Phase 1 Geoenvironmental Risk Assessment and Phase 2 Ground Investigation

LADY ANN ROAD
SOOTHILL, BATLEY

for

D. Noble Limited

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Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Charnock Court 6 South Parade Wakefield West Yorkshire WF1 1LR UK

T +44(0)1924 360458 **E** mdja@geoenvironmental.co.uk **W** www.geoenvironmental.co.uk

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1 INTRODUCTION

1.1 At the request of D. Noble Limited, a Phase I Geoenvironmental and Geotechnical Assessment (Desk Study) and a Phase II Intrusive Investigation have previously been carried out at Lady Ann Road in Batley in September 2016. It was proposed to develop the site with residential properties.

1.2 The intrusive investigation comprised trial pitting with associated in-situ and laboratory testing. Recommendations were made for the safe and economic development of the site, and the findings presented in Michael D Joyce Associates LLP Report No. 3663, dated September 2016.

1.3 The study did not include checks on services on or adjacent to the site, and no structural or asbestos surveys were carried out.

1.4 Subsequent to this report, the proposed layout has been revised. As such the original recommendations have been reassessed in the light of these changes.

1.5 In addition, given the time which has lapsed since the original investigation, it was also considered prudent to update the Phase 1 part of the investigation, and carry out a new site inspection. This latest report also presents the findings of this.

2 THE SITE

2.1 The site covers an area of approximately 3.3 hectares and is located approximately 3km north of the centre of Dewsbury. The Ordnance Survey grid reference is SE 250 246. Figure 1 shows the general site location, whilst figure 2 shows the site in more detail.

2.2 The site was originally inspected in 2016, and again in November 2022. It is a large plot of land situated between Lady Ann Road to the east and Primrose Hill to the west. Access to the site was in the south east corner across a railway sleeper along a footpath, or from the northwest corner of the site over a wooden fence.

2.3 The site is an irregular shape, with the northern site boundary marked by a 1.0m high wooden fence with trees and bushes. The western site boundary is marked by back gardens of terraced houses on Primrose Hill, with the actual boundary marked by a typical wooden garden fence. The north eastern site boundary is marked mainly by dense bushes/trees, with the rest of the eastern boundary marked by a small beck and Lady Ann Road.

2.4 The site slopes down steeply from the west towards the east and south. The site is surfaced by overgrown weeds, reeds, bushes, trees and grass.

2.5 In the central eastern corner of the site, a depressed area of reeds exists, which is very soft underfoot and according to locals is prone to regular flooding. The same is noted in the northeast corner of the site, and to a lesser extent adjacent to southeast boundary.

2.6 A row of mature trees cuts the site in roughly half across the centre from the east to the west. It is understood that the trees have Tree Protection Orders (TPO) placed on them.

2.7 Fly-tipped material was identified in west and centre of site, typically household waste. Fly tipped material also encountered in northeast corner of site and northwest corner of site, again typically household waste. Although asbestos was not identified, it is possible that it may exist within some of the fly tipped material.

2.8 Manholes/Drainage is situated along eastern site boundary. Overhead electricity pylons are situated in the north of the site, running east to west.

3 SITE HISTORY

3.1 The following archival Ordnance Survey maps have been examined to trace the past development of the site. These are reproduced in Appendix 5 with the current site boundary superimposed on them. The apparent displacement on the older maps is due to a change in Ordnance Survey co-ordinates.

Scale and Year of Publication			
6" to 1 mile	1854	1:2500	1894
	1892		1907
	1906		1922
	1932		1933
	1938		1939
	1948		1955
	1957		1969
	1967		
1:10,000	1975	1:1250	1955
	1985		1969
	1992		1970
	1995		1977
	2002		1992
	2010		1995
	2014		

3.2 The earliest map of 1854 shows the site and surrounding area to be essentially agricultural. However by 1894, Lady Ann Mills had been built to the east of the site. This was a large woollen mill. A smaller Culvert Mills (Flock) lay to the south on Lady

Ann Road, with Farfield Nursery to the north of the site. Railway lines had been built to the west and to the southeast. A quarry is also shown to the south of the site.

3.3 By 1907 Primrose Hill had been constructed with most of the terraced housing adjoining it. The terraced housing on Lady Ann Road was also begun around this time and by 1972 extended much of the way along Lady Ann Road, both to the north and south of Culvert Mills.

3.4 Further development surrounding the site continued and by 1933 part of the site itself had become allotments. Over the subsequent years most of the site became allotment gardens. There were a number of small sheds and greenhouses but no obvious large structures.

3.5 The site continued to be used as allotments over the following years, and according to the historical maps the site has never been used for any other purpose. Lady Ann Mills became a business park during the 1990s and Culvert Mills was used as warehousing. The former quarry appears to have had housing built within it.

3.6 Due to time and cost constraints, it has not been possible to consult with local history journals and newspapers. This can be carried out if requested, but is unlikely to provide any significant additional information.

3.7 It is not believed that the study site is of archaeological interest, but it would be prudent to make enquiries with West Yorkshire Archaeology Service, if this has not already been carried out.

4 GEOLOGY AND MINING

4.1 Geology

4.1.1 Maps of the British Geological Survey (BGS), in particular 1:10,560 scale sheet 232SE and 1:50,000 scale sheet 77 show the site to be underlain by mudstones, siltstones, shales and sandstone of the Carboniferous Middle Coal Measures.

4.1.2 The geological amps show two faults crossing the site. The main fault trends in a northeast-southwest direction through the northern part of the site, whilst a sub-ordinate fault runs a northwest-southeast direction and abuts the main fault.

4.1.3 The result of this faulting is that undifferentiated mudstones, siltstones and shales underlie the northern part of the site, and the Thornhill Rock sandstone underlies the southern part of the site.

4.1.4 There is a small area of Alluvial Deposits overlying the bedrock in the northeast corner of the site, adjacent to Howley Beck and Lady Ann Mills.

4.2 Mining

4.2.1 A mining report has been obtained from the Coal Authority, and is reproduced in full in Appendix 6. It dates from 2016, although the mining situation is very unlikely to have changed since that date. It states that there has been mining in three seams of coal between 50m and 300m depth, with the last date of working being 1907. Under normal circumstances, any subsidence should have ceased by now.

4.2.2 The report makes no mention of shallow workings being present or that shallow unrecorded workings might be present. The Coal Authority holds no record of any notice or subsidence claim having been made.

4.2.3 No shaft or adits are reported on, or within 20m of the site boundary. Although old unrecorded mine entries might be present on the site, these are considered relatively unlikely. No past, present or future opencasts are reported within the vicinity of the site.

4.3 GroundSure Geo-Insight

4.3.1 An up-to-date GroundSure Geo-Insight Report has been obtained for the site and is reproduced in Appendix 4. The report is based on the British Geological Survey (BGS) geological maps, GroundSure data and miscellaneous other geological sources.

4.3.2 None of the following are recorded beneath the site.

Geology
Records of Landslip within 500m of site boundary Records relating to permeability of Landslips within the site boundary

Ground Workings
Historical Surface Ground Working Features from Small Scale Mapping Historical Underground Working Features from Small Scale Mapping Current Ground Workings

Mining, Extraction and Natural Cavities
Historical Mining Johnson Poole and Bloomer Mining Area Non-Coal Mining Non-Coal Mining Cavities Natural Cavities Brine Extraction Gypsym Extraction Tin Mining Clay Mining

Railways and Tunnels
Tunnels Historical Railway and Tunnel Features Historical Railways Active Railways Railway Projects

In respect of natural ground subsidence, the BGS reports the following risk ratings.

Hazard	Risk
Shrink-Swell Clay	Negligible and Very Low
Landslide	Low and Moderate (in northern part of site only)
Ground Dissolution of Soluble Rocks	Negligible
Compressible Deposits	Moderate (alluvium only)
Collapsible Deposits	Negligible and Very Low
Running Sand	Negligible and Low

4.3.3 The risk of landslide across the site is very low, although the northernmost part of the site is low. A small section adjacent to the western boundary is categorised as Moderate, such that the potential for instability should be considered in the design.

5 HYDROGEOLOGY AND FLOODING

Hydrogeology

5.1 The Coal Measures occur throughout the heavily industrialised areas of West and South Yorkshire. They comprise a thick sequence of faulted rocks characterised by the repeated sequence of mudstone, siltstone, sandstone, seatearth and coal.

5.2 The Coal Measures, though classed as a minor aquifer, may provide good borehole yields from sandstones and many industrial supplies rely on them. However, groundwater flow is extensively affected by the faulting and fissuring of the rocks, and also by the results of coal mining and associated dewatering activities. Due to the complex, and often poorly understood hydrogeology, it is impossible to subdivide the Coal Measures into aquifers and non-aquifers except on a very detailed level and the whole sequence must therefore be considered in general terms as an aquifer.

5.3 Since April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive.

5.4 The aquifer within the superficial and bedrock deposits is designated as Secondary A. This is described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

5.5 Details provided by the Environment Agency in the GroundSure Enviro-Insight report, indicate there to be no licensed surface water or groundwater abstraction points within at least 900m of the site.

Fluvial (Watercourse) Flooding

5.6 The northeastern part of the site is shown to lie within Flood Zones 2 and 3 according to data supplied by the Environment Agency within the GroundSure Report. This estimates the annual probability of flooding as one in one hundred (1%) or greater in respect of Flood Zone 3.

5.7 The Environment Agency Risk of Flooding from Rivers and the Sea (RoFRaS) database also provides an indication of river and coastal flood risk at a national level on a 50m grid as used by many of the insurance companies. RoFRaS data is based on a 50m grid system, with the flood rating at the centre of the grid calculated and given below. The data considers the probability that the flood defences will overtop or breach, and the distance from the river or the sea. RoFRaS data for the study site indicates the site or an area within 25m has both a High (1 in 30 or greater) and Medium (less than 1 in 30 and more than 1 in 100) chance of flooding in any given year.

Surface Water Flooding

5.8 The GroundSure Report also includes a surface water flood risk provided by Ambiental Risk Analytics. This indicates potential surface water flooding along much of the eastern part of the site. The highest risk on the site is a 1 in 30 year flood, where surface water flooding would be greater than 1.0m.

5.9 The corresponding risk of groundwater flooding is low.

5.10 The areas affected by river and surface water flooding are approximate and appears to include the rear garden areas of the proposed properties to the east side of the

new access road. It is therefore recommended that a detailed Flood Risk Assessment for both river and surface water flooding is carried out, which should also assess predicted future flood levels relative to garden areas and floor levels of the proposed properties.

6 GROUNDSURE ENVIRO-INSIGHT REPORT

6.1 An updated GroundSure Enviro-Insight Report has also been commissioned for this site. The following features are recorded within 250m of the site and full details are given in Appendix 4.

6.2 Records of Licensed Discharge Consents

There is a sewage discharge consent for the discharge of sewage at time of flood at a point recorded as being 33m to the south of the site. This is presumably to Howley Beck.

6.3 Environment Agency Landfill Sites

Bridge Street in Batley, some 125m to the west is listed as a historical landfill site operated by James Duncan Limited for "*liquid waste*". Soothill Tip is also recorded to be 201m to the east at its nearest point. However there are no details given other than it was a historical refuse tip on the Ordnance Survey mapping of 1968.

6.4 Environment Agency Recorded Pollution Incidents

There has been one recorded pollution incident in the vicinity of the site. The event had a "significant" water impact and comprised 'diesel'. The location is identified as 156m to the south of the site.

6.5 Contemporary Trade Entries

The GroundSure Enviro-Insight Report lists various trade entries in the vicinity of the site. It should be noted that these lists are rarely complete.

6.6 Others

None of the following are recorded within 250m of the centre of the study site.

Environmental Permits, Incidents and Registers
Historic IPC Authorisations
Part A(1) and IPPC Authorised Activities
Red List Discharge Consents
List 1 Dangerous Substances Inventory sites
List 2 Dangerous Substances Inventory sites
Part A(2) and Part B Activities and Enforcements
Category 3 or 4 Radioactive Substances Authorisations
Water Industry Referrals
Planning Hazardous Substance Consents and Enforcements (within 500m)
COMAH and NIHHS sites
Sites Determined as Contaminated Land under Part 2A EPA 1990

Landfill and Other Waste Sites
Environment Agency Registered Landfill Sites
BGS/DoE Landfill Site Survey
Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites
Environment Agency Licensed Waste Sites

Current Land Uses
Current Industrial Sites Data
Records of Petrol and Fuel Sites
National Grid Underground Electricity Cables
National Grid Gas Transmission Pipelines

Hydrogeology and Hydrology
Groundwater Abstraction Licences
Surface Water Abstraction Licences
Potable Water Abstraction Licences
Source Protection Zones
Source Protection Zones within Confined Aquifer
Environment Agency information on river quality
Groundwater Vulnerability and Soil Leaching Potential
Environment Agency information on River quality
River Network entries
Surface Water Features

Flooding
Flood Defences Areas benefiting from Flood Defences Areas used for Flood Storage BGS Groundwater Flooding susceptibility (within 50m) BGS confidence rating for the Groundwater Flooding susceptibility areas

Designated Environmentally Sensitive Sites
Sites of Special Scientific Interest (SSSI) National Nature Reserves (NNR) Special Areas of Conservation (SAC) Special Protection Areas (SPA) Ramsar Sites Ancient Woodlands Local Nature Reserves (LNR) World Heritage Sites Environmentally Sensitive Areas Outstanding Natural Beauty (AONB) National Parks Nitrate Sensitive Areas Nitrate Vulnerable Zones

6.7 The GroundSure Enviro-Insight Report is based upon known, published information and may not comprise a complete record of all features of relevance. An explanation of the datasets used is available on request.

