (i) Human Health – risks associated with contamination in the made ground and/or natural strata: risk via ingestion (soil), inhalation (dust or vapour) or direct contact.
- (ii) Property (including services and flora) – risks associated contamination affecting concrete, service pipes and flora.
- (iii) Controlled Waters – risks to surface water features including drain on site and surface water features off site. Potential risks to quality of water in groundwater

7.2 Risk Assessment: Human Health Risks from Exposure to Contaminated Soil

7.2.1 The risks to human health have been assessed by inspection of shallow soils for the presence of elevated contaminants based on the expected contaminant findings detailed in the conceptual model and completion of a quantitative risk assessment.

7.2.2 The soil contamination concentrations have initially been compared to a range of generic assessment criteria that have been prepared to allow the assessment of contamination relative to uncontaminated and/or background levels.

7.2.3 These include the use of the Land Quality Management and Chartered Institute of Environmental Health assessment criteria (S4ULs), the Category 4 Screening Levels (C4SLs).

7.2.4 These assessment criteria have been derived using the CLEA model and fully justified input parameters. The contamination assessment has been undertaken using assessment criteria derived for residential use without plant uptake.

7.2.5 The following table summarises the chemical test results for the samples tested and lists the relevant assessment criteria and the samples with a concentration in excess of the assessment criteria. Note that only determinands with a concentration above the laboratory limit of detection are presented in the table below:

Determinands	Range of Concentrations (mg/kg)	Assessment Criteria	Samples Fail
Arsenic	6.6 – 11.8	37 ¹	---
Cadmium	<0.1 – 0.2	11 ¹	---
Chromium	54.0 – 79.4	910 ¹	---
Copper	15 - 31	2400 ¹	---
Lead	6 - 92	210 ²	---
Nickel	13.6 – 45.7	180 ¹	---
Water Soluble Boron	0.4 – 0.8	290 ¹	---
Zinc	40 - 62	3700 ¹	---
Phenanthrene	<0.03 – 0.32	95 ¹	---
Anthracene	<0.04 – 0.07	2400 ¹	---
Fluoranthene	<0.03 – 0.36	280 ¹	---
Pyrene	<0.03 – 0.33	620 ¹	---
Benzo(a)anthracene	<0.06 – 0.13	7.2 ¹	---
Chrysene	<0.02 – 0.17	15 ¹	---
Benzo(a)pyrene	<0.04 – 0.36	2.2 ²	---
Indeno(123cd)pyrene	<0.04 – 0.07	27 ¹	---
Benzo(ghi)perylene	<0.04 – 0.08	320 ¹	---
Benzo(b)fluoranthene	<0.05 – 0.20	2.6 ¹	---
Benzo(k)fluoranthene	<0.02 – 0.19	77 ¹	---
Asbestos	NAD		

Table 3: Summary of Contamination Assessment

1 CIEH/LQM Derived Assessment Criteria (S4ULs based on 1% SOM)

2 Category 4 Screening Levels

7.2.6 It can be seen from the table that there are no elevated concentrations of contaminants of concern.

7.2.7 In addition, none of the ten samples tested proved positive for the presence of asbestos.

7.3 Risk Assessment: Buildings

7.3.1 Risks to buildings include the assessment of the aggressive nature of the shallow ground with respect to concrete, the risks to the degradation of water pipes and flora due to contamination.

Risk to Concrete

7.3.2 To assess the potential risks to concrete, BEK has compared the previous site investigation data to assessment criteria presented in the BRE Special Digest 1: Concrete in Aggressive Ground.

7.3.3 The sulphate concentrations (water soluble 2:1) in the shallow ground range between <0.0015 and 0.0169 g/l. These values are all below the DS-1 threshold of 1.2 g/l.

7.3.4 With consideration to the range of pH values (5.83 to 8.48), the concrete classification suitable for the site would be DS-1 AC-1s.

Risks to Services

7.3.5 Potable water supply pipes can be at risk from degradation if the shallow ground consists of specific organic contamination. Guidance published by UKWIR includes a methodology for the site investigation and risk assessment to determine pipe specification.

7.3.6 For brownfield sites, site investigation may be required along the intended route of the water pipeline and samples recovered from specific depths and tested for specific contaminants of concern.

7.3.7 On the basis of the ground conditions encountered, risks to water supply pipelines are considered to be very low, however it is recommended that consultation is undertaken with the water service supplier to confirm this.

Risks to Flora

7.3.8 Copper, nickel and zinc are toxic to plants. The effects of copper, nickel and zinc are often regarded as additive.

7.3.9 The assessment criteria used for copper, nickel and zinc, are 'pseudo total concentrations' are derived from BS3882:2007 as follows:

Phytotoxic Contaminant	pH Range		
	<6.0	6.0 to 7.0	>7.0
Zinc (nitric acid extractable)	<200	<200	<300
Copper (nitric acid extractable)	<100	<135	<200
Nickel (nitric acid extractable)	<60	<75	<110

Table 4: Limits for Phytotoxic Contaminants (Units mg/kg)

7.3.10 By comparing the chemical test results (Appendix F) to the concentrations in the above table, it can be seen that there are no elevated concentrations of phytotoxic contaminants above the assessment criteria.

7.4 Risk Assessment: Controlled Waters

7.4.1 No significant contamination has been found at the site and therefore risks to controlled waters are considered to be negligible.

7.5 Risk Assessment: Conclusions

- 7.5.1 The site investigation encountered laterally continuous homogeneous topsoil at each location (to 0.6 m) described 'dark brown soft sandy clay with much rootlets'. A sand horizon was encountered beneath the topsoil in the south-western half of the site. The sand horizon varied in thickness from 0.2 m to 0.4 m and it was described as 'light brown/yellow fine to medium sand'.
- 7.5.2 Clay was identified within every exploratory location beneath the topsoil/sand which was generally described as 'stiff orange/light brown clay with rare sand pockets and rare fine to coarse gravels'.
- 7.5.3 Topsoil and natural superficial samples recovered from site investigation have been tested for wide range of contaminants of concern. The chemical test results have been compared to relevant generic assessment criteria to identify potential contaminants of concern.
- 7.5.4 Based on the contamination assessment herein and with respect to the redevelopment of the site for residential use without gardens, there are no contaminants of concern present at the site.
- 7.5.6 Potential risks associated with contamination are considered to be negligible.

8. GEOTECHNICAL ASSESSMENT

- 8.1 From the trial pits it appears that the general profile of the ground strata is consistent, comprising made ground, over stiff clays with occasional pocket of sand and fine to coarse gravels clays. In the south-western half of the site a fine to medium sand band overlies the clay.
- 8.2 The top soil/stiff clay interface varies between 0.5 to 0.7m below ground level, but in Trial Pit Nos TP5 to TP11 inclusive, a sand band that varies in thickness from 0.2 to 0.4 m separates the top soil from the clay.
- 8.3 The shear vane tests taken in the clay at around 1 m below ground level vary from 62 kPa to 120 kPa and based on these readings it is considered that the anticipated bearing capacity can be conservatively taken as 125 kN/m². Thus, for typical two storey units standard strip footings will be adequate across the site, founded at 900 mm below ground level.
- 8.4 The PI results undertaken on 3 samples from Trial Pit Nos TP1, TP7 and TP11 (between 0.8 and 1.2 m) vary from 14 to 23 indicating that the clays have a low to medium volume change potential. Therefore, if any trees are in close proximity to the new build, foundation depths should be designed in accordance with NHBC Chapter 4.2 "Building near Trees" and for conservative design the clay should be taken as having a medium volume change potential.
- 8.5 No ground water or water strikes were recorded in any of the logs and as foundation depths are likely to be around 900mm trenches should remain stable.
- 8.6 Subject to the proximity of trees, their genus, and the depth of foundations required under NHBC Chapter 4.2, slabs may be ground bearing provided that all the top soil is removed and replaced with a 6F2 type material compacted in 100 mm layers using a vibratory roller. Alternatively suspended reinforced concrete slabs or beam and block floors may be adopted.
- 8.7 New road construction will probably need a capping layer, the depth of which will be subject to CBR results and whether or not the roads are to be adopted.

9. CONCLUSIONS & RECOMMENDATIONS

9.1 This report provides an assessment of the ground conditions based on the assessment of available site investigation information and quantifies the potential risks associated with contamination and provides a geotechnical assessment with respect to supporting foundation design.

9.2 The risk assessment considers the redevelopment of the site to residential.

Contamination Assessment

9.3 Based on the contamination assessment herein and with respect to the redevelopment of the site for residential use with gardens, no potential risks associated with contamination have been identified and any associated risk are considered to be negligible.

Geotechnical Assessment

9.4 Assuming the site is to be redeveloped with standard two storey houses, standard strip footings will be adequate across the site. No ground water or water strikes were recorded in any of the logs and as foundation depths are likely to be around 900 mm trenches should remain stable

9.5 The PI results indicate that the clays have a low to medium volume change potential. Therefore, if any trees are in close proximity to the new build, foundation depths should be designed in accordance with NHBC Chapter 4.2 "Building near Trees" and for conservative design the clay should be taken as having a medium volume change potential.

9.6 Subject to the proximity of trees, their genus, and the depth of foundations required under NHBC Chapter 4.2, slabs may be ground bearing provided that all the top soil is removed and replaced with a 6F2 type material compacted in 100 mm layers using a vibratory roller. Alternatively suspended reinforced concrete slabs or beam and block floors may be adopted.

9.7 New road construction will probably need a capping layer, the depth of which will be subject to CBR results and whether or not the roads are to be adopted.

Other Considerations

9.8 All groundworkers adopt standard PPE when on site and remain vigilant during ground excavations for the presence (or suspected presence) of contamination. If visual or olfactory evidence of contamination is encountered then works should cease and specialist advice sought.

- 9.9 Any material removed from the site should be disposed of in accordance with appropriate legislation and regulations, including the Duty of Care Regulations. Chemical testing has confirms that the made ground can be disposed of as inert waste.
- 9.10 Consideration should also be given to the requirements of the water supply provider. Although any potential risks are considered to be negligible, they are likely to require the UKWIR risk assessment to be completed to determine the specification for the water pipes and consultation with the water supply provider is recommended.

APPENDIX A

Historical OS Maps



Site Details:

Wango Lane, L10 8JG

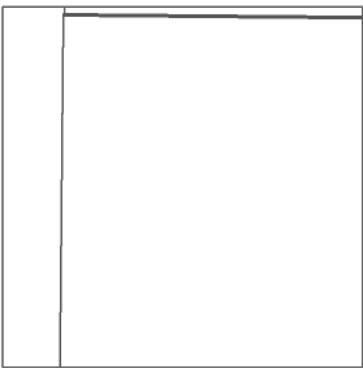
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Grid Ref: 338796, 398399

Map Name: County Series

Map date: 1867

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Report Ref: CMAPS-CM-704983-29721-160418HIS
Grid Ref: 338796, 398399

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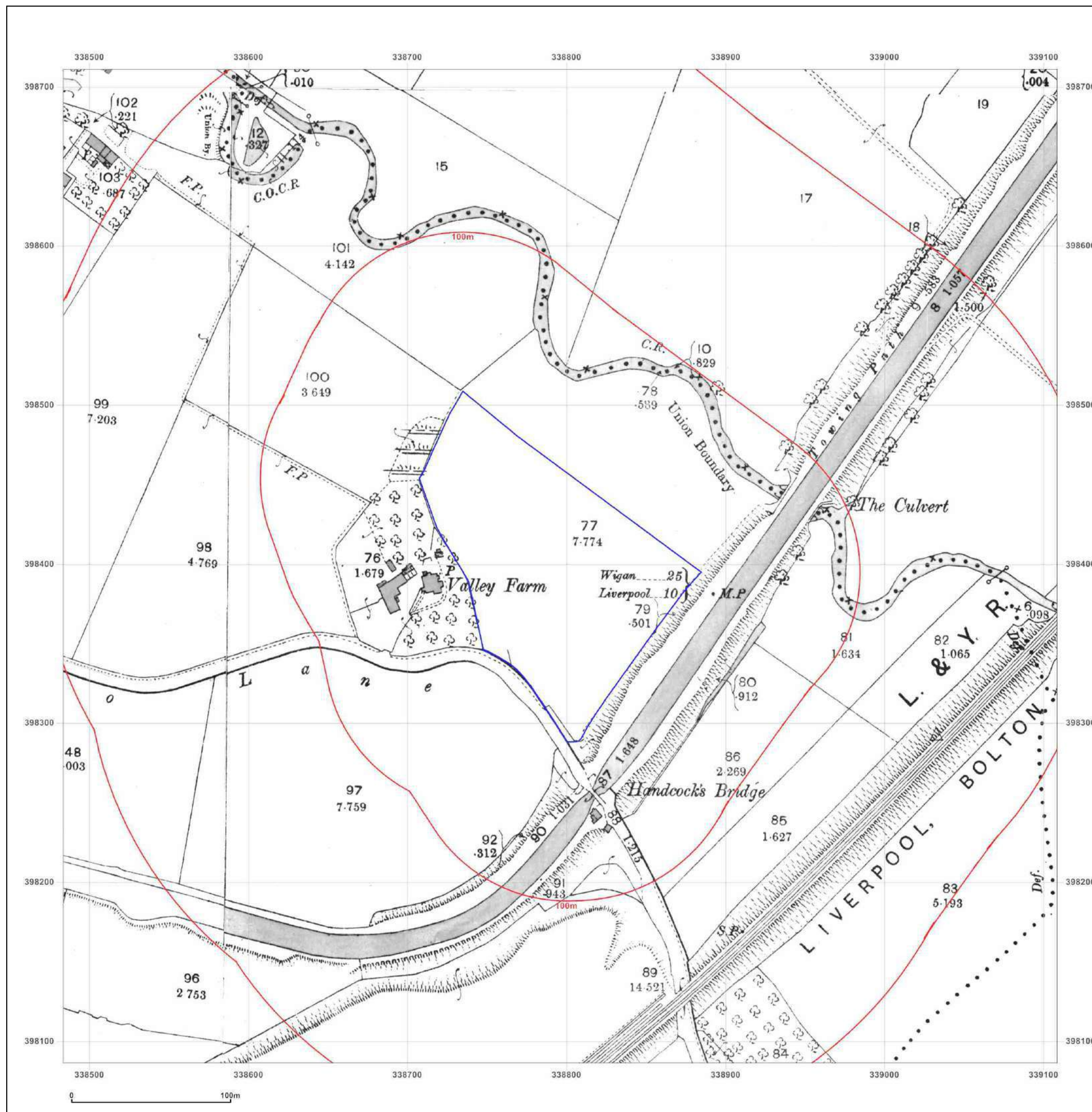


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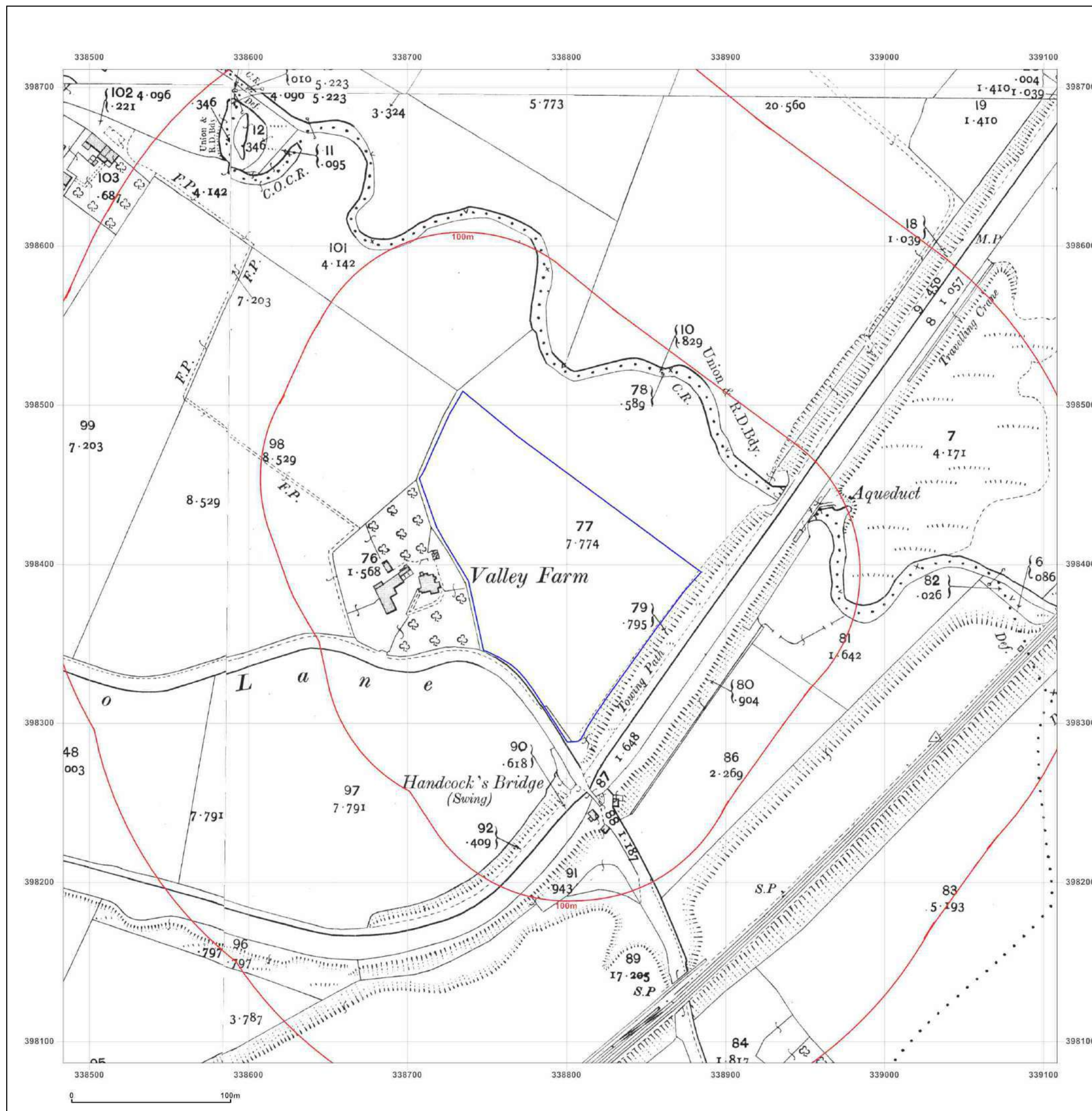


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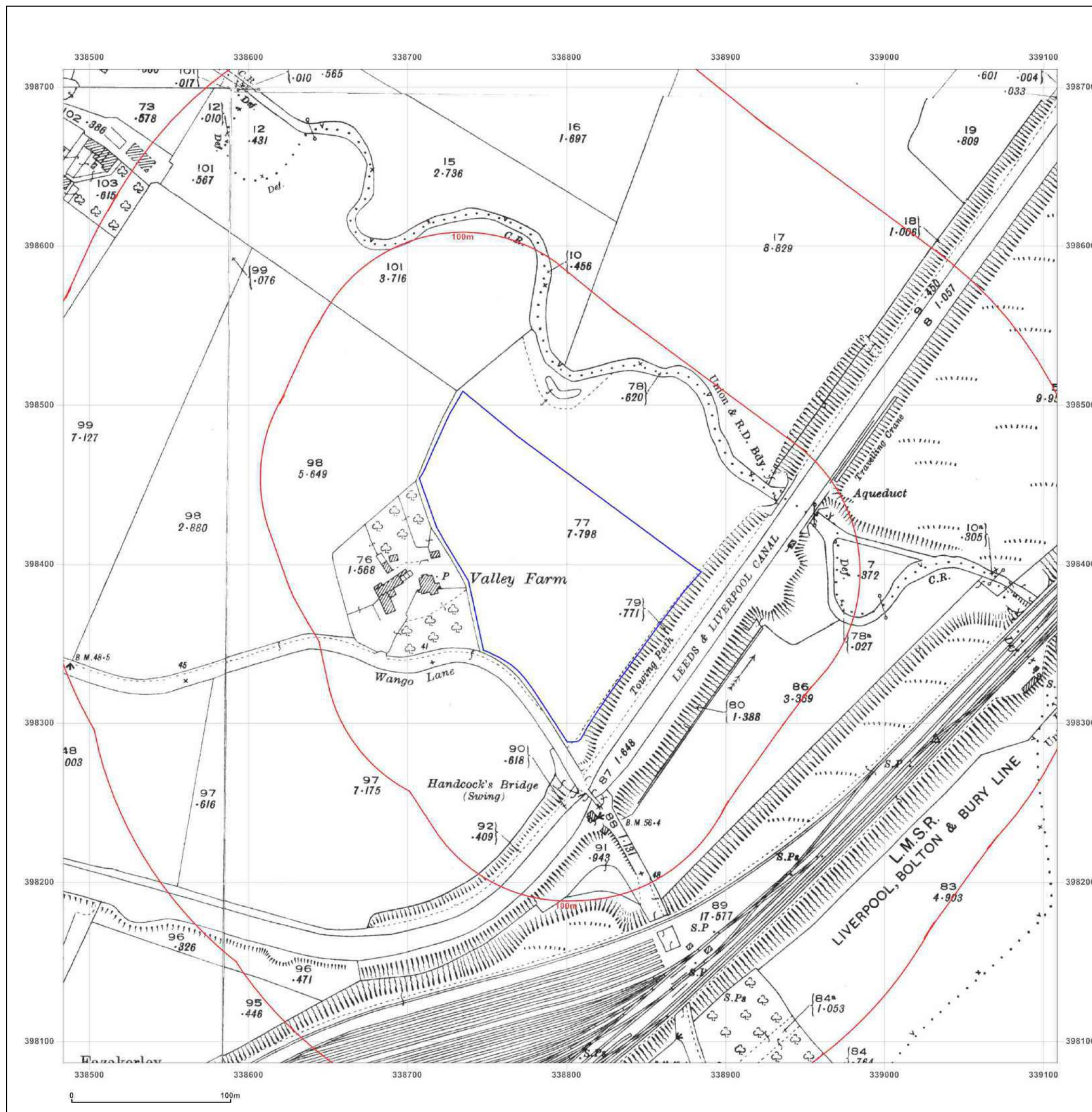


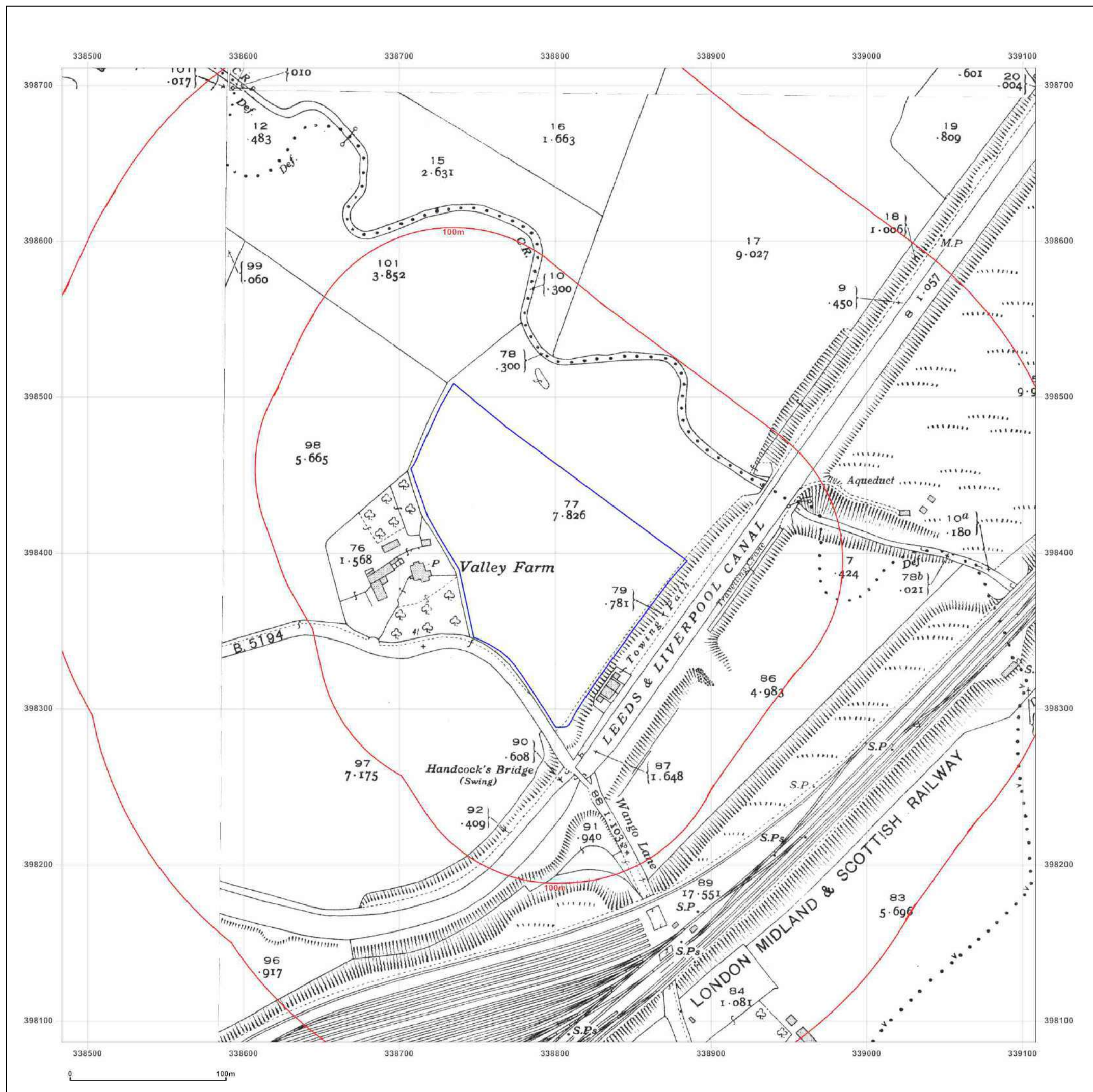
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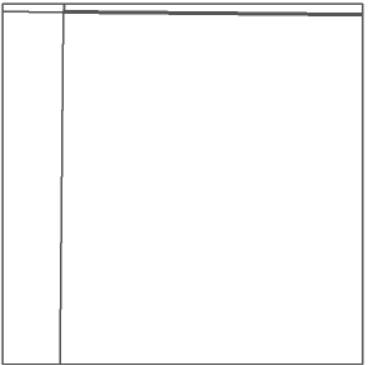
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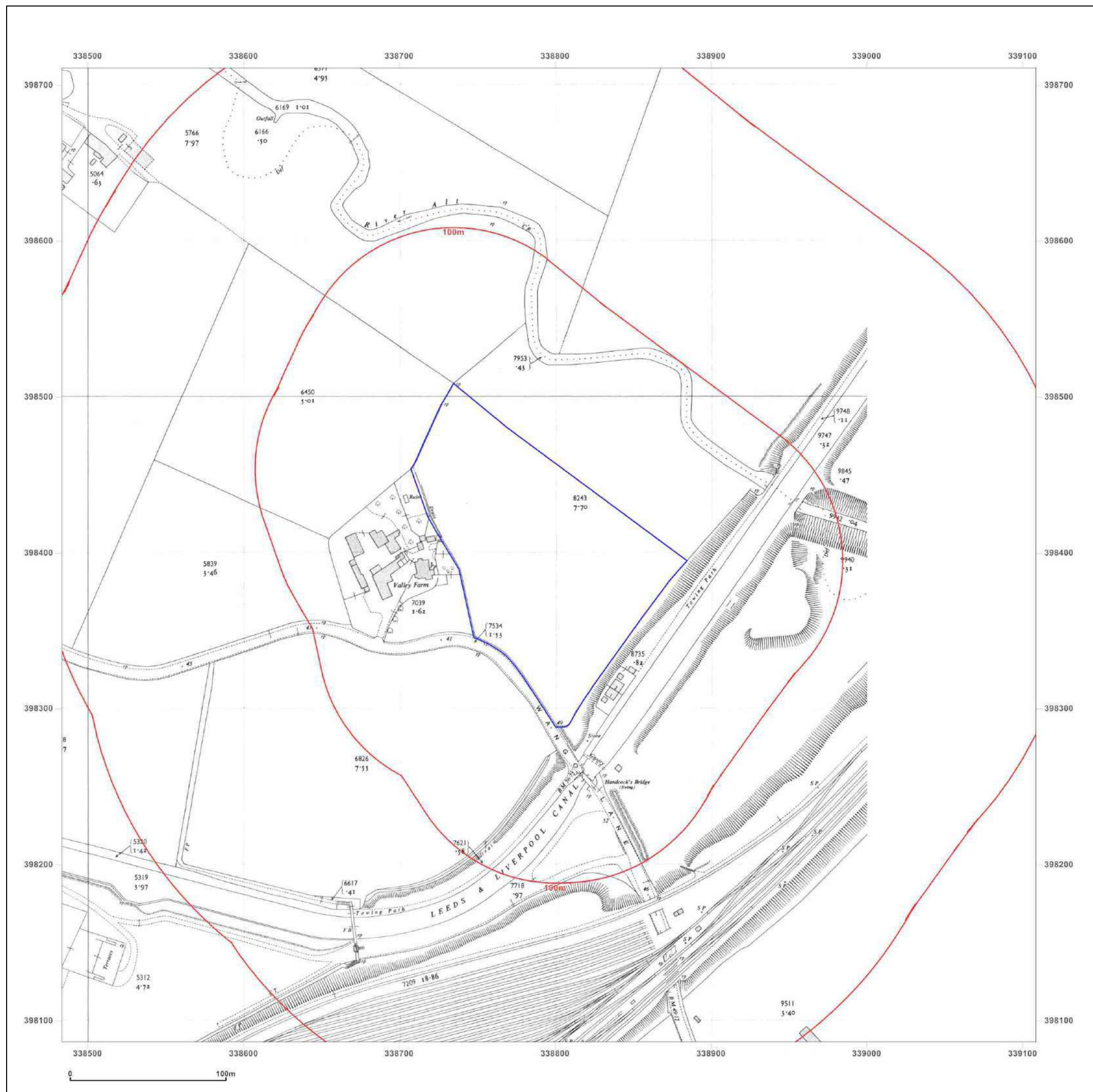


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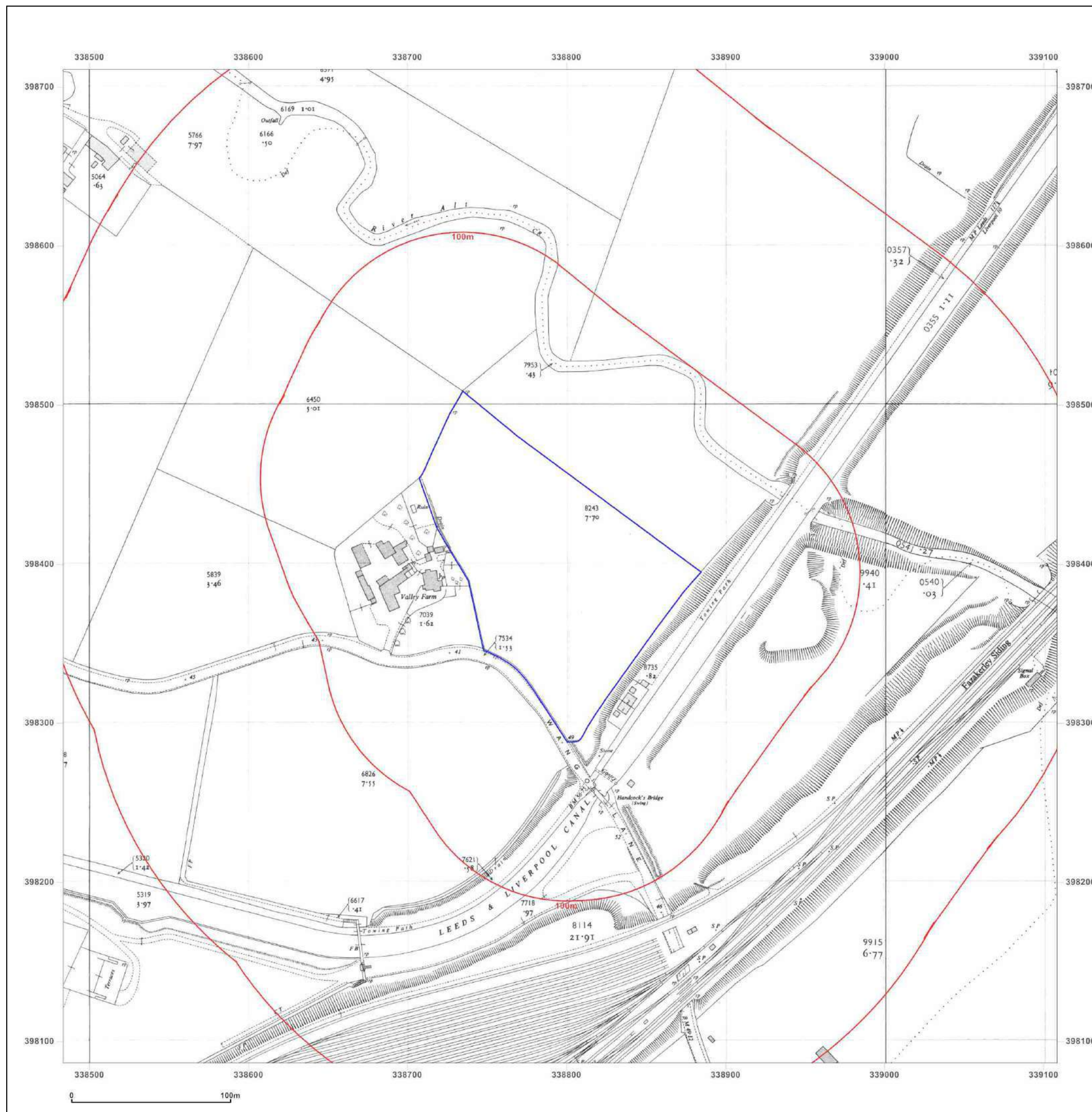