6.8 It should be noted that due to time constraints the Local Authority has not been contacted, nor has the Petroleum Licensing Officer as former fuel tanks are not suspected.

7 CONTAMINATED LAND

7.1 There is no significantly visible contaminated material on the surface of the site, nor is there any distressed vegetation suggestive of significant or serious contamination. There is some fly-tipping across the site, and pieces of asbestos cement sheeting can be seen scattered across the site in places.

8 RADON

8.1 According to the GroundSure Geo-Insight report the site lies in an area where between 3% and 5% of homes are above the action level recommended by the Health Protection Agency. **Basic Radon Protective Measures are therefore necessary** according to the BGS data provided in the GroundSure report and as described in Building Research Publication BR 211.

9 THE INVESTIGATION

9.1 The investigation was designed to provide preliminary information on ground and groundwater conditions on the site, together with identifying potential areas of contamination. The investigation was undertaken in accordance with the principles of BS EN 1997-1: 2004 "Eurocode 7 - Geotechnical Design - Part 1: General Rules", BS EN 1997-2: 2007 "Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing", BS5930: 1999 and BS10175: 2001 and under the full-time supervision of a Fellow of the Geological Society from Michael D Joyce Associates LLP.

9.2 The ground investigation was carried out on the 15th, 19th and 22nd August 2016 and comprised 29 No. trial pits. The trial pitting consisted of excavating the trial holes using a mechanical excavator. On completion, the excavations were backfilled with the arisings. The exploratory trial pit positions are shown on figure 1, relative to the original development proposals. Since then the proposed layout has been modified, and figure 2 presents the latest development proposals.

It should be noted that areas adjacent to Howley Beck were inaccessible due to the very soft ground. In addition, the northwest corner of the site was inaccessible due to slipping on soft side long ground.

10 STRATA PROFILE

10.1 The full exploratory trial pit records are presented in Appendix 1. These give full strata descriptions based on visual examination and are in accordance with the requirements of BS EN ISO 14688-1:2002 "Geotechnical Investigation and Testing - Identification and Classification of Soil - Part 1", BS EN ISO 14688-2:2004 "Geotechnical Investigation and Testing - Identification and Classification of Soil - Part 2", and BS EN ISO 14689-1:2003 "Geotechnical Investigation and Testing - Identification and Classification of Rock - Part 1".

10.2 Trial pits TP1 to TP9 were excavated on the lower-lying southeastern part of the site. Several trial pits indicated a thin covering of Made Ground over Alluvial Deposits in the near surface. The Alluvial Deposits were encountered as slightly clayey sands in trial pits TP1 and TP2.

10.3 This Alluvium was underlain by yellow-brown moderately weathered fine to medium grained sandstone. This became less weathered with depth, such that these two trial pits terminated at around 3m depth on competent bedrock.

10.4 In trial pits TP3 and TP9 the Alluvium was absent. In places there was a thin covering of topsoil and/or Made Ground, below which there was completely weathered sandstone bedrock. This occurred as light brown and orange gravelly sand, which was clayey in places. The degree of weathering decreased with depth, such that below this there was the same moderately weathered sandstone which was encountered in trial pits TP1 and TP2. These trial pits terminated at between 2.6m and 4.0m depth, depending on the degree of weathering. Trial pit TP22 was located towards the top of the slope and this encountered a thin covering of Made Ground over weathered sandstone.

10.5 There appears to be a fault which runs roughly east-west between trial pits TP10, TP11 and TP23 to the south and trial pits TP12 and TP24 to the north. This resulted in the sandstone being replaced by mudstone bedrock to the north of the fault. The mudstone comprises a light brown slightly sandy clayey gravel of mudstone at the surface. With depth the degree of weathering decreases and a highly weathered mudstone becomes moderately weathered. These trial pits generally extended to the maximum reach of the excavator at around 4m depth.

10.6 This mudstone forms the higher ground in the west of the site. However towards the base of the slope there is a change in the geology. Trial pits TP18, TP19, TP20 and TP21 encountered stiff to firm orange-brown sandy clay to around 1.5m to 1.7m depth, which overlies the weathered mudstone. This material may possibly be a Head Deposit. It was also notable that this area was also very soft and boggy. There was also some standing water around trial pit TP20, particularly in areas where there has been some previous localised shallow excavations of the ground surface.

10.7 Trial pit TP17 encountered a little Made Ground overlying a firm to stiff brown and grey sandy clay to 2.3m depth. To the south of this, trial pit TP16 encountered Made Ground to 1.3m depth. This comprised a black and grey sandy gravel of fine to coarse ash, clinker, brick and tile. This in turn overlies orange-grey-brown silty clayey sand to 2.3m and underlain by the weathered mudstone.

10.8 The trial pits in the area to the south of Lady Ann Business Park encountered Alluvial Deposits. Trial pit TP13 encountered very soft brown-grey sandy clayey gravelly clay to 2.9m depth. This had a strong natural organic odour throughout. There was also a thin covering of Made Ground at the surface. Trial pit TP14 encountered very soft

organic clay to 1.6m depth overlying clayey gravelly sand. Mudstone bedrock was encountered at 2.9m depth and 2.2m depth respectively in these two trial pits.

10.9 Trial pit TP19 encountered soft to firm clay to 2.0m depth overlying clayey gravel, with shaly mudstone bedrock at 3.0m depth.

10.10 The same Alluvial Deposits were encountered in trial pit TP11 to 2.1m depth, with very soft organic clay at the surface. Trial pit TP10 was further up the slope and encountered weathered mudstone bedrock below the topsoil.

10.11 Groundwater was encountered as seepages in the following trial pits.

Trial Pit No.	Seepage Depth (mbegl)
TP1	2.1
TP3	2.7
TP7	2.1
TP11	1.0
TP13	1.9
TP14	1.5
TP15	3.0
TP16	3.0
TP17	3.60

10.12 There was no unusual colouration or odours to any of the soils encountered during the investigation and no obvious visual evidence of contamination, such as asbestos, was found during the investigation. This does not mean that asbestos containing materials or asbestos fibres are not present, particularly since they were observed on the surface.

10.13 It should be noted that lateral and vertical changes can occur between exploratory points and care is needed when extrapolation is used. This is particularly true of the Made Ground which, by its nature, can be very variable in its physical and chemical composition.

11 IN-SITU AND LABORATORY TESTING

11.1 In-Situ Gas Monitoring

11.1.1 Methane is the dominant constituent of landfill gas, and can form an explosive mixture in air at concentrations of between 5% and 15%. Thus 5% methane in air is known as the Lower Explosive Limit (LEL). Concentrations less than this do not normally ignite. Carbon dioxide can also be a potential problem, especially where it occurs in concentrations greater than 1.5%.

11.1.2 In-situ gas tests were carried out in probe holes made in the sides of the trial pits. Testing was with a portable meter, which measures the methane content as its percentage volume in air. The corresponding oxygen and carbon dioxide concentrations are also measured.

11.1.3 No methane, carbon monoxide or hydrogen sulphide gases were detected in any of the boreholes. Carbon dioxide ranged from zero to 1.2% by volume.

11.1.4 The risks associated with the gases have been considered in accordance with British Standard BS 8485:2007 “Code of Practice for the Characterisation and Remediation from Ground Gas in Affected Developments”, CIRIA report C665, “Assessing Risks Posed by Hazardous Ground Gases to Buildings” and NHBC Report No. 4 “Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present”.

11.2 Geotechnical Laboratory Testing

The soil testing was carried out to BS1377:1990 Methods of Test for Soils for Civil Engineering Purposes. Testing was carried out by Envirolab of Cheshire and Geo-Site Testing Services Limited (GSTL) of Llanelli to UKAS accredited procedures. The full results are presented in Appendix 2.

11.2.1 Plasticity Tests

Atterberg Limits Classification tests were carried out on eleven samples of the clay.

Trial Pit No.	Depth (m)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
TP1	1.10	23	42	20	22
TP2	0.80	22	40	19	21
TP4	0.90	14	34	13	21
TP7	1.10	20	42	20	22
TP12	1.30	19	37	19	18
TP14	1.00	30	44	24	20
TP17	2.40	20	37	18	19
TP20	1.00	23	41	22	19
TP24	1.30	15	37	14	23
TP26	1.00	17	53	19	34
TP29	1.60	21	39	18	21

The clays are of a low to high plasticity. They can be expected to exhibit medium swelling and shrinkage properties, but are not potentially frost susceptible.

11.2.2 Sulphate and Acidity Tests

Chemical tests were carried out on representative samples of the sub-soils in order to determine their water soluble content and acidity.

Borehole No.	Depth (m)	Water Soluble Sulphate Content (g/l)	pH
Natural Clay			
TP1	1.10	0.05	7.86
TP4	0.90	0.03	6.87
TP7	1.10	0.03	7.30
TP14	1.00	0.05	6.58
TP17	2.40	0.03	6.69
TP20	1.00	0.02	7.57
TP24	1.30	0.04	7.95
TP26	1.00	0.06	7.16
TP29	1.60	0.06	6.43
Made Ground			
TP1	0.05	0.03	6.29
TP2	0.20	<0.01	6.04
TP3	0.30	<0.01	5.28
TP5	0.20	<0.01	5.37
TP6	0.05	<0.01	6.06
TP13	0.10	0.04	6.76
TP16	0.50	0.04	6.45
TP18	0.05	0.17	6.41
TP20	0.10	<0.01	7.10
TP22	0.05	<0.01	4.61
TP23	0.40	0.04	7.14
Topsoil			
TP4	0.05	<0.01	5.49
TP8	0.05	<0.01	4.68
TP9	0.05	0.01	7.17
TP10	0.05	<0.01	6.87
TP11	0.10	0.06	6.77
TP29	0.05	<0.01	5.19

Contamination testing recorded negligible to low water soluble sulphate contents and acidic to slightly alkaline pH values.

11.3 Contamination Testing

Rationale

11.3.1 The investigation and sampling was under the full time direction of a Fellow of the Geological Society. All the recovered soil samples were screened on site for any visual or olfactory evidence of contamination including the presence of VOCs. Samples were selected from the trial pits on the basis of those which were most likely to be contaminated and those which gave the most appropriate indication of the spread of any contaminants. The samples were stored in both glass and plastic containers and kept in cooled conditions. Testing was carried out by Envirolab of Cheshire to UKAS accredited procedures in accordance with MCERTS performance standards.

11.3.2 The aim of this was to make a preliminarily assessment of the level of any contamination on the site in order to determine if there was any significant risk associated with contaminants in respect of both human health and the environment, including controlled waters.

11.3.3 Standard Appendix B attached to this report discusses the methodology for the assessment of contamination and should be read in conjunction with the comments overleaf.

11.3.4 The Contaminated Land Report (CLR) series of documents have been produced by the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency, to provide regulators with "relevant, appropriate, authoritative and scientifically based information and advice on the assessment of risk from contamination in soils".

11.3.5 The Environment Agency has issued a number of Soil Guideline Values (SGVs) which, whilst non-binding, may be used as guidance in the assessment of land and in setting remediation targets. They should only be applied to human health assessments.

11.3.6 The SGVs have been derived using the Contaminated Land Exposure Assessment Model (CLEA) and are based on assumptions relating to soil conditions, pollutant type and behaviour, land use patterns and the availability of receptors. SGVs are also subject to statistical assessment. The CLR documentation requires that the results of laboratory testing are subject to statistical analysis to remove uncertainty over a so-called 'averaging area'.

11.3.7 To date selective SGVs have been issued for the following land-uses as follows;

- Residential with and without plant uptake (SGVres)
- Allotments
- Commercial/Industrial (SGVcomm)

11.3.8 DEFRA previously issued "Outcome of the Way Forward Exercise on Soil Guideline Values". This document was intended to provide guidance to determine if there is a Significant Possibility of Significant Harm (SPOSH) i.e. whether land meets the legal trigger of being contaminated land.

11.3.9 In the context of Part 2A, a risk assessor using an SGV would conclude the following (DEFRA, 2008).

- At a representative average soil concentration at or below an SGV, it is very unlikely that there will be a *significant possibility of significant harm (SPOSH)*.

- At a representative average soil concentration above an SGV, there *might* be a *significant possibility of significant harm* with the significance linked to the margin of exceedance, the duration and frequency of exposure, and other site-specific factors that the enforcing authority may wish to take into account. Further investigation and/or detailed evaluation will usually be required.

11.3.10 It should be stressed that where there is any uncertainty as to whether or not there is a SPOSH, it was the policy of this practice to adopt a conservative approach, particularly in the adoption of clean cover systems.

11.3.11 In April 2012, Defra published new Statutory Guidance which forms a major part of their contaminated land regimes under Part 2A of the Environment Protection Act 1990. The regime provides a means of dealing with contaminated land which poses a significant risk to human health or the environment where there is no alternative solution. It also works alongside planning rules and building regulations to help ensure that affected land is made suitable for use when it is redeveloped.

11.3.12 Since the regime was first introduced in 2000 there has been considerable uncertainty over how to decide when land is, and is not, contaminated land on grounds of the legal test of *significant possibility of significant harm to human health or the environment*.

11.3.13 To help address this, one of the main changes set out in the new Statutory Guidance, is the introduction of a new four category test to help decide when land is, and is not, contaminated land on grounds of *significant possibility of significant harm to human health*. Under the new four category test:

- Category 1 describes land that is clearly contaminated land, for example because similar land is known to have caused significant harm in the past.

- Categories 2 and 3 cover less straightforward land where more detailed consideration is needed before the regulator can decide either: (a) that there is a strong case for regulatory action, in which case the land would be in Category 2 and be classified as contaminated land under Part 2A; or (b) that such a case does not exist, in which case the land would be in Category 3 and not be classified as contaminated land under Part 2A.