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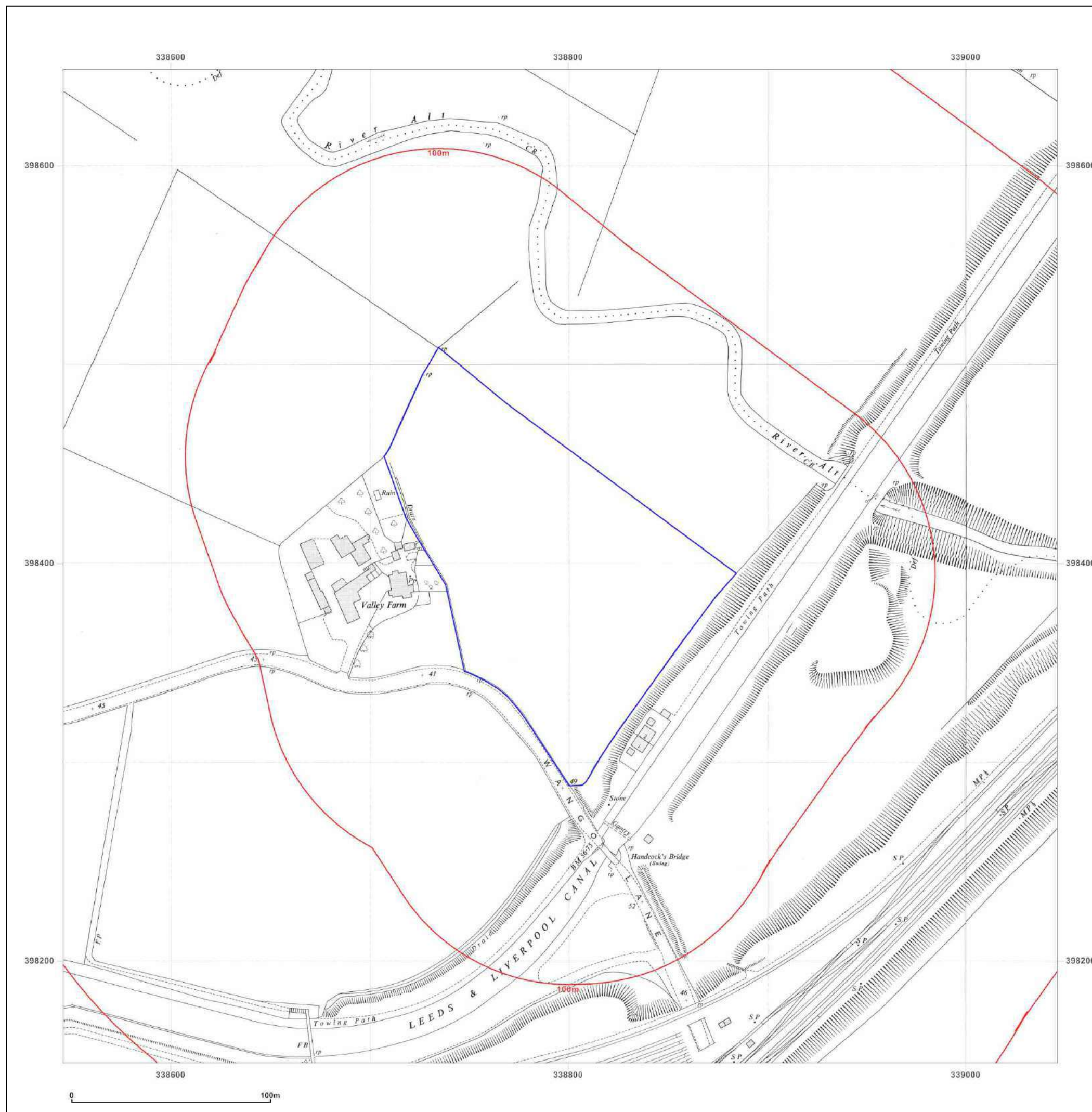


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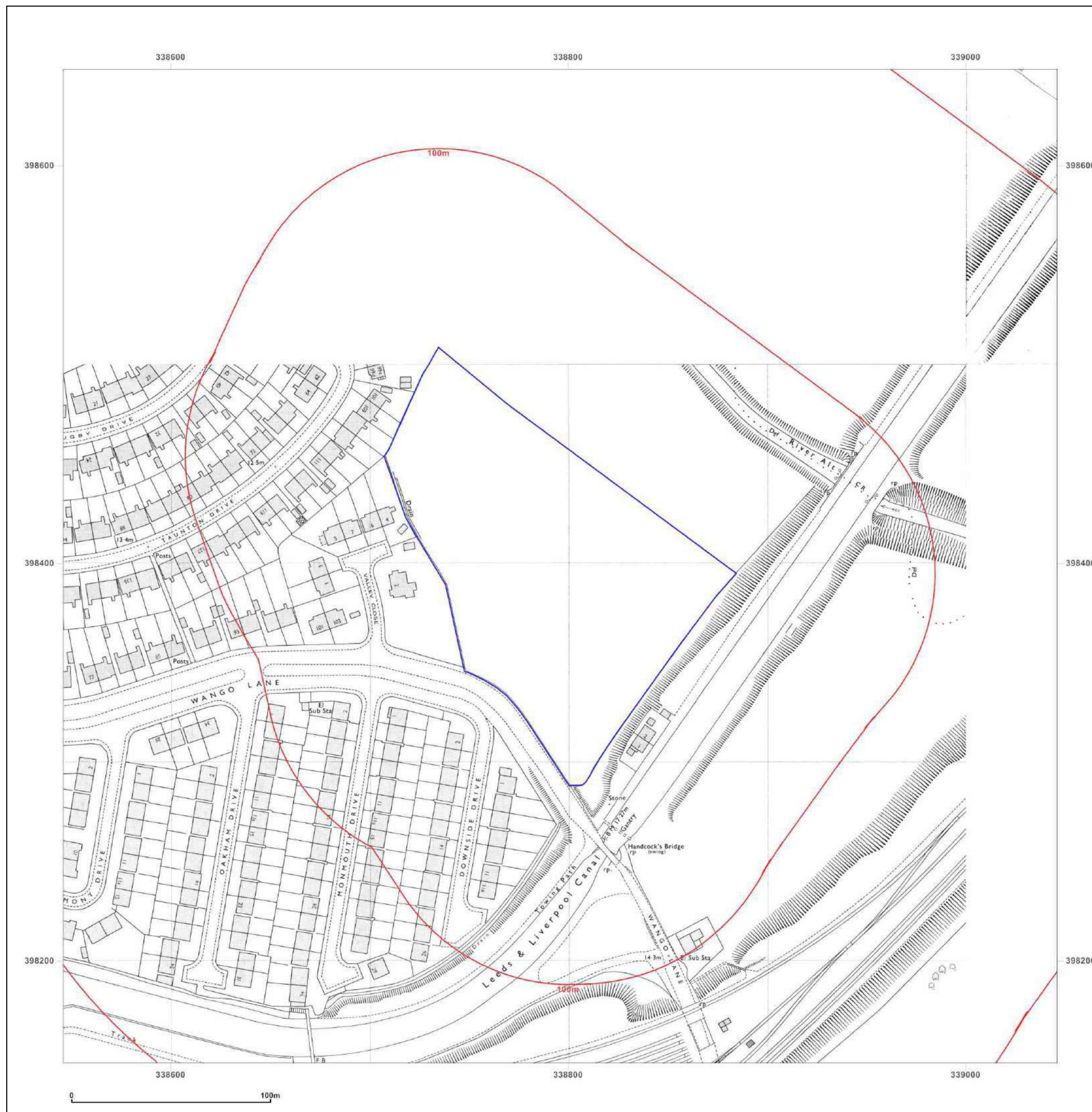


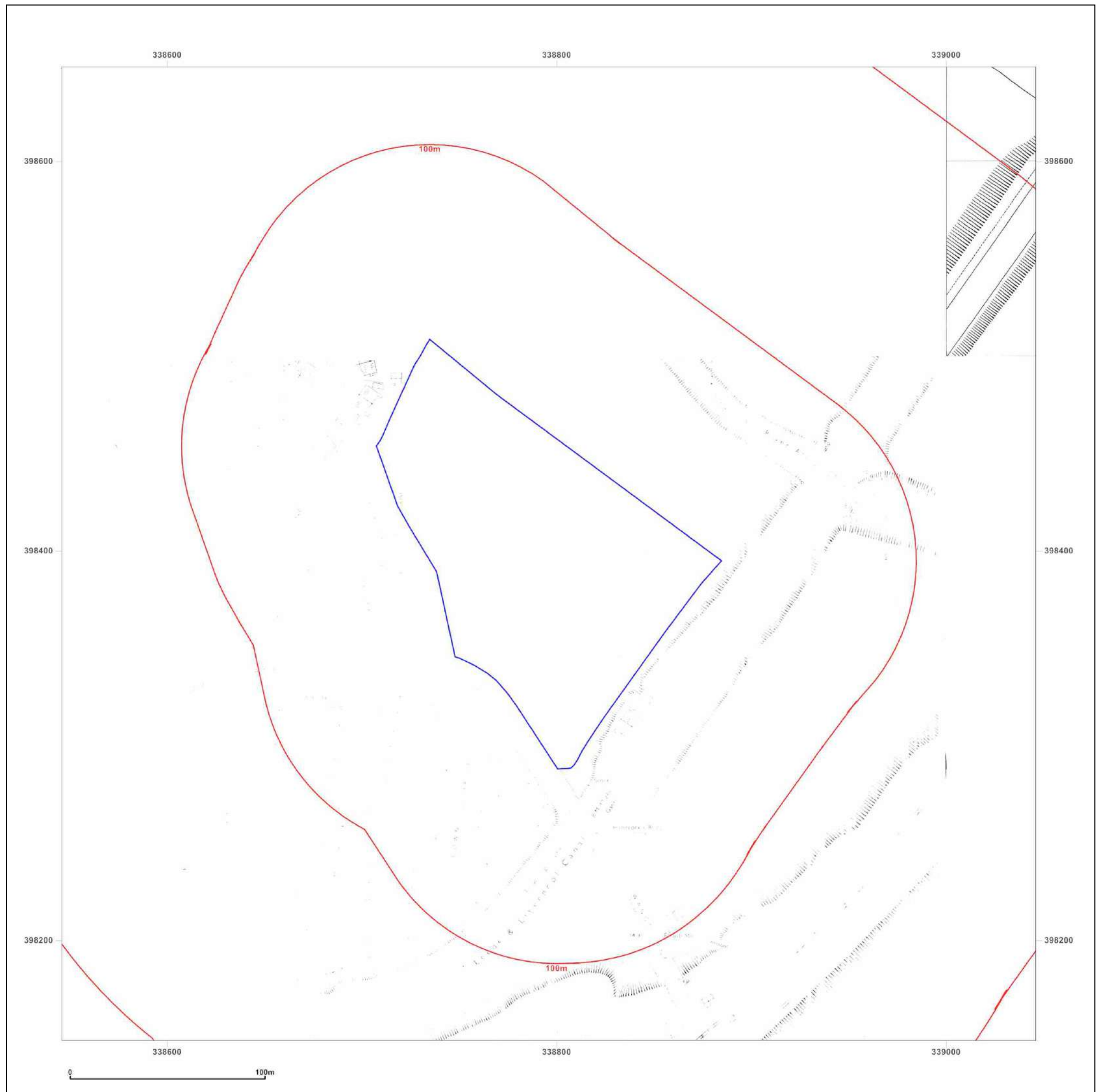
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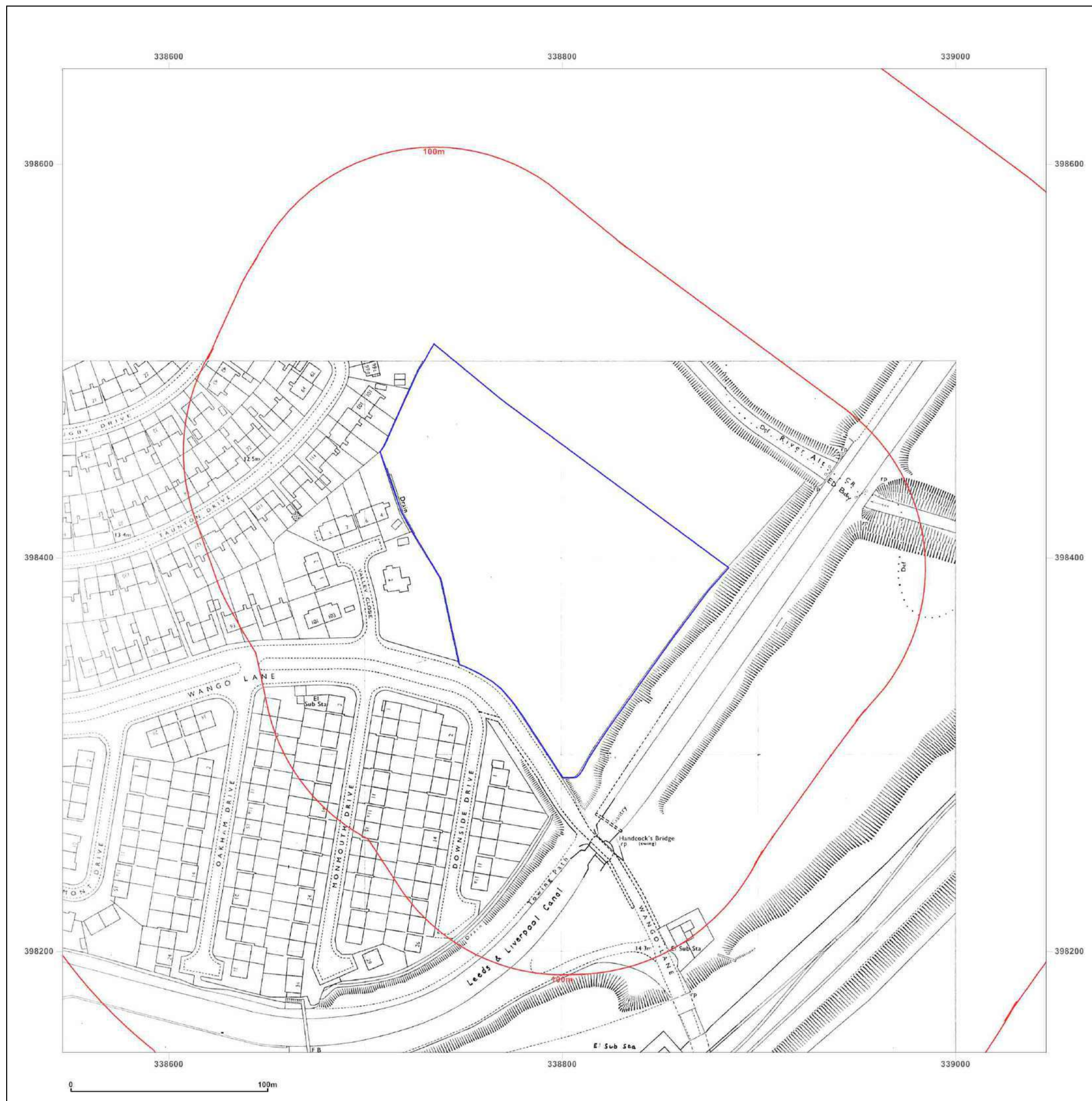


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Grid Ref: 338796, 398399

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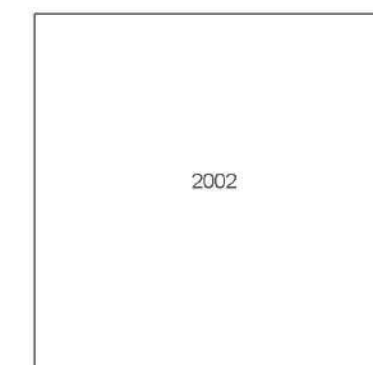
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Grid Ref: 338796, 398399

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Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000



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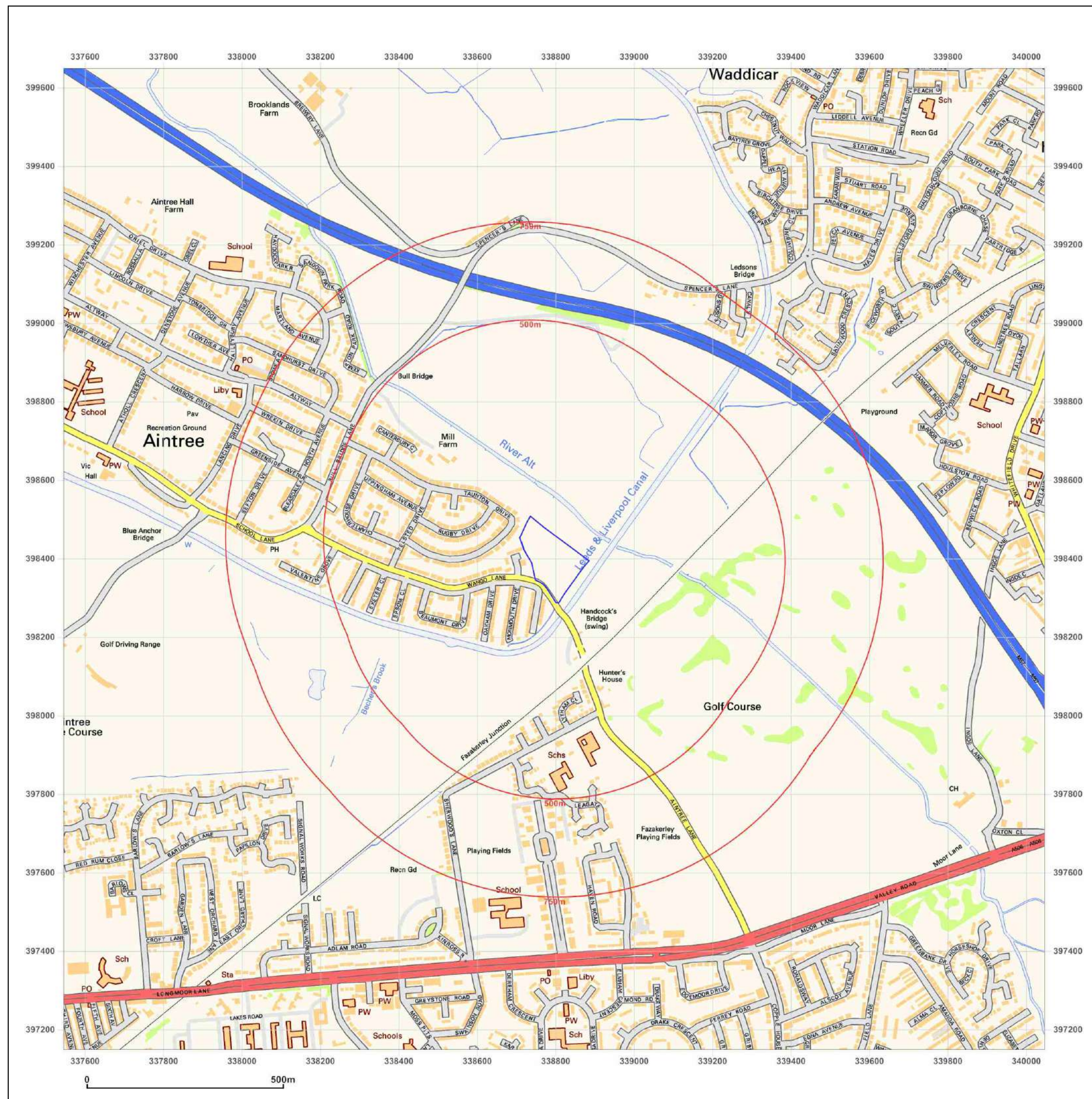
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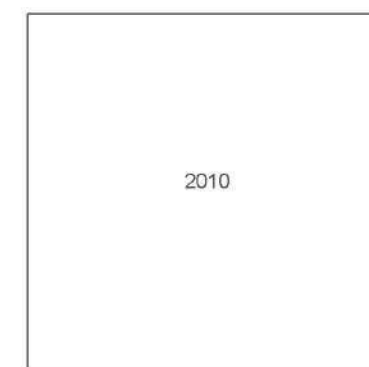
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Map Name: National Grid

Map date: 2010

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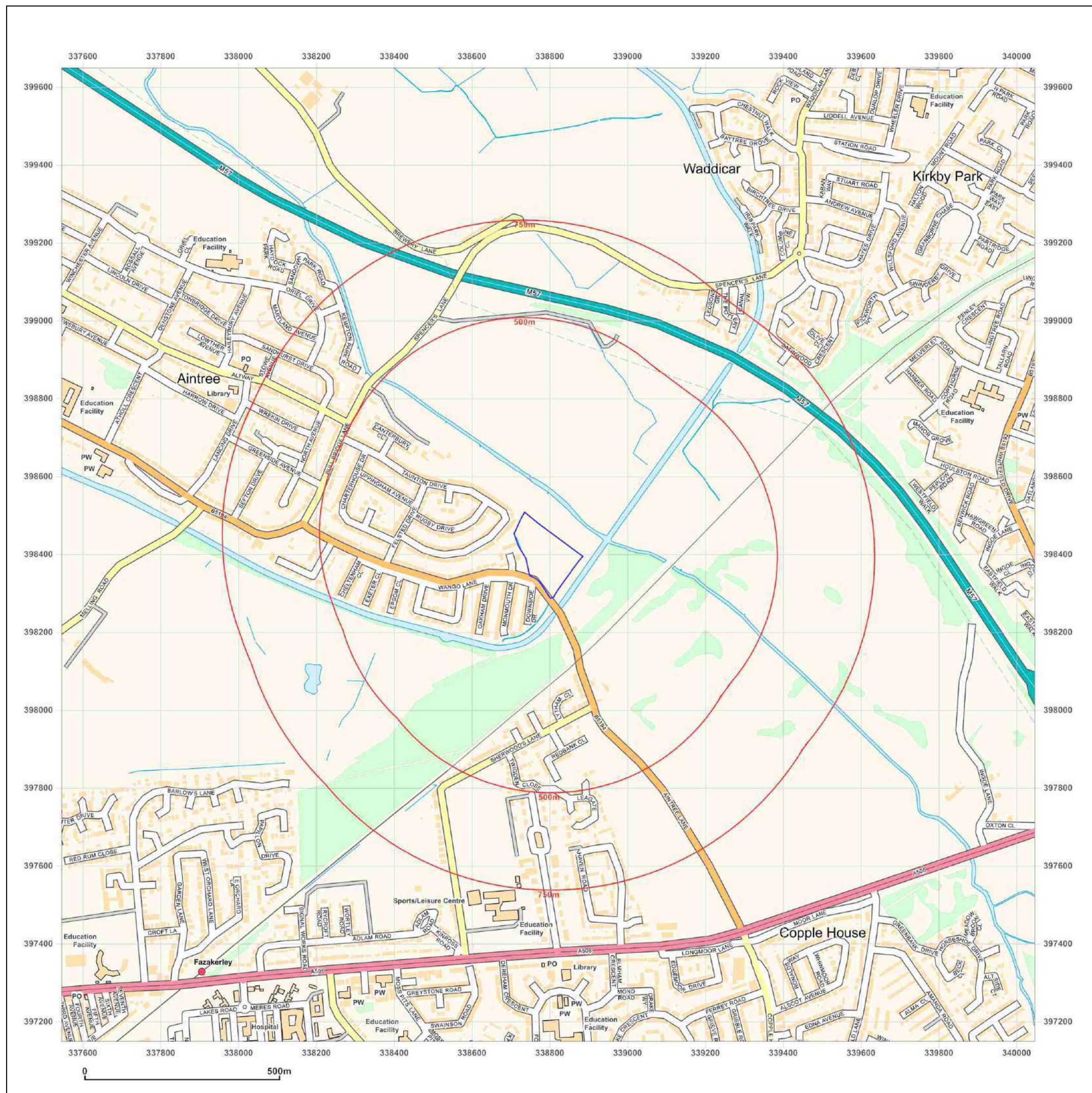


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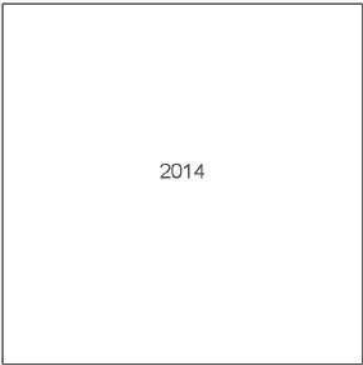
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Map Name: National Grid

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APPENDIX B

GeoInsight Report

Address: Wango Lane, L10 8JG
Date: 16 Apr 2018
Reference: CMAPS-CM-704983-29721-160418GEO
Client: CENTREMAPS



Aerial Photograph Capture date: 11-Jun-2015
Grid Reference: 338796,398399
Site Size: 1.87ha

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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

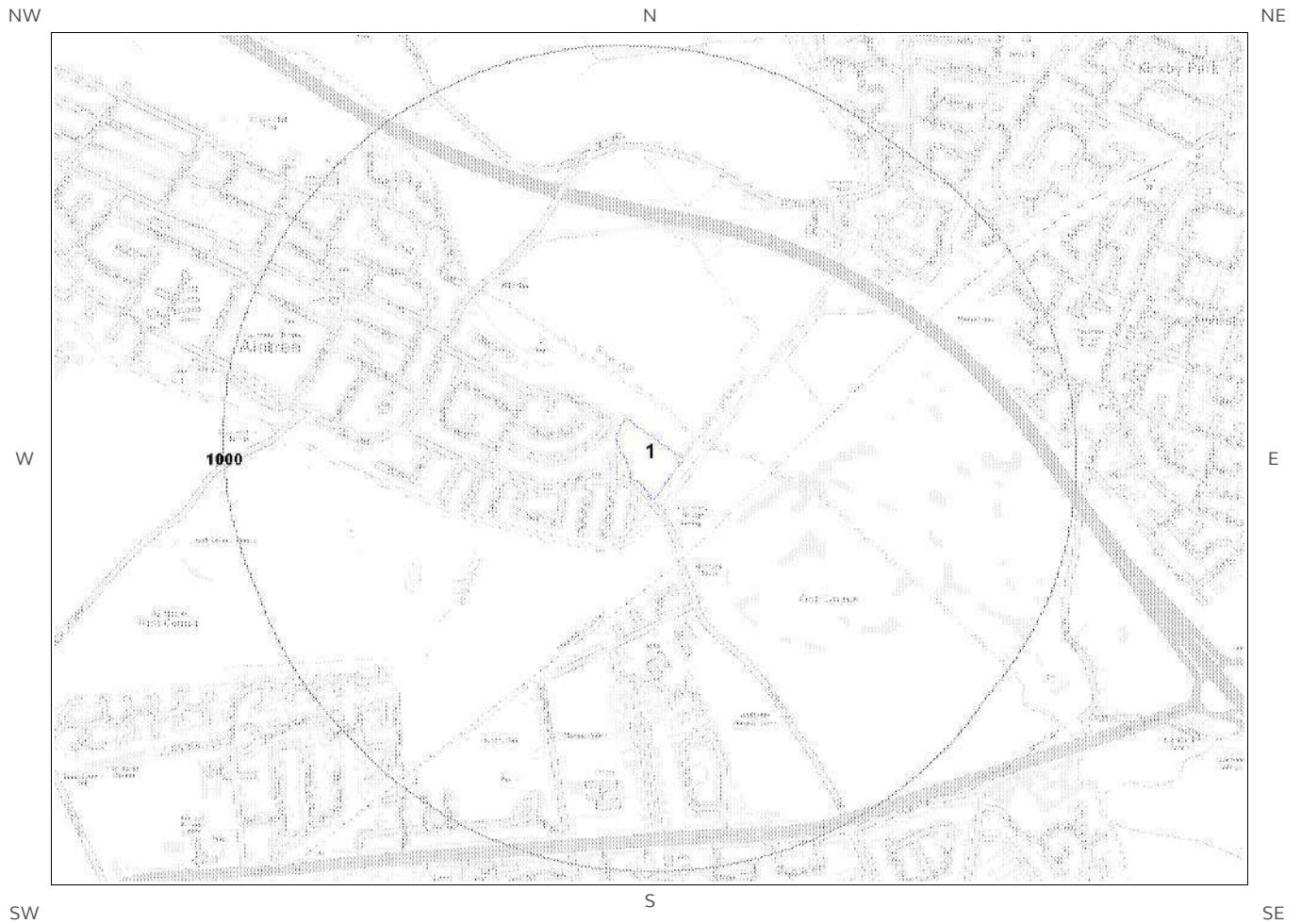
	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	0	8	0	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
4.3 Current Ground Workings	0	0	0	0	0

Section 5: Mining, Extraction & Natural Cavities

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

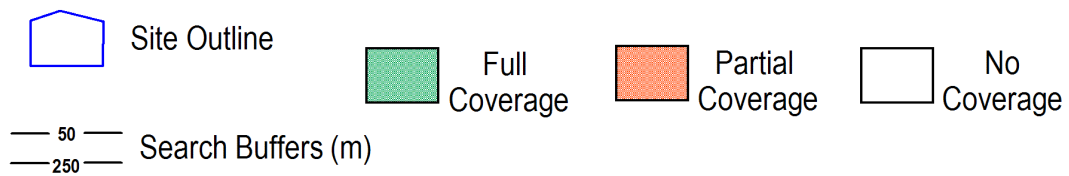
Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0
Section 6: Natural Ground Subsidence	On-site				
6.1 Shrink-Swell Clay	Very Low				
6.2 Landslides	Very Low				
6.3 Ground Dissolution of Soluble Rocks	Negligible				
6.4 Compressible Deposits	Moderate				
6.5 Collapsible Deposits	Very Low				
6.5 Running Sand	Low				
Section 7: Borehole Records	On-site	0-50m	51-250		
7 BGS Recorded Boreholes	0	2	0		
Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250		
8 Records of Background Soil Chemistry	2	2	0		
Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500	
9.1 Tunnels	0	0	0	Not Searched	
9.2 Historical Railway and Tunnel Features	0	0	21	Not Searched	
9.3 Historical Railways	0	0	0	Not Searched	
9.4 Active Railways	0	0	10	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	1491.0	No deposits are mapped	No coverage	No coverage	No coverage

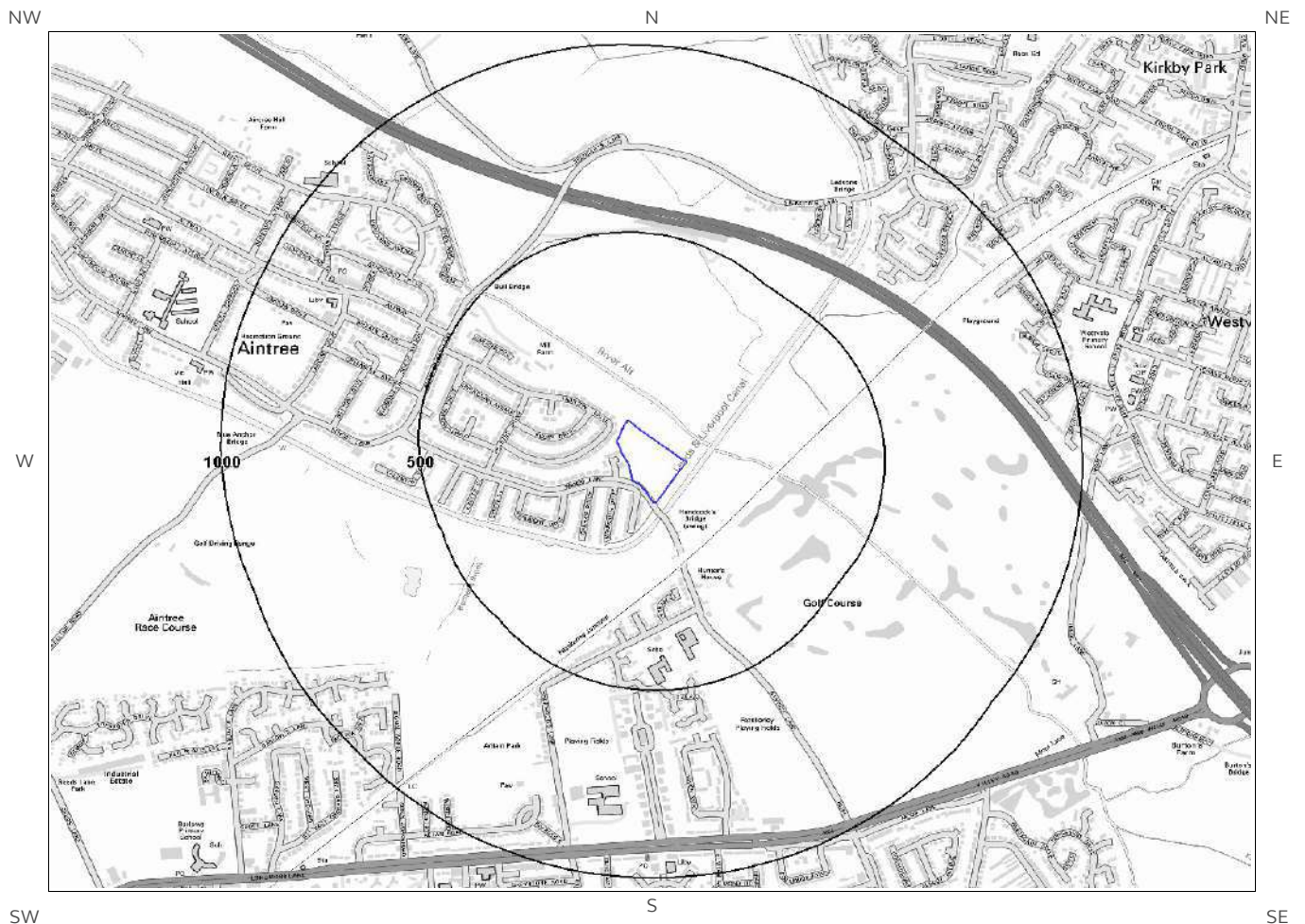
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not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

The definitions of coverage are as follows:

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

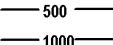
1 Geology (1:10,000 scale).