- Category 4 describes land that is clearly not contaminated land, as discussed below.

11.3.14 One of the main purposes of including the Categories in the Statutory Guidance is to provide a legal framework against which new technical tools can be developed by the land contamination sector to describe the Categories in more detail with regard to specific substances and/or situations.

11.3.15 The new Category 4 test is particularly important in terms of reducing uncertainty over when land is definitely not caught by the regime.

11.3.16 The new Statutory Guidance makes clear what land should be placed into Category 4, for example:

(a) Land where no relevant contaminant linkage has been established.

(b) Land where there are only normal levels of contaminants in soil (as explained in Section 3 of the guidance), unless there is a particular reason to consider otherwise. In other words land with normal background concentrations in the soil.

(c) Land that has been excluded from the need for further inspection and assessment under Part 2A because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of the guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of the guidance, e.g. Category 4 Screening Levels.

(d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed to in the normal course of their lives).

11.3.17 The guidance clarifies how generic assessment criteria (including the currently available SGVs/GACs) should and should not be used. It states that:

3.27 It is common practice in contaminated land risk assessment to use "generic assessment criteria" (GACs) as screening tools in generic quantitative human health risk assessment to help assessors decide when land can be excluded from the need for further inspection and assessment, or when further work may be warranted.

3.28 Local authorities may use GACs and other technical tools to inform certain decisions under the Part 2A regime, provided: (i) they understand how they were derived and how they can be used appropriately; (ii) they have been produced in an objective, scientifically robust and expert manner by reputable organisations; and (iii) they are only used in a manner that is in accordance with Part 2A and this Guidance.

3.29 GACs relating to human health risk assessment represent cautious estimates of levels of contaminants in soil at which there is considered to be no risk to health or, at most, a minimal risk to health. With regard to such GACs:

(a) They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.

(b) They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which GACs are exceeded (in itself) as being particularly relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.

(c) They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risks to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.

(d) They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.

(e) They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.

11.3.18 The way in which the new four category system is intended to operate and the place of the C4SLs within that system, was explained in detail in the Impact Assessment which accompanied the Statutory Guidance. Please note that although the detail of the Impact Assessment is included here to provide clarity on the job expected of C4SLs, the Statutory Guidance, itself, sets out the regime that needs to be delivered under Part 2A.

11.3.19 The C4SLs are intended as "*relevant technical tools*" (in relation to Paragraph 4.2.1(c)) provides to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

11.3.20 The Impact Assessment (IA), which accompanied the revised SG (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that:

> *"The new statutory guidance with bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land".*

11.3.21 A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

> *"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soils that, unless stated otherwise, are tolerable or pose a minimal risk to human health".*

11.3.22 C4SLs, therefore, should not be viewed as "SPOSH levels" and they should not be used as a legal trigger for the determination of land under Part 2A.

11.3.23 In 2014 CL:AIRE (Contaminated Land: Application in Real Environments) published "*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*". In it a series of C4SLs were proposed as follows;

Analyte	Residential (with home grown produce) (mg/kg)	Residential (without home grown produce) (mg/kg)	Allotments (mg/kg)	Commercial (mg/kg)	POS (mg/kg)
Arsenic	37	40	49	640	79
Benzene	0.87	3.3	0.18	98	140
Benzo(a)Pyrene	5.0	5.3	5.7	77	10
Cadmium	22	150	3.9	410	880
Chromium (vi)	21	21	170	49	21
Lead	200	310	80	2300	630

Results

11.3.24 Five samples of topsoil and twelve samples of Made Ground were tested. The following range of results was obtained and the full results are presented in Appendix 3.

Topsoil

Analyte	Concentration Range (mg/kg)		Maximum Permitted Concentration for Residential Use (mg/kg)
Arsenic	4	31	37 (1)
Cadmium	<0.05	<0.05	22 (1)
Chromium (vi)	<1	<1	21 (1)
Copper	5	700	2400 (2)
Mercury	<0.17	<0.17	40 (2)
Nickel	14	46	130 (2)
Selenium	<1	<1	250 (2)
Lead	11	154	200 (1)
Zinc	54	348	3700 (2)
Phenol	<1	<1	420 (1)
Benzo(a)pyrene	<0.04	1.45	5.0 (1)
Dibenzo(a,h)anthracene	<0.04	0.24	0.24 (2)
Naphthalene	<0.03	0.19	2.3 (2)
Fluorene	<0.01	0.21	170 (2)
Asbestos	None	None	None

(1) *C4SL published 2014.*

(2) *Suitable for Use Values derived by LQM/CIEH "Generic Assessment Criteria for Human Health Risk Assessment" 2009. For organics a SOM of 1.0% assumed.*

11.3.25 All the results for topsoil fell below their respective C4SLs and SGVs for a residential end-use.

Made Ground

Analyte	Concentration Range (mg/kg)		Maximum Permitted Concentration for Residential Use (mg/kg)
Arsenic	15	136	37 (1)
Cadmium	<0.05	0.08	22 (1)
Chromium (vi)	<1	<1	21 (1)
Copper	44	436	2400 (2)
Mercury	<0.17	1.86	40 (2)
Nickel	21	39	130 (2)
Selenium	<1	<1	250 (2)
Lead	47	432	200 (1)
Zinc	66	1060	3700 (2)
Phenol	<1	<1	420 (1)
Benzo(a)pyrene	0.17	3.13	5.0 (1)
Dibenzo(a,h)anthracene	<0.04	0.44	0.24 (2)
Naphthalene	<0.03	1.71	2.3 (2)
Fluorene	0.03	0.76	170 (2)
Asbestos	Amosite	Amosite	None

(1) *Values derived by LQM/CIEH "Generic Assessment Criteria for Human Health Risk Assessment" 2009. For organics a SOM of 2.5% assumed.*

(2) *Latest SGV published in 2009.*
< indicates below the limit of detection.

(3) *C4SL published 2014.*

11.3.26 The Made Ground was found to contain some areas with elevated Arsenic and Lead. Of the twelve samples tested, four exceeded the C4SL of 37mg/kg for Arsenic. Six samples exceeded the C4SL for Lead of 200mg/kg. In addition, Amosite (Brown Asbestos) board was found in two of the samples.

Waste Acceptance Criteria

11.3.27 The Landfill Directive sets out procedures for waste acceptance at landfills and the types of waste for each class of landfill as specified by Waste Acceptance Criteria (WAC). The WAC are predominantly lists of "limit values" for certain parameters obtained from standard leaching tests of wastes going to landfills. WAC are set out in the Landfill Directive itself. Full details can be found in the Environment Agency document "Guidance for waste destined for disposal in landfills" Version 2, June 2006.

11.3.28 At this stage no samples of Made Ground have been WAC tested. If at a later date materials from the site were to be excavated and removed to landfill this testing would be necessary in addition to that already undertaken.

12 GEOENVIRONMENTAL RISK ASSESSMENT

Conceptual Site Model

12.1 A quantitative health and environmental risk assessment has been carried out as part of this assessment. The process of risk assessment is set out in Part IIA of the Environment Protection Act 1990 and amended in part by The Water Act 2003. This defines contaminated land as *"any land which appears to the local authority in whose area it is situated to be in such a condition by reason of substances in, on or under the land, that there is a significant possibility of significant harm being caused, or that significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused".*

12.2 The Act introduces the concept of a pollution linkage. This linkage consists of a pollution (contaminative) source or hazard and a receptor, together with an established pathway between the two. For land to be contaminated, a pollution linkage (hazard-pathway-receptor) must exist. This forms a so-called 'conceptual model' of the site.

12.3 Examples of pathways and effects from land contamination (after PPS 23) are given below, and these are illustrated on figure 3.

12.4 Human Health (Pathways 1-5, Receptors A – C)

Uptake of contaminants by food plants grown in contaminated soil - Uptake will depend on the concentration of a contaminant in soil, its chemical form, soil pH, plant species and prominence in diet.

Ingestion and inhalation - Substances may be ingested directly by young children playing on contaminated soil, or by eating plants which have absorbed metals or are contaminated with soil or dust. Ingestion may also occur via contaminated water supplies. Metals and some organic material substances may be inhaled from dusts and soils. Land gas, radon and volatile organic compounds can be inhaled directly.

Skin contact - Soil containing tars, oils and corrosive substances may cause irritation to the skin through direct contact. Some substances (e.g. phenols) may be absorbed into the body through the skin or through cuts and abrasions.

Irradiation - As well as being inhaled and absorbed through the skin, radioactive materials emitting gamma rays can cause a radiation response.

Fire and explosion - Materials such as coal, coke particles, oil, tar, pitch, rubber, plastic and domestic waste are all combustible. Both underground fires and biodegradation of organic materials may produce toxic or flammable gases. Methane and other gases may explode if allowed to accumulate in confined spaces.

12.5 Buildings (Pathways 7 and 8)

Fire and explosion - Underground fires may cause ground subsidence and cause structural damage. Accumulations of flammable gases in confined space leads to a risk of explosion. Underground fires may damage services.

Chemical attack on building materials and services - Sulphates may attack concrete structures. Acids, oils and tarry substances may accelerate corrosion of metals or attack plastics, rubber and other polymeric materials used in pipework and service conduits or as jointing seals and protective coatings to concrete and metals.

Physical - Blast-furnace and steel-making slag (and some natural materials) may expand. Degradation of fills may cause settlement and voids in buried tanks and drums may collapse as corrosion occurs or under loading.

12.6 Natural Environment (Pathway 6, Receptors D - E)

Phytotoxicity (prevention/inhibition of plant growth) - Some metals essential for plant growth at low levels are phytotoxic at higher concentrations. Methane and other gases may give rise to phytotoxic effects.

Contamination of water resources - Soil has a limited capacity to absorb, degrade or attenuate the effects of pollutants. When this is exceeded, polluting substances may enter into surface and groundwaters.

Ecotoxological effects - Contaminants in soil may affect microbial, animal and plant populations. Ecosystems or individual species on the site, in surface waters or areas affected by migration from the site may be affected.

12.7 For any contaminant source identified, judgement is used regarding the probability of a pollution linkage occurring and the potential consequences of that linkage. Based on the probability and likely consequences, the overall risk (significance) can be established. The definitions that have been used for this purpose are given in Standard Appendix B. The probability of a hazard, combined with its consequences, can be used to assess risk. This forms the so-called Conceptual Site Model.

Sources

12.8 The site has been used in the past as allotments. As such heavy metals, especially lead, zinc, copper and arsenic can be present. In addition, asbestos cement sheeting will have been used in part in former buildings, such as sheds, as evidenced by observations on site.

Risk Assessment based on Conceptual Site Model
Summary of Hazards, Pathways and Receptors

Source	Potential Pollutant	Pathways	Receptor	Risk (1)
Potential contaminated Made Ground. **Possible past minor spillages and metals.**	Oils, fuels, grease, hydraulic fluid, metals, asbestos.	1 - 5	A. Present Occupants.	Site Unoccupied.
			B. Groundworkers.	**Low Risk** involved with excavation work, providing personnel adopt suitable precautions, together with washing facilities.
			C. Future Occupants.	**Low Risk** for residential use, providing Made Ground is capped by clean sub soil and topsoil.
		6	D. Controlled Waters.	**Low Risk at present.** Provided on-site monitoring is undertaken throughout, and ground work phases of development shows no adverse effects, the risk will be **low**.
			E. Ecosystems.	**Low Risk** as leaching is not considered likely.
		7	F. Building Materials and Services.	**Low Risk.** Install pipes in clean bedding materials. Adequate precautions to be taken in respect of buried concrete.
Organic Material.	Landfill Gases, Radon, VOCs, SVOCs.	8	A - F	**Moderate Risk.** Low values of ground gases present during the investigation. However Basic Radon Gas Protection Measures are required.
Waste materials.	Fly-tipping.			Any waste materials to be removed from site.

(1) See Standard Appendix B. *The risk ratings are based on the results of the investigation, assumes that the remedial measures proposed in Section 13 are applied.*

Pathways and Receptors

12.9 The principal receptors are groundworkers, future residents and controlled waters (Receptors B, C and D). However based on the past history of the site and the laboratory testing to date, the probability of soil contamination being present sufficient to affect the identified receptors is considered to be a low risk.

12.10 The overall risk is assessed to be low providing the remedial recommendations made in Section 13 are followed. At this stage it is not considered that there is likely to be any significant risk and further intrusive investigation in respect of contamination is not considered to be necessary at present.

12.11 With any site, the possibility of contaminants being present, sufficient to cause significant harm cannot be entirely precluded without extensive intrusive investigation, sampling and testing since it is not always possible to determine if contaminants have been tipped on the site, or have seeped into the ground, or have migrated below the ground onto the site from adjacent pieces of land. However, based on the investigation carried out to date, this is considered unlikely.

12.12 It is recommended that if during construction any suspicious or unusual odours, colours, liquids or soils are uncovered, these should be brought to the attention of Michael D Joyce Associates LLP and appropriate advice sought.

13 RECOMMENDATIONS

13.1 It is proposed to redevelop the site for residential purposes. At present there do not appear to be any major geotechnical constraints to developing this site. However, there are a number of aspects that need to be taken into consideration when assessing the feasibility and design of this scheme.

13.2 Foundation Criteria

Normal Strip Footings

13.2.1 Normal to deep strip footings will be suitable for most of the new buildings. They will have to be sited below any Made Ground and original topsoil still remaining after site clearance, and founded upon the underlying firm clay. This clay can be expected to exhibit moderate swelling and shrinkage properties. In order to allow for seasonal variations in the moisture content of this clay, foundation levels should be at least 0.9m below groundlevel. At this depth, for foundations sited upon the firm clay, allowable bearing pressures of up to 80kN/m^2 can be adopted. It would also be prudent to lightly reinforce the footings. Since the eastern part of the site lies in a Zone 3 Floodplain, a flood risk assessment will be required in this respect. This will make recommendations in respect of minimum flood levels and other precautions to be taken into consideration with respect of potential flooding.

13.2.2 In all cases the foundation excavations must be inspected to ensure that no footings are sited upon any weak Made Ground, softer clays or other such weak materials that would be incapable of safely sustaining the applied foundation loads. This will be particularly important wherever any appreciable amounts of Made Ground occur.

Wherever any suspect ground is encountered at proposed foundation level, then that footing must be deepened until a satisfactory bearing medium is obtained.

13.2.3 It is normal practice to avoid building directly over faults. It is recommended that for houses within 10m either side of the fault, that these properties are constructed on raft foundations. This will mitigate against potential future movement.

Piling

13.2.4 The Alluvial Deposits are not suitable for founding upon, and it is recommended that piled foundations are used for those properties along the eastern boundary. It is likely that ground levels will have to be raised in this area, such that floor levels are sited above predicted future flood levels. Recommendations are made in Section 13.12 with respect to further investigation to better delineate between strip/trench footings and piled foundations.

13.2.5 In order to provide a satisfactory bearing medium, especially in view of the variable depth and density of fill across this area, all piles will have to be sited within the underlying mudstone or sandstone bedrock. The piling will also have to overcome difficulties expected with shallow groundwater levels along the eastern part of the site adjacent to Howley Beck.

13.2.6 Piling may be inhibited by the presence of denser fill or large sandstone boulders. Where these occur they would either have to be dug out if shallow or additional piles installed if any individual pile terminates above bedrock level.

13.2.7 If piling is adopted in this area, it is recommended that either driven pre-cast concrete or steel tubular piles are used. Steel tubular piles can then be infilled with concrete. Driven piles are preferable to bored piles, as they will be better able to overcome the presence of larger obstructions. A 275mm square pre-cast concrete pile, founded upon competent mudstone or sandstone bedrock, can be expected to have a safe working load of 20 tonnes.

13.2.8 In order to achieve their full working load, each pile must be driven to a `set'. In view of the nature of the backfill, it would be advisable to site all the piles on the underlying bedrock, in order to take full advantage of their maximum carrying capacity. In this respect they should be designed as essentially end bearing.

13.2.9 For piles sited upon bedrock, it is normally recommended that they penetrate into rock at least 5 times their diameter in order to achieve the maximum working load. However this may not always be possible where hard resistant bedrock is encountered. It is recommended therefore that a sufficient number of pile load tests are carried out to ensure that the piles can carry the required working loads without giving rise to any unacceptable settlements. This will be particularly important should piling terminate at shallower levels on suspected fill.

13.2.10 Negative skin friction is not expected to be a major problem especially if no appreciable loads are exerted on the ground at surface level. However, there may be some settlement of the fill around the piles, but as they will be essentially end bearing, this is not expected to affect their performance.

13.2.11 The houses can then be founded upon ring beams designed to span between the piles. In order to bond them to the piles, the tops of the piles must be broken out to expose the reinforcement, which can then be tied into that of the beams.

13.2.12 It is recommended that a specialist piling contractor is used for any detailed design. Any solution must also take into account vibration and the effect on adjacent properties.

13.3 Building Near Trees

13.3.1 Wherever any houses are located near existing or proposed new trees, their foundations must be sited below the potential root growth zone. Reference should therefore be made to the NHBC Standards Chapter 4.2 "Building Near Trees", which gives guidance on foundation criteria, depths and construction. All services will also have to be similarly protected.

13.4 Landfill and Radon Gas

13.4.1 The site is in an area where Basic Radon Protection Measures are required for new properties.

13.4.2 British Standard BR211 (2015) “Radon: Guidance on Protective Measures for New Buildings” all give construction advice for preventing gases entering buildings, the principles of which are incorporated in these recommendations. Advice is also given in respect of sealing services where they pass through impermeable membranes. The radon membrane selected should also be chosen provide protection against methane and carbon dioxide.

13.4.3 The supervision of the installation will need to be undertaken by a suitably qualified consultant. Detailed records and photographs of the installations should be made.

13.5 Existing Drains and Services

13.5.1 Wherever any redundant drains and other services channels are likely to underlie building foundations, they must be dug out and replaced by lean mix concrete, or compacted hardcore. Alternatively, long drainage runs can be grouted up, particularly where their alignments are uncertain but care is needed to ensure that no grout enters any live services. In the case of roads, they should be dug out and the areas infilled by properly compacted fill.

13.6 Road Construction

13.6.1 The new road should conform to the specifications of a Type A1 Road, up to 5.5m wide, in accordance with the former West Yorkshire County Council "Highways Design Guide", which continues to be implemented by the district council. It should also conform to "The Specifications of Highway Works" and "The Notes for Guidance on the Specification for Highway Works".

13.6.2 For most of the site the subgrade will comprise weathered mudstone or sandstone bedrock. In some places Made Ground will underlie the new carriageway. This should be dug out to a depth of 0.75m and replaced by suitable, non-frost susceptible materials, laid in properly compacted layers to formation level.

13.6.3 It is recommended that a design CBR of 2% be adopted for some of the new roads. This will allow for a reasonable construction thickness on top of the subgrade, as well as for any isolated weaker areas of the clays. For the road along the east part of the site, Alluvial Deposits are likely to comprise the subgrade, and as such a lower CBR of 1% should be assumed for this material.

13.6.4 The design of trafficked pavements must take account of the ground conditions and likely traffic loads during the life of the development. Designs meeting the following requirements will normally be acceptable. At sites where particular poor ground conditions are encountered or where it is anticipated that there will be a particularly high frequency of commercial vehicle or abnormal load movements, further analysis is accordance with the "Design Manual for Roads and Bridges" will be required to demonstrate integrity of the design.

13.6.5 A preliminary design can be prepared using an "Equilibrium CBR" value based on the appropriate type of sub-grade material as set out in the table below. However, if this method of CBR estimation is used, testing by an approved laboratory will be required prior to construction in order to verify the CBR value used for design.

Equilibrium CBR Value to be used for Design Purposes		
Type of Soil	**Plasticity Index**	**Equilibrium CBR (%)**
Heavy Clay	50 or greater	Less than 2
Heavy Clay	40 to 49	2
Heavy Clay	30 to 39	2
Silty Clay	20 to 29	3
Sandy Clay	10 to 19	4
Silt	Less than 10	1
Sand (Poorly graded)	Non-plastic	20
Sand (well graded)	Non-plastic	40
Gravel (poorly graded)	Non-plastic	40
Sandy Gravel (well graded)	Non-plastic	60

(*Based on Design Manual for Roads and Bridges)*

13.6.6 A granular foundation comprising sub-base or a combination of sub-base and a capping layer can be provided in accordance with the table below.

Pavement Foundation Design					
CBR (%)	**Capping (mm)**	**+**	**Sub-Base (mm)**	**OR**	**Sub-Base (mm)**
Less than 2	600	+	150		--
2	450	+	150		--
3	350	+	150	OR	300
4	300	+	150	OR	275
5 to 15	250	+	150	OR	225
> than 15	--	+	--		150

13.6.7 Sub-grades that have CBR values significantly less than 2% and deform under construction traffic may be unsuitable to support the pavement. In this case, special measures will be required. No material within 450mm of the finished road surface should be frost susceptible.

13.6.8 Prior to the application of any sub-base, all subgrades must be checked by proof rolling to ensure that an adequate CBR exists. Where any loose granular or soft clayey areas remain, these must be either dug out and replaced by compacted material or an additional 150mm of sub-base added. This will be especially important wherever trench works for drains, sewers and other services have been carried out. Old foundations should be removed to a depth of 1m below subgrade level to prevent hardspots occurring. It will also be necessary to prevent the deterioration of the subgrade due to the effects of wet weather and the site traffic.

13.7 Sustainable Surface Water Drainage

13.7.1 As the southern third of the site is underlain by sandstone bedrock, soakaways for carriageway and/or house roof surface water drainage should be feasible in this area. Each soakaway will have to be sited in the clean, unweathered zone of the sandstone bedrock, which should be at a reasonable depth. If soakaways are proposed, it will be necessary to carry out some further representative tests in order to establish the permeabilities of the sandstone bedrock, and depths of clean unweathered zones at the actual locations of the proposed soakaways. Soakaways should be designed in accordance with BRE Digest 365: *Soakaway Design* and sized so that they discharge the design storm within 24 hours.

13.7.2 The positioning of the soakaways should also take into account potential downslope discharge of the surface water. In addition, no soakaways should be placed within 5m of building foundations, nor should they discharge directly into Made Ground.

13.7.3 Soakaways will not be suitable in the mudstone bedrock underlying the northern two-thirds of the site. As an alternative it may be possible to discharge directly to the watercourse, subject to approval by the regulators.

13.8 Excavations and Groundwater

13.8.1 Soft ground plant should prove suitable for most of the excavations.

13.8.2 For all deep excavations in excess of 1.2m where vertical sides are necessary, trench supports should be provided as the soils will not be self-supporting for any appreciable length of time. It would also be prudent to monitor excavations for the presence of explosive or asphyxiating gases.

13.8.3 Groundwater seepages were noted in places in the near surface. It should also be remembered that trapped groundwater can be released from areas of Made Ground when they are excavated. In addition seasonal variation in groundwater levels will occur and groundwater will be shallower during the winter months. In this respect it is considered good practice for ground staff to be equipped with pumping apparatus as a precaution. Along the eastern boundary of the site this standing groundwater level is expected to lie very close the level of Howley Beck.

13.9 Contamination

13.9.1 Laboratory testing to date has recorded some soil contamination in the Made Ground, but not in the topsoil. It is therefore recommended that in the first instance any asbestos cement sheeting is removed from the topsoil at the surface. This should be done by hand-picking of pieces from the surface, bagging and disposal at a licensed facility.

13.9.2 The topsoil should then be separated from the Made Ground during the site strip. It should be possible to remove the topsoil, but the Made Ground should be reused only below hardstanding areas. Providing the asbestos cement sheeting has been removed, it should be possible to reuse the topsoil subject to the approval of the regulators. However this will require further testing of the topsoil stockpile to ensure that it is free of asbestos.

13.9.3 As a precautionary measure and to provide a growing medium for plants, it is recommended that a clean cover system is applied to garden areas only where Made Ground forms the subsoils. The clean cover system should consist of a minimum of 600mm of clean topsoil and sub-soil. This is in accordance with the recommendations

in the joint NHBC, Environment Agency and Chartered Institute of Environmental Health publication "Guidance for the Safe Development of Housing on Land Affected by Contamination" published in 2008.

13.9.4 According to the Environment Agency's Remediation Position Statements, the placement of a cover system using "clean" material is not treatment of waste. Consequently, no licensing/permitting position statements are applicable to this type of remediation. If the cover system uses 'waste materials' in its construction, waste management licensing exemption paragraph 9A may be applicable to its installation. If the installation of the proposed cover system does not meet the criteria for registration of this exemption, the activity may be regulated through a waste management site licence.

13.9.5 The clean cover system should be validated in accordance with the "Verification Requirements for Cover Systems – Technical Guidance for Developers, Landowners and Consultants". This document has recently been issued by the Yorkshire and Humberside Pollution Advisory Council and adopted by Local Authorities in Yorkshire, Humberside and Lincolnshire. Where applicable, it should also be in accordance with the requirements of the NHBC as set out in Standards Extra 47 (June 2010) "Contaminated Land – Cover System Validation".

Source of Material

13.9.6 Material can be sourced from clean site won. In the interest of sustainability, Local Authorities promote the use of such site-won materials providing that they are suitable for the intended end use of the site. Alternatively, materials can be sourced from other developments and commercial companies.

13.9.7 Should it be necessary to import any topsoil or subsoil, the topsoil should be sourced from a recognised provider. The soil concentrations should not exceed any of the following levels, and as such the material supplier should be made aware of these. The topsoil should also comply with BS3882: 2015: Specification for Topsoil, and a test certificate to confirm this should be provided in advance. The subsoil should comply with BS8601: 2015: Specification for Subsoil and requirements for use. No certificate or test results should be more than 30 days old.

Characterisation of Material

13.9.8 It is essential that material is inert and suitable for its intended use. Sampling of materials should be undertaken as early as possible i.e. *prior to placement* (for site won material) and *prior to importation* (for imported material). This is to avoid the costly exercise of re-excavating *unsuitable* materials and the possibility of cross contamination.

Certificates from Commercial Suppliers

13.9.9 Where material is provided by a commercial company, certificates or other industry Quality Protocol compliance i.e. WRAP, will normally be accepted. Caution should be given to importing materials, specifically soils that have been recycled from demolition or skip waste as they could be contaminated. Imported topsoil should be as specified in BS 3882:2007 as 'suitable for its intended purpose'.

Initial Screening

13.9.10 A visual / olfactory inspection of the topsoil should be carried out by an Environmental Engineer to ensure that:

- It is a suitable growing medium.
- It is free from obvious contamination i.e staining / free product etc.
- It has not come from areas where Japanese Knotweed or other invasive or injurious plants, as specified by the Environment Agency are suspected to have been growing.
- It is not odorous (could be considered a statutory nuisance).
- It is free from unsuitable materials i.e. bricks, brick ties, timber and glass etc).
- There are no visible signs of asbestos containing materials (ACM's).

Testing Schedule and Number of Samples

13.9.11 Chemical testing will normally be required on any materials that are to be used as cover material, even where this includes first generation quarried material. This should be carried out by Michael D Joyce Associates LLP.