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



Artificial Ground Legend

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	Site Outline		Made Ground (undivided)		Disturbed Ground (undivided)
	Search Buffers (m)		Worked Ground (undivided)		Landscaped Ground (undivided)
			Infilled Ground		Reclaimed Ground

1. Geology 1:10,000 scale

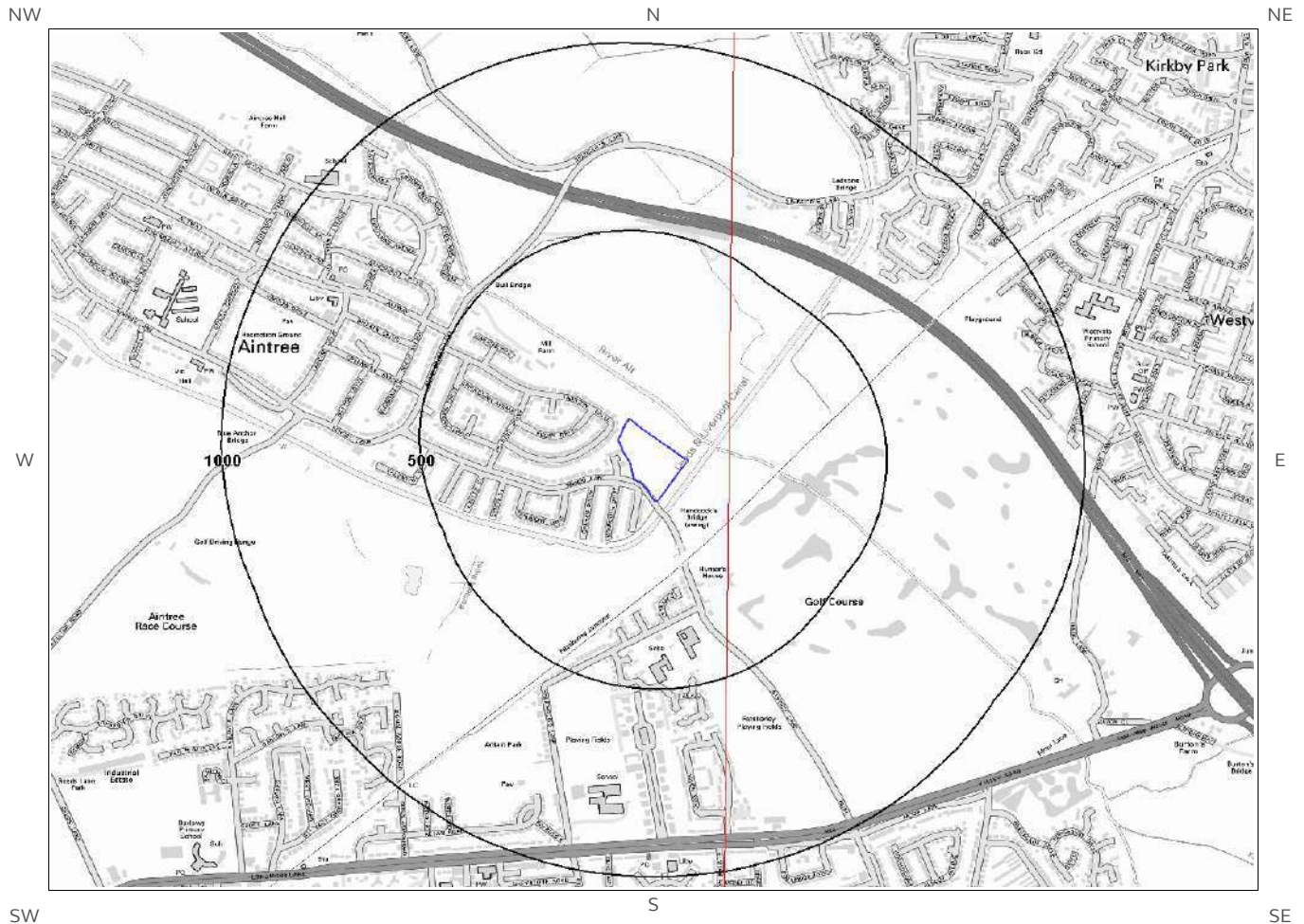
1.1 Artificial Ground

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

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

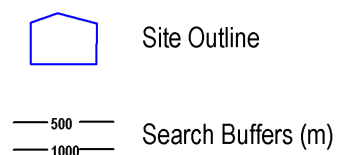
Database searched and no data found.

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



Artificial Ground Legend

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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

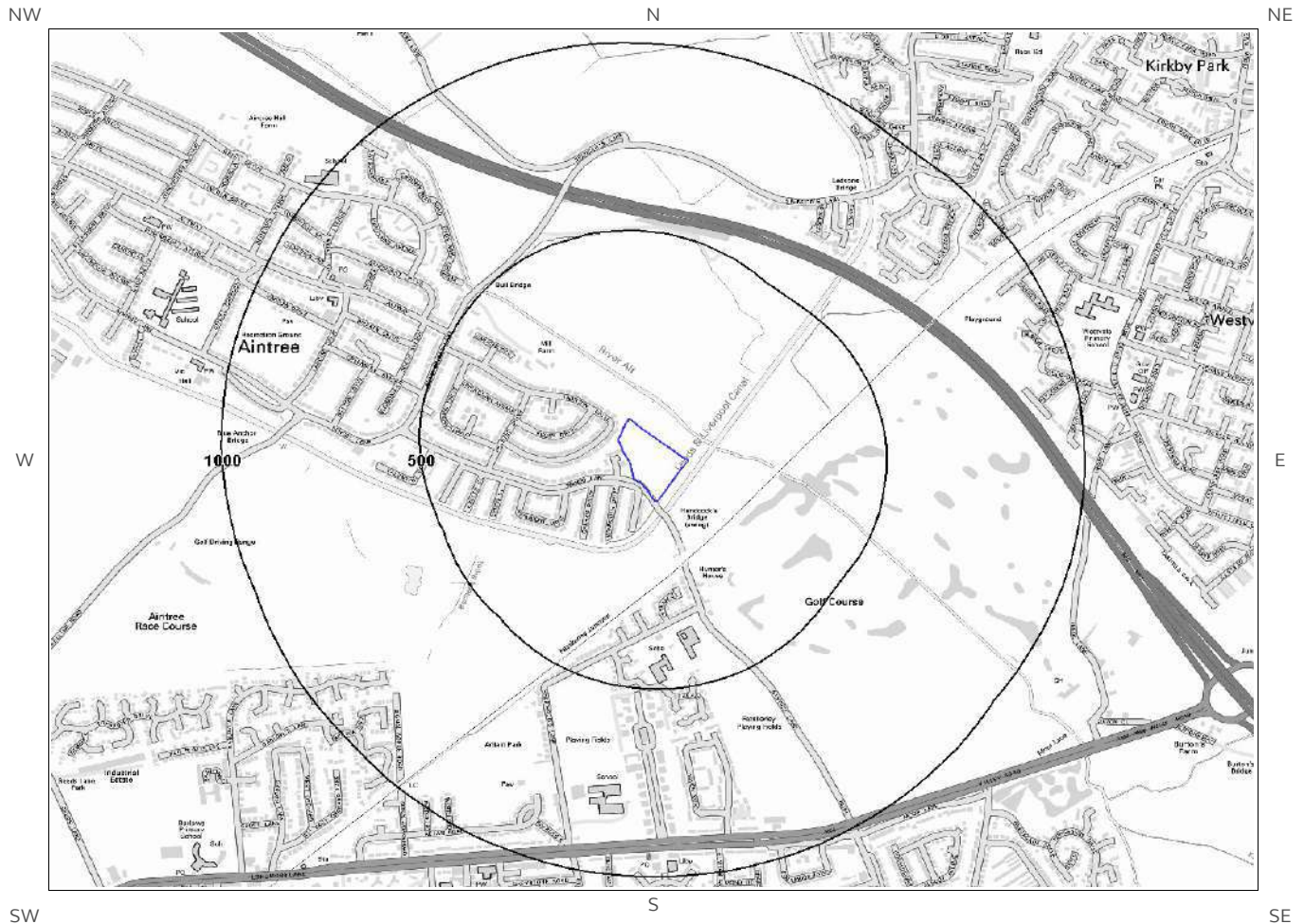
Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale? No

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)

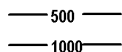


Bedrock and linear features Legend

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Site Outline



Search Buffers (m)

1.3 Bedrock and linear features

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

1.3.1 Bedrock/ Solid Geology

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

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

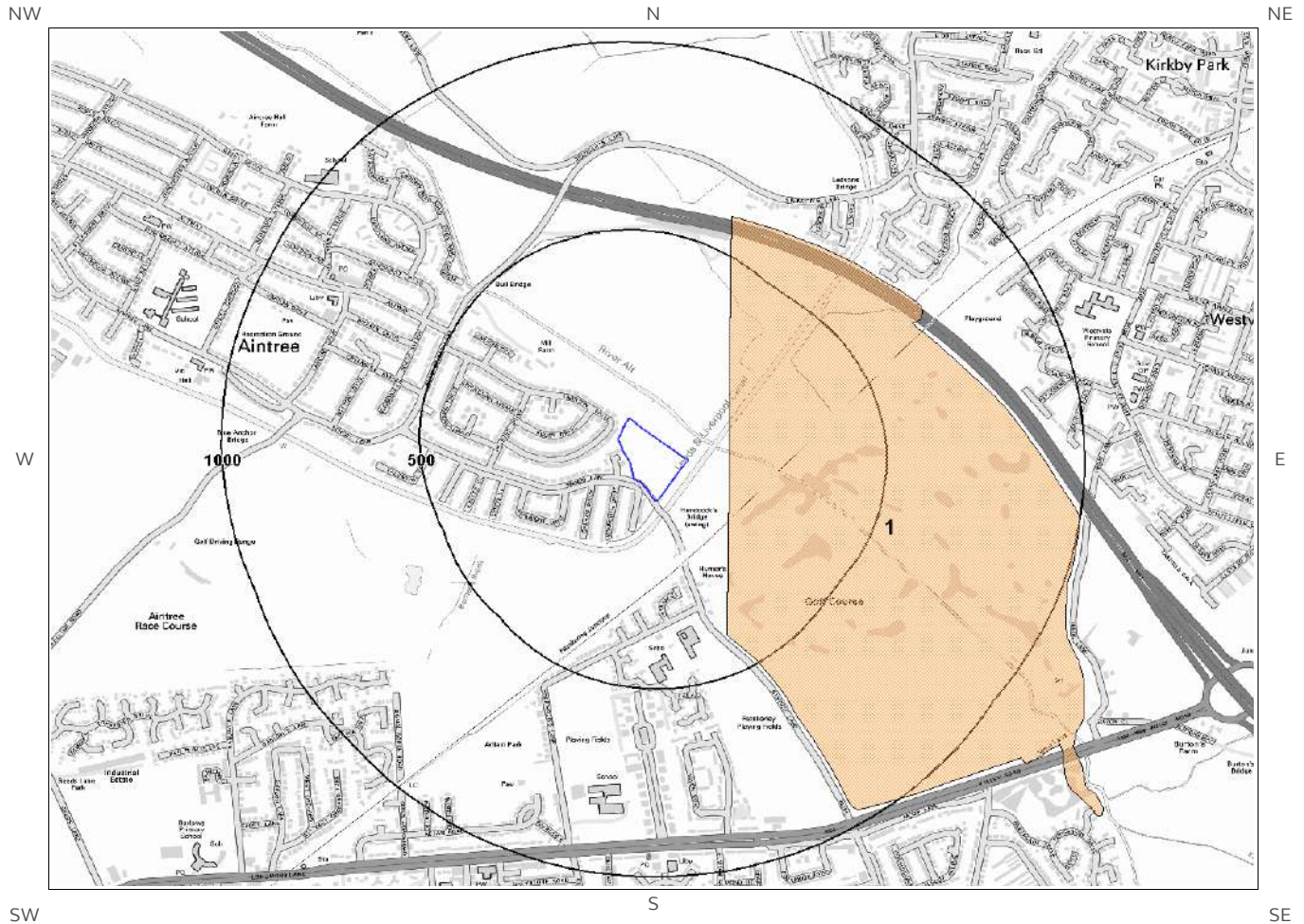
Database searched and no data found at this scale.

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.

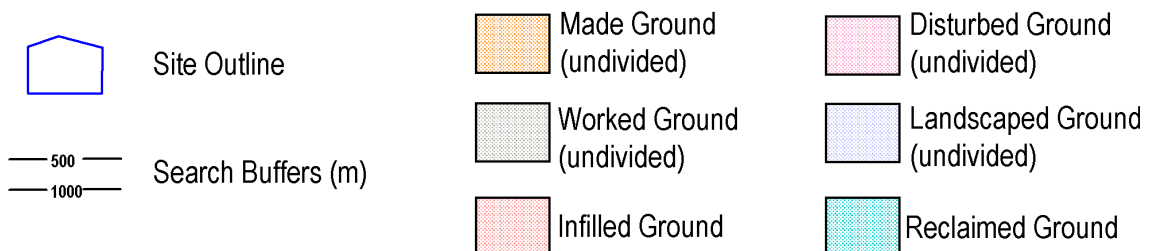
This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

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: 083

2.1.1 Artificial/ Made Ground

Are there any records of Artificial/ Made Ground within 500m of the study site boundary? Yes

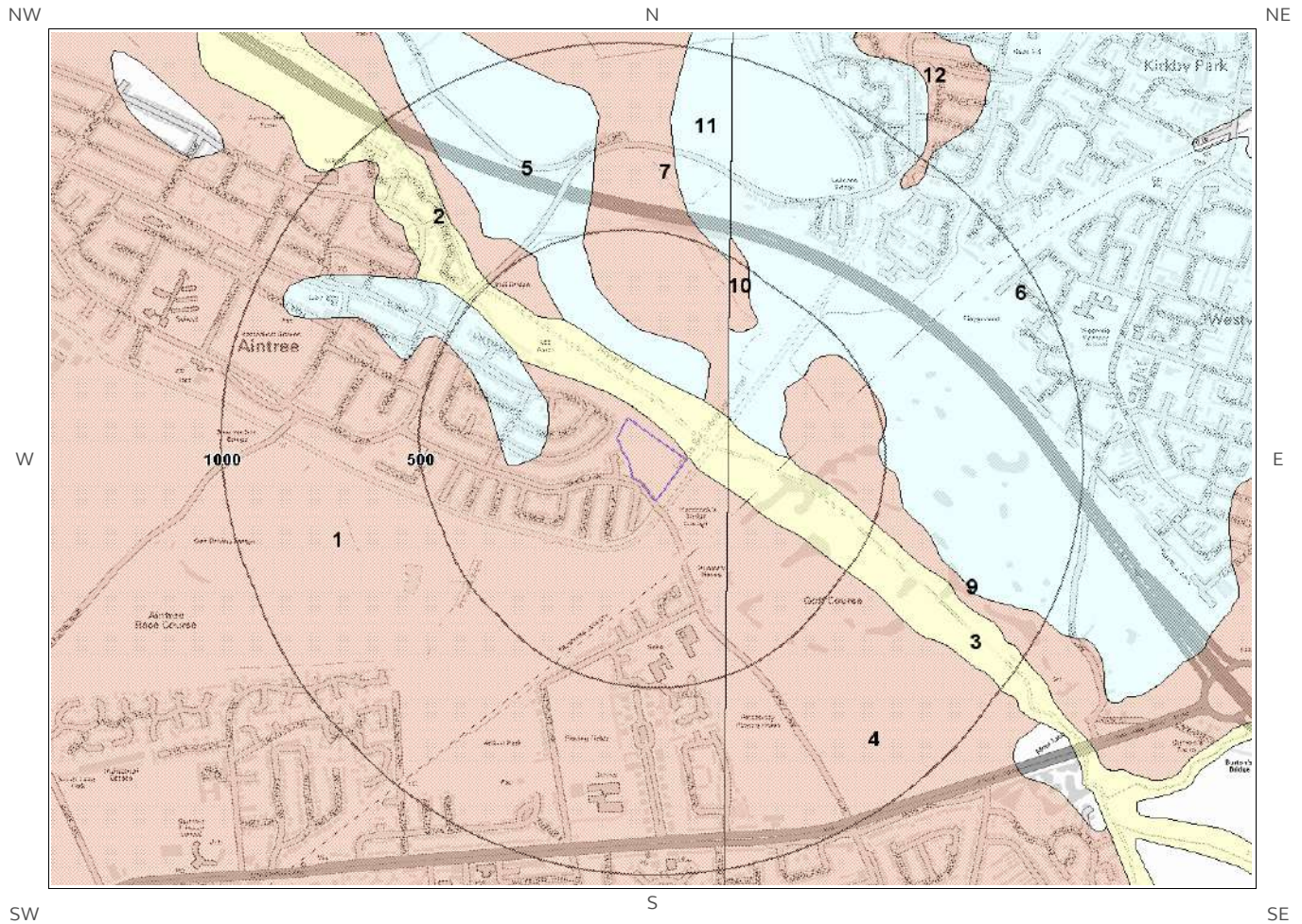
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	103.0	E	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

2.1.2 Permeability of Artificial Ground

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

Database searched and no data found.

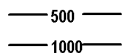
2.2 Superficial Deposits and Landslips map (1:50,000 scale)



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Site Outline



Search Buffers (m)

2.2 Superficial Deposits and Landslips

2.2.1 Superficial Deposits/ Drift Geology

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

ID	Distance	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	SSA-S	SHIRDLEY HILL SAND FORMATION	SAND
2	7.0	NE	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
3	103.0	E	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
4	127.0	SE	SSA-S	SHIRDLEY HILL SAND FORMATION	SAND
5	130.0	NE	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
6	152.0	NE	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
7	152.0	NE	SSA-S	SHIRDLEY HILL SAND FORMATION	SAND
8	177.0	W	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
9	243.0	E	SSA-S	SHIRDLEY HILL SAND FORMATION	SAND
10	345.0	NE	SSA-S	SHIRDLEY HILL SAND FORMATION	SAND
11	488.0	NE	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	Intergranular	High	High
7.0	NE	Intergranular	High	Very 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.

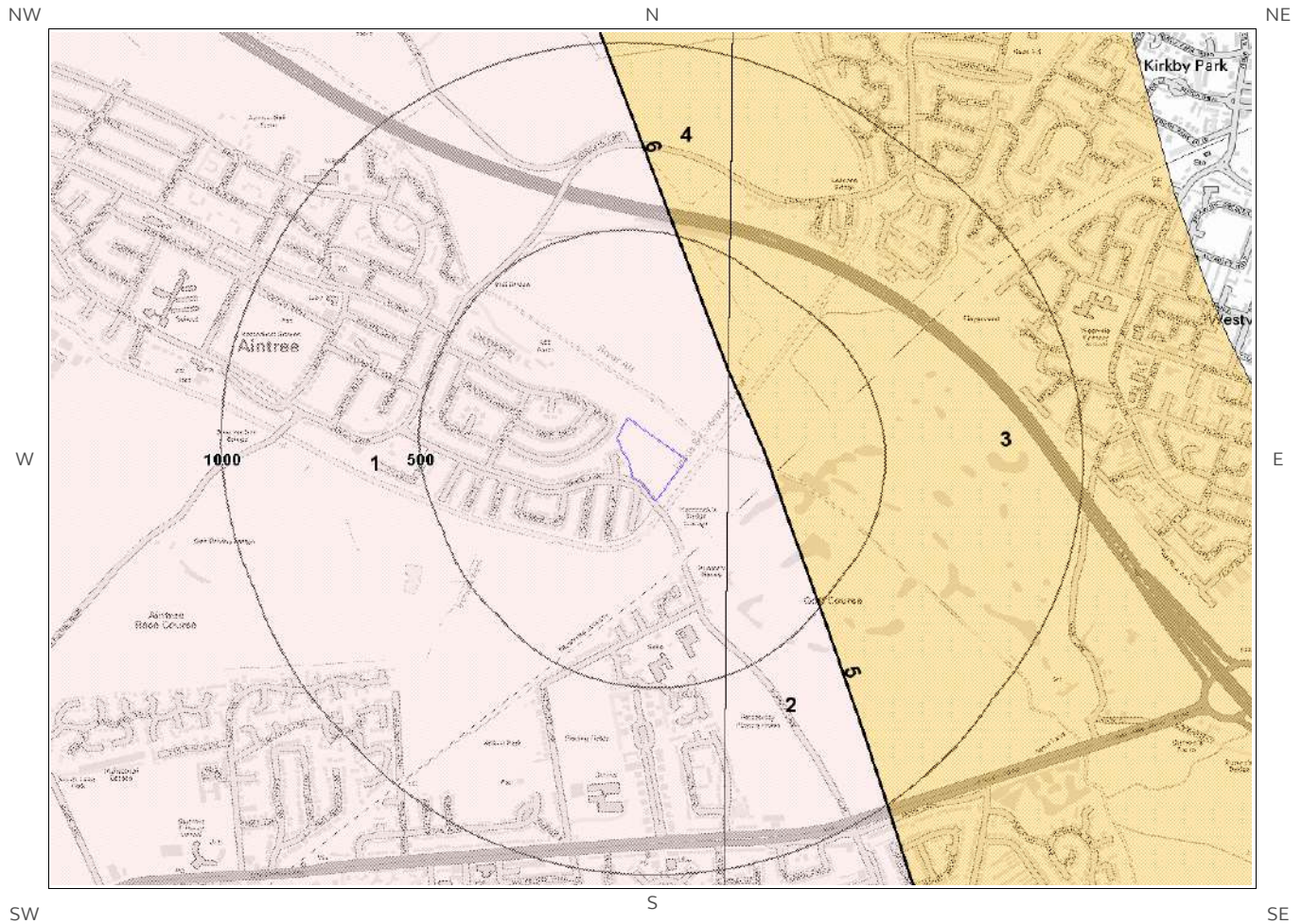
2.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site boundary?

No

Database searched and no data found.

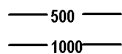
2.3 Bedrock and linear features map (1:50,000 scale)



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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: 083

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	WLSF-SDST	WILMSLOW SANDSTONE FORMATION - SANDSTONE	-
2	103.0	E	WLSF-SDST	WILMSLOW SANDSTONE FORMATION - SANDSTONE	-
3	188.0	NE	CHES-SDST	CHESTER FORMATION - SANDSTONE	OLENEKIAN
4	252.0	NE	CHES-SDST	CHESTER FORMATION - SANDSTONE	OLENEKIAN

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	Intergranular	High	High

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
5	188.0	NE	FAULT	Fault, inferred
6	252.0	NE	FAULT	Fault, 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

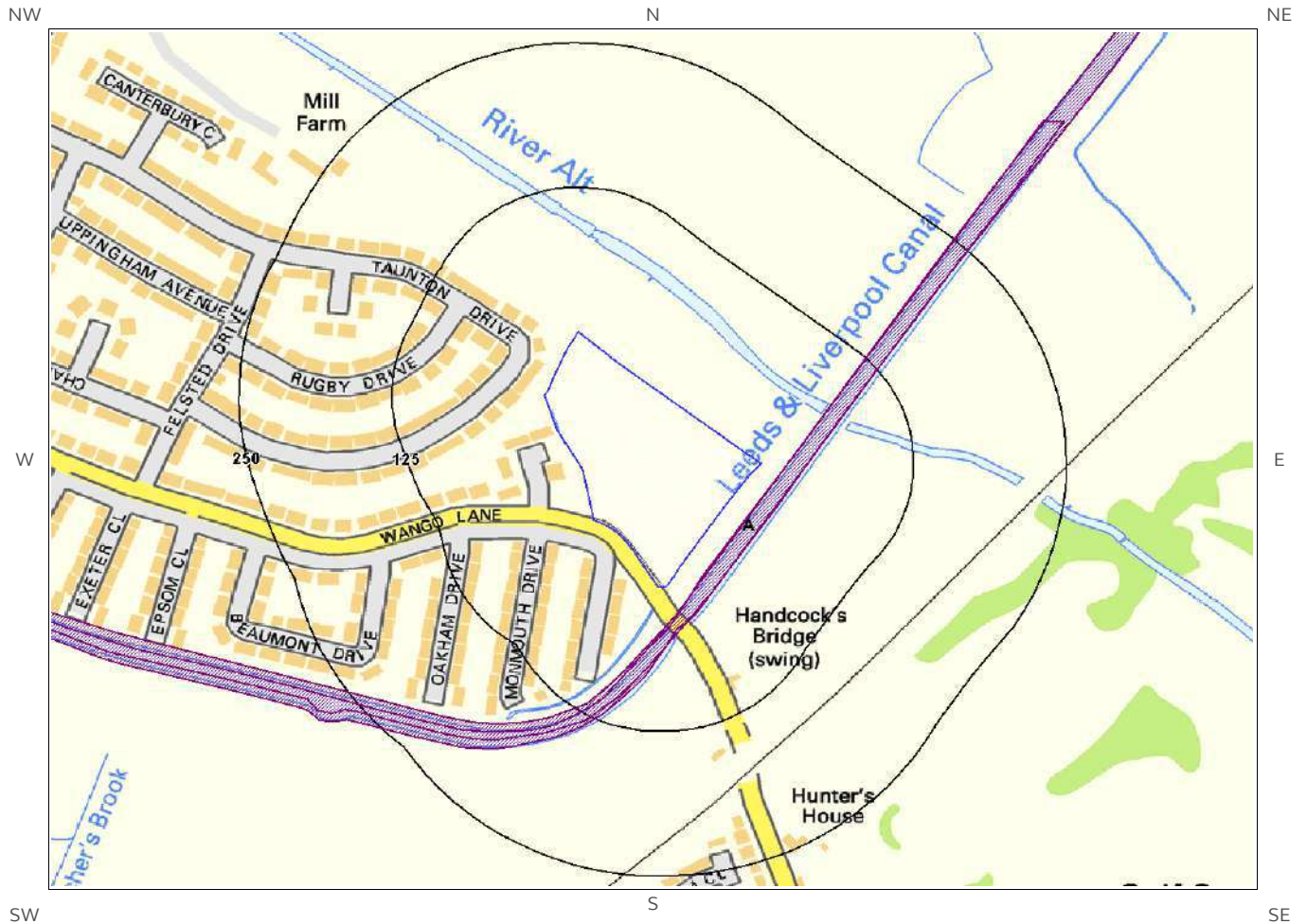
Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

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

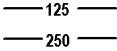
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

4 Ground Workings map



Ground Workings Legend

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-  Site Outline
-  Search Buffers (m)
125
250
-  Historic Surface Ground Workings
-  Historic Underground Workings
-  Current Ground Workings

4 Ground Workings

4.1 Historical Surface Ground Working Features derived from Historical Mapping

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

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

ID	Distance (m)	Direction	NGR	Use	Date
1A	18.0	SE	337922 398426	Canal	1906
2A	18.0	SE	337922 398426	Canal	1938
3A	18.0	SE	337922 398426	Canal	1925
4A	18.0	SE	337922 398426	Canal	1891
5B	18.0	SE	336984 399079	Canal	1974
6B	18.0	SE	336984 399079	Canal	1967
7B	18.0	SE	336984 399079	Canal	1987
8B	18.0	SE	336984 399079	Canal	1949

4.2 Historical Underground Working Features derived from Historical Mapping

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

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

Database searched and no data found.

4.3 Current Ground Workings

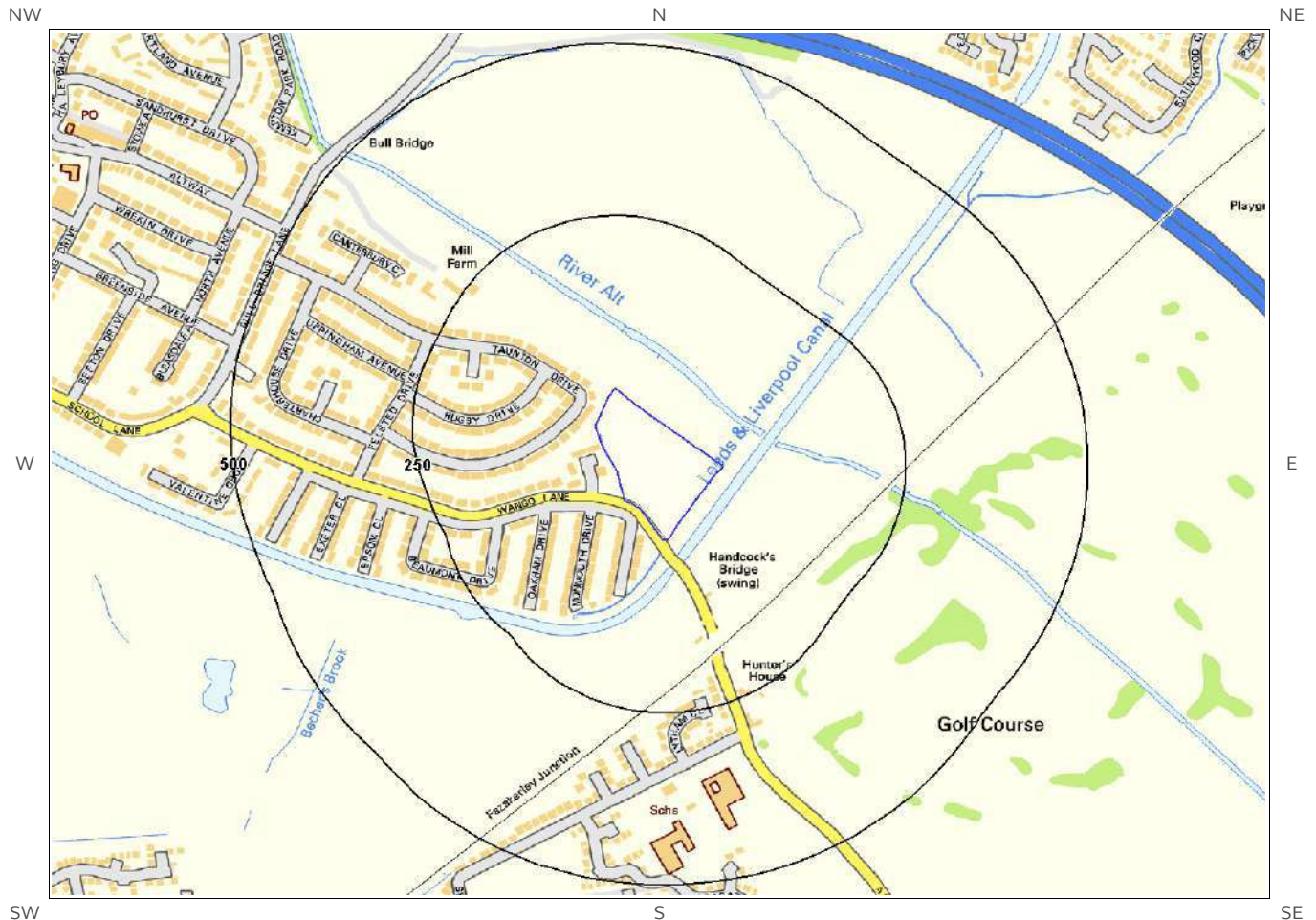
This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

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

No

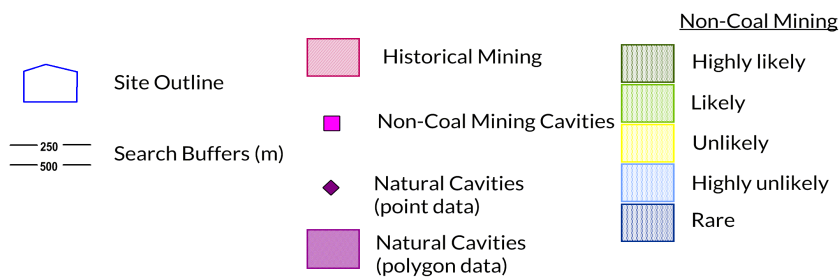
Database searched and no data found.

5 Mining, Extraction & Natural Cavities map



**Mining, Extraction and
Natural Cavities Legend**

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5 Mining, Extraction & Natural Cavities

5.1 Historical Mining

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

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

Database searched and no data found.

5.2 Coal Mining

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

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

Database searched and no data found.

5.3 Johnson Poole and Bloomer

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

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

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

5.4 Non-Coal Mining

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

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

Database searched and no data found.

5.5 Non-Coal Mining Cavities

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

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

Database searched and no data found.

5.6 Natural Cavities

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

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

Database searched and no data found.

5.7 Brine Extraction

This data provides information from the 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.

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

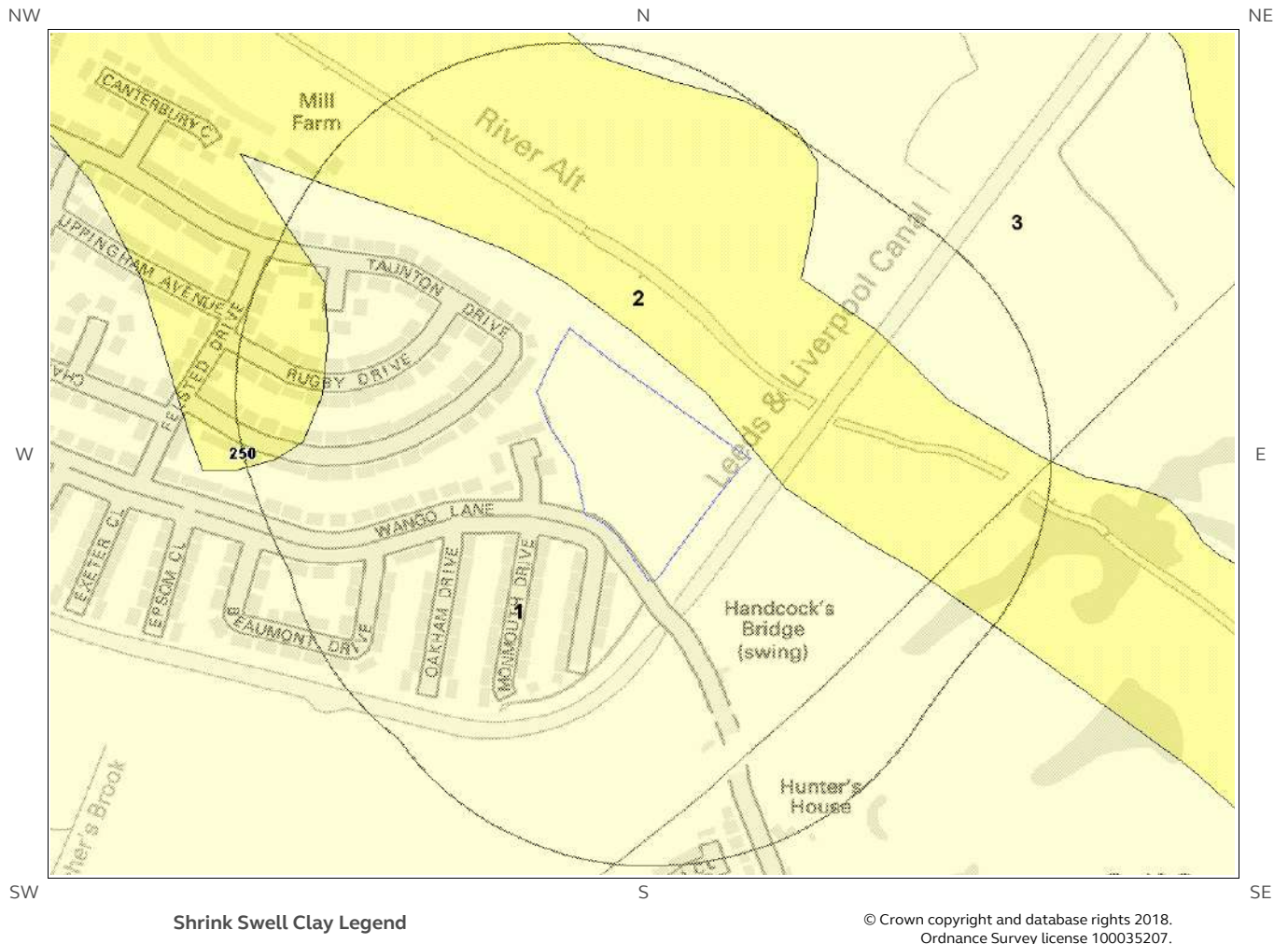
Are there any Clay Mining areas within 1000m of the study site boundary?

No

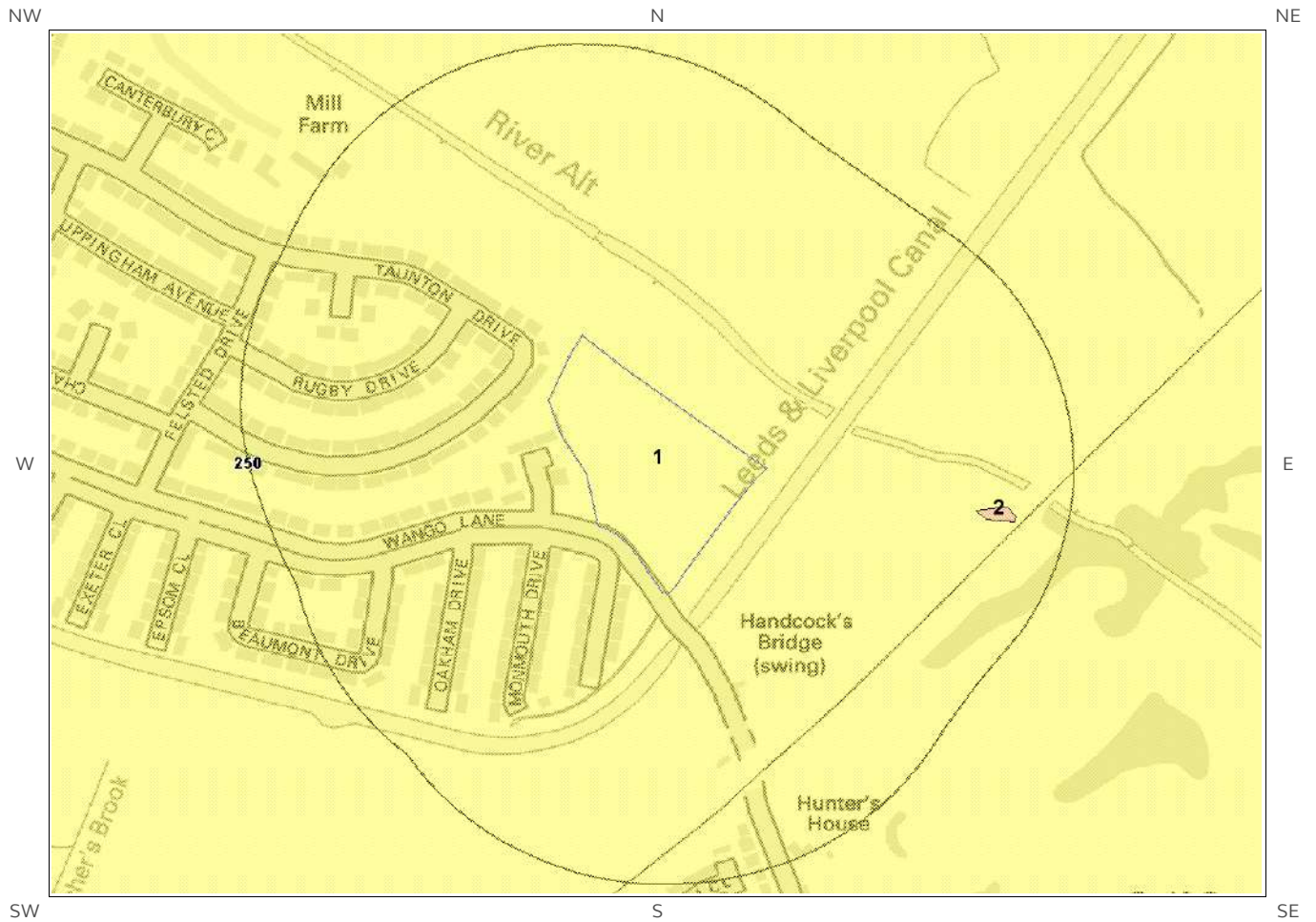
Database searched and no data found.

6 Natural Ground Subsidence

6.1 Shrink-Swell Clay map



6.2 Landslides map

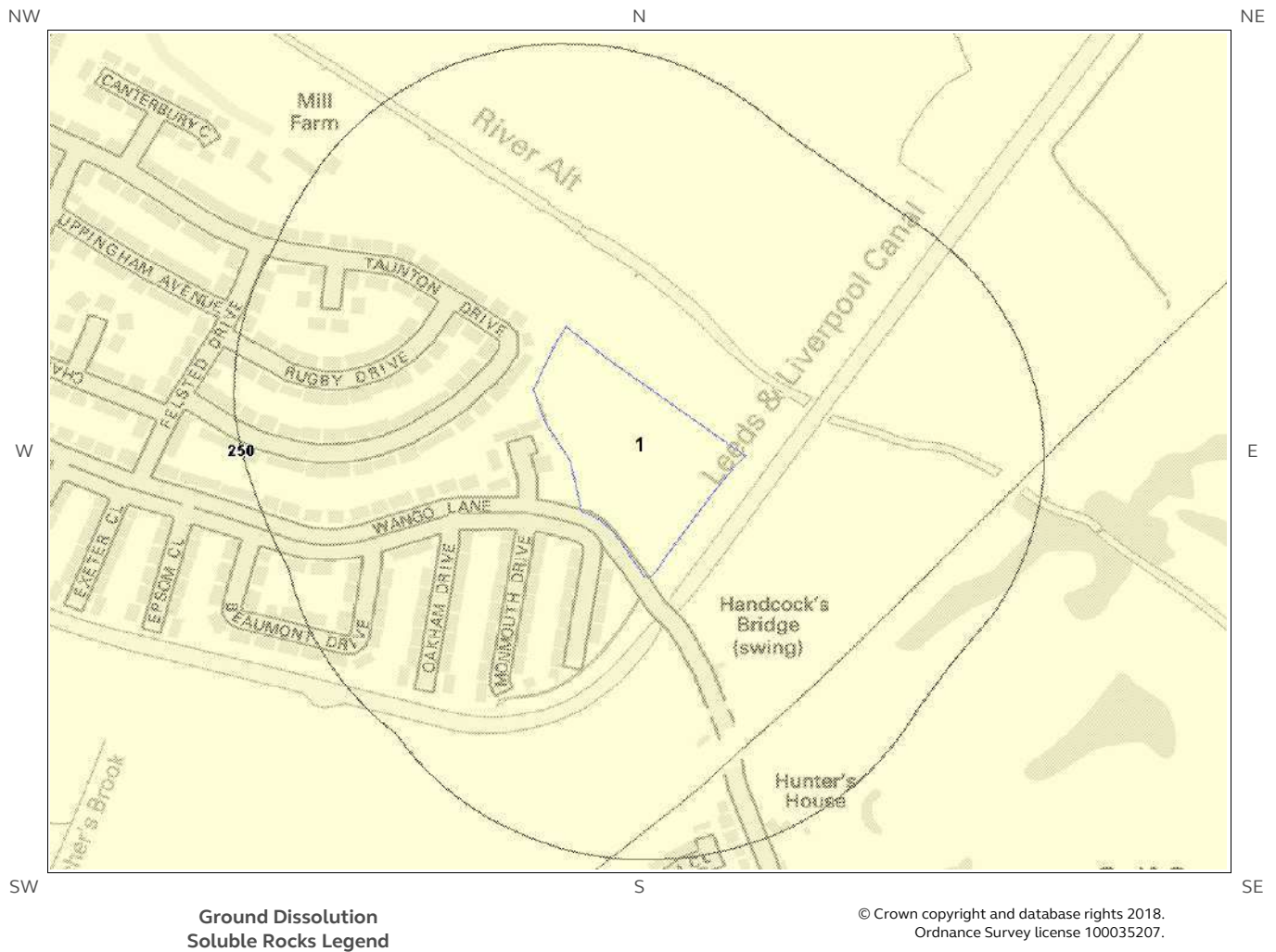


Landslides Legend

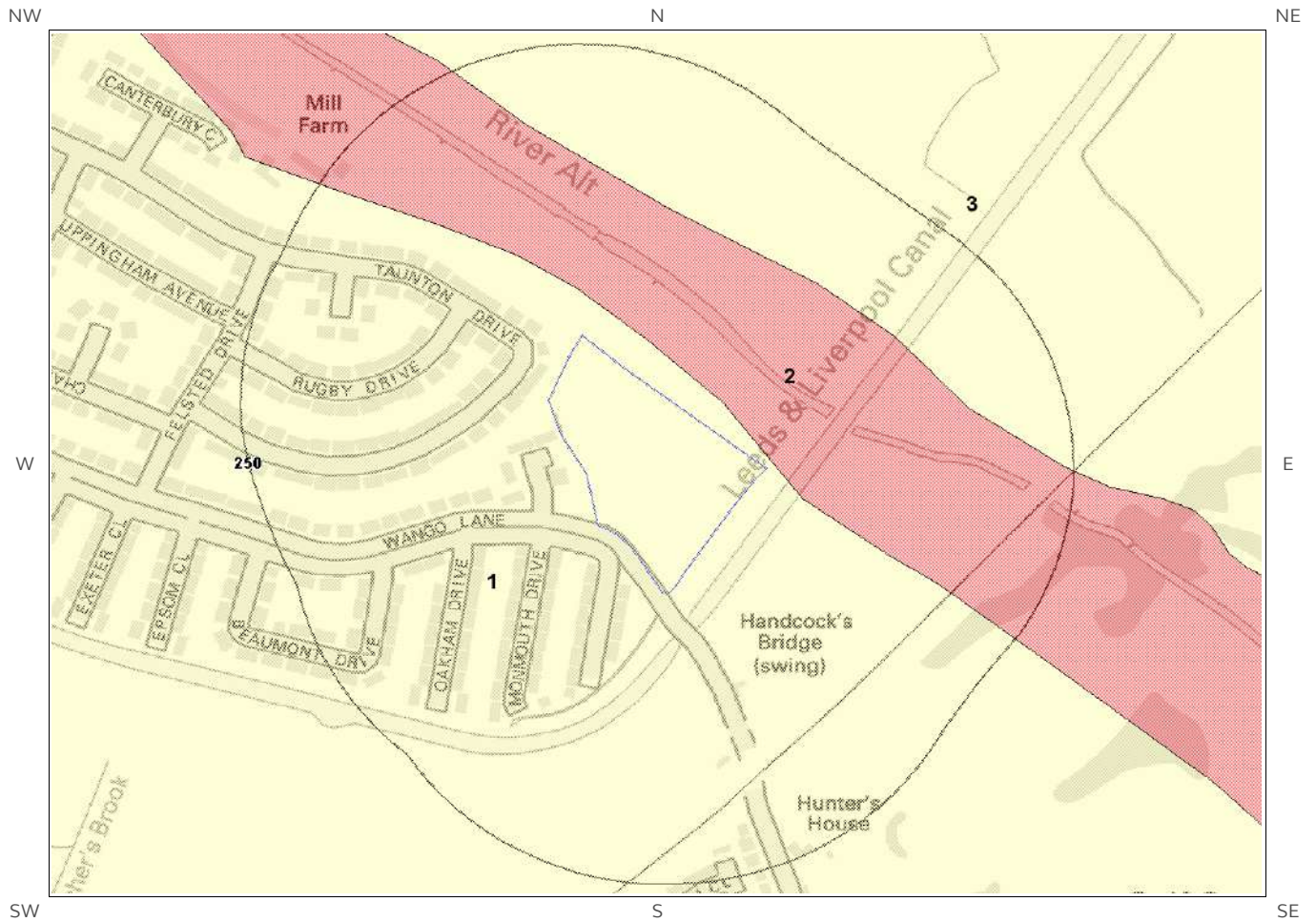
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6.3 Ground Dissolution of Soluble Rocks map



6.4 Compressible Deposits map

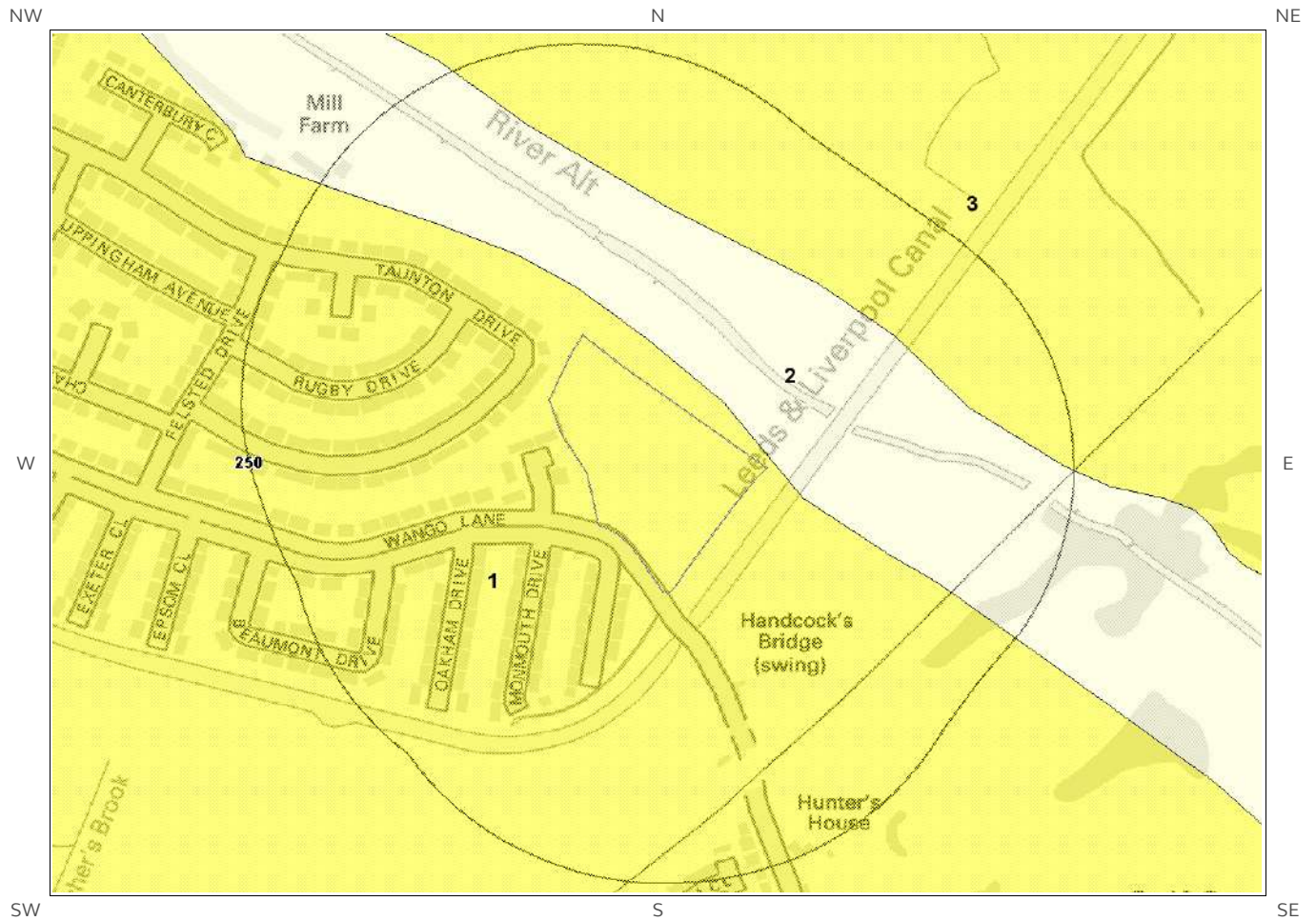


Compressible Deposits Legend

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6.5 Collapsible Deposits map

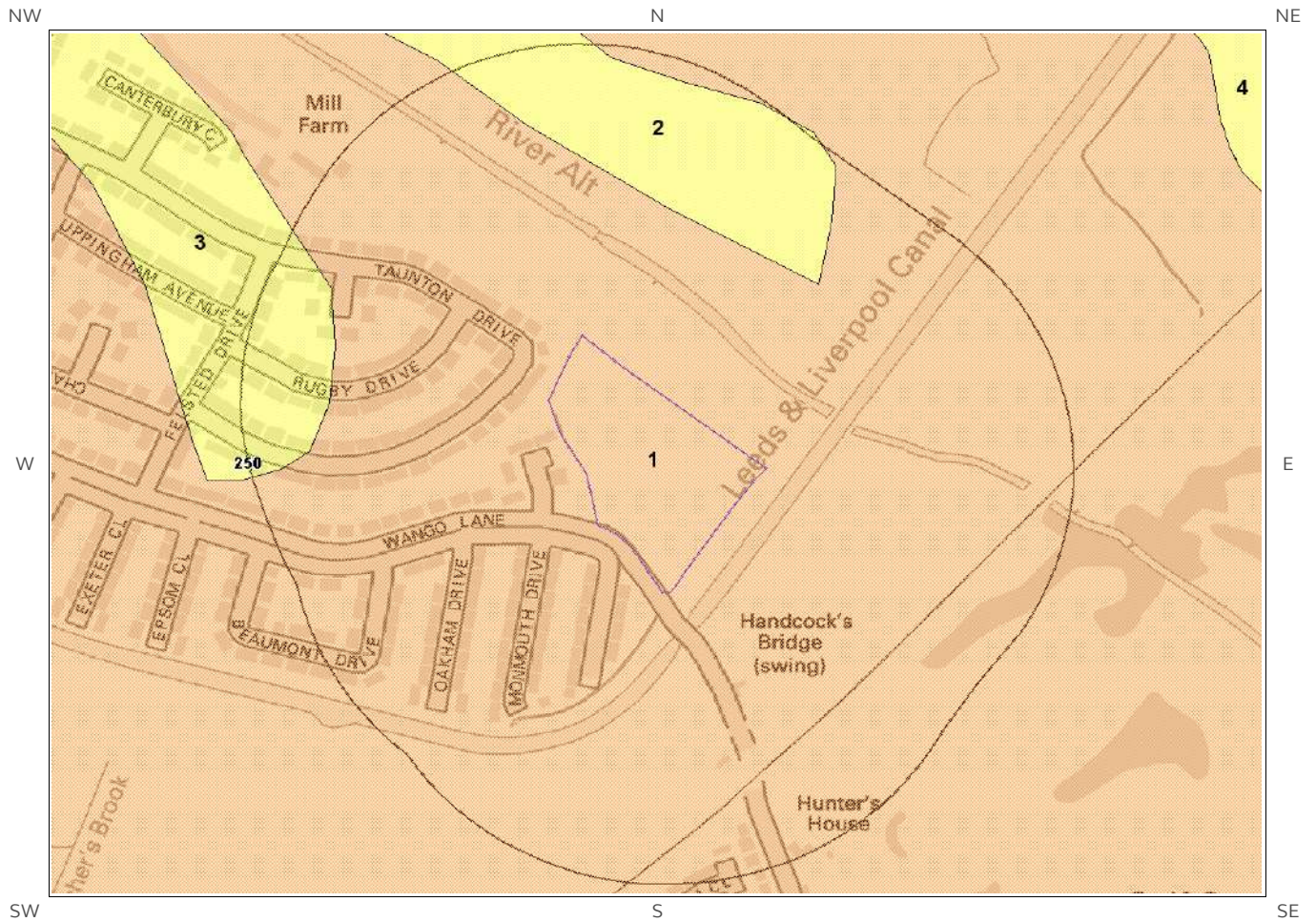


Collapsible Deposits Legend

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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? **Moderate**

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	Negligible	Ground conditions predominantly non-plastic. 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 likely due to potential problems with shrink-swell clays.
2	7.0	NE	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 likely 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.

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

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.

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.
2	7.0	NE	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

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.
2	7.0	NE	Negligible	No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. No special ground investigation required, or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

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

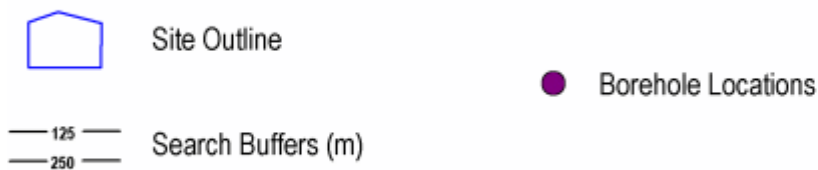
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.

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:

2

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	38.0	S	338800 398250	SJ39NE373	13.1	HEADCOCKS BRIDGE AINTREE 2
2	50.0	S	338820 398240	SJ39NE372	12.7	HEADCOCKS BRIDGE AINTREE 1

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/159359

#2: scans.bgs.ac.uk/sobi_scans/boreholes/159358

8 Estimated Background Soil Chemistry

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

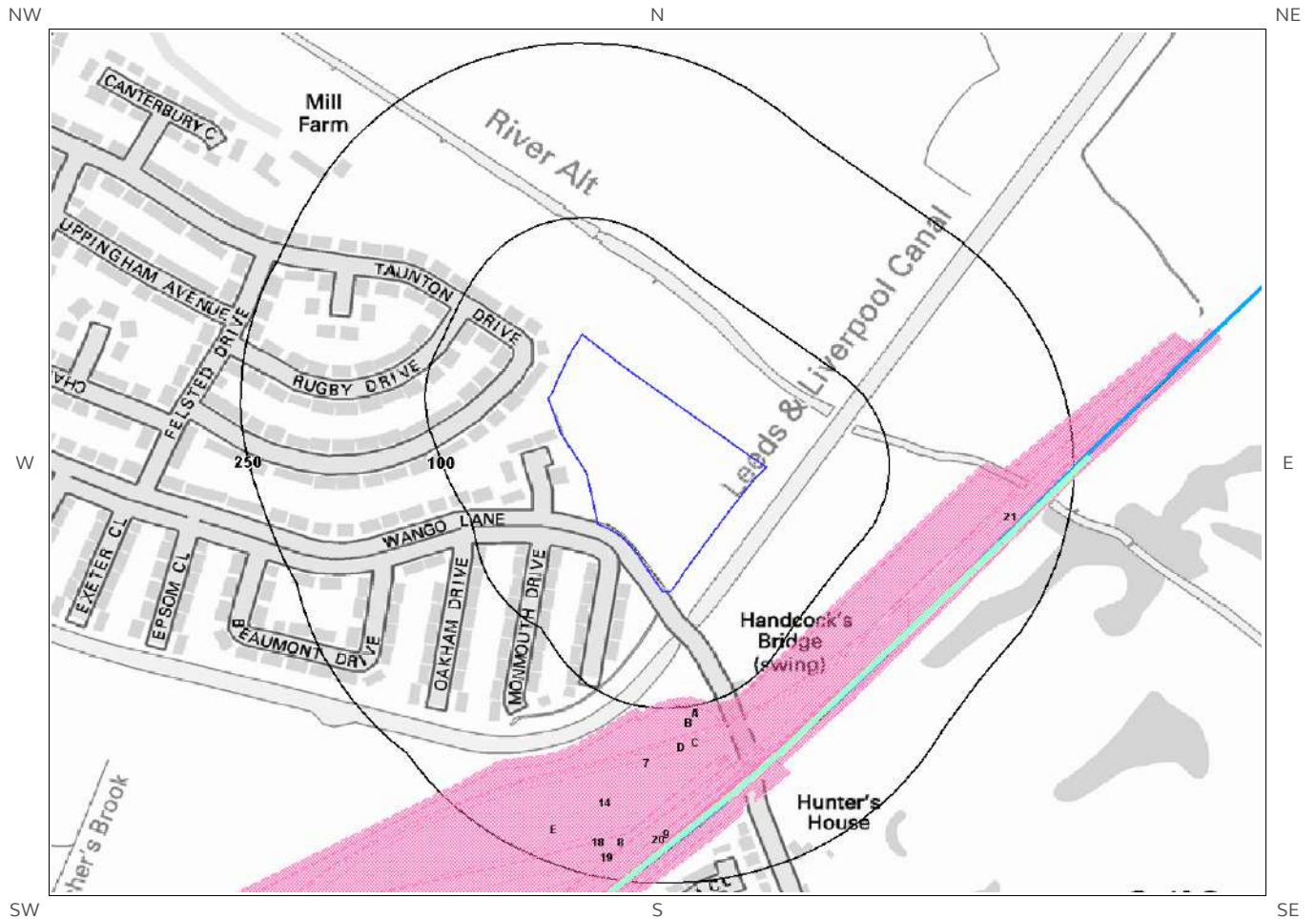
4

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	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
7.0	NE	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<100 mg/kg
30.0	NE	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<100 mg/kg

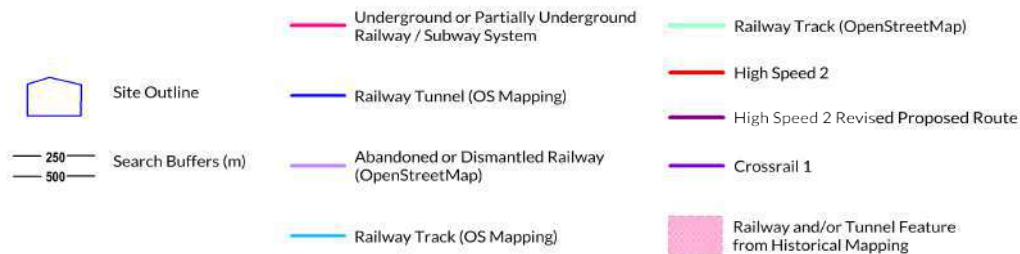
*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

9 Railways and Tunnels map



Railways and Tunnels Legend

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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
1A	92	S	338630 398046	Railway Sidings	1974
2A	92	S	338630 398046	Railway Sidings	1967
3A	92	S	338630 398046	Railway Sidings	1987
4	92	S	338630 398046	Railway Sidings	1955
5B	98	S	338628 398041	Railway Sidings	1938
6B	98	S	338628 398041	Railway Sidings	1925

ID	Distance (m)	Direction	NGR	Details	Date
7	121	S	338640 398040	Railway Sidings	1925
10C	123	SE	339000 398278	Railway Sidings	1937
11C	123	SE	339000 398278	Railway Sidings	1927
12D	123	SE	338995 398257	Railway Sidings	1964
13D	123	SE	338995 398257	Railway Sidings	1960
14	123	SE	338826 398144	Railway Sidings	1958
15E	131	S	338694 398084	Railway Sidings	1958
16E	131	S	338694 398084	Railway Sidings	1964
17E	131	S	338694 398084	Railway Sidings	1971
8	146	S	338490 397906	Railway Sidings	1906
18	147	SE	338832 398104	Railway Sidings	1981
9	155	S	338438 397950	Railway Sidings	1891
19	156	SE	338732 398013	Railway Sidings	1908
20	167	S	338784 398059	Railway Sidings	1893
21	169	SE	339086 398348	Railway Sidings	1961

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.