Suitability of Material

13.9.12 Based on the characterisation of materials, they should be either deemed suitable or unsuitable. The soil concentrations should not exceed any of the following levels, and as such the material supplier should be made aware of these.

Analyte	Maximum Permitted Concentration (mg/kg)
Arsenic	37
Cadmium	22
Chromium (vi)	21
Copper	2400
Mercury	40
Nickel	130
Selenium	250
Lead	200
Zinc	3700
Phenol	420
Benzo(a)pyrene	5.0
Dibenzo(a,h)anthracene	0.24
Naphthalene	2.3
Flourene	170
Asbestos	None

Stockpiling and Quarantining of Material

13.9.13 It is essential that 'suitable' material is either placed in its intended area straight away i.e soft / landscaped areas or stockpiled in a suitable quarantine area to prevent on-site contamination, i.e. for example, fuel leakage from machinery.

Verification of Required Depth

13.9.14 It is important to establish that the required depth has been achieved and is consistent across the site. There are two main ways to achieve this:

- *Depth testing in-situ* – small trial pit excavated to allow measurement of its depth by tape measure or measuring staff.
- *Topographical surveys* – accurate survey of the base and final formation layer height to establish the depth of cover.

13.9.15 The verification of depth and confirmation of such layers should be carried out by Michael D Joyce Associates LLP. In addition, samples will be taken for analysis of both the topsoil and subsoil at a rate of 1 in every 3 plots. The results should comply with the Maximum Permitted Concentration given previously.

Reporting

13.9.16 The purpose of verification documentation is to provide transparent reasoning as to why the remediation, was required, a methodology about how it was to be undertaken and proof that the specified works have been undertaken so as to provide confirmation that the site is 'suitable for its intended use'.

13.9.17 The document is utilised not only to satisfy conditions of planning permissions but also is to be kept on record by the Local Authority should queries be raised during the lifetime of the development and to confirm to future purchasers that the site is suitable for use. The report should be carried out by Michael D Joyce Associates LLP.

13.9.18 The Local Authority ideally would recommend the following programme of photographs to be undertaken of the placement of inert cover:

- Photographs of any stockpiles and quarantine areas.
- Proof that the depth of inert cover has been installed.
- Proof that the quality of the material to be used as inert cover.
- Proof of the method of placement and different layers if appropriate.

- Proof of the completed project.
- Inclusion of geographic background features which will aid locating the photograph.
- Inclusion of site identification boards within the photos which show the date, position taken i.e. corner of plot 3 and the site name.
- Inclusion of photographs of site stockpiles and quarantine areas.

13.9.19 When hardstanding is proposed, the link between the potential contaminants in the soil and the end users will no longer exist. As such, no special precautions are necessary. If the Made Ground has been removed during site strip, a clean cover system is not required although some topsoil will be needed as a growing medium.

13.9.20 If off-site disposal is envisaged, this may necessitate taking the materials to a suitably licensed facility as required by the landfill directive. Landfilling is now actively discouraged and consequently material classified as contaminated can prove expensive to dispose of.

13.9.21 The main objective of the Landfill Directive is to prevent or reduce as far as possible the negative effects of landfilling waste on the environment and on human health. It is intended to reduce the disposal of waste materials to landfills and to encourage more sustainable approaches to dealing with wastes. It bans the landfill of liquids and certain solid wastes, introduces requirements for the treatment of wastes prior to landfill and provides for the classification of landfills as sites for inert, hazardous or non-hazardous waste and prohibits co-disposal.

13.9.22 It sets out procedures for waste acceptance at landfills and the types of waste for each class of landfill as specified by Waste Acceptance Criteria (WAC). The WAC are predominantly lists of “limit values” for certain parameters obtained from standard

leaching tests of wastes going into landfills. WAC are set out in the Landfill Directive itself. Full details can be found in the Environment Agency document "Guidance for waste destined for disposal in landfills" Version 2 June 2006.

13.10 Cement and Buried Concrete

13.10.1 The Made Ground has generally been found to contain low levels of water soluble sulphates.

13.10.2 In accordance therefore with the Building Research Establishment Special Digest No. 1 "Concrete in Aggressive Ground", a normal Portland cement in accordance with Group DS-1 Specifications should be used for all buried concrete, mortar, concrete piles, and pre-cast concrete pipes. In local areas Made Ground is present and a sulphate resisting cement (DS-2) would be prudent in these areas.

13.11 Services

13.11.1 Flexible service connections will be necessary on this site, especially in the areas of deeper fill. In addition, adequate gradients should be provided for all drains and sewers so as not to create backfalls should any future ground movements take place in the deeper backfill. Compacting the bases of all such trenches will reduce settlement.

13.11.2 Wherever drains and mains services pass from natural to Made Ground strata, adequate flexibility should be provided so that breakages do not occur due to adverse settlements between materials of differing compressibility.

13.11.3 The results of the chemical testing should be provided to the utilities companies so that any specific requirements they may have can be provided for.

13.12 Further Monitoring and Inspection

13.12.1 It is strongly recommended that the extent of the very soft and soft Alluvial Deposits along the eastern boundary of the site, are better defined. This should be with a series or window sampling boreholes, during which Standard Penetration Tests (SPTs) should be carried out to determine the bearing capacity of the soils. It is also recommended that a series of combined gas and groundwater monitoring standpipes are installed as part of this work. In order to confirm a suitable material for possible piles, this work should be supplemented by a few deeper cable percussive boreholes.

13.12.2 As discussed in Section 13.1, it is normal practice not to construct across fault lines. It is recommended that the position of the fault is better identified.

13.12.3 Should any geotechnical or geoenvironmental problems arise on site or if ground conditions are different from those that we predicted, they should be referred back to Michael D Joyce Associates LLP.

A D Joyce

BSc MSc ARSM CEng CGeol CEnv MICE FGS SiLC

November 2022

This report is subject to the provisions of the Copyright Acts and is for the sole benefit of D. Noble Limited in respect of a preliminary assessment of geotechnical and contamination conditions on the site. It does not purport to provide specialist legal advice in respect of environmental issues. The report cannot be assigned to, or relied on, by any other party without prior permission.

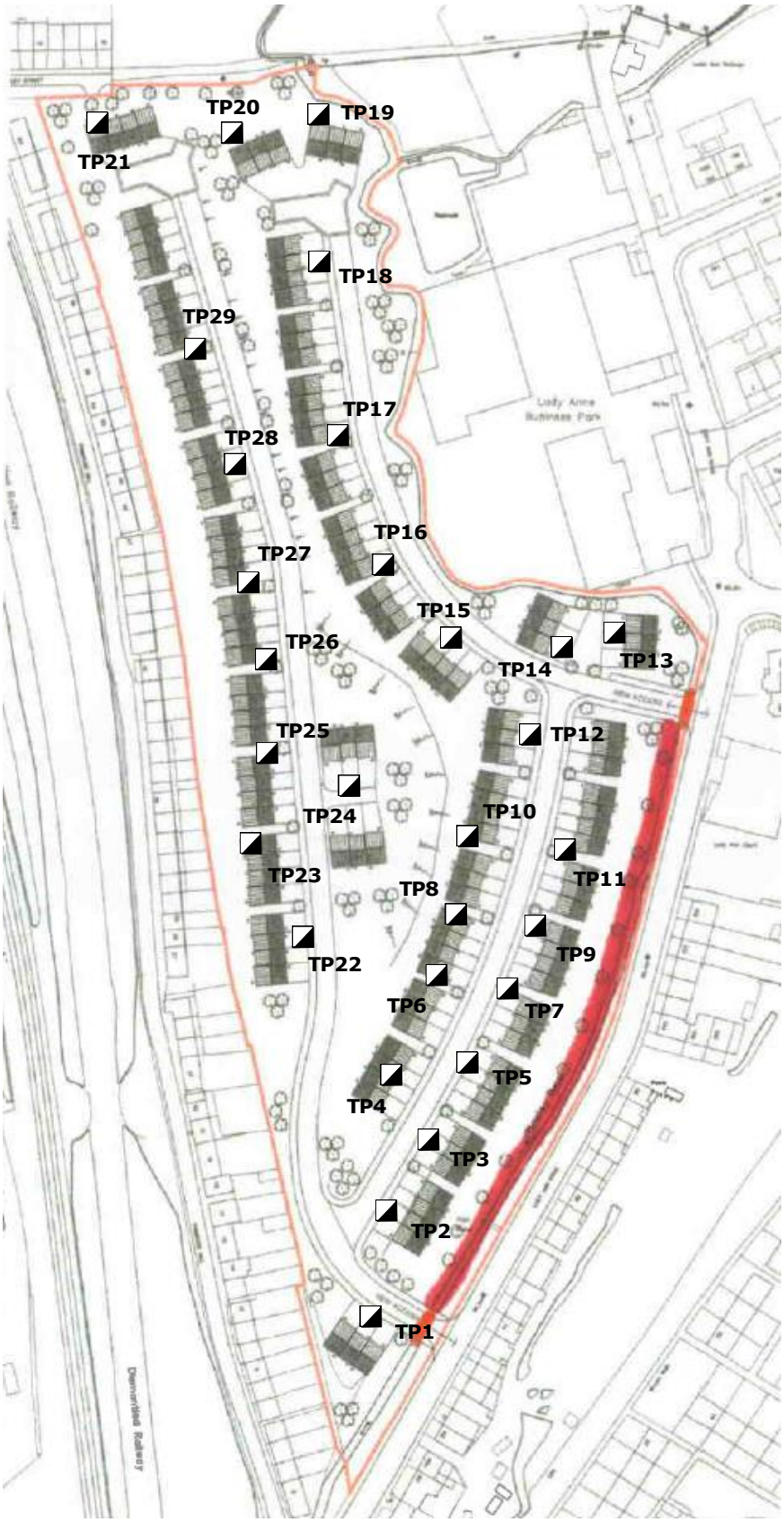
Procedure Notes

The desk study and ground investigation have been carried out in accordance with the principles of BS EN 1997-1: 2004 "Eurocode 7 - Geotechnical Design - Part 1: General Rules", BS EN 1997-2: 2007 "Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing", BS5930: 1999 and BS10175: 2001, and the terms of the client's brief. By its very nature any ground investigation only samples a small percentage of the ground. Consequently changes in ground conditions and soil properties can occur between any two exploratory points, for example local features such as soft ground, pockets of contamination and faults. This is also true of the exploration of mineworkings and such features can extend beneath parts of the site not investigated. Unrecorded bell pits and shafts can also exist between exploratory points. The ground investigation is designed to minimize such risks. Conclusions and recommendations are based on the information presented in this report, but unforeseen features may exist. Therefore, actual ground conditions should be noted during construction and further advice sought if they differ significantly from those predicted.

Further investigation can be carried out to further reduce uncertainty and risk but ultimately these risks cannot be eliminated. Similarly a desk study normally only considers readily available information and further information could be held by other sources. In commissioning further research or investigation the cost/benefit of doing so must be considered.

Where buildings are present on a site, structural and asbestos surveys have not been carried out, unless specifically stated. An unexploded ordnance survey has not been carried out. In relevant situations it would be prudent to commission such surveys.

Where information has been obtained from Third Parties, no liability can be accepted for the accuracy or completeness of this information. Where anecdotal evidence or speculations are presented, they must be treated as such and cannot be relied upon.



Lady Ann Road, Batley

Original Development Proposals and Exploratory Trial Pit Positions

Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

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Scale: NTS

Figure: 1



Lady Ann Road, Batley

Latest Development Proposals

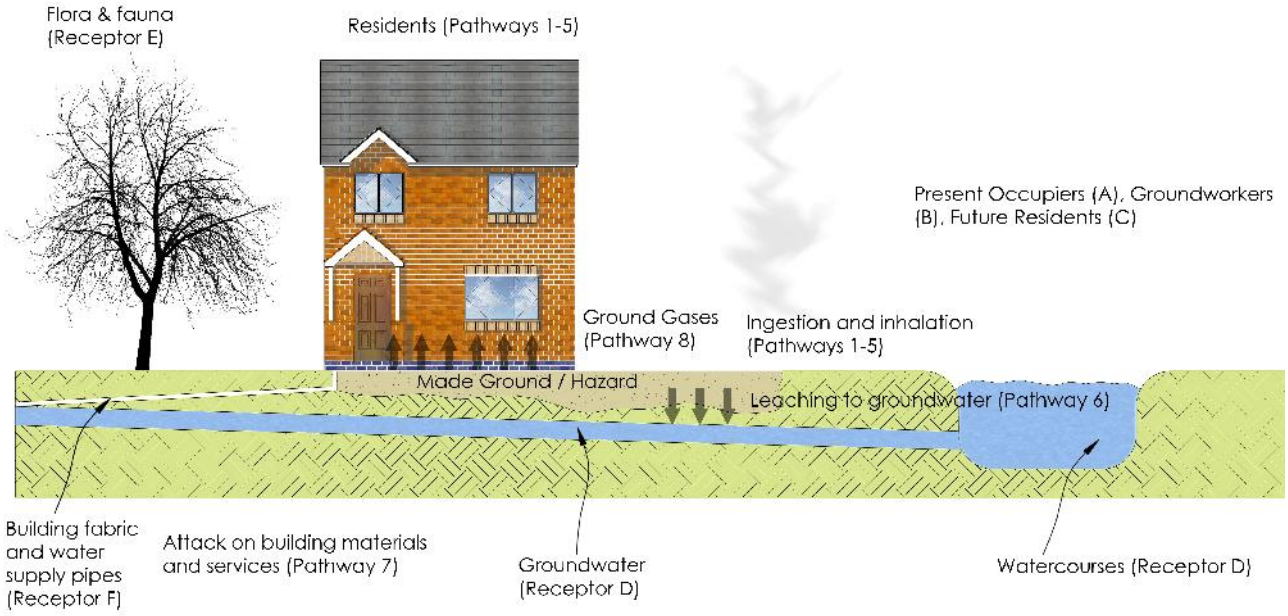
Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

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Scale: NTS

Figure: 2



Pathways

1. Ingestion of contaminated soil/dust
2. Ingestion of contaminated food
3. Ingestion of contaminated water
4. Inhalation of contaminated vapours
5. Dermal contact with contaminated soil/dust or water
6. Pollution of controlled water and off site migration
7. Attack on building materials and services
8. Migration of landfill gases and radon

Receptors

A. Present site occupiers
B. Site development personnel
C. Future residents
D. Controlled waters
E. Flora and fauna
F. Building and services

Schematic Representation of Conceptual Site Model

Schematic Representation of Conceptual Site Model

Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Figure: 3

APPENDIX 1

Trial Pit Records

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 15th August 2016

Client: D. Noble Limited

Trial Pit No: 1

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.05	ES		L= 2.1m, W= 0.6m D= 3.1m	-0.1		MADE GROUND - Dark brown slightly gravelly silty sandy topsoil. Gravel of fine to medium ash and glass.	
1.10	D				1	Orange light brown slightly gravelly clayey SAND. Gravel of fine to medium, sub-angular mudstone (possible Alluvial Deposits).	
2.10		▽	Groundwater seepage	-2.1	2		
2.20	D					Grey-brown clayey gravelly SAND. Gravel of fine, sub-angular sandstone. (Organic odour and staining throughout stratum). Gravel becoming cobbles from 2.5m.	
				-2.8			
					3	Yellowish-brown moderately weathered, fine to medium grained SANDSTONE.	
				-3.1			
						End of Trial Pit	
					4		

Stability: Sides stable

General: Refused at 3.1m on intact rock

Groundwater: Slow seepage at 2.1m

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 15th August 2016

Client: D. Noble Limited

Trial Pit No: 2

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.0m, W= 0.6m D= 3.0m			MADE GROUND - Dark brown slightly gravelly silty sandy topsoil. Gravel of fine to medium brick, steel, cloth and ash.	
0.20	ES			-0.4			
						Reddish-brown slightly silty clayey SAND (possible Alluvium).	
0.80	D			-1	1		
						Yellowish-brown moderately weathered, fine to medium grained SANDSTONE.	
1.30	D						
					2		
				-3	3	End of Trial Pit	
					4		

Stability: Sides stable

General: Refused at 3.0m on intact rock

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 15th August 2016

Client: D. Noble Limited

Trial Pit No: 3

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.2m, W= 0.6m D= 3.2m			MADE GROUND - Dark brown slightly gravelly silty sandy topsoil. Gravel of fine to medium brick, ash and glass.	
0.30	ES			-0.4			
				-1	1	Reddish-brown slightly silty clayey SAND (possible Alluvium).	
1.20 - 1.60	B					Yellowish-brown moderately weathered, fine to medium grained SANDSTONE.	
2.70		▽	Groundwater strike		2		
					3		
				-3.2		End of Trial Pit	
					4		

Stability: Sides unstable from 1.1m

General: Abandoned 3.2m pit collapsing

Groundwater: Strike at 2.7m, causing pit to collpase

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 15th August 2016

Client: D. Noble Limited

Trial Pit No: 4

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.05	ES		L= 2.2m, W= 0.6m D= 4.0m	-0.2		TOPSOIL - Turf over dark brown silty clay.	
0.90	D				1	Brown-orange slightly clayey gravelly SAND. Gravel of fine to medium, sub-angular sandstone.	
					2		
3.00 - 3.50	B			-3	3	Grey-brown slightly sandy, slightly clayey GRAVEL/ highly fractured MUDSTONE. Gravel of sub-angular, fine to boulder sized mudstone.	
				-4	4	End of Trial Pit	

Stability: Sides stable

General: Abandoned 4m - full reach of digger

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 15th August 2016

Client: D. Noble Limited

Trial Pit No: 5

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.3m, W= 0.6m D= 3.1m			MADE GROUND - Dark brown slightly gravelly silty sandy topsoil. Gravel of fine to medium, sub-angular brick and mudstone.	
0.20	ES			-0.3			
						Orange, light brown slightly gravelly clayey SAND. Gravel of fine to medium, sub-angular sandstone.	
				-1.1	1		
						Yellowish-brown moderately weathered, fine to medium grained SANDSTONE.	
					2		
					3		
				-3.1			
						End of Trial Pit	
					4		

Stability: Sides stable

General: Refused at 3.1m on mudstone bedrock

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 15th August 2016

Client: D. Noble Limited

Trial Pit No: 6

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.05	ES		L= 2.1m, W= 0.6m D= 3.4m	-0.1		MADE GROUND - Dark brown slightly gravelly silty sandy topsoil. Gravel of fine to medium brick.	
						Light brown-orange gravelly SAND. Gravel of fine to cobble sized, sub-angular sandstone.	
					1		
				-1.3		Yellowish-brown moderately weathered, fine to medium grained SANDSTONE.	
					2		
					3		
				-3.4		End of Trial Pit	
					4		

Stability: Sides stable

General: Refused at 3.4m on mudstone bedrock

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 15th August 2016

Client: D. Noble Limited

Trial Pit No: 7

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.1m, W= 0.6m D= 2.6m	-0.1		TOPSOIL - Turf over dark brown silty clayey topsoil.	
						Brown slightly gravelly silty SAND. Gravel of fine to coarse, sub-angular sandstone.	
				-1	1		
1.10	D					Orange-brown clayey GRAVEL. Gravel of fine to coarse, sub-angular sandstone.	
				-1.5			
						Light brown, dark grey slightly sandy clayey GRAVEL/ highly fractured MUDSTONE. Gravel of fine to boulder sized, sub-angular mudstone.	
					2		
2.10		▽	Groundwater strike				
				-2.5			
				-2.6		Dark grey-brown fine grained clayey intact MUDSTONE.	
						End of Trial Pit	
					3		
					4		

Stability: Sides stable

General: Refused at 2.6m on mudstone bedrock

Groundwater: Strike at 2.10m

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 15th August 2016

Client: D. Noble Limited

Trial Pit No: 8

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
			L= 2.2m, W= 0.6m D= 2.8m	0	0	Ground Surface	
				-0.1		TOPSOIL - Turf over dark brown silty clayey topsoil.	
						Light orange-brown sandy GRAVEL. Gravel of fine to cobbled sized, sub-angular mudstone and sandstone.	
				-0.9	1	Yellowish-brown moderately weathered, fine to medium grained SANDSTONE.	
					2		
				-2.8		End of Trial Pit	
					3		
					4		

Stability: Sides stable

General: Refused at 2.8m on mudstone bedrock

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 15th August 2016

Client: D. Noble Limited

Trial Pit No: 9

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.2m, W= 0.6m D= 2.7m	-0.1		TOPSOIL - Turf over dark brown silty clayey topsoil.	
1.00	D				1	Brown slightly gravelly clayey SAND. Gravel of fine to medium, sub-angular mudstone and sandstone.	
				-1.5			
2.00 - 2.50	B				2	Yellowish-brown moderately weathered, fine to medium grained SANDSTONE.	
				-2.7			
					3	End of Trial Pit	
					4		

Stability: Sides stable

General: Refused at 2.7m on mudstone bedrock

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 15th August 2016

Client: D. Noble Limited

Trial Pit No: 10

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.15m, W= 0.6m D= 2.6m	-0.1		TOPSOIL - Turf over dark brown silty clayey topsoil.	
1.00	D				1	Yellowish-brown moderately weathered, fine to medium grained SANDSTONE.	
					2		
				-2.6			
						End of Trial Pit	
					3		
					4		

Stability: Sides unstable

General: Abandoned 2.6m sides collapsing

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 15th August 2016

Client: D. Noble Limited

Trial Pit No: 11

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	ES		L= 2.30m, W= 0.6m D= 2.2m			Reeds over very soft dark brown-black peaty organic CLAY.	
				-0.5		Very soft and soft orange-brown sandy gravelly CLAY. Gravel of fine to medium, sub-angular mudstone (possible Alluvial Deposits).	
0.90	D						
1.00		▽	Groundwater seepage		1		
1.50	D						
					2		
2.10 - 2.20	B			-2.1			
				-2.2		Grey-brown clayey fine grained intact MUDSTONE/SILTSTONE.	
						End of Trial Pit	
					3		
					4		

Stability: Sides stable

General: Refused at 2.2m on mudstone/siltstone

Groundwater: Seepage at 1.0m

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 19th August 2016

Client: D. Noble Limited

Trial Pit No: 12

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.1m, W= 0.6m D= 3.4m	-0.1		TOPSOIL - Turf over dark brown silty sandy topsoil.	
						Light brown-orange slightly silty clayey gravelly SAND. Gravel of fine to coarse, sub-angular mudstone and sandstone.	
					1		
				-1.2			
1.30	D					Soft orange-grey slightly gravelly silty sandy CLAY. Gravel of fine to coarse, sub-angular mudstone and sandstone.	
				-1.6			
						Grey, dark grey slightly sandy clayey mudstone GRAVEL/ highly fractured MUDSTONE. Gravel of fine to boulder sized, sub-angular mudstone.	
					2		
					3		
				-3.3			
				-3.4		Dark grey-brown fine grained intact shaly MUDSTONE.	
						End of Trial Pit	
					4		

Stability: Sides stable

General: Refused at 3.4m on mudstone bedrock

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 19th August 2016

Client: D. Noble Limited

Trial Pit No: 13

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	ES		L= 2.0m, W= 0.6m D= 3.0m			MADE GROUND - Dark brown-black slightly sandy gravelly clay. Gravel of fine to medium ash, clinker mudstone.	
				-0.4		Very soft brown-grey sandy clayey gravelly CLAY. Organic odour throughout. Gravel of fine, sub-angular mudstone (Alluvium).	
					1		
1.90		▽	Groundwater seepage		2		
				-2.9			
				-3	3	Grey-brown clayey fine grained intact MUDSTONE/SILTSTONE.	
						End of Trial Pit	
					4		

Stability: Sides unstable, collapsing from 0.4m

General: Refused at 3.0m on mudstone bedrock

Groundwater: Seepage at 1.90m

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 19th August 2016

Client: D. Noble Limited

Trial Pit No: 14

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.3m, W= 0.6m D= 2.8m			MADE GROUND - Black-grey gravelly clay. Gravel of fine to medium. sub-angular mudstone.	
				-0.3			
						Very soft and soft grey-brown organic silty CLAY (Alluvium).	
1.0	D				1		
1.00	HV		40 kPa				
1.50		▽	Groundwater seepage	-1.6			
						Orange-brown clayey gravelly SAND. Gravel of fine to medium, sub-angular mudstone and sandstone.	
					2		
				-2.2			
						Grey-orange clayey GRAVEL/ highly fractured MUDSTONE. Gravel of fine to boulder sized, sub-angular mudstone.	
				-2.7			
				-2.8		Dark grey-brown fine grained intact MUDSTONE.	
						End of Trial Pit	
					3		
					4		

Stability: Sides stable

General: Refused at 2.8m on mudstone bedrock

Groundwater: Seepage at 1.50m

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 19th August 2016

Client: D. Noble Limited

Trial Pit No: 15

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.7m, W= 0.6m D= 4.0m	-0.1		TOPSOIL - Turf over brown silty sandy topsoil.	
						Soft to firm brown, light grey sandy CLAY.	
1.0	D				1		
1.00	HV		65 kPa				
				-2	2	Grey-orange clayey GRAVEL. Gravel of fine to cobble sized mudstone.	
3.00		▽	Groundwater seepage	-3	3	Dark grey slightly clayey shaly MUDSTONE.	
				-4	4	End of Trial Pit	

Stability: Sides stable

General: Abandoned at 4m - full reach of digger

Groundwater: Seepage at 3m

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 19th August 2016

Client: D. Noble Limited

Trial Pit No: 16

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.4m, W= 0.6m D= 4.0m			MADE GROUND - Black and grey sandy gravel of fine to coarse ash, clinker, brick and tile.	
0.50	ES				1		
				-1.3			
						Orange-grey-brown silty clayey SAND.	
					2		
				-2.3			
						Grey, dark brown clayey GRAVEL. Gravel of fine to cobble sized mudstone.	
					3		
				-3.1			
						Dark grey slightly shaly MUDSTONE.	
3.70		▽	Groundwater seepage				
				-4	4		
						End of Trial Pit	

Stability: Sides stable

General: Abandoned at 4m - full reach of digger

Groundwater: Seepage at 3m

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 19th August 2016

Client: D. Noble Limited

Trial Pit No: 17

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.2m, W= 0.6m D= 4.0m			MADE GROUND - Grey-brown slightly gravelly silty sand. Gravel of fine to coarse metal, plastic, brick and tile.	
				-0.3			
						Firm to stiff brown-grey sandy CLAY.	
					1		
1.50	HV		80 kPa				
					2		
				-2.3			
2.40	D					Dark grey-brown clayey GRAVEL. Gravel of fine to cobble sized mudstone.	
				-3	3		
						Dark brown slightly clayey shaly MUDSTONE.	
3.60		▽	Groundwater seepage				
				-4	4		
						End of Trial Pit	