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? Yes

Distance (m)	Direction	Name	Type
161	SE	Not given	Rail
161	SE	Not given	Rail
162	SE	Not given	Multi Track
162	SE	Not given	Multi Track
164	SE	Not given	Rail
164	SE	Not given	Rail
177	S	Not given	Rail
177	S	Not given	Rail
202	E	Not given	Rail
202	E	Not given	Rail

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.

APPENDIX C

EnviroInsight Report

Address: Wango Lane, L10 8JG
Date: 16 Apr 2018
Reference: CMAPS-CM-704983-29721-160418EDR
Client: CENTREMAPS



Aerial Photograph Capture date: 11-Jun-2015
Grid Reference: 338796,398399
Site Size: 1.87ha

Report Reference: CMAPS-CM-704983-29721-160418EDR
Client Reference: 29721

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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	0	1	10	19
1.2 Additional Information – Historical Tank Database	0	0	0	3
1.3 Additional Information – Historical Energy Features Database	0	0	8	7
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	2
1.6 Potentially Infilled Land	0	10	0	11
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	1
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	2	11
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	1	0	7	2
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
---	---------	-------	--------	---------	----------	-----------

3.1 Landfill Sites

3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	0	1	3
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	1	0	0

3.2 Landfill and Other Waste Sites Findings

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

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

4.1 Current Industrial Sites Data	0	1	4	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology

5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?

None identified

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

Identified

5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.

Section 6: Hydrogeology and Hydrology

0-500m

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

Identified

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

Identified

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	2	5
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	4
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	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)	2	0	1	2	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	Yes	Yes
6.10 Ordnance Survey MasterMap Water Network entries within 500m of the site	2	4	10	20	Not searched	Not searched
6.11 Surface water features within 250m of the study site	Yes	Yes	Yes	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?	Identified					
7.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	Identified					
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?	None identified					
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	None identified					
7.6 Are there any areas used for Flood Storage within 250m of the study site?	None identified					
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?	Low					

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	0	0
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	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	1	1	0	4

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?	Moderate
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?	Moderate
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?	Low
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Section 10: Mining

10.1 Are there any coal mining areas within 75m of the study site?	None identified
10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?	None identified
10.3 Are there any brine affected areas within 75m of the study site?	None identified

Using this report

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

1. Historical Industrial Sites

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

2. Environmental Permits, Incidents and Registers

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

3. Landfills and Other Waste Sites

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

4. Current Land Uses

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

5. Geology

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

6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction 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.

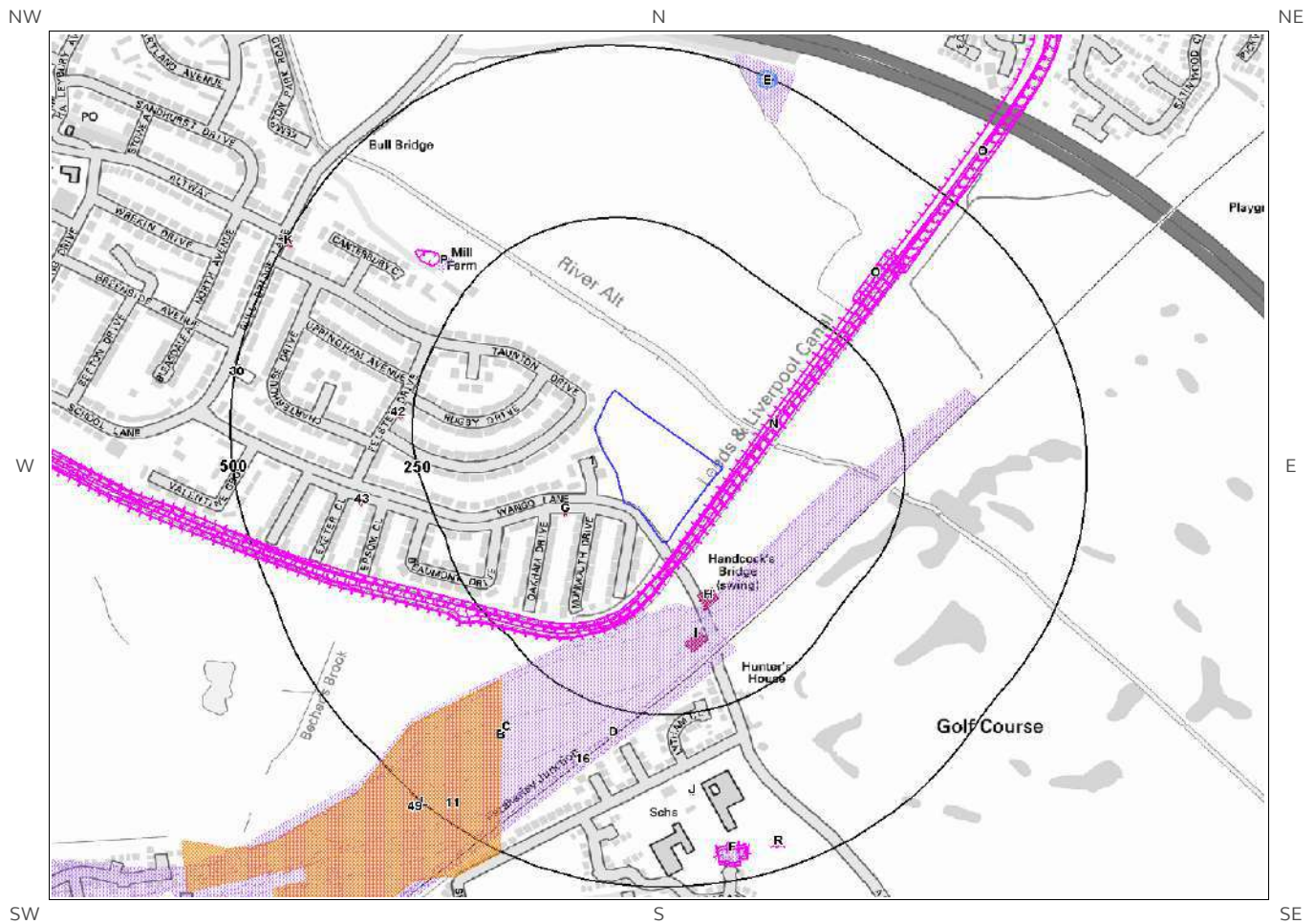
Note: Maps

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



Site Outline



Industrial Land Use



Potentially Infilled Land

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



Search Buffers (m)



Energy Features



Petrol Stations



Tanks



Garages

1. Historical Industrial Sites

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

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

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 30

ID	Distance [m]	Direction	Use	Date
1	21	SW	Pump	1851
2C	92	S	Railway Sidings	1955
3A	92	S	Railway Sidings	1987
4A	92	S	Railway Sidings	1967
5A	92	S	Railway Sidings	1974
6B	98	S	Railway Sidings	1938
7B	98	S	Railway Sidings	1925
8C	121	S	Railway Sidings	1925
9I	133	S	Electric Substation	1987
10L	146	S	Railway Sidings	1906
11	155	S	Railway Sidings	1891
12D	281	S	Railway Building	1955
13D	285	S	Railway Building	1925
14P	289	NW	Unspecified Mill	1851
15O	304	NE	Refuse Heap	1974
16	332	S	Railway Building	1925
17	412	SW	Railway Sidings	1925
18F	446	S	Unspecified Works	1955
19E	446	NE	Unspecified Works	1967
20E	446	NE	Unspecified Works	1987
21E	446	NE	Unspecified Works	1974
22F	448	S	Filter Beds	1925
23F	452	S	Filter Beds	1938
24F	452	S	Filter Beds	1925
25F	452	S	Filter Beds	1906
26R	460	S	Refuse Destructor	1925
27E	484	NE	Unspecified Tank	1987
28E	484	NE	Unspecified Tank	1974
29E	488	NE	Unspecified Tank	1967
30	495	W	Pump	1851

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
31E	483	NE	Unspecified Tank	1964
32E	483	NE	Unspecified Tank	1964
33E	483	NE	Unspecified Tank	1993

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:

15

ID	Distance (m)	Direction	Use	Date
34G	78	W	Electricity Substation	1993
35G	80	W	Electricity Substation	1971
36G	81	W	Electricity Substation	1981
37H	88	SE	Electricity Substation	1971
38H	88	SE	Electricity Substation	1981
39H	97	SE	Electricity Substation	1993
40I	136	S	Electricity Substation	1981
41I	137	S	Electricity Substation	1993
42	264	W	Electricity Substation	1993
43	333	W	Electricity Substation	1993
44J	361	S	Electricity Substation	1995
45J	361	S	Electricity Substation	1996
46J	361	S	Electricity Substation	1998
47K	488	NW	Electricity Substation	1995
48K	489	NW	Electricity Substation	1973

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: 2

ID	Distance (m)	Direction	Use	Date
49	296	SW	Carriage and Wagon Works	1893
50L	296	SW	Carriage and Wagon Works	1908

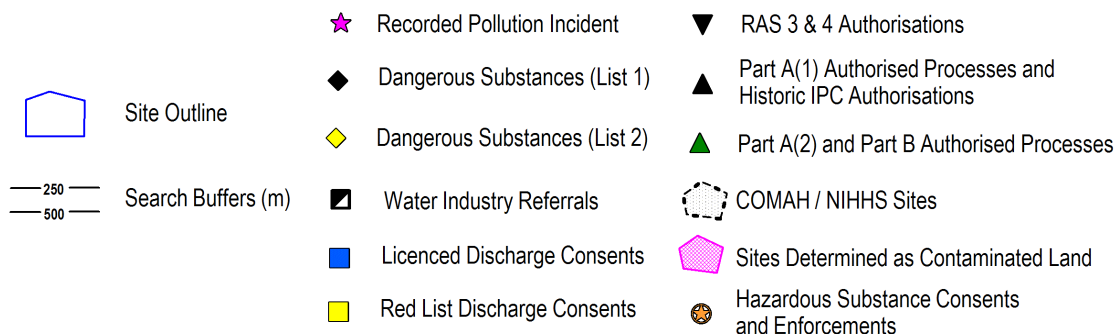
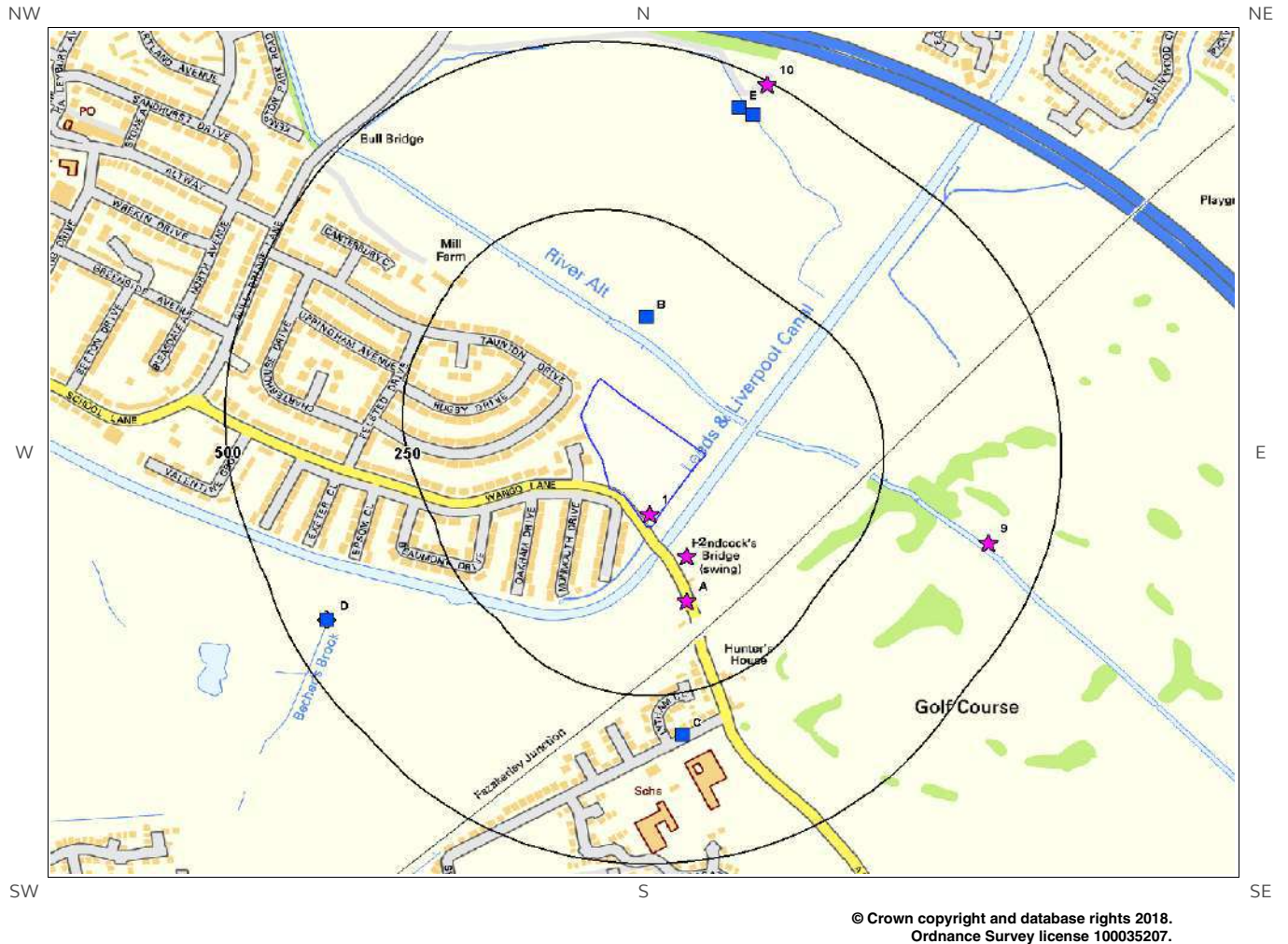
1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 21

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

ID	Distance(m)	Direction	Use	Date
51	12	SE	Canal	1851
52M	17	SE	Canal	1925
53M	18	SE	Canal	1925
54M	18	SE	Canal	1938
55M	18	SE	Canal	1906
56M	18	SE	Canal	1891
57N	18	SE	Canal	1974
58N	18	SE	Canal	1987
59N	18	SE	Canal	1967
60N	18	SE	Canal	1955
61O	304	NE	Refuse Heap	1974
62P	305	NW	Pond	1955
63Q	367	NE	Canal	1891
64Q	367	NE	Canal	1938
65Q	367	NE	Canal	1925
66Q	367	NE	Canal	1907
67F	448	S	Filter Beds	1925
68F	452	S	Filter Beds	1938
69F	452	S	Filter Beds	1925
70F	452	S	Filter Beds	1906
71R	460	S	Refuse Destructor	1925

2. Environmental Permits, Incidents and Registers Map



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:

1

The following List 2 Dangerous Substance Inventory Site records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
11D	443	SW	338350 398150	Name: Aintree Racecourse Co. Ltd, Aintree Status: Not Active Receiving Water: Mersey Estuary Authorised Substances: Iron

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:

13

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
12B	112	NE	338800 398600	Address: WANGO LANE PS, AINTREE, SEFTON, MERSEYSIDE Effluent Type: SEWAGE DISCHARGES - UNSPECIFIED - WATER COMPANY Permit Number: 01SEF0084 Permit Version: 1 Receiving Water: - Status: REVOKED - UNSPECIFIED Issue date: - Effective Date: 01-Jul-1991 Revocation Date: 31/12/1994
13B	112	NE	338800 398600	Address: WANGO LANE PS, AINTREE, SEFTON, MERSEYSIDE Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: 01SEF0084 Permit Version: 2 Receiving Water: - Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: -

ID	Distance (m)	Direction	NGR	Details	
14C	312	S	338850 397980	Address: SHERWOODS LANE PUMPING STATION, FAZAKERLEY, LIVERPOOL, MERSEYSIDE Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: 016987001 Permit Version: 2	Receiving Water: RIVER ALT Status: MODIFIED - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 25/04/2003 Effective Date: 25-Apr-2003 Revocation Date: -
15C	312	S	338850 397980	Address: SHERWOODS LANE PS, SEFTON, MERSEYSIDE Effluent Type: MISCELLANEOUS DISCHARGES - EMERGENCY DISCHARGES Permit Number: 01LIV0033 Permit Version: 1	Receiving Water: RIVER ALT Status: CONSENT REVOKED OR REVISED - NEW CONSENT ISSUED (37(1)) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 25/04/2003
16C	312	S	338850 397980	Address: SHERWOODS LANE PUMPING STATION, FAZAKERLEY, LIVERPOOL, MERSEYSIDE Effluent Type: MISCELLANEOUS DISCHARGES - EMERGENCY DISCHARGES Permit Number: 016987001 Permit Version: 1	Receiving Water: RIVER ALT Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 30-Sep-1994 Revocation Date: 24/04/2003
17D	443	SW	338350 398150	Address: AINTREE RACECOURSE, THE AINTREE CENTRE, ORMSKIRK RD, LIVERPOOL, MERSEYSIDE Effluent Type: UNSPECIFIED Permit Number: 016997015 Permit Version: 1	Receiving Water: BECHERS BROOK Status: REVOKED - UNSPECIFIED Issue date: - Effective Date: 20-May-1996 Revocation Date: 20/08/1996
18E	446	NE	338930 398910	Address: MELLING STW, SPENCERS LANE, MELLING, SEFTON, MERSEYSIDE Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: 016930114 Permit Version: 4	Receiving Water: TRIB RIVER ALT Status: MODIFIED - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 24/09/2009 Effective Date: 01-Jan-2010 Revocation Date: -
19E	446	NE	338930 398910	Address: MELLING STW, SPENCERS LANE, MELLING, SEFTON, MERSEYSIDE Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: 016930114 Permit Version: 3	Receiving Water: TRIB RIVER ALT Status: MODIFIED - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 19/12/2005 Effective Date: 31-Dec-2005 Revocation Date: 31/12/2009
20E	446	NE	338930 398910	Address: MELLING STW, SPENCERS LANE, MELLING, SEFTON, MERSEYSIDE Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: 016930114 Permit Version: 2	Receiving Water: TRIB RIVER ALT Status: CONSENT REVOKED OR REVISED - NEW CONSENT ISSUED (37(1)) Issue date: 31/01/1985 Effective Date: 31-Jan-1985 Revocation Date: 30/12/2005
21E	446	NE	338930 398910	Address: MELLING STW, SPENCERS LANE, MELLING, SEFTON, MERSEYSIDE Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: 016930114 Permit Version: 1	Receiving Water: TRIB RIVER ALT Status: REVOKED - UNSPECIFIED Issue date: - Effective Date: 12-Jan-1980 Revocation Date: 30/01/1985
22E	447	NE	338950 398900	Address: MELLING WWTW, MELLING, LANCASHIRE Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016987034 Permit Version: 1	Receiving Water: UNNAMED TRIB OF RIVER ALT Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 13/08/1999 Effective Date: 13-Aug-1999 Revocation Date: 01/05/2003

ID	Distance (m)	Direction	NGR	Details	
23E	447	NE	338950 398900	Address: MELLING WWTW, MELLING, LANCASHIRE Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016987034 Permit Version: 3	Receiving Water: UNNAMED TRIB OF RIVER ALT Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 02/05/2003 Effective Date: 02-May-2003 Revocation Date: -
24E	447	NE	338950 398900	Address: MELLING WWTW, MELLING, LANCASHIRE Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: 016987034 Permit Version: 3	Receiving Water: UNNAMED TRIB OF RIVER ALT Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 02/05/2003 Effective Date: 02-May-2003 Revocation Date: -

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

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

0

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

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

10

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

ID	Distance (m)	Direction	NGR	Details
1	0	On Site	338803 398307	Incident Date: 18-Jun-2002 Incident Identification: 85651 Pollutant: Specific Waste Materials Pollutant Description: Household Waste Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
2	65	SE	338856 398245	Incident Date: 02-Apr-2002 Incident Identification: 68322 Pollutant: Specific Waste Materials Pollutant Description: Household Waste Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
3A	120	SE	338856 398179	Incident Date: 15-Nov-2004 Incident Identification: 277760 Pollutant: Specific Waste Materials Pollutant Description: Household Waste Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
4A	120	SE	338856 398179	Incident Date: 15-Nov-2004 Incident Identification: 277760 Pollutant: General Biodegradable Materials and Wastes : Inert Materials and Wastes : Specific Waste Materials Pollutant Description: Natural Organic Material :Construction and Demolition Materials and Wastes :Household Waste :Tyres :Vehicles and Vehicle Parts Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
5A	120	SE	338856 398179	Incident Date: 15-Nov-2004 Incident Identification: 277760 Pollutant: Specific Waste Materials Pollutant Description: Tyres Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
6A	120	SE	338856 398179	Incident Date: 15-Nov-2004 Incident Identification: 277760 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Natural Organic Material Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
7A	120	SE	338856 398179	Incident Date: 15-Nov-2004 Incident Identification: 277760 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
8A	120	SE	338856 398179	Incident Date: 15-Nov-2004 Incident Identification: 277760 Pollutant: Specific Waste Materials Pollutant Description: Vehicles and Vehicle Parts Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
9	418	E	339281 398264	Incident Date: 20-Jun-2001 Incident Identification: 10407 Pollutant: Sewage Materials Pollutant Description: Crude Sewage Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
10	495	NE	338969 398945	Incident Date: 27-Dec-2001 Incident Identification: 49673 Pollutant: Sewage Materials Pollutant Description: Crude Sewage Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)

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

0

Database searched and no data found.

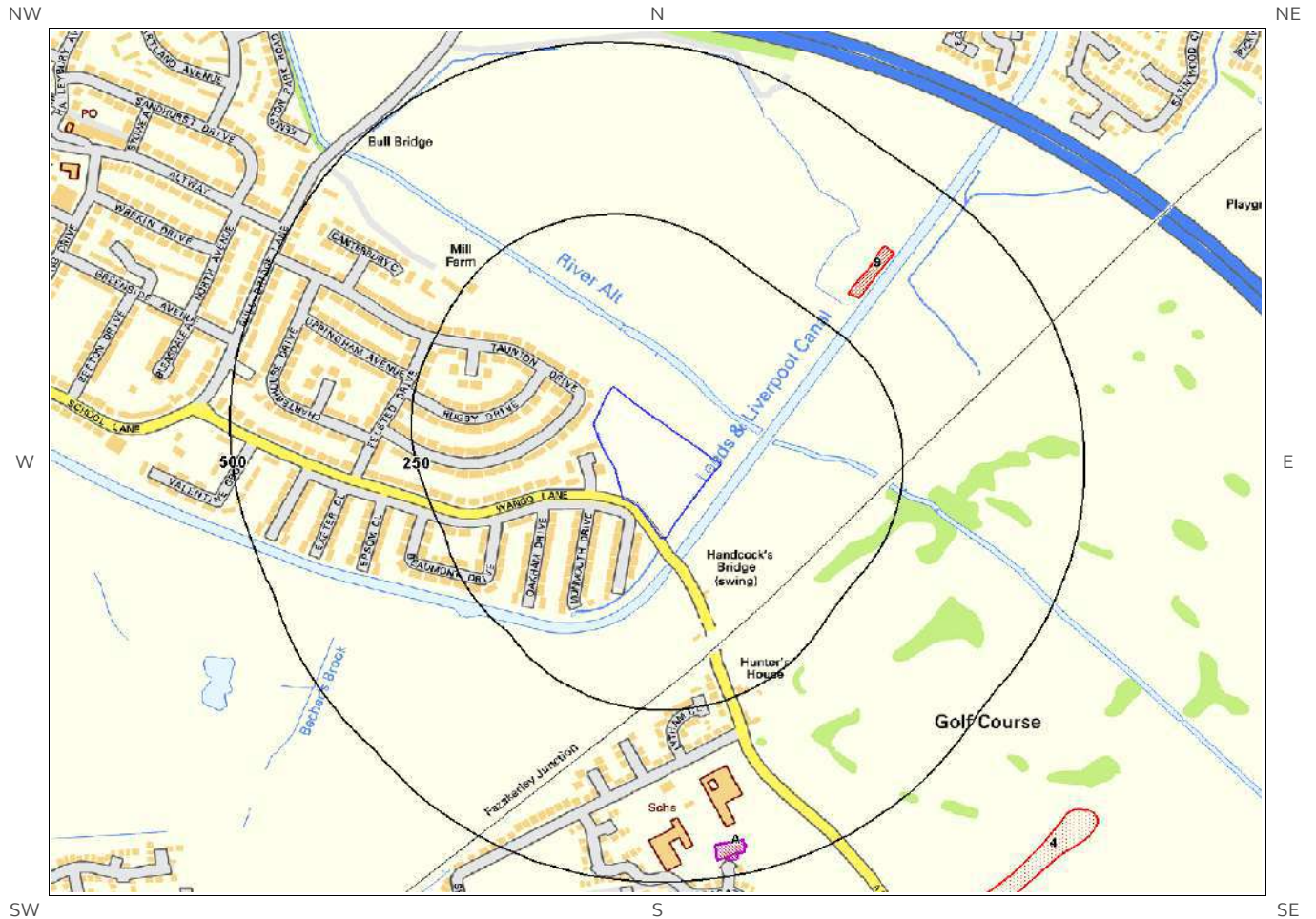
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

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?

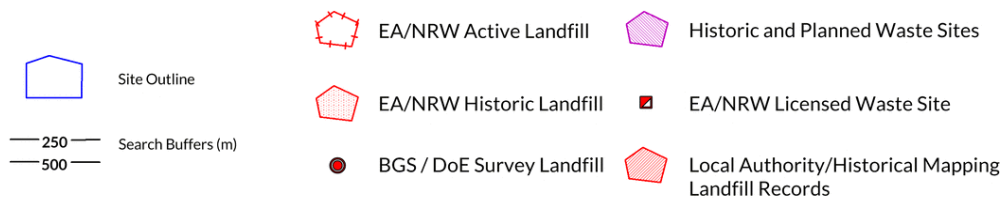
0

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:

4

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	676	SE	339200 397700	Site Address: Liverpool Municipal Golf Course, Valley Road, Kirkby, Knowsley Waste Licence: Yes Site Reference: 405/01, GDO 232, 271 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 09-Feb-1993 Licence Surrendered: Licence Holder Address: Environmental Services Department, The Mansion House, Calderstones Park, Liverpool Operator: Liverpool City Council Licence Holder: Liverpool City Council First Recorded: 09-Feb-1993 Last Recorded: -
Not shown	1023	E	339900 398000	Site Address: Ingoe Lane, Knowsley, Merseyside Waste Licence: - Site Reference: GDO 234 Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: Probably Local Authority First Recorded: - Last Recorded: -
Not shown	1383	SE	340100 397400	Site Address: Burton's Bridge, Kirkby Waste Licence: - Site Reference: - Waste Type: Household Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -
Not shown	1445	SE	340100 397000	Site Address: Gillmoss "B", Back of Gillmoss Lane, Gillmoss, Liverpool, Merseyside Waste Licence: - Site Reference: K1/16/219, GDO M219 Waste Type: Industrial, Household Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -

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

0

Database searched and no data found.

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

1

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
9	302	NE	339090 398675	Refuse Tip	1973 mapping	Polygon

3.2 Other Waste Sites

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

3

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		
1A	450	S	338897 397834	Type of Site: Refuse Destructor Site Address: N/A	Planning Application Reference: N/A Date: 1908	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
2A	452	S	338896 397833	Type of Site: Disused Refuse Destructor Site Address: N/A	Planning Application Reference: N/A Date: 1937	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
3A	452	S	338896 397833	Type of Site: Refuse Destructor Site Address: N/A	Planning Application Reference: N/A Date: 1927	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon

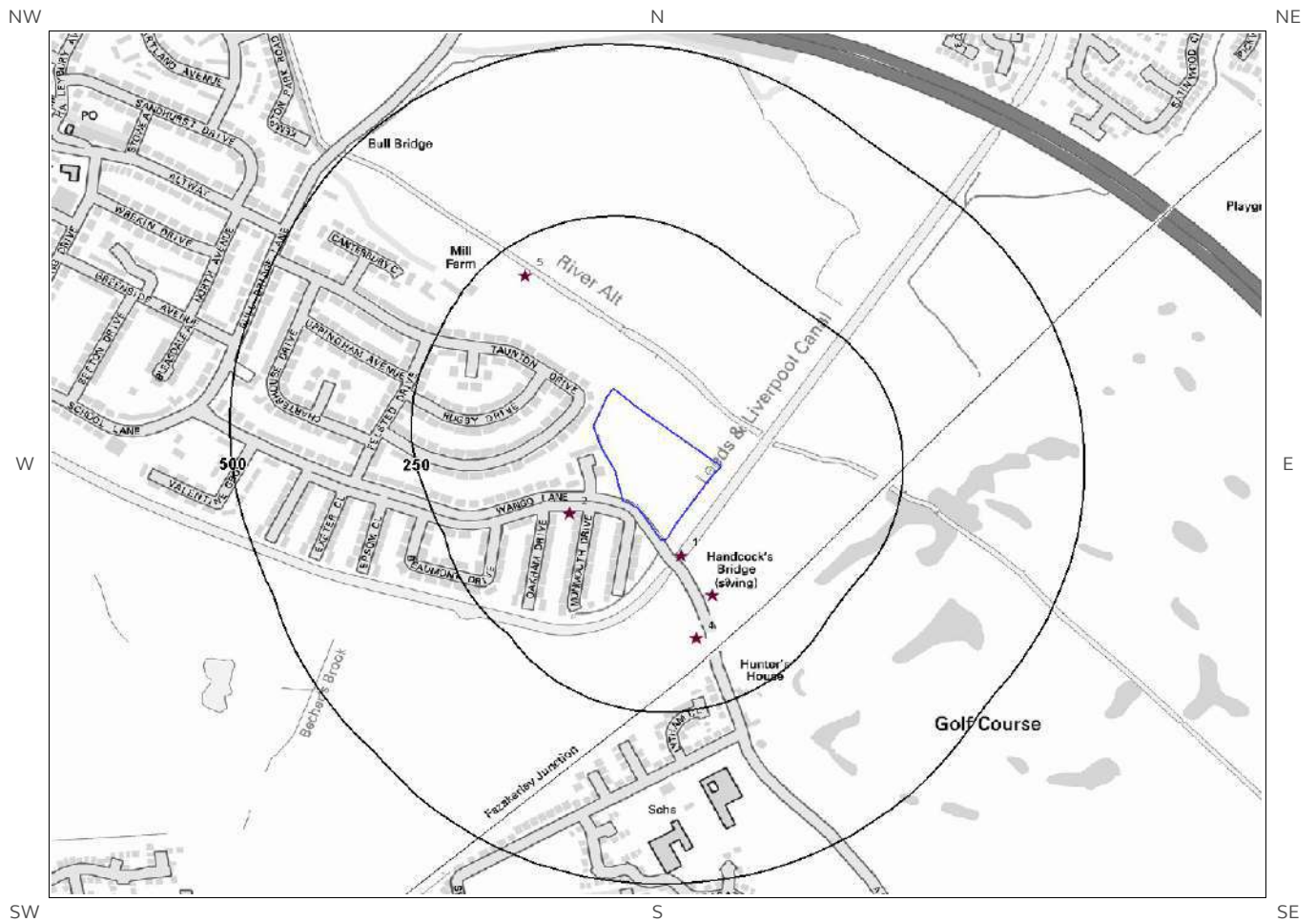
3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

1

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

ID	Distance (m)	Direction	NGR	Details
Not shown	700	SE	339086 397647	Site Address: Fazakerley Playing Fields, Aintree Lane, Fazakerley, Liverpool, Merseyside, L10 1LT Type: Deposit of waste to land as a recovery operation Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: COT029 EPR reference: EA/EPR/BB3739RX/A001 Operator: U K Sports Parks Ltd Waste Management licence No: 103301 Annual Tonnage: 256500.0 Issue Date: 21/02/2012 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Revoked Site Name: Fazakerley Playing Fields Correspondence Address: -

4. Current Land Use Map



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4. Current Land Uses

4.1 Current Industrial Data

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

5

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	31	SE	Gantry	338829 398267	L10	Travelling Cranes and Gantries	Industrial Features
2	75	W	Electricity Sub Station	338675 398327	L10	Electrical Features	Infrastructure and Facilities
3	103	SE	Electricity Sub Station	338872 398209	L10	Electrical Features	Infrastructure and Facilities
4	149	S	Electricity Sub Station	338849 398146	L10	Electrical Features	Infrastructure and Facilities
5	204	NW	Outfall	338614 398673	L10	Waste Storage, Processing and Disposal	Infrastructure and Facilities

4.2 Petrol and Fuel Sites

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

0

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

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

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

0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

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

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

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

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

5.2 Superficial Ground and Drift Geology

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

Lex Code	Description	Rock Type
SSA-S	SHIRDLEY HILL SAND FORMATION	SAND
ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

5.3 Bedrock and Solid Geology

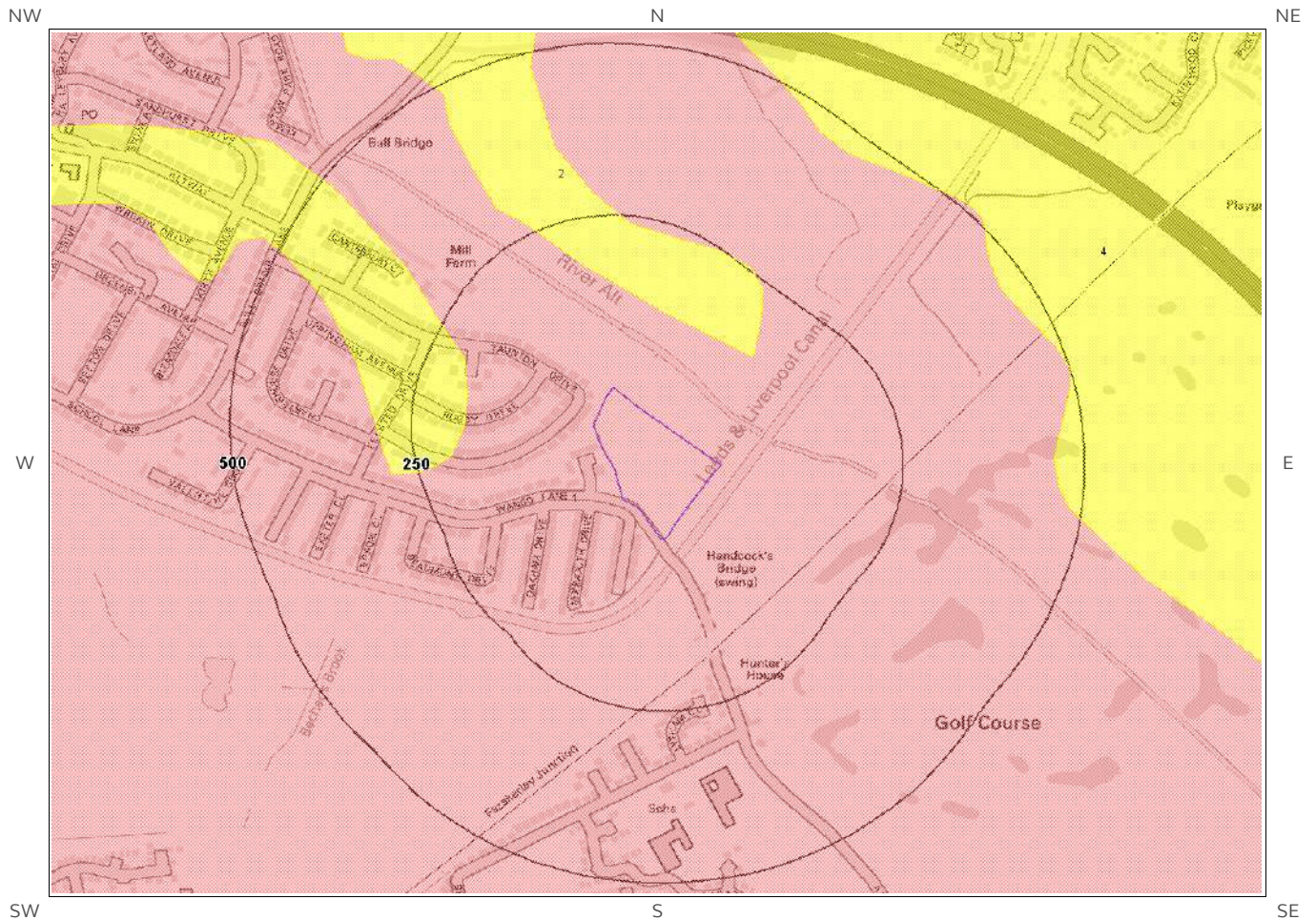
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
WLSF-SDST	WILMSLOW SANDSTONE FORMATION	SANDSTONE

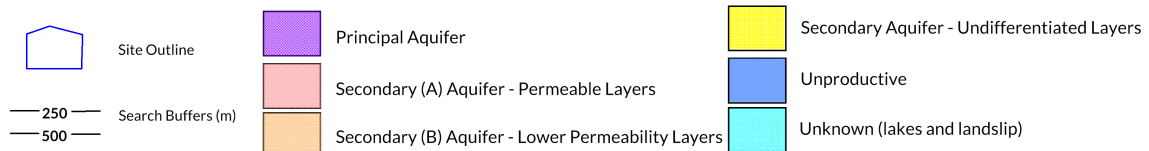
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

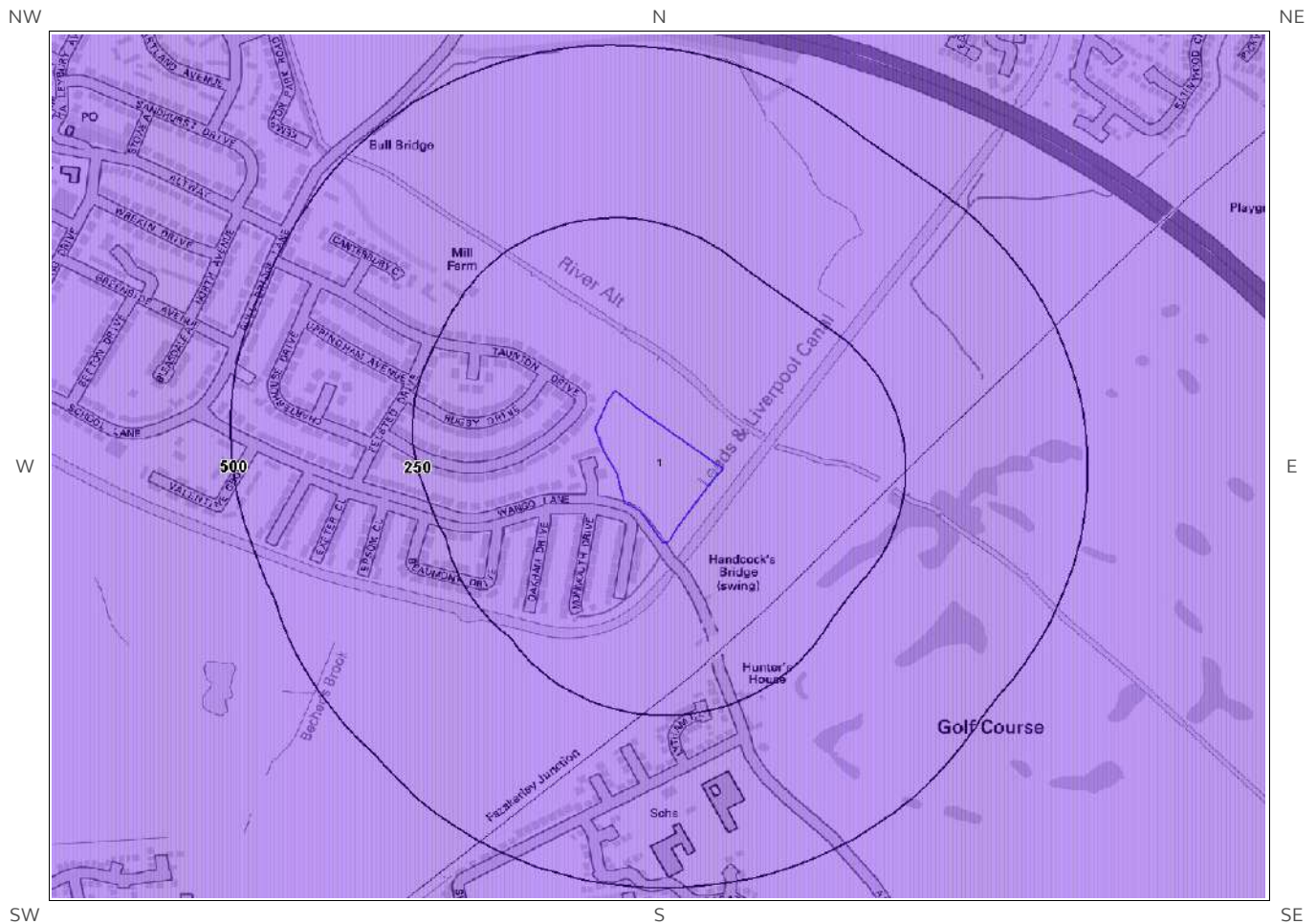
6a. Aquifer Within Superficial Geology



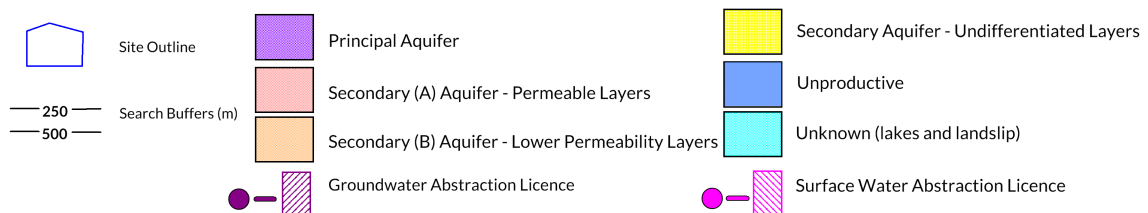
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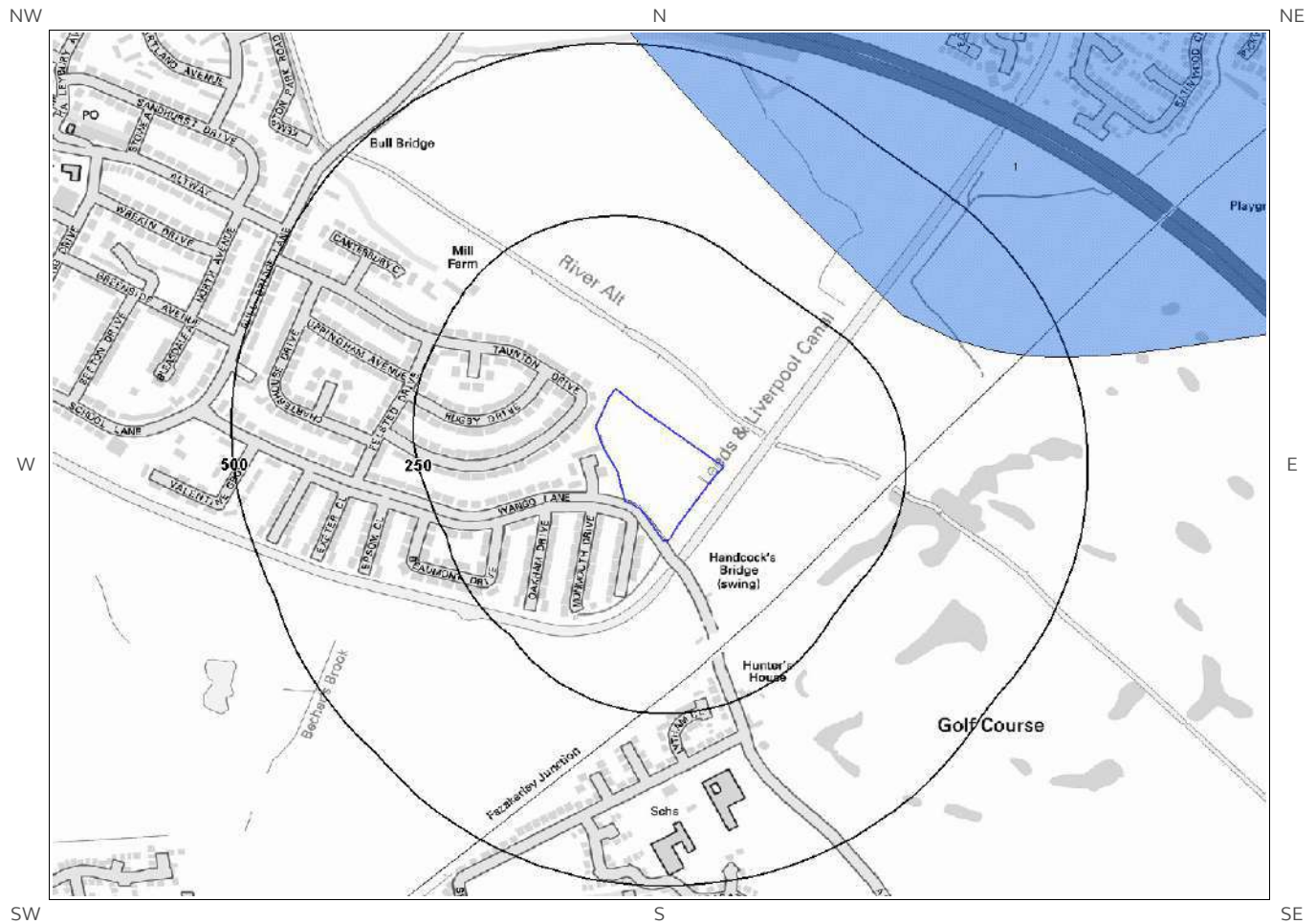
6b. Aquifer Within Bedrock Geology and Abstraction Licenses



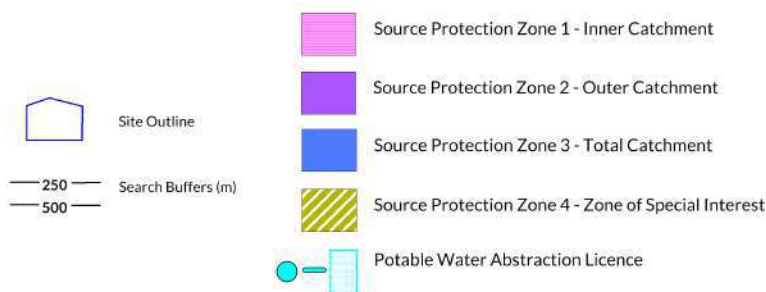
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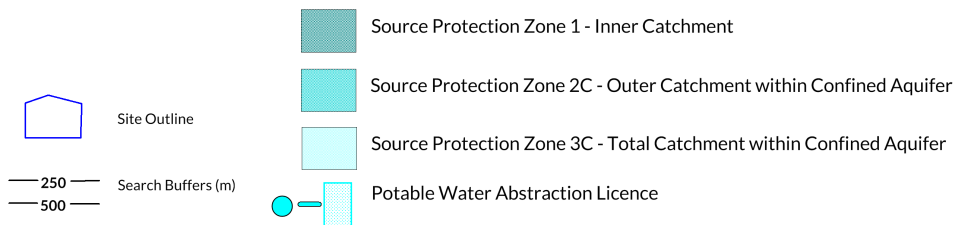
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licences



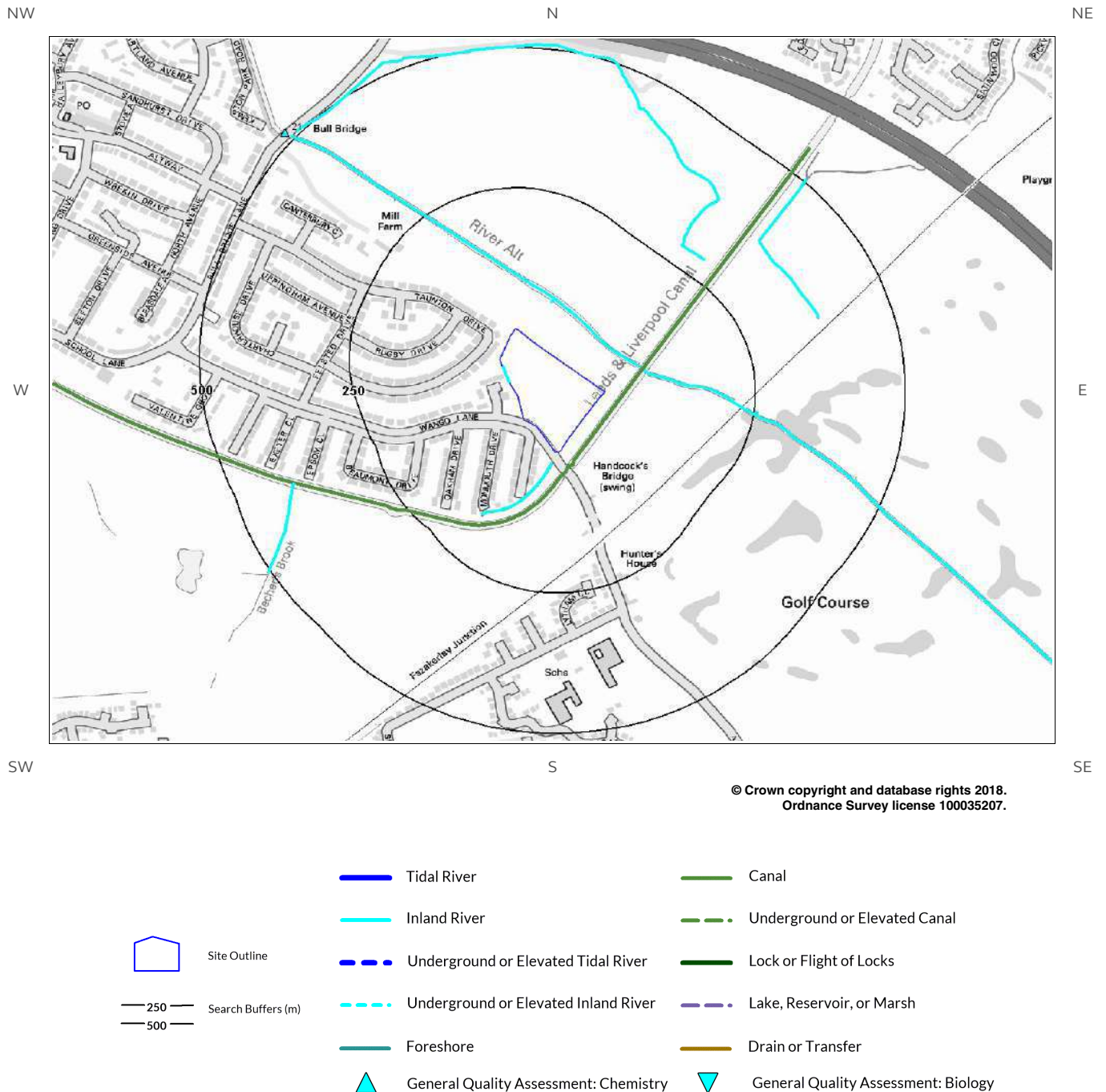
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6d. Hydrogeology – Source Protection Zones within confined aquifer



6e. Hydrology – Watercourse Network and River Quality



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
1	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
2	130	NE	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
3	177	W	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
4	459	E	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
1	0	On Site	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?

Identified

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

ID	Distance (m)	Direction	NGR	Details
Not shown	939	SW	338140 397620	Status: Historical Licence No: 2569031129 Details: Evaporative Cooling Direct Source: Ground Water - North West Region Point: "borehole At Fazakerley, Liverpool" Data Type: Point Name: STELLA PRODUCTS LTD Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 8621 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 11/11/1998 Version End Date:
Not shown	939	SW	338140 397620	Status: Historical Licence No: 2569031129 Details: Evaporative Cooling Direct Source: Ground Water - North West Region Point: Borehole At Fazakerley, Liverpool Data Type: Point Name: STELLA PRODUCTS LTD Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 8621 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 11/11/1998 Version End Date:
Not shown	1155	W	337640 398010	Status: Active Licence No: 2569031123 Details: Spray Irrigation - Direct Direct Source: Ground Water - North West Region Point: Borehole 'c' At Aintree Racecourse Data Type: Point Name: AINTREE RACECOURSE CO LTD Annual Volume (m³): 54600 Max Daily Volume (m³): 728 Original Application No: NPS/WR/020765 Original Start Date: 18/10/1996 Expiry Date: - Issue No: 102 Version Start Date: 26/1/2016 Version End Date:
Not shown	1792	W	337000 397910	Status: Historical Licence No: 2569031123 Details: Spray Irrigation - Direct Direct Source: Ground Water - North West Region Point: Underground Strata In Aintree L/pool Data Type: Point Name: AINTREE RACECOURSE CO LTD Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 8541 Original Start Date: 18/10/1996 Expiry Date: - Issue No: 100 Version Start Date: 18/10/1996 Version End Date:
Not shown	1792	W	337000 397910	Status: Active Licence No: 2569031123 Details: Spray Irrigation - Direct Direct Source: Ground Water - North West Region Point: Underground Strata In Aintree Liverpool Data Type: Point Name: AINTREE RACECOURSE CO LTD Annual Volume (m³): 54600 Max Daily Volume (m³): 728 Original Application No: NPS/WR/020765 Original Start Date: 18/10/1996 Expiry Date: - Issue No: 102 Version Start Date: 26/1/2016 Version End Date:
Not shown	1802	W	336980 397940	Status: Historical Licence No: 2569031123 Details: Spray Irrigation - Direct Direct Source: Ground Water - North West Region Point: Underground Strata In Aintree L/pool Data Type: Point Name: AINTREE RACECOURSE CO LTD Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 8541 Original Start Date: 18/10/1996 Expiry Date: - Issue No: 100 Version Start Date: 18/10/1996 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1802	W	336980 397940	Status: Active Licence No: 2569031123 Details: Spray Irrigation - Direct Direct Source: Ground Water - North West Region Point: Underground Strata In Aintree Liverpool Data Type: Point Name: AINTREE RACECOURSE CO LTD	Annual Volume (m³): 54600 Max Daily Volume (m³): 728 Original Application No: NPS/WR/020765 Original Start Date: 18/10/1996 Expiry Date: - Issue No: 102 Version Start Date: 26/1/2016 Version End Date:

6.4 Surface Water Abstraction Licences

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

Identified

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	1039	NW	337400 400300	Status: Historical Licence No: 2569031063 Details: Spray Irrigation - Direct Direct Source: "surface, Non-tidal - North West Region" Point: "r Alt At Maghull, Liverpool, Merseyside" Data Type: Line Name: CAUNCE	Annual Volume (m³): - Max Daily Volume (m³): - Application No: 2645 Original Start Date: 11/5/1983 Expiry Date: - Issue No: 100 Version Start Date: 11/5/1983 Version End Date:
Not shown	1039	NW	337400 400300	Status: Historical Licence No: 2569031063 Details: Spray Irrigation - Direct Direct Source: Surface, Non-tidal - North West Region Point: R Alt At Maghull, Liverpool, Merseyside Data Type: Line Name: CAUNCE	Annual Volume (m³): - Max Daily Volume (m³): - Application No: 2645 Original Start Date: 11/5/1983 Expiry Date: - Issue No: 100 Version Start Date: 11/5/1983 Version End Date:
Not shown	1039	NW	337400 400300	Status: Active Licence No: 2569031063 Details: Spray Irrigation - Direct Direct Source: Surface, Non-tidal - North West Region Point: River Alt At Maghull Liverpool Merseyside Data Type: Line Name: CAUNCE	Annual Volume (m³): 40914 Max Daily Volume (m³): 1091.04 Application No: 2645 Original Start Date: 11/5/1983 Expiry Date: - Issue No: 100 Version Start Date: 11/5/1983 Version End Date:
Not shown	1510	N	338400 400000	Status: Historical Licence No: 2569031094 Details: Spray Irrigation - Direct Direct Source: Surface, Non-tidal - North West Region Point: Leeds & Liverpool Canal At Melling Data Type: Line Name: BRITISH WATERWAYS BOARD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: 2861 Original Start Date: 20/9/1991 Expiry Date: - Issue No: 100 Version Start Date: 20/9/1991 Version End Date:

6.5 Potable Water Abstraction Licences

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

None identified

Database searched and no data found.

6.6 Source Protection Zones

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

Identified

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

ID	Distance (m)	Direction	Zone	Description
1	329	NE	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? None identified

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

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

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

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
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.
0	On Site	Minor Aquifer/High Leaching Potential	H1	Soils which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater.
131	NE	Minor Aquifer/High Leaching Potential	H3	Coarse textured or moderately shallow soils which readily transmit non-adsorbed pollutants and liquid discharges but have some ability to attenuate adsorbed pollutants because of their clay or organic matter content.
397	N	Major Aquifer/High Leaching Potential	H1	Soils which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater.
493	NE	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? Identified

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	928	NW	338250 399300	River Name: Alt Reach: M57 To Hillhouse Stw End/Start of Stretch: Start of Stretch NGR	E	E	F	F	F
Not shown	928	NW	338250 399300	River Name: Alt Reach: Liverpool North Stw To M57 End/Start of Stretch: End of Stretch NGR	E	E	E	E	E

Chemical quality data is based on the General Quality Assessment Headline Indicators scheme (GQAH). In England, each chemical sample is measured for ammonia and dissolved oxygen. In Wales, the samples are measured for biological oxygen demand (BOD), ammonia and dissolved oxygen. The results are graded from A ('Very Good') to F ('Bad').

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

ID	Distance (m)	Direction	NGR	River Quality Grade	Chemical Quality Grade				
					2005	2006	2007	2008	2009
21	517	NW	338350 398855	River Name: Alt Reach: Liverpool North Stw To M57 End/Start of Stretch: Sample Point NGR	B	B	C	C	C
Not shown	928	NW	338250 399300	River Name: Alt Reach: Liverpool North Stw To M57 End/Start of Stretch: End of Stretch NGR	B	B	C	C	C
Not shown	928	NW	338250 399300	River Name: Alt Reach: M57 To Hillhouse Stw End/Start of Stretch: Start of Stretch NGR	D	D	E	E	D
Not shown	1386	SE	339940 397490	River Name: Simonswood Bk Reach: Kirkby Bk To Alt End/Start of Stretch: End of Stretch NGR	C	C	C	B	B

6.10 Ordnance Survey MasterMap Water Network

Are there any Ordnance Survey MasterMap Water Network entries within 500m of the study site?

#DRN_Count#

#NDF_DRN_tag#

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

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

ID	Distance/Direction	Name	Type of Watercourse	Additional Details
1	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
16	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
2	19 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.5
17	19 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.5
3	27 SE	Leeds and Liverpool Canal	Canal. A manmade watercourse for inland navigation.	Catchment Area: Ribble Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 14.2
18	27 SE	Leeds and Liverpool Canal	Canal. A manmade watercourse for inland navigation.	Catchment Area: Ribble Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 14.2
4	67 NE	River Alt	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 8.9
19	67 NE	River Alt	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 8.9
5	72 NE	River Alt	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 8.9
20	72 NE	River Alt	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 8.9
6	73 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.8
21	73 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.8
7	80 NE	River Alt	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 6.5
8	80 NE	River Alt	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 8.1

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
22	80 NE	River Alt	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 6.5
23	80 NE	River Alt	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 8.1
9	251 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.4
10	251 E	River Alt	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 7.1
24	251 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.4
25	251 E	River Alt	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 7.1
11	286 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
26	286 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
12	364 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.3
27	364 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.3
13	378 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 0.9
28	378 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 0.9

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
14	379 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
29	379 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
15	398 W	Becher's Brook	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
16	398 W	Leeds and Liverpool Canal	Canal. A manmade watercourse for inland navigation.	Catchment Area: Ribble Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 14.6
30	398 W	Becher's Brook	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
31	398 W	Leeds and Liverpool Canal	Canal. A manmade watercourse for inland navigation.	Catchment Area: Ribble Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 14.6
17	497 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.2
Not shown	497 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: 1.2
18	499 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided
Not shown	499 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Alt Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section: Not Provided

6.11 Surface Water Features

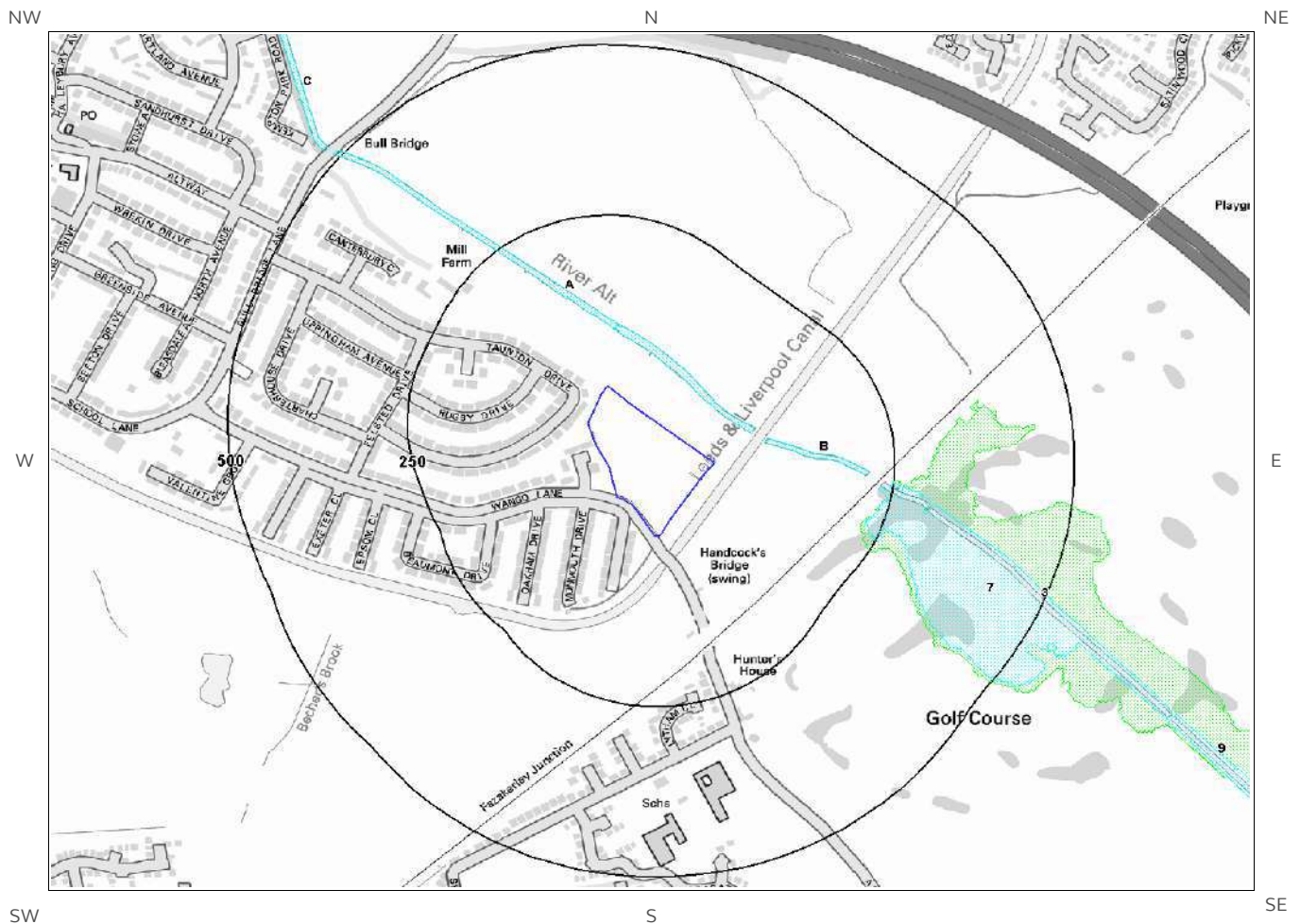
Are there any surface water features within 250m of the study site?