Stability: Sides stable

General: Abandoned at 4m - full reach of digger

Groundwater: Seepage at 3.6m

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 19th August 2016

Client: D. Noble Limited

Trial Pit No: 18

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.05	ES		L= 2.9m, W= 0.6m D= 4.0m	-0.1		MADE GROUND - Dark brown silty clayey gravel. Gravel of fine to medium brick.	
				-0.3		Soft dark brown sandy CLAY.	
					1	Orange-brown slightly gravelly sandy CLAY. Gravel of fine to medium, sub-angular mudstone.	
				-1.3			
				-2	2	Dark grey clayey GRAVEL. Gravel of fine to cobble sized, sub-angular mudstone.	
						Dark grey-brown slatey MUDSTONE.	
					3		
				-4	4		
						End of Trial Pit	

Stability: Sides stable

General: Abandoned at 4m - full reach of digger

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 19th August 2016

Client: D. Noble Limited

Trial Pit No: 19

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.8m, W= 0.6m D= 4.0m	-0.2		TOPSOIL - Turf over brown silty sandy topsoil.	
						Soft orange-brown sandy CLAY.	
				-1.6	1		
1.70	D					Firm to stiff dark grey-blue gravelly clay/highly weathered shaly MUDSTONE. Gravel of fine to coarse, sub-angular mudstone.	
					2		
					3		
				-3.9			
				-4		Dark grey-brown intact clayey MUDSTONE.	
					4	End of Trial Pit	

Stability: Sides stable

General: Refused at 4m - mudstone bedrock

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 19th August 2016

Client: D. Noble Limited

Trial Pit No: 20

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	ES		L= 2.5m, W= 0.6m D= 4.0m	-0.2		MADE GROUND - Dark brown-black clayey gravel. Gravel of fine brick, tile and clinker.	
1.00	D				1	Soft to firm brown sandy CLAY.	
1.00	HV		45 kPa				
				-1.7			
					2	Firm brown-grey slightly gravelly CLAY. Gravel of fine to medium mudstone.	
2.50	HV		60 kPa				
				-3.1	3		
						Light brown-grey clayey GRAVEL/ highly weathered MUDSTONE. Gravel of fine to boulder sized, sub-angular mudstone.	
				-4	4		
						End of Trial Pit	

Stability: Sides stable

General: Abandoned at 4m - full reach of digger

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 19th August 2016

Client: D. Noble Limited

Trial Pit No: 21

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.7m, W= 0.6m D= 3.8m			MADE GROUND - Dark brown-black clayey gravel. Gravel of fine brick, tile and clinker.	
				-0.3			
						Soft to firm brown sandy CLAY (possible Head Deposits).	
					1		
				-1.5			
						Light grey-brown clayey GRAVEL/ highly weathered MUDSTONE. Gravel of fine to boulder sized, sub-angular mudstone.	
					2		
					3		
				-3.7			
				-3.8		Dark grey-brown silty intact MUDSTONE.	
						End of Trial Pit	
					4		

Stability: Sides stable

General: Refused at 3.8m on mudstone bedrock

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 22nd August 2016

Client: D. Noble Limited

Trial Pit No: 22

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.05	ES		L= 2.5m, W= 0.6m D= 4.0m	-0.1		MADE GROUND - Dark brown slightly gravelly silty sandy topsoil. Gravel of fine to coarse brick.	
						Yellowish-brown moderately weathered, fine to medium grained SANDSTONE.	
					1		
					2		
					3		
				-4	4	End of Trial Pit	

Stability: Sides stable

General: Abandoned at 4m - full reach of digger

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 22nd August 2016

Client: D. Noble Limited

Trial Pit No: 23

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.5m, W= 0.6m D= 4.0m			MADE GROUND - Dark brown-black silty gravelly sandy topsoil. Gravel of fine to coarse brick, glass and concrete.	
0.40	ES			-0.5			
						Light brown-orange slightly sandy clayey GRAVEL/ highly weathered MUDSTONE. Gravel of fine to boulder sized, sub-angular mudstone.	
					1		
					2		
					3		
				-3.2			
						Dark brown-grey clayey moderately weathered MUDSTONE. Gravel of fine to boulder sized mudstone.	
				-4	4		
						End of Trial Pit	

Stability: Sides stable

General: Abandoned at 4m - full reach of digger

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 22nd August 2016

Client: D. Noble Limited

Trial Pit No: 24

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
			L= 2.9m, W= 0.6m D= 4.0m	0	0	Ground Surface	
				-0.1		TOPSOIL - Turf over dark brown silty clay topsoil.	
					1	Light brown-orange slightly sandy clayey GRAVEL/ highly weathered MUDSTONE. Gravel of fine to boulder sized, sub-angular mudstone.	
				-1.3			
					2	Firm grey-brown gravelly moderately weathered MUDSTONE, with bands of sandstone.	
					3		
				-4	4	End of Trial Pit	

Stability: Sides stable

General: Abandoned at 4m - full reach of digger

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 22nd August 2016

Client: D. Noble Limited

Trial Pit No: 25

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.9m, W= 0.6m D= 4.0m	-0.2		MADE GROUND - Dark brown slightly gravelly silty sandy topsoil. Gravel of fine to medium brick.	
						Light brown-orange slightly sandy clayey becoming moderately weathered MUDSTONE. Gravel of fine to boulder sized, sub-angular mudstone.	
					1		
					2		
					3		
				-4	4	End of Trial Pit	

Stability: Sides stable

General: Abandoned at 4m - full reach of digger

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 22nd August 2016

Client: D. Noble Limited

Trial Pit No: 26

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	D		L= 2.4m, W= 0.6m D= 4.0m	-0.1		TOPSOIL - Dark brown silty sandy topsoil.	
						Brown, light grey clayey becoming moderately weathered MUDSTONE. Gravel of fine to boulder sized mudstone.	
					1		
					2		
					3		
				-4	4		
						End of Trial Pit	

Stability: Sides stable

General: Abandoned at 4m - full reach of digger

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 22nd August 2016

Client: D. Noble Limited

Trial Pit No: 27

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	D		L= 2.4m, W= 0.6m D= 4.0m	-0.2		MADE GROUND - Dark brown slightly gravelly silty sandy topsoil. Gravel of fine to coarse brick.	
						Light orange-brown slightly sandy clayey highly weathered MUDSTONE. Gravel of fine to cobble sized mudstone.	
					1		
					2		
				-2.5			
						Brown, light grey clayey GRAVEL, moderately weathered MUDSTONE. Gravel of fine to boulder sized mudstone.	
					3		
				-4			
					4	End of Trial Pit	

Stability: Sides stable

General: Abandoned at 4m - full reach of digger

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 22nd August 2016

Client: D. Noble Limited

Trial Pit No: 28

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.4m, W= 0.6m D= 4.0m	-0.2		MADE GROUND - Dark brown slightly gravelly silty sandy topsoil. Gravel of fine to coarse brick.	
					1	Light orange-brown slightly sandy clayey highly weathered MUDSTONE. Gravel of fine to cobble sized mudstone.	
				-2	2	Brown, light grey clayey moderately weathered MUDSTONE. Gravel of fine to boulder sized mudstone.	
				-4	3		
					4	End of Trial Pit	

Stability: Sides stable

General: Abandoned at 4m - full reach of digger

Groundwater: None encountered

Site: Lady Ann Road [3663]

Location: Soothill, Batley

Excavated by: JCB 3CX

Date: 22nd August 2016

Client: D. Noble Limited

Trial Pit No: 29

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L= 2.4m, W= 0.6m D= 4.0m	-0.1		TOPSOIL - Dark brown silty sandy topsoil.	
					1	Light orange-brown slightly sandy clayey highly weathered MUDSTONE. Gravel of fine to cobble sized mudstone.	
				-1.4			
					2	Brown, light grey clayey moderately weathered MUDSTONE. Gravel of fine to boulder sized mudstone.	
					3		
				-4	4	End of Trial Pit	

Stability: Sides stable

General: Abandoned at 4m - full reach of digger

Groundwater: None encountered

APPENDIX 2

Geotechnical Laboratory Test Results

Laboratory Report

2788

GEO Site & Testing Services Ltd

Contract Number: 32323

Client's Reference:

Report Date: **19-09-2016**

Client **Michael D Joyce Associates LLP**
Michael D Joyce Associates LLP
Charnock Court 6
South Parade
Wakefield
West Yorkshire
WF1 1LR

Contract Title: **Batley**

For the attention of: **Anthony D Joyce**

Date Received: **09-09-2016**

Date Commenced: **09-09-2016**

Date Completed: **19-09-2016**

Test Description	Qty
Moisture Content	11
Atterberg Limits PL/LL 4 Point	11
Water Solube Sulphate 1377 : 1990 Part 3 : 5	9
pH 1377 : 1990 Part 3 : 9	9
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
- denotes test carried out by approved contractor
@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - Emma Sharp (Office Manager)
Jon Tatam (Administrative/Quality Assistant) - Paul Evans (Quality/Technical Manager) - Vaughan Edwards (Managing Director)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk

Client ref: n/a

Location: Lady Ann Road, Batley

Contract Number: 32323-080916

Hole Number	Sample Number	Type	Depth (m)	Description of Sample*
TP01			1.10	Brown gravelly sandy fine to medium silty CLAY.
TP02			0.80	Brown gravelly sandy fine to medium silty CLAY.
TP04			0.90	Brown gravelly sandy fine to medium silty CLAY.
TP07			1.10	Brown gravelly sandy fine to medium silty CLAY.
TP12			1.30	Brown gravelly sandy fine to medium silty CLAY.
TP14			1.00	Brown gravelly sandy fine to medium silty CLAY.
TP17			2.40	Brown gravelly sandy fine to medium silty CLAY.
TP20			1.00	Brown gravelly sandy fine to medium silty CLAY.
TP24			1.30	Brown gravelly sandy fine to medium silty CLAY.
TP26			1.00	Brown gravelly sandy fine to medium silty CLAY.
TP29			1.60	Brown gravelly sandy fine to medium silty CLAY.

Note: Results on this table are in summary format and may not meet the requirements of the relevant standards, additional information is held by the laboratory

GSTL
GEO SITE & TESTING SERVICES LTD

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)
Date: 19.9.16

UKAS TESTING
2788

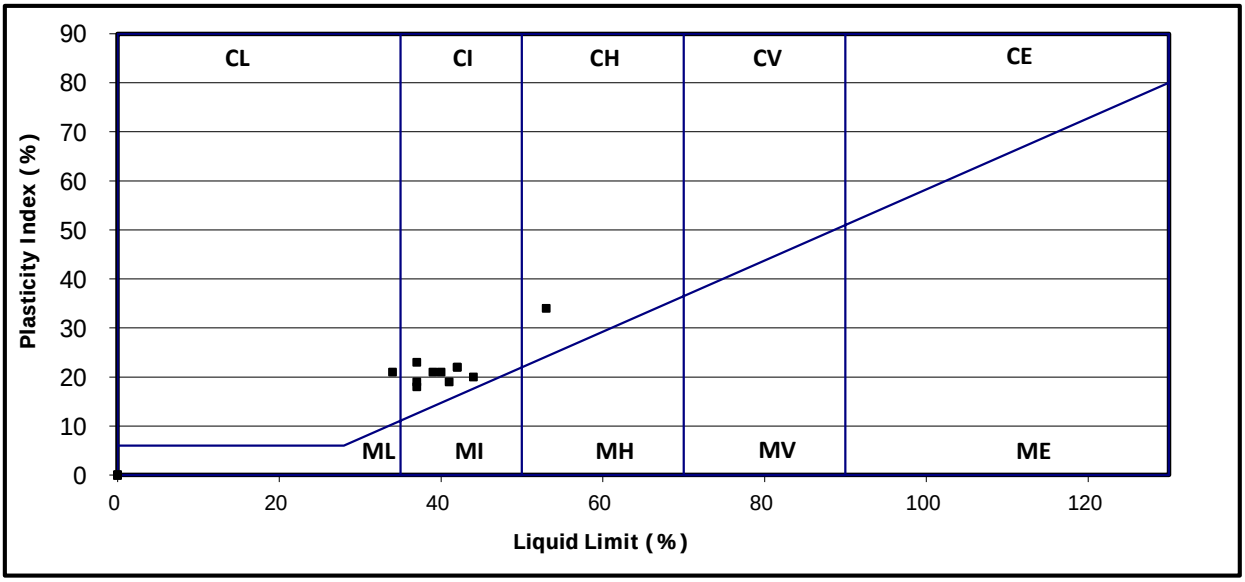
Test Report: **Method of the Determination of the plastic limit and plasticity index**
BS 1377 : Part 2 : 1990 Method 5

Client ref: n/a
Location: Lady Ann Road, Batley
Contract Number: 32323-080916

Hole / Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3 / 4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
TP01		1.10	23	42	20	22	99	CI Intermediate Plasticity
TP02		0.80	22	40	19	21	91	CI Intermediate Plasticity
TP04		0.90	14	34	13	21	81	CL Low Plasticity
TP07		1.10	20	42	20	22	74	CI Intermediate Plasticity
TP12		1.30	19	37	19	18	98	CI Intermediate Plasticity
TP14		1.00	30	44	24	20	93	CI Intermediate Plasticity
TP17		2.40	20	37	18	19	98	CI Intermediate Plasticity
TP20		1.00	23	41	22	19	81	CI Intermediate Plasticity
TP24		1.30	15	37	14	23	96	CI Intermediate Plasticity
TP26		1.00	17	53	19	34	87	CH High Plasticity
TP29		1.60	21	39	18	21	87	CI Intermediate Plasticity

Symbols: **NP : Non Plastic** **# : Liquid Limit and Plastic Limit Wet Sieved**

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.
BS 5930:1999+A2:2010



For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)
Date: 19.9.16

UKAS TESTING 2788

Unit 4
Heol Aur
Dafen Ind Estate
Dafen
Carmarthenshire
SA14 8QN
Tel: 01554 784040
01554 750752
Fax: 01554 770529
01554 784041
Web: www.geo.uk.com