Identified

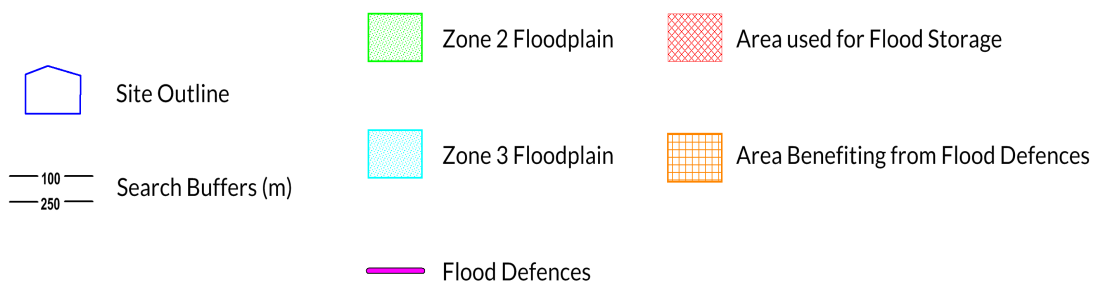
The following surface water records are not represented on mapping:

Distance (m)	Direction
0	On Site
19	S
20	SE
35	S
63	NE
76	NE
232	E

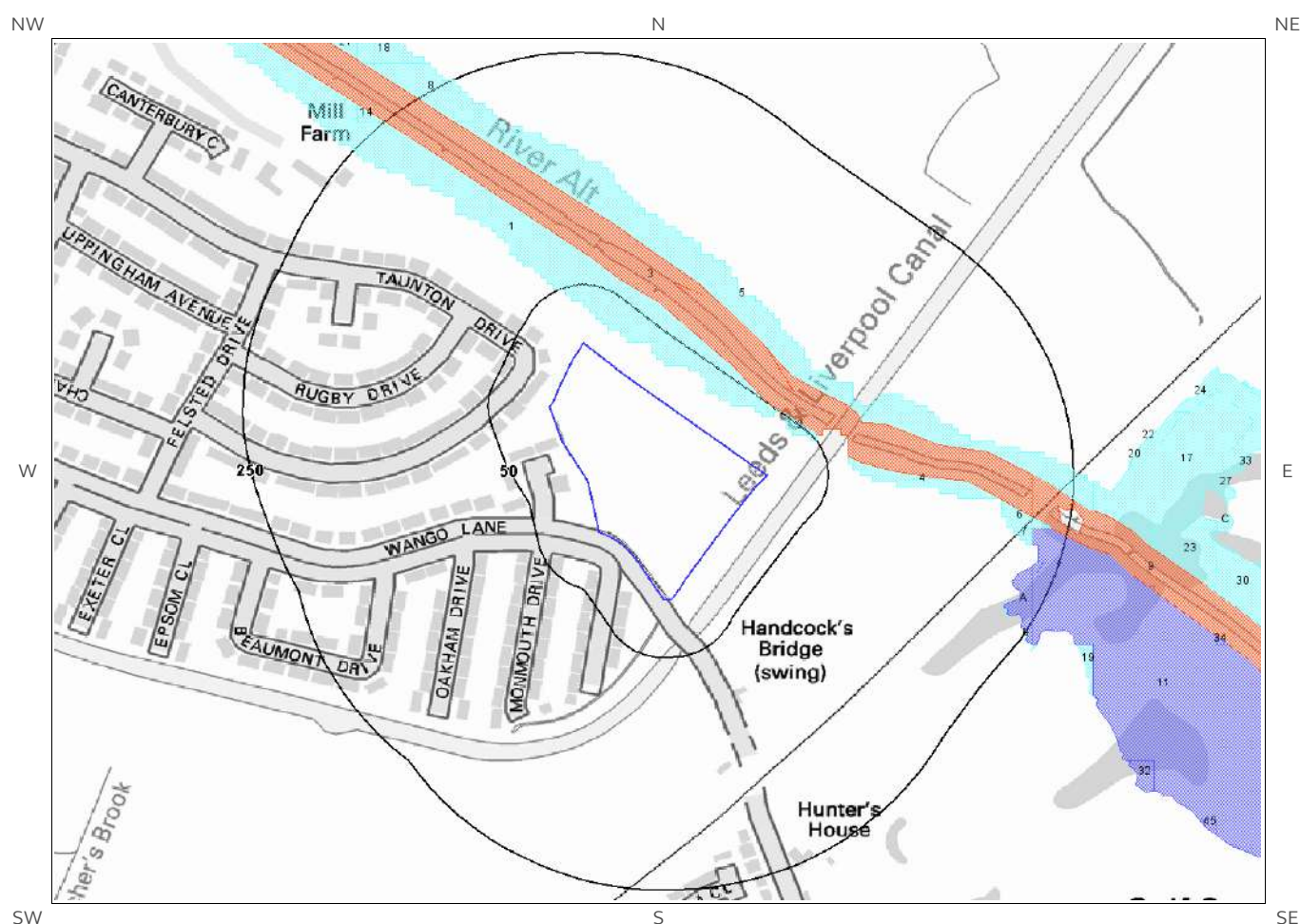
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



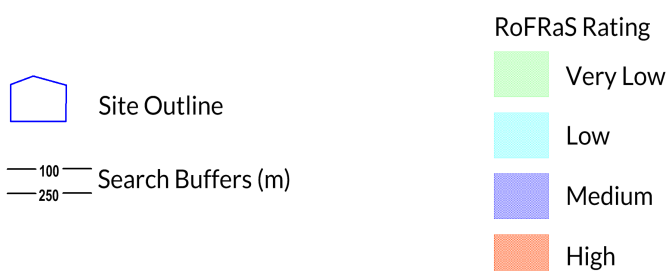
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7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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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? Identified

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

ID	Distance (m)	Direction	Update	Type
1A	63	NE	19-Mar-2018	Zone 2 - (Fluvial /Tidal Models)
2B	75	NE	19-Mar-2018	Zone 2 - (Fluvial /Tidal Models)
3	220	SE	19-Mar-2018	Zone 2 - (Fluvial /Tidal Models)

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? Identified

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

ID	Distance (m)	Direction	Update	Type
1A	63	NE	19-Mar-2018	Zone 3 - (Fluvial Models)
2B	75	NE	19-Mar-2018	Zone 3 - (Fluvial Models)
3	224	E	19-Mar-2018	Zone 3 - (Fluvial Models)

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.

Any relevant data within 250m is represented on the RoFRaS Flood map. Data to 50m is reported in the table below.

ID	Distance (m)	Direction	RoFRaS flood Risk
1	22.0	NE	Low
2	40.0	NE	Low
3	50.0	NE	High

7.4 Flood Defences

Are there any Flood Defences within 250m of the study site?

None identified

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?

None identified

7.6 Areas benefiting from Flood Storage

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

None identified

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? Identified

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

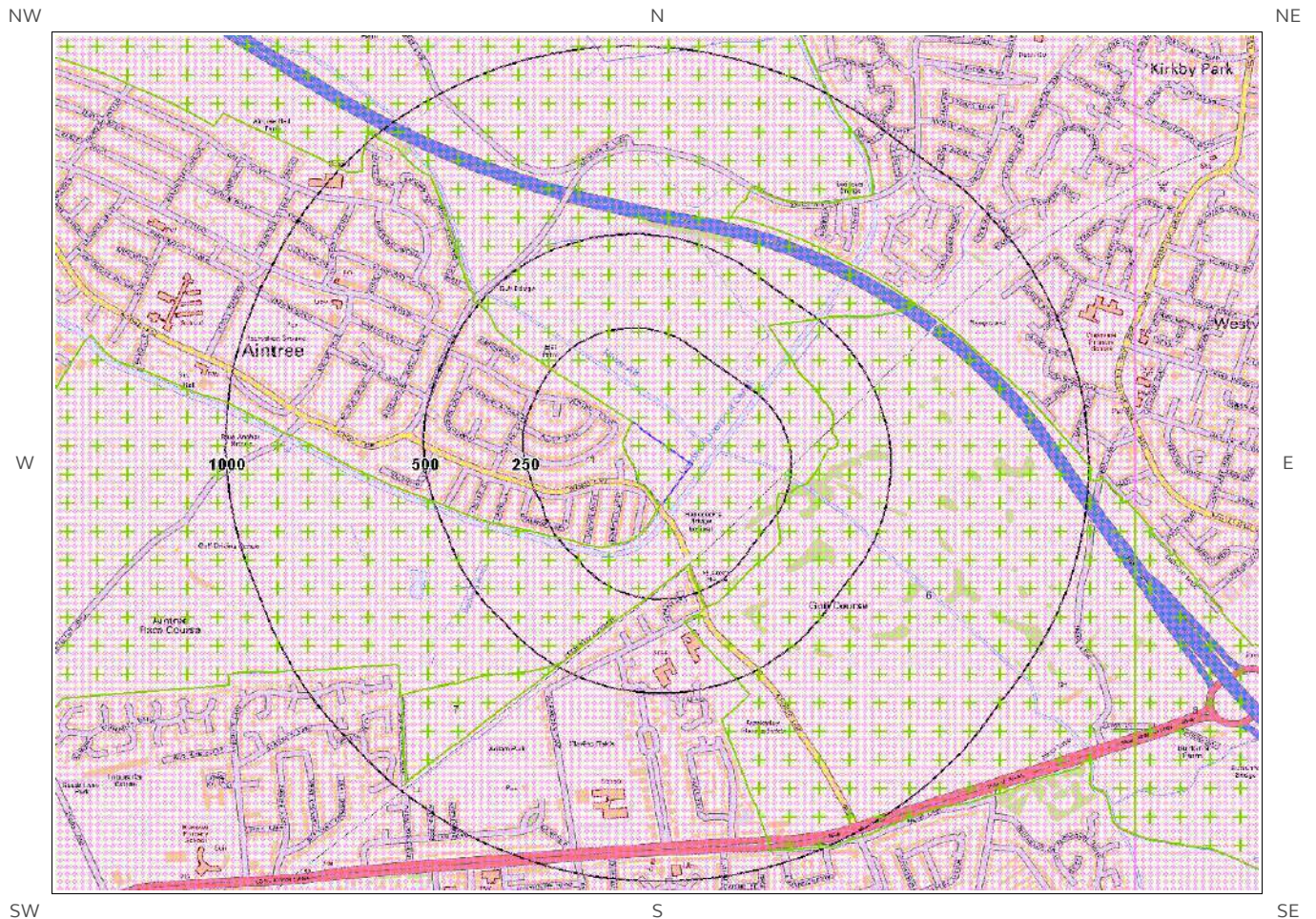
What is the British Geological Survey confidence rating in this result?

Low

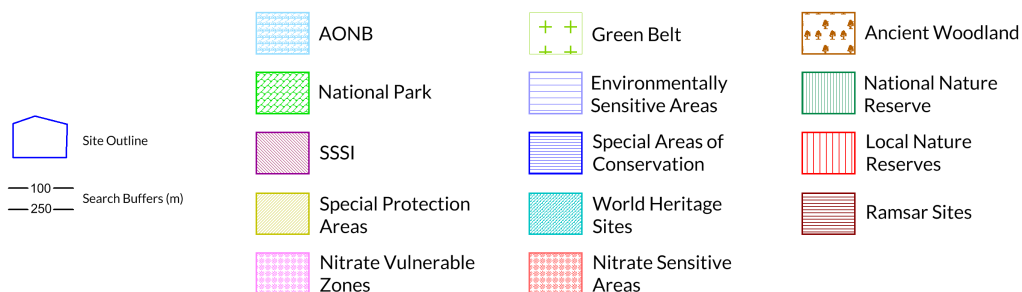
Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

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? Identified

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

Database searched and no data found.

0

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

Database searched and no data found.

0

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

Database searched and no data found.

0

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

Database searched and no data found.

0

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

Database searched and no data found.

0

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

Database searched and no data found.

0

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

Database searched and no data found.

0

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	1116	E	Existing	DEFRA
Not shown	1491	N	Existing	DEFRA
Not shown	1954	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
5	0	On Site	Liverpool, Manchester and West Yorks Greenbelt	Sefton District (B)
6	231	E	Liverpool, Manchester and West Yorks Greenbelt	Knowsley
7	485	SW	Liverpool, Manchester and West Yorks Greenbelt	Liverpool District (B)
8	1122	E	Liverpool, Manchester and West Yorks Greenbelt	Knowsley
Not shown	1491	N	Liverpool, Manchester and West Yorks Greenbelt	Sefton District (B)
Not shown	1787	NE	Liverpool, Manchester and West Yorks Greenbelt	Sefton District (B)
Not shown	1954	NE	Liverpool, Manchester and West Yorks Greenbelt	Sefton 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?

Moderate

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

Hazard
Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

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?

Low

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

Hazard
Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property no significant increase in insurance risk due to running sand problems is likely.

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

9.2.1 Radon Affected Areas

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

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

9.2.2 Radon Protection

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

10. Mining

10.1 Coal Mining

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

None identified

Database searched and no data found.

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary?

None identified

Database searched and no data found.

10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site?

None identified

Guidance: No Guidance Required.

APPENDIX D

Potential Pollutant Linkages

POTENTIAL RECEPTOR	COMMENTS	Include in PCM
PROPERTY: Other		
On Site		
Crops	None intended on site	✗
Domestic Produce	May be grown in residential gardens	✓
Livestock	None anticipated on site	✗
Domestic Animals	May be owned by residents	✓
Game	None on site	✗
Off Site		
Crops	None adjacent to the site	✗
Domestic Produce	Possibly in houses in vicinity of the site	✓
Livestock	None adjacent to the site	✗
Domestic Animals	May belong to adjacent residents	✓
Game	Not applicable	✗
PROPERTY: Buildings		
On Site		
	Building, services, flora	✓
Off Site		
	Buildings, services, flora	✓
HUMANS		
On Site		
Residents	Future Residents	✓
Construction Workers	During ground excavations	✓
Employees	Not applicable	✗
Surface water users	No significant surface waters on site	✗
Off Site		
Residents	Residents adjacent to the site	✓
Recreational users	Possible walkers using the canal towpath	✓
Groundwater users	No groundwater abstraction licenses within 250 m	✗
Controlled Waters		
On Site		
Surface Waters	No watercourses located on the site	✗
Groundwater	The superficial strata comprises of glaciofluvial deposits which are considered a potential receptor. The underlying bedrock is classified as a Principal Aquifer and is also a potential receptor	✓
Off Site		
Controlled Waters	The nearest significant water feature is Leeds and Liverpool Canal and River Alt	✓
Ecological Systems		
On/Off Site		
SSSIs, national nature reserves, SACs etc	Not applicable to the site	✗

Table A: Potential Receptors to be Considered in the Preliminary Conceptual Model

Link	Source	Hazard	Transport Mechanism	Pathway	Medium of Exposure	Receptor	Risk Summary*
1	Contaminated soils	Direct contact /ingestion of soil or dust	Direct contact with contaminated soil	Dermal contact/ingestion of soil at surface	Soil	Humans (on-site/off-site)	Low
2	Contaminated soils	Ingestion of homegrown vegetables	Ingestion of plants affected by contamination	Ingestion	Pore waters	Humans (on-site)	Low
3	Contaminated soils	Particulate inhalation	Wind blown particulates	Inhalation of particulates	Air	Humans (on-site/off-site)	Low
4	Contaminated soils	Damage to flora	Uptake of contaminants of concern by plants	Plant uptake	Pore water	Flora	Low
5	Contaminated Soils	Damage to property/services	Direct contact of contaminants with Building Structure/services	Direct contact	Soil/Water	Flora, services	Low
6	Contaminated Soils	Degradation of River Alt/canal water quality	Dissolution or suspension of contaminants into watercourse	Dissolution or Suspension	Water	Watercourse	Low
7	Contaminated Soils	Degradation of groundwater quality	Dissolution or suspension of contaminants into groundwaters	Dissolution or Suspension	Water	Groundwaters	Low

Table B: Preliminary Conceptual Model

***Relative Risk Screening and Prioritisation for further Investigation & or Assessment**

High	Higher probability of occurrence and identification of primary sources of contamination with respect to most sensitive receptors.
Medium	Pollutant linkage generally dependent on the presence of other primary pollutant linkages and/or where pollutant linkage generally associated with less sensitive receptors.
Low	Lower probability of occurrence such as based on requirement for significant migration pathway or where pollutant linkage requires the presence of source contaminants at concentration likely to be much higher than other identified pollutant linkages.

APPENDIX E

Trial Pit Records

PROJECT NUMBER 17335
PROJECT NAME Wango Lane, Aintree
CLIENT Mulberry Homes Ltd

DATE 23rd April 2018
DRILLING METHOD Trial Pit
TRIAL PIT NO TP1
SHEET 1/1

COMMENTS Shear Vane @ 0.5 m = 44 kPa, SV @ 1.0 m = 112 kPa.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0.1	0.2	D = 0.2 m				Dark brown soft sandy clay with much rootlets (Topsoil)		0.1
0.2								0.2
0.3								0.3
0.4								0.4
0.5								0.5
0.6						Stiff orange/brown clay with rare sand pockets and rare fine to coarse gravels		0.6
0.7								0.7
0.8	0.8	D = 0.8 m B = 0.8 - 1.0 m						0.8
0.9								0.9
1								1
1.1								1.1
1.2								1.2
1.3								1.3
1.4								1.4
1.5								1.5
1.6								1.6
1.7								1.7
1.8								1.8
1.9								1.9
2								2
2.1								2.1
2.2								2.2
2.3						Termination Depth at: 2.3 m		2.3
2.4								2.4

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Page 1 of 1

PROJECT NUMBER 17335 PROJECT NAME Wango Lane, Aintree CLIENT Mulberry Homes Ltd	DATE 23rd April 2018 DRILLING METHOD Trial Pit TRIAL PIT NO TP2 SHEET 1/1
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COMMENTS Shear Vane @ 0.6 m = 82 kPa, SV @ 1.0 m = 98 kPa.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0.1	0.1	D = 0.1 m				Dark brown soft sandy clay with much rootlets (Topsoil)		0.1
0.2								0.2
0.3								0.3
0.4								0.4
0.5								0.5
0.6								0.6
0.7						Stiff orange/brown clay with rare sand pockets and rare fine to coarse gravels		0.7
0.8								0.8
0.9								0.9
1.0								1.0
1.1	1.1	D = 1.1 m						1.1
1.2								1.2
1.3								1.3
1.4								1.4
1.5								1.5
1.6								1.6
1.7						Termination Depth at: 1.7 m		1.7
1.8								1.8
1.9								1.9
2.0								2.0
2.1								2.1
2.2								2.2
2.3								2.3
2.4								2.4

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PROJECT NUMBER 17335

PROJECT NAME Wango Lane, Aintree

CLIENT Mulberry Homes Ltd

DATE 23rd April 2018

DRILLING METHOD Trial Pit

TRIAL PIT NO TP3

SHEET 1/1

COMMENTS Shear Vane @ 0.6 m = 118 kPa, SV @ 1.0 m = >120 kPa.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0.1	0.15	D = 0.15 m				Dark brown soft sandy clay with much rootlets (Topsoil)		0.1
0.2								0.2
0.3								0.3
0.4								0.4
0.5								0.5
0.6								0.6
0.7						Stiff orange/brown clay with rare sand pockets and rare fine to coarse gravels		0.7
0.8								0.8
0.9								0.9
1								1
1.1								1.1
1.2								1.2
1.3								1.3
1.4								1.4
1.5								1.5
1.6								1.6
1.7								1.7
1.8								1.8
1.9								1.9
2						Termination Depth at: 2.0 m		2
2.1								2.1
2.2								2.2
2.3								2.3
2.4								2.4

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Page 1 of 1

PROJECT NUMBER 17335 PROJECT NAME Wango Lane, Aintree CLIENT Mulberry Homes Ltd	DATE 23rd April 2018 DRILLING METHOD Trial Pit TRIAL PIT NO TP4 SHEET 1/1
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COMMENTS Shear Vane @ 0.6 m = >120 kPa, SV @ 1.0 m = 92 kPa.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0.1						Dark brown soft sandy clay with much rootlets (Topsoil)		0.1
0.2	0.2	D = 0.2 m						0.2
0.3								0.3
0.4								0.4
0.5								0.5
0.6						Stiff orange/brown clay with rare sand pockets and rare fine to coarse gravels		0.6
0.7								0.7
0.8								0.8
0.9								0.9
1								1
1.1								1.1
1.2								1.2
1.3								1.3
1.4								1.4
1.5								1.5
1.6								1.6
1.7								1.7
1.8								1.8
1.9						Termination Depth at: 1.9 m		1.9
2								2
2.1								2.1
2.2								2.2
2.3								2.3
2.4								2.4

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PROJECT NUMBER 17335

PROJECT NAME Wango Lane, Aintree

CLIENT Mulberry Homes Ltd

DATE 23rd April 2018

DRILLING METHOD Trial Pit

TRIAL PIT NO TP5

SHEET 1/1

COMMENTS Shear Vane @ 0.6 m = 110 kPa, SV @ 1.0 m = 94 kPa.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0.1						Dark brown soft sandy clay with much rootlets (Topsoil)		0.1
0.2								0.2
0.3								0.3
0.4	0.4	D = 0.4 m						0.4
0.5								0.5
0.6						Stiff orange/brown clay with rare sand pockets and rare fine to coarse gravels		0.6
0.7								0.7
0.8								0.8
0.9								0.9
1								1
1.1								1.1
1.2								1.2
1.3								1.3
1.4								1.4
1.5								1.5
1.6								1.6
1.7						Termination Depth at: 1.7 m		1.7
1.8								1.8
1.9								1.9
2								2
2.1								2.1
2.2								2.2
2.3								2.3
2.4								2.4

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PROJECT NUMBER 17335
PROJECT NAME Wango Lane, Aintree
CLIENT Mulberry Homes Ltd

DATE 23rd April 2018
DRILLING METHOD Trial Pit
TRIAL PIT NO TP6
SHEET 1/1

COMMENTS Shear Vane @ 0.7 m = 92 kPa, SV @ 0.9 m = 88 kPa.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0.1						Dark brown soft sandy clay with much rootlets (Topsoil)		0.1
0.2								0.2
0.3								0.3
0.4	0.4	D = 0.4 m				Light brown/yellow fine to medium sand		0.4
0.5								0.5
0.6								0.6
0.7						Stiff orange/brown clay with rare sand pockets and rare fine to coarse gravels		0.7
0.8								0.8
0.9								0.9
1								1
1.1								1.1
1.2								1.2
1.3								1.3
1.4								1.4
1.5								1.5
1.6								1.6
1.7								1.7
1.8						Termination Depth at: 1.7 m		1.8
1.9								1.9
2								2
2.1								2.1
2.2								2.2
2.3								2.3
2.4								2.4

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PROJECT NUMBER 17335

PROJECT NAME Wango Lane, Aintree

CLIENT Mulberry Homes Ltd

DATE 23rd April 2018

DRILLING METHOD Trial Pit

TRIAL PIT NO TP7

SHEET 1/1

COMMENTS Shear Vane @ 0.8 m = 102 kPa, SV @ 1.0 m = 110 kPa.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0.1						Dark brown soft sandy clay with much rootlets (Topsoil)		0.1
0.2								0.2
0.3	0.3	D = 0.3 m						0.3
0.4						Light brown/yellow fine to medium sand		0.4
0.5								0.5
0.6								0.6
0.7								0.7
0.8	0.8 - 1.0	D = 0.9 m B = 0.8 - 1.0 m				Stiff orange/brown clay with rare sand pockets and rare fine to coarse gravels		0.8
0.9								0.9
1								1
1.1								1.1
1.2								1.2
1.3								1.3
1.4								1.4
1.5								1.5
1.6						Termination Depth at: 1.6 m		1.6
1.7								1.7
1.8								1.8
1.9								1.9
2								2
2.1								2.1
2.2								2.2
2.3								2.3
2.4								2.4

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PROJECT NUMBER 17335
PROJECT NAME Wango Lane, Aintree
CLIENT Mulberry Homes Ltd

DATE 23rd April 2018
DRILLING METHOD Trial Pit
TRIAL PIT NO TP8
SHEET 1/1

COMMENTS Shear Vane @ 0.8 m = 106 kPa, SV @ 1.3 m = >120 kPa

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0.1	0.2	D = 0.2 m				Dark brown soft sandy clay with much rootlets (Topsoil)		0.1
0.2								0.2
0.3								0.3
0.4								0.4
0.5						Light brown/yellow fine to medium sand		0.5
0.6								0.6
0.7						Stiff orange/brown clay with rare sand pockets and rare fine to coarse gravels		0.7
0.8								0.8
0.9								0.9
1								1
1.1								1.1
1.2								1.2
1.3								1.3
1.4								1.4
1.5								1.5
1.6								1.6
1.7								1.7
1.8								1.8
1.9								1.9
2								2
2.1								2.1
2.2						Termination Depth at: 2.2 m		2.2
2.3								2.3
2.4								2.4

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PROJECT NUMBER 17335
PROJECT NAME Wango Lane, Aintree
CLIENT Mulberry Homes Ltd

DATE 23rd April 2018
DRILLING METHOD Trial Pit
TRIAL PIT NO TP9
SHEET 1/1

COMMENTS Shear Vane @ 0.6 m = 84 kPa, SV @ 1.6 m = 74 kPa

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0.1						Dark brown soft sandy clay with much rootlets (Topsoil)		0.1
0.2	0.2	D = 0.2 m						0.2
0.3						Light brown/yellow fine to medium sand		0.3
0.4	0.4	D = 0.4 m						0.4
0.5						Stiff orange/brown clay with rare sand pockets and rare fine to coarse gravels		0.5
0.6								0.6
0.7								0.7
0.8								0.8
0.9								0.9
1								1
1.1								1.1
1.2								1.2
1.3								1.3
1.4								1.4
1.5								1.5
1.6								1.6
1.7								1.7
1.8								1.8
1.9								1.9
2								2
2.1								2.1
2.2						Termination Depth at: 2.2 m		2.2
2.3								2.3
2.4								2.4

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PROJECT NUMBER 17335
PROJECT NAME Wango Lane, Aintree
CLIENT Mulberry Homes Ltd

DATE 23rd April 2018
DRILLING METHOD Trial Pit
TRIAL PIT NO TP10
SHEET 1/1

COMMENTS Shear Vane @ 0.7 m = 52 kPa, SV @ 1.0 m = 86 kPa, SV @ 1.5 m = 78 Kpa. Water ingress at 0.5 m (Running Sands)

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0.1						Dark brown soft sandy clay with much rootlets (Topsoil)		0.1
0.2	0.2	D = 0.2 m						0.2
0.3								0.3
0.4						Light brown/yellow fine to medium sand		0.4
0.5								0.5
0.6						Stiff orange/brown clay with rare sand pockets and rare fine to coarse gravels		0.6
0.7								0.7
0.8								0.8
0.9								0.9
1								1
1.1								1.1
1.2								1.2
1.3								1.3
1.4								1.4
1.5								1.5
1.6								1.6
1.7								1.7
1.8								1.8
1.9						Termination Depth at: 1.9 m		1.9
2								2
2.1								2.1
2.2								2.2
2.3								2.3
2.4								2.4

Disclaimer This bore log is intended for environmental not geotechnical purposes.

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PROJECT NUMBER 17335

PROJECT NAME Wango Lane, Aintree

CLIENT Mulberry Homes Ltd

DATE 23rd April 2018

DRILLING METHOD Trial Pit

TRIAL PIT NO TP11

SHEET 1/1

COMMENTS Shear Vane @ 1.0 m = 62 kPa, SV @ 1.2 m = 102 kPa. SV @ 1.5 m = 80 Kpa.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0.1	0.1	D = 0.1 m				Dark brown soft sandy clay with much rootlets (Topsoil)		0.1
0.2						Light brown/yellow fine to medium sand		0.2
0.3								0.3
0.4	0.4	D = 0.4 m						0.4
0.5						Stiff orange/brown clay with rare sand pockets and rare fine to coarse gravels		0.5
0.6								0.6
0.7								0.7
0.8								0.8
0.9								0.9
1.0	1.0 - 1.2	B = 0.8 - 1.0 m						1.0
1.1								1.1
1.2	1.2	1.2 m						1.2
1.3								1.3
1.4								1.4
1.5								1.5
1.6								1.6
1.7								1.7
1.8								1.8
1.9								1.9
2.0								2.0
2.1						Termination Depth at: 2.1 m		2.1
2.2								2.2
2.3								2.3
2.4								2.4

Disclaimer This bore log is intended for environmental not geotechnical purposes.