Certificate of Analysis

Date:	15-09-16
Client:	MDJA
Our Reference:	32323-
Client Reference:	N/A
Contract Title:	Lady Ann Road, Bately
Description: (Total Samples)	9
Date Received:	08-09-16
Date Started:	13-09-16
Date Completed:	15-09-16
Test Procedures:	(B.S. 1377 : PART 3 : 1990)

Notes:

Solid samples will be disposed 1 month and liquids 2 weeks

Approved By:

Authorised Signatories:

Emma Sharp	Ben Sharp	Paul Evans
Laboratory Office Manager	Contracts Manager	Quality Manager

Contract No: 32323-
Client Ref: N/A
Location: Lady Ann Road, Bately
Date: 15-09-2016

SUMMARY OF CHEMICAL ANALYSIS

(B.S. 1377 : PART 3 : 1990)

Hole Number	Sample Number	Sample Type	Depth m	Sulphate Content SO_3			Chloride Content		pH Value @ 25°C Redox	Organic Matter Content %	Redox Mv
				Acid Soluble Sulphate as % SO_3	Aqueous Extract Sulphate as g/l SO_3	Ground-water g/l	2/1 Water Soluble Chloride ions %	Acid Soluble Chloride %			
				Clause 5.2 & 5.5.	Clause 5.3 & 5.5.	Clause 5.4.	Clause 7.2	Clause 7.3	Clause 9.5	Clause 3	Clause 4
TP01		D	1.10		0.05				7.86		
TP29		D	1.60		0.06				6.43		
TP07		D	1.10		0.03				7.30		
TP20		D	1.00		0.02				7.57		
TP04		D	0.90		0.03				6.87		
TP26		D	1.00		0.06				7.16		
TP24		D	1.30		0.04				7.94		
TP14		D	1.00		0.05				6.58		
TP17		D	2.40		0.03				6.69		

NCP - No Chloride present

APPENDIX 3

Contamination Laboratory Test Results

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 16/05725
Issue Number: 1 **Date:** 19 September, 2016

Client: Michael D Joyce Associates LLP
Charnock Court
6 South Parade
Wakefield
WF1 1LR

Project Manager: Mr Anthony Joyce
Project Name: Lady Ann Road, Batley
Project Ref: Not specified
Order No: N/A
Date Samples Received: 25/08/16
Date Instructions Received: 13/09/16
Date Analysis Completed: 19/09/16

Prepared by:

Kate Ellison
Administrative Assistant

Approved by:

Lianne Bromiley
Senior Client Manager

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING 1247

Envirolab Job Number: 16/05725

Client Project Name: Lady Ann Road, Batley

Client Project Ref: Not specified

Lab Sample ID	16/05725/1	16/05725/2	16/05725/3	16/05725/4	16/05725/5	16/05725/6	16/05725/7	16/05725/8	Units	Method ref
Client Sample No										
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP06	TP08	TP09		
Depth to Top	0.05	0.20	0.30	0.05	0.20	0.05	0.05	0.05		
Depth To Bottom										
Date Sampled	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	4A	4A	4AE	4AE	4AE	4AE	4AE	5		
% Stones >10mm$_A^{\#}$	<0.1	<0.1	<0.1	9.9	6.1	15.5	9.7	<0.1	% w/w	A-T-044
pH$_D^{M\#}$	6.29	6.04	5.28	5.49	5.37	6.06	4.68	7.17	pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	g/l	A-T-026s
Cyanide (total)$_A^{M\#}$	<1	1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	A-T-050s
Arsenic$_D^{M\#}$	45	29	37	29	36	28	39	4	mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	mg/kg	A-T-024s
Copper$_D^{M\#}$	101	68	69	700	81	65	63	5	mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-040s
Lead$_D^{M\#}$	432	230	121	114	210	393	85	11	mg/kg	A-T-024s
Mercury$_D$	0.64	1.86	0.29	0.19	0.39	0.34	0.20	<0.17	mg/kg	A-T-024s
Nickel$_D^{M\#}$	30	33	21	19	23	21	24	14	mg/kg	A-T-024s
Selenium$_D$	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-024s
Zinc$_D^{M\#}$	161	326	130	129	264	1060	118	66	mg/kg	A-T-024s

Envirolab Job Number: 16/05725

Client Project Name: Lady Ann Road, Batley

Client Project Ref: Not specified

Lab Sample ID	16/05725/1	16/05725/2	16/05725/3	16/05725/4	16/05725/5	16/05725/6	16/05725/7	16/05725/8	Units	Method ref
Client Sample No										
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP06	TP08	TP09		
Depth to Top	0.05	0.20	0.30	0.05	0.20	0.05	0.05	0.05		
Depth To Bottom										
Date Sampled	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	4A	4A	4AE	4AE	4AE	4AE	4AE	5		
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	Amosite	Amosite	NAD	NAD	NAD	NAD	-		A-T-045
Asbestos Matrix (visual)$_A$	-	-	Board	-	-	-	-	-		A-T-045
Asbestos Matrix (microscope)$_A$	-	Board	-	-	-	-	-	-		A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A	No	No	N/A	N/A	N/A	N/A	-		Gravimetry

Envirolab Job Number: 16/05725

Client Project Name: Lady Ann Road, Batley

Client Project Ref: Not specified

Lab Sample ID	16/05725/1	16/05725/2	16/05725/3	16/05725/4	16/05725/5	16/05725/6	16/05725/7	16/05725/8	Units	Method ref
Client Sample No										
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP06	TP08	TP09		
Depth to Top	0.05	0.20	0.30	0.05	0.20	0.05	0.05	0.05		
Depth To Bottom										
Date Sampled	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16	15-Aug-16		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	4A	4A	4AE	4AE	4AE	4AE	4AE	5		
PAH 16										
Acenaphthene$_A^{M\#}$	1.05	0.78	0.71	0.28	0.23	0.43	0.76	<0.01	mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	0.07	0.10	0.11	0.04	0.04	0.08	0.08	<0.01	mg/kg	A-T-019s
Anthracene$_A^{M\#}$	1.44	1.07	1.01	0.47	0.34	0.95	1.24	<0.02	mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	4.04	3.18	2.82	1.81	1.03	2.62	3.35	<0.04	mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	3.13	2.46	1.91	1.45	0.89	2.27	2.85	<0.04	mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	3.97	3.30	2.66	1.98	1.07	2.87	3.52	<0.05	mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	1.47	1.13	0.75	0.67	0.38	1.05	1.19	<0.05	mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	1.63	1.46	1.29	0.79	0.45	1.29	1.62	<0.07	mg/kg	A-T-019s
Chrysene$_A^{M\#}$	4.58	3.51	3.15	2.15	1.25	2.88	3.56	<0.06	mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.44	0.30	0.22	0.24	0.12	0.27	0.33	<0.04	mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	8.63	5.96	5.73	3.53	2.07	4.99	6.65	<0.08	mg/kg	A-T-019s
Fluorene$_A^{M\#}$	0.76	0.60	0.56	0.21	0.18	0.33	0.56	<0.01	mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	1.98	1.52	1.06	0.89	0.55	1.42	1.57	<0.03	mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	1.08	1.71	0.67	0.19	0.19	0.39	0.65	<0.03	mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	6.77	4.69	5.07	2.60	1.60	3.56	5.17	<0.03	mg/kg	A-T-019s
Pyrene$_A^{M\#}$	7.36	5.24	4.91	3.28	1.82	4.35	5.76	<0.07	mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	48.4	37	32.6	20.6	12.2	29.7	38.8	<0.08	mg/kg	A-T-019s

Envirolab Job Number: 16/05725

Client Project Name: Lady Ann Road, Batley

Client Project Ref: Not specified

Lab Sample ID	16/05725/9	16/05725/10	16/05725/11	16/05725/12	16/05725/13	16/05725/14	16/05725/15	16/05725/16	Units	Method ref
Client Sample No										
Client Sample ID	TP10	TP11	TP13	TP16	TP18	TP20	TP22	TP23		
Depth to Top	0.05	0.10	0.10	0.50	0.05	0.10	0.05	0.40		
Depth To Bottom										
Date Sampled	15-Aug-16	15-Aug-16	19-Aug-16	19-Aug-16	19-Aug-16	19-Aug-16	22-Aug-16	22-Aug-16		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	5A	6E	4A	4A	6E	4AB	4AE	6A		
% Stones >10mm$_A^{\#}$	13.5	<0.1	11.1	26.3	<0.1	22.2	1.9	5.0	% w/w	A-T-044
pH$_D^{M\#}$	6.87	6.77	6.76	6.45	6.41	7.10	4.61	7.14	pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	<0.01	0.06	0.04	0.04	0.17	<0.01	<0.01	0.04	g/l	A-T-026s
Cyanide (total)$_A^{M\#}$	<1	<1	<1	<1	<1	<1	2	<1	mg/kg	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	<0.2	6.5	<0.2	<0.2	<0.2	mg/kg	A-T-050s
Arsenic$_D^{M\#}$	5	28	50	136	27	26	30	15	mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	A-T-024s
Copper$_D^{M\#}$	16	92	436	158	110	33	65	44	mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-040s
Lead$_D^{M\#}$	11	154	204	267	189	47	116	97	mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	0.25	<0.17	mg/kg	A-T-024s
Nickel$_D^{M\#}$	23	46	39	47	34	23	21	28	mg/kg	A-T-024s
Selenium$_D$	<1	<1	<1	<1	2	<1	<1	<1	mg/kg	A-T-024s
Zinc$_D^{M\#}$	54	348	552	221	367	66	111	157	mg/kg	A-T-024s

Envirolab Job Number: 16/05725

Client Project Name: Lady Ann Road, Batley

Client Project Ref: Not specified

Lab Sample ID	16/05725/9	16/05725/10	16/05725/11	16/05725/12	16/05725/13	16/05725/14	16/05725/15	16/05725/16	Units	Method ref
Client Sample No										
Client Sample ID	TP10	TP11	TP13	TP16	TP18	TP20	TP22	TP23		
Depth to Top	0.05	0.10	0.10	0.50	0.05	0.10	0.05	0.40		
Depth To Bottom										
Date Sampled	15-Aug-16	15-Aug-16	19-Aug-16	19-Aug-16	19-Aug-16	19-Aug-16	22-Aug-16	22-Aug-16		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	5A	6E	4A	4A	6E	4AB	4AE	6A		
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	-	NAD	NAD	NAD	NAD	NAD	NAD	NAD		A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A		Gravimetry

Envirolab Job Number: 16/05725

Client Project Name: Lady Ann Road, Batley

Client Project Ref: Not specified

Lab Sample ID	16/05725/9	16/05725/10	16/05725/11	16/05725/12	16/05725/13	16/05725/14	16/05725/15	16/05725/16	Units	Method ref
Client Sample No										
Client Sample ID	TP10	TP11	TP13	TP16	TP18	TP20	TP22	TP23		
Depth to Top	0.05	0.10	0.10	0.50	0.05	0.10	0.05	0.40		
Depth To Bottom										
Date Sampled	15-Aug-16	15-Aug-16	19-Aug-16	19-Aug-16	19-Aug-16	19-Aug-16	22-Aug-16	22-Aug-16		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	5A	6E	4A	4A	6E	4AB	4AE	6A		
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01	0.07	0.15	0.03	0.12	0.35	0.45	0.19	mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	0.01	0.02	<0.01	0.02	0.06	0.02	mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	0.09	0.19	0.12	0.22	0.52	0.72	0.33	mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	0.22	0.38	0.22	0.28	1.32	2.54	0.91	mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	0.26	0.29	0.17	0.22	0.93	2.25	0.77	mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	0.22	0.28	0.16	0.25	1.34	2.88	0.88	mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	0.15	0.10	0.06	<0.05	0.40	1.03	0.35	mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	0.22	0.24	0.10	<0.07	0.51	1.18	0.44	mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06	0.35	0.44	0.29	0.40	1.43	2.76	0.88	mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04	<0.04	0.11	0.22	0.08	mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	0.72	1.11	0.75	0.95	3.07	5.35	1.64	mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	0.04	0.09	0.03	0.12	0.26	0.34	0.13	mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	0.18	0.15	0.07	<0.03	0.53	1.48	0.49	mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	0.09	<0.03	<0.03	0.30	0.30	0.12	mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	0.42	0.91	0.54	0.80	2.22	3.45	1.21	mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07	0.68	1.05	0.68	0.80	2.70	4.82	1.43	mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	<0.08	3.62	5.46	3.27	4.18	16	29.9	9.86	mg/kg	A-T-019s

Envirolab Job Number: 16/05725

Client Project Name: Lady Ann Road, Batley

Client Project Ref: Not specified

Lab Sample ID	16/05725/17								Units	Method ref
Client Sample No										
Client Sample ID	TP29									
Depth to Top	0.05									
Depth To Bottom										
Date Sampled	22-Aug-16									
Sample Type	Soil									
Sample Matrix Code	4AE									
% Stones >10mm$_A^{\#}$	6.6								% w/w	A-T-044
pH$_D^{M\#}$	5.19								pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	<0.01								g/l	A-T-026s
Cyanide (total)$_A^{M\#}$	<1								mg/kg	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2								mg/kg	A-T-050s
Arsenic$_D^{M\#}$	31								mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5								mg/kg	A-T-024s
Copper$_D^{M\#}$	46								mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1								mg/kg	A-T-040s
Lead$_D^{M\#}$	111								mg/kg	A-T-024s
Mercury$_D$	<0.17								mg/kg	A-T-024s
Nickel$_D^{M\#}$	21								mg/kg	A-T-024s
Selenium$_D$	<1								mg/kg	A-T-024s
Zinc$_D^{M\#}$	120								mg/kg	A-T-024s

Envirolab Job