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APPENDIX F

Chemical Test Results



Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8PL

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

BEK Enviro Limited
Suite One
No 3 Mitton Road Business Park
Mitton Road
Whalley
Lancashire
BB7 9YE

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781



Attention : Michael Buckley
Date : 9th May, 2018
Your reference :
Our reference : Test Report 18/6189 Batch 1
Location : Wango Lane
Date samples received : 25th April, 2018
Status : Final report
Issue : 1

Seventeen samples were received for analysis on 25th April, 2018 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Paul Boden BSc
Project Manager

Client Name: BEK Enviro Limited
Reference:
Location: Wango Lane
Contact: Michael Buckley
JE Job No.: 18/6189

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1	2	3	4	5	6	7	8	9	10	Please see attached notes for all abbreviations and acronyms		
Sample ID	TP1	TP1	TP2	TP4	TP5	TP7	TP7	TP9	TP10	TP11			
Depth	0.20	0.80	1.10	0.20	0.40	0.30	0.90	0.20	0.20	1.20			
COC No / misc													
Containers	J	J	J	J	J	J	J	J	J	J			
Sample Date	23/04/2018	23/04/2018	23/04/2018	23/04/2018	23/04/2018	23/04/2018	23/04/2018	23/04/2018	23/04/2018	23/04/2018			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	25/04/2018	25/04/2018	25/04/2018	25/04/2018	25/04/2018	25/04/2018	25/04/2018	25/04/2018	25/04/2018	25/04/2018	LOD/LOR	Units	Method No.
Arsenic [#]	9.7	8.6	10.1	9.5	11.1	8.0	11.8	7.8	7.9	6.6	<0.5	mg/kg	TM30/PM15
Cadmium [#]	0.1	<0.1	0.1	0.2	0.2	0.1	<0.1	0.2	0.2	<0.1	<0.1	mg/kg	TM30/PM15
Chromium [#]	79.4	57.6	58.4	61.1	70.9	74.9	57.3	71.6	70.3	54.0	<0.5	mg/kg	TM30/PM15
Copper [#]	31	17	16	27	31	26	18	22	25	15	<1	mg/kg	TM30/PM15
Lead [#]	82	8	10	91	92	59	10	53	53	6	<5	mg/kg	TM30/PM15
Nickel [#]	16.3	44.1	45.7	15.2	21.1	16.4	41.8	13.6	15.0	33.7	<0.7	mg/kg	TM30/PM15
Selenium [#]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM30/PM15
Total Sulphate as SO ₄ [#]	294	150	137	347	256	298	159	235	260	241	<50	mg/kg	TM50/PM29
Water Soluble Boron [#]	0.6	0.6	0.7	0.7	0.5	0.4	0.8	0.4	0.4	0.6	<0.1	mg/kg	TM74/PM32
Zinc [#]	51	60	62	49	61	45	58	40	44	46	<5	mg/kg	TM30/PM15
Mercury CVAf	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	TM61/PM62
PAH MS													
Naphthalene [#]	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene [#]	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene [#]	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene [#]	0.32	<0.03	<0.03	0.34	0.08	0.08	<0.03	0.08	0.09	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene [#]	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene [#]	0.36	<0.03	<0.03	0.73	0.17	0.17	<0.03	0.16	0.19	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.33	<0.03	<0.03	0.69	0.16	0.17	<0.03	0.14	0.18	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.13	<0.06	<0.06	0.45	<0.06	0.08	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene [#]	0.17	<0.02	<0.02	0.49	0.10	0.12	<0.02	0.08	0.12	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene [#]	0.28	<0.07	<0.07	0.69	0.14	0.16	<0.07	0.10	0.19	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.15	<0.04	<0.04	0.36	0.08	0.09	<0.04	0.07	0.10	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene [#]	0.07	<0.04	<0.04	0.22	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	0.08	<0.04	<0.04	0.26	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 16 Total	1.9	<0.6	<0.6	4.3	0.7	0.9	<0.6	0.6	0.9	<0.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.20	<0.05	<0.05	0.50	0.10	0.12	<0.05	0.07	0.14	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.08	<0.02	<0.02	0.19	0.04	0.04	<0.02	0.03	0.05	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	100	99	100	107	103	103	100	104	101	100	<0	%	TM4/PM8
Phenol [#]	0.50 ^{AA}	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	TM26/PM21
Natural Moisture Content	32.6	17.2	19.6	31.9	30.8	31.7	19.6	30.4	29.5	16.7	<0.1	%	PM4/PM0
Hexavalent Chromium [#]	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO ₄ (2:1 Ext) [#]	0.0053	0.0046	0.0037	0.0079	0.0088	0.0161	0.0044	0.0104	0.0065	0.0169	<0.0015	g/l	TM38/PM20
Total Cyanide [#]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	TM89/PM45
Organic Matter	3.5	0.4	0.5	3.5	4.1	3.2	0.5	2.6	3.2	0.3	<0.2	%	TM21/PM24

Client Name: BEK Enviro Limited
Reference:
Location: Wango Lane
Contact: Michael Buckley

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/6189	1	TP1	0.20	1	03/05/2018	General Description (Bulk Analysis)	soil.stones
					03/05/2018	Asbestos Fibres	NAD
					03/05/2018	Asbestos Fibres (2)	NAD
					03/05/2018	Asbestos ACM	NAD
					03/05/2018	Asbestos ACM (2)	NAD
					03/05/2018	Asbestos Type	NAD
					03/05/2018	Asbestos Type (2)	NAD
					03/05/2018	Asbestos Level Screen	NAD
18/6189	1	TP1	0.80	2	03/05/2018	General Description (Bulk Analysis)	soil.stones
					03/05/2018	Asbestos Fibres	NAD
					03/05/2018	Asbestos Fibres (2)	NAD
					03/05/2018	Asbestos ACM	NAD
					03/05/2018	Asbestos ACM (2)	NAD
					03/05/2018	Asbestos Type	NAD
					03/05/2018	Asbestos Type (2)	NAD
					03/05/2018	Asbestos Level Screen	NAD
18/6189	1	TP2	1.10	3	03/05/2018	General Description (Bulk Analysis)	soil.stones
					03/05/2018	Asbestos Fibres	NAD
					03/05/2018	Asbestos Fibres (2)	NAD
					03/05/2018	Asbestos ACM	NAD
					03/05/2018	Asbestos ACM (2)	NAD
					03/05/2018	Asbestos Type	NAD
					03/05/2018	Asbestos Type (2)	NAD
					03/05/2018	Asbestos Level Screen	NAD
18/6189	1	TP4	0.20	4	03/05/2018	General Description (Bulk Analysis)	Soil/Stone
					03/05/2018	Asbestos Fibres	NAD
					03/05/2018	Asbestos Fibres (2)	NAD
					03/05/2018	Asbestos ACM	NAD
					03/05/2018	Asbestos ACM (2)	NAD
					03/05/2018	Asbestos Type	NAD
					03/05/2018	Asbestos Type (2)	NAD
					03/05/2018	Asbestos Level Screen	NAD
18/6189	1	TP5	0.40	5	03/05/2018	General Description (Bulk Analysis)	Soil/Stone
					03/05/2018	Asbestos Fibres	NAD
					03/05/2018	Asbestos Fibres (2)	NAD

Client Name: BEK Enviro Limited
Reference:
Location: Wango Lane
Contact: Michael Buckley

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/6189	1	TP5	0.40	5	03/05/2018	Asbestos ACM	NAD
					03/05/2018	Asbestos ACM (2)	NAD
					03/05/2018	Asbestos Type	NAD
					03/05/2018	Asbestos Type (2)	NAD
					03/05/2018	Asbestos Level Screen	NAD
18/6189	1	TP7	0.30	6	03/05/2018	General Description (Bulk Analysis)	Soil/Stone
					03/05/2018	Asbestos Fibres	NAD
					03/05/2018	Asbestos Fibres (2)	NAD
					03/05/2018	Asbestos ACM	NAD
					03/05/2018	Asbestos ACM (2)	NAD
					03/05/2018	Asbestos Type	NAD
					03/05/2018	Asbestos Type (2)	NAD
					03/05/2018	Asbestos Level Screen	NAD
18/6189	1	TP7	0.90	7	03/05/2018	General Description (Bulk Analysis)	Soil/Stone
					03/05/2018	Asbestos Fibres	NAD
					03/05/2018	Asbestos Fibres (2)	NAD
					03/05/2018	Asbestos ACM	NAD
					03/05/2018	Asbestos ACM (2)	NAD
					03/05/2018	Asbestos Type	NAD
					03/05/2018	Asbestos Type (2)	NAD
					03/05/2018	Asbestos Level Screen	NAD
18/6189	1	TP9	0.20	8	03/05/2018	General Description (Bulk Analysis)	Soil/Stone
					03/05/2018	Asbestos Fibres	NAD
					03/05/2018	Asbestos Fibres (2)	NAD
					03/05/2018	Asbestos ACM	NAD
					03/05/2018	Asbestos ACM (2)	NAD
					03/05/2018	Asbestos Type	NAD
					03/05/2018	Asbestos Type (2)	NAD
					03/05/2018	Asbestos Level Screen	NAD
18/6189	1	TP10	0.20	9	03/05/2018	General Description (Bulk Analysis)	Soil/Stone
					03/05/2018	Asbestos Fibres	NAD
					03/05/2018	Asbestos Fibres (2)	NAD
					03/05/2018	Asbestos ACM	NAD
					03/05/2018	Asbestos ACM (2)	NAD
					03/05/2018	Asbestos Type	NAD
					03/05/2018	Asbestos Type (2)	NAD
					03/05/2018	Asbestos Level Screen	NAD
18/6189	1	TP11	1.20	10	03/05/2018	General Description (Bulk Analysis)	Soil/Stone
					03/05/2018	Asbestos Fibres	NAD
					03/05/2018	Asbestos Fibres (2)	NAD
					03/05/2018	Asbestos ACM	NAD
					03/05/2018	Asbestos ACM (2)	NAD
					03/05/2018	Asbestos Type	NAD
					03/05/2018	Asbestos Type (2)	NAD
					03/05/2018	Asbestos Level Screen	NAD

Client Name: BEK Enviro Limited

Reference:

Location: Wango Lane

Contact: Michael Buckley

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/6189

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x20 Dilution

JE Job No: 18/6189

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO ₂ generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21	As received solid or water samples are extracted in Methanol: Sodium Hydroxide (0.1M NaOH) (60:40) by orbital shaker.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	Dried and ground solid sample is boiled with dilute hydrochloric acid, the resulting liquor is then analysed.	Yes		AD	Yes
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes

JE Job No: 18/6189

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes

APPENDIX G

Geotechnical Test Results

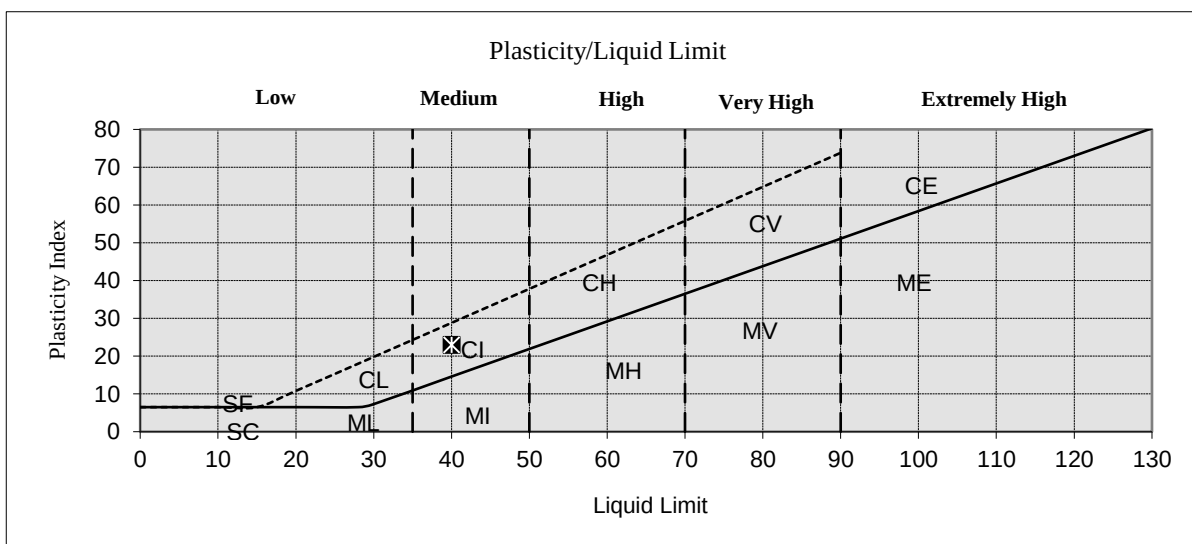


LABORATORY TEST REPORT

LIQUID & PLASTIC LIMIT TESTS BS 1377: Part 2: 1990 Cl 4.4,5.3

Site Ref.:	Wango Lane, Aintree	Job No.:	14950/1
Client:	Bek Enviro	Lab Ref No.:	SA32599
		Sample Ref.:	TP1 (0.8-1.0m)
		Date Received:	25/04/2018
		Date Tested:	09/05/2018
Originator:	Michael Buckley	Date Reported:	09/05/2018

Sampling Certificate	Yes
Sampled By	Client
Sample Type	Bulk
Sample Preparation Method	As Received
MATERIAL	Cohesive CLAY
Retained 425 micron (%)	0.5
Natural Moisture Content (%)	21
Liquid Limit (single point)(%)	40
Plastic Limit (%)	17
Plasticity Index	23



K. Monks

Approved Signature

James Fisher Testing Services Ltd

■ Karl Monks, Lab Team Leader

R02 R2 WTN



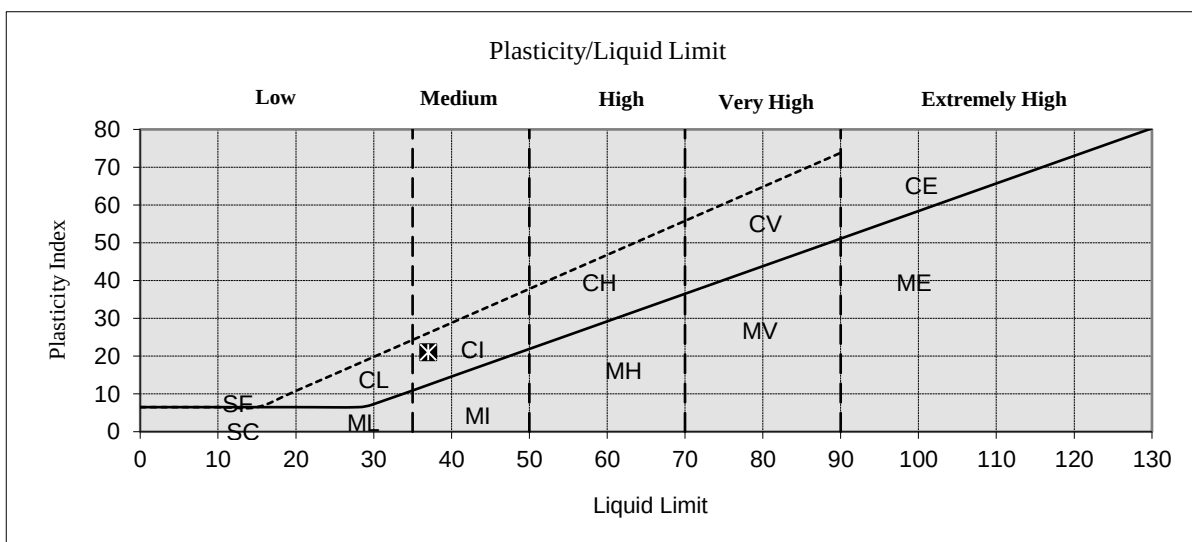


LABORATORY TEST REPORT

LIQUID & PLASTIC LIMIT TESTS BS 1377: Part 2: 1990 Cl 4.4,5.3

Site Ref.:	Wango Lane, Aintree	Job No.:	14950/1
Client:	Bek Enviro	Lab Ref No.:	SA32599
		Sample Ref.:	TP7 (0.8-1.0m)
		Date Received:	25/04/2018
		Date Tested:	09/05/2018
Originator:	Michael Buckley	Date Reported:	09/05/2018

Sampling Certificate	Yes
Sampled By	Client
Sample Type	Bulk
Sample Preparation Method	As Received
MATERIAL	Cohesive CLAY
Retained 425 micron (%)	2.0
Natural Moisture Content (%)	20
Liquid Limit (single point)(%)	37
Plastic Limit (%)	16
Plasticity Index	21



K. Monks

Approved Signature

James Fisher Testing Services Ltd

■ Karl Monks, Lab Team Leader

R02 R2 WTN



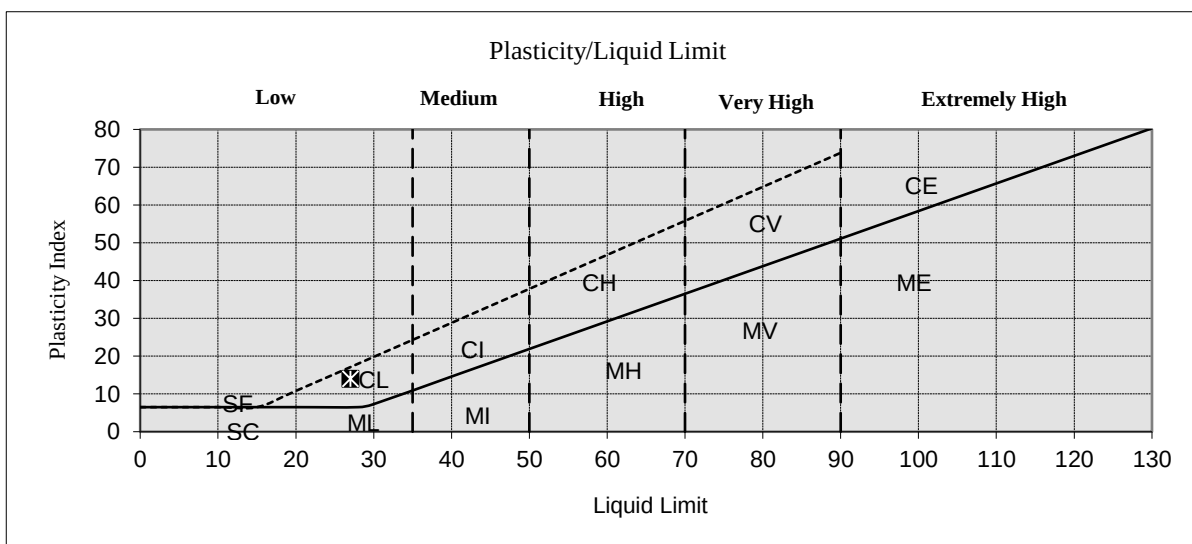


LABORATORY TEST REPORT

LIQUID & PLASTIC LIMIT TESTS BS 1377: Part 2: 1990 Cl 4.4.5.3

Site Ref.:	Wango Lane, Aintree	Job No.:	14950/1
Client:	Bek Enviro	Lab Ref No.:	SA32599
		Sample Ref.:	TP11 (1.0-1.2m)
		Date Received:	25/04/2018
		Date Tested:	09/05/2018
Originator:	Michael Buckley	Date Reported:	09/05/2018

Sampling Certificate	Yes
Sampled By	Client
Sample Type	Bulk
Sample Preparation Method	As Received
MATERIAL	Firm Brown CLAY
Retained 425 micron (%)	7.5
Natural Moisture Content (%)	17
Liquid Limit (single point)(%)	27
Plastic Limit (%)	13
Plasticity Index	14



K. Monks

Approved Signature

James Fisher Testing Services Ltd

■ Karl Monks, Lab Team Leader

R02 R2 WTN



APPENDIX H

Photographs



Trial Pit 1

Photograph 1



Trial Pit 1

Photograph 2



Trial Pit 2

Photograph 3



Trial Pit 2

Photograph 4



Trial Pit 3

Photograph 5



Trial Pit 3

Photograph 6

	Trial Pit 4
	Photograph 7 Trial Pit 4 Photograph 8

	Trial Pit 5
	Photograph 9 Trial Pit 5 Photograph 10



Trial Pit 6

Photograph 11



Trial Pit 6

Photograph 12



Trial Pit 7

Photograph 13



Trial Pit 7

Photograph 14



Trial Pit 8

Photograph 15



Trial Pit 8

Photograph 16



Trial Pit 9

Photograph 17



Trial Pit 9

Photograph 18



Trial Pit 10

Photograph 19



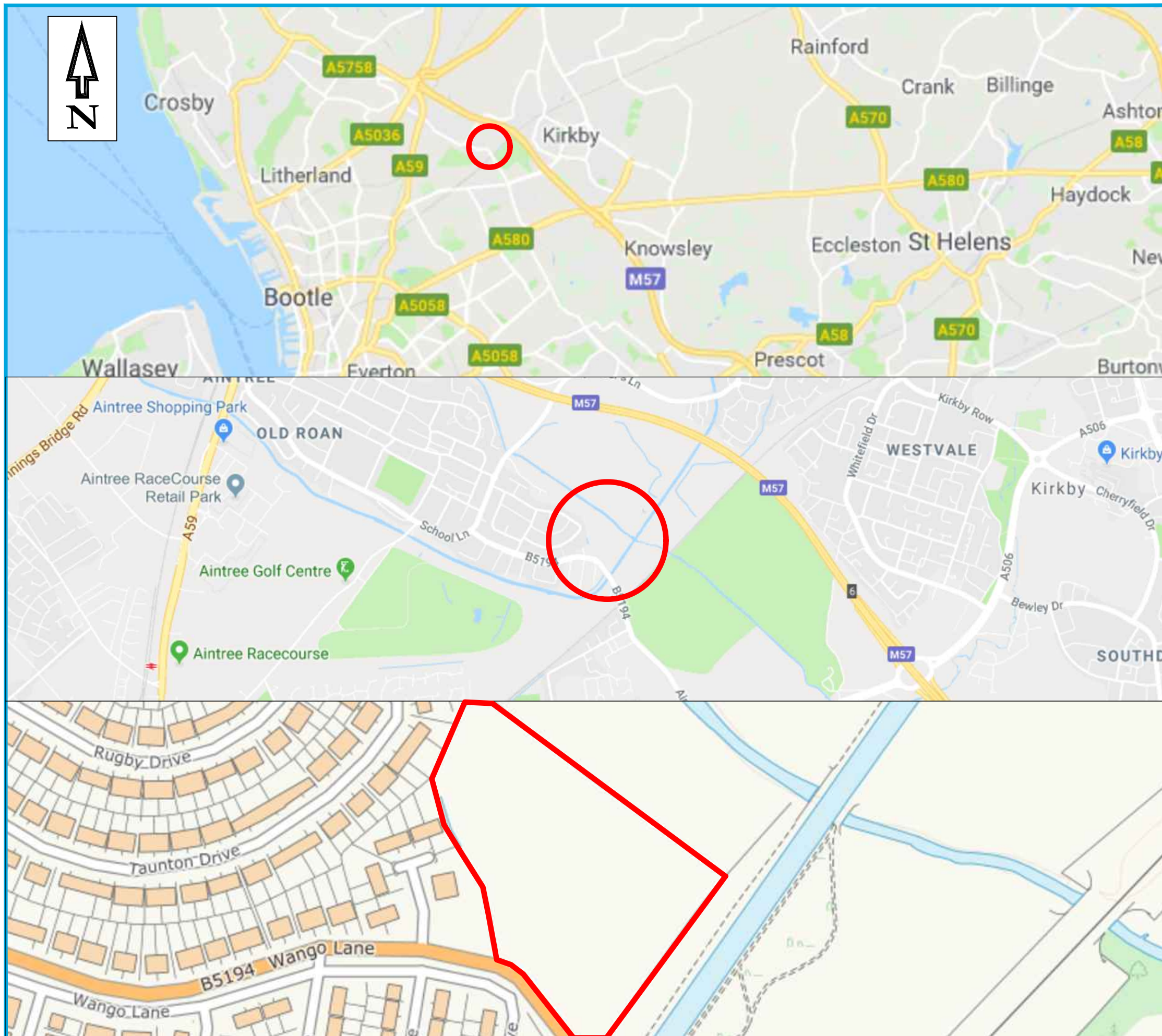
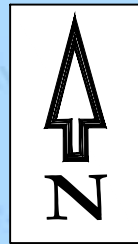
Trial Pit 10

Photograph 20

	Trial Pit 11
	Photograph 21 Trial Pit 11 Photograph 22

APPENDIX I

Drawings



LEGEND

 SITE LOCATION

REV	DESCRIPTION	DATE	BY



GEO-ENVIRONMENTAL CONSULTING ENGINEERS
Suite One, No 3 Mitton Road Business Park, Mitton Road,
Whalley, Lancashire BB7 9YE
Tel: 01254 377622 Mob: 07906753583
Email: mbuckley@bekenviro.co.uk
Web: www.bekenviro.co.uk

CLIENT.
MULBERRY HOMES LTD

JOB TITLE.
WANGO LANE, AINTREE

DRAWING TITLE.
SITE LOCATION PLAN

SCALE © A3. N.T.S	DRAWN BY. D.E.	APPROVED BY. M.B.	DATE. 16/04/18
DRAWING No. 17335-1	REV. -		



LEGEND

— SITE FOOTPRINT

REV	DESCRIPTION	DATE	BY



GEO-ENVIRONMENTAL CONSULTING ENGINEERS
Suite One, No 3 Mitton Road Business Park, Mitton Road,
Whalley, Lancashire BB7 9YE
Tel: 01254 377622 Mob: 07906753583
Email: mbuckley@bekenviro.co.uk
Web: www.bekenviro.co.uk

CLIENT.

MULBURY HOMES LTD

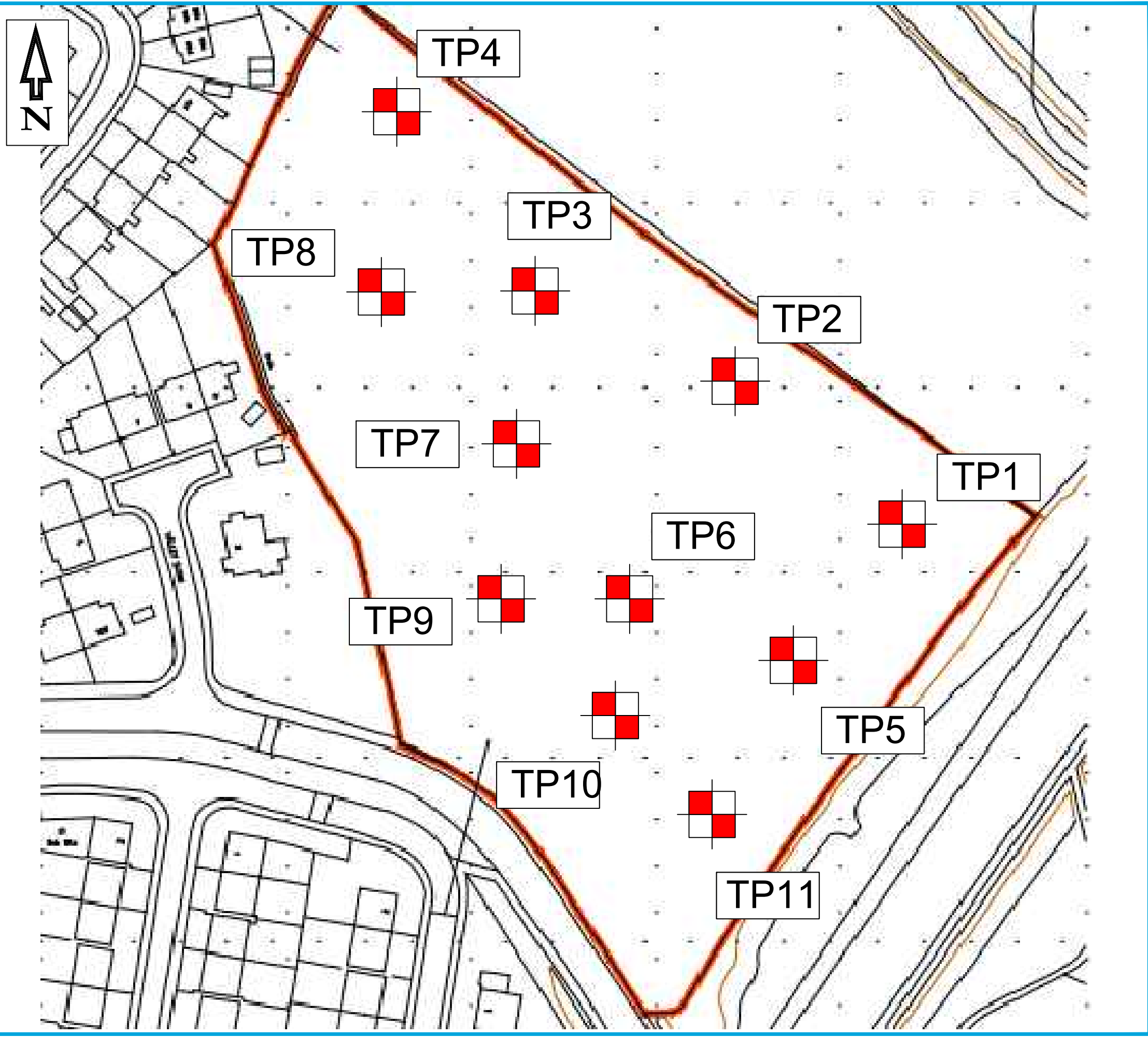
JOB TITLE.

WANGO LANE, AINTREE

DRAWING TITLE.

SITE LAYOUT PLAN

SCALE @ A3. N'TS	DRAWN BY. D.E.	APPROVED BY. M.B.	DATE. 16/04/18
DRAWING No. 17355-2			REV. -



LEGEND

-  SITE FOOTPRINT
-  BEK TRIAL PIT

REV	DESCRIPTION	DATE	BY



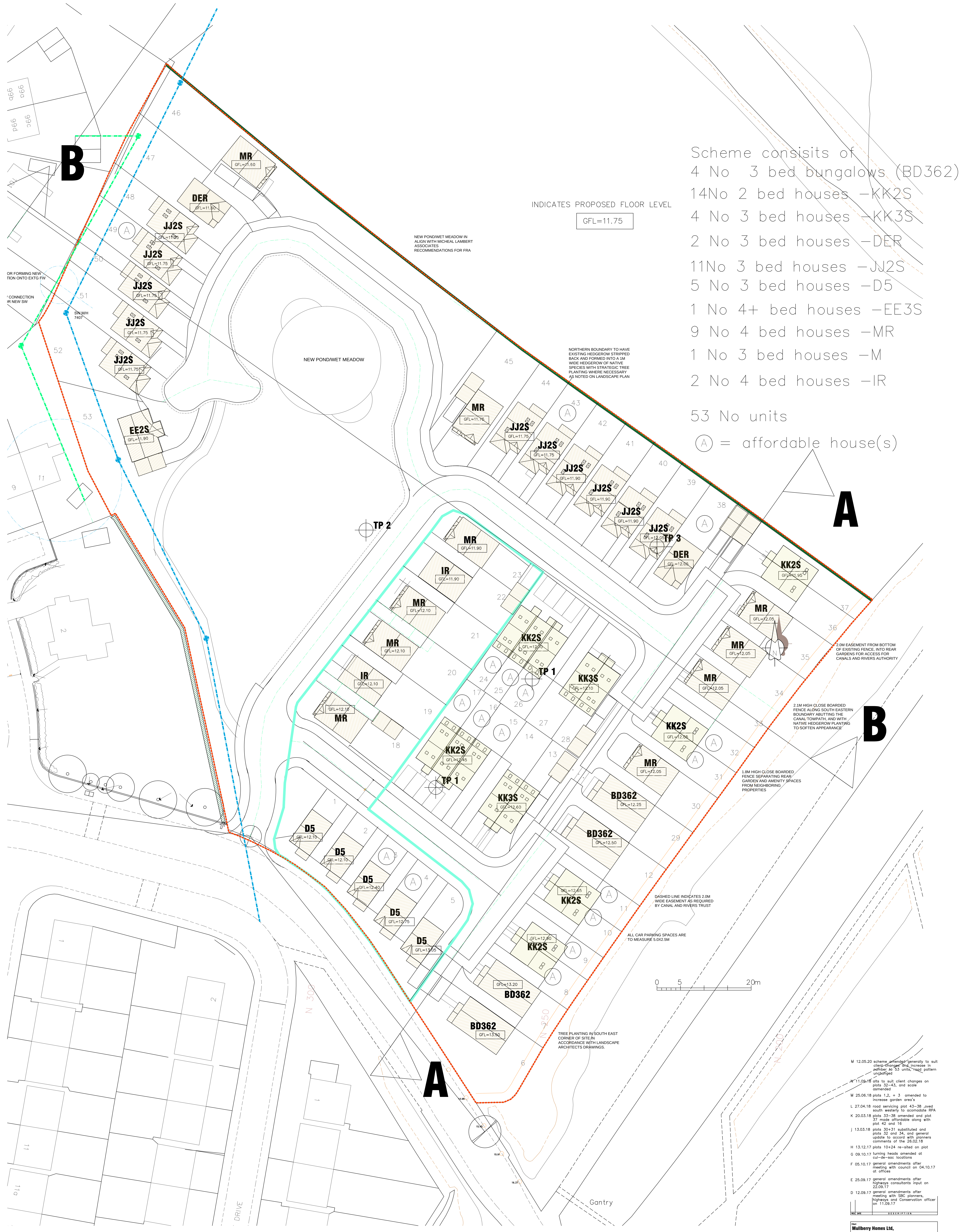
GEO-ENVIRONMENTAL CONSULTING ENGINEERS
Suite One, No 3 Mitton Road Business Park, Mitton Road,
Whalley, Lancashire BB7 9YE
Tel: 01254 377622 Mob: 07906753583
Email: mbuckley@bekenviro.co.uk
Web: www.bekenviro.co.uk

CLIENT.
MULBERRY HOMES LTD

JOB TITLE.
WANGO LANE, AINTREE

DRAWING TITLE.
TRIAL PIT LOCATION PLAN

SCALE © A3. N'TS	DRAWN BY. D.E.	APPROVED BY. M.B.	DATE. 23/04/18
DRAWING No. 17335-3			REV. -



- Scheme consists of
- 4 No 3 bed bungalows (BD362)
 - 14No 2 bed houses –KK2S
 - 4 No 3 bed houses –KK3S
 - 2 No 3 bed houses –DER
 - 11No 3 bed houses –JJ2S
 - 5 No 3 bed houses –D5
 - 1 No 4+ bed houses –EE3S
 - 9 No 4 bed houses –MR
 - 1 No 3 bed houses –M
 - 2 No 4 bed houses –IR
- 53 No units
- Ⓐ = affordable house(s)

M 12.05.20 scheme amended generally to suit client changes and increase in number of units, and scale amended

N 11.09.18 alterations to suit client changes on plots 32-43, and scale amended

M 25.06.18 plots 1, 2, + 3 amended to increase garden area's

L 27.04.18 road servicing plot 43-38, moved south westerly to accommodate RPA

K 20.03.18 plots 33-38 amended and plot 37 made affordable along with plot 42 and 16

J 13.03.18 plots 30+31 substituted and plots 32 and 34, and general updates to accord with planners comments of the 26.02.18

H 13.12.17 plots 10+24 re-sited on plot

G 09.10.17 turning heads amended at cul-de-sac locations

F 05.10.17 general amendments after meeting with Council on 04.10.17 at offices

E 25.09.17 general amendments after highways consultants input on 22.09.17

D 12.09.17 general amendments after meeting with SBC planners, highways and Conservation officer on 11.09.17

DESCRIPTION			
Mulberry Homes Ltd, 45 Preston New Road, Blackburn, Lancs			
PROPOSED SITE WANGO LANE, AINTREE			
Drawing Title PROPOSED SITE PLAN			
Drawing No. WL		Drawing No Drwg No 150 M	
Scale 1/250th	Date 12.09.18	Drawn	Checked



GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Suite One | No 3 Mitton Road Business Park | Mitton Road | Whalley | Lancashire | BB7 9YE
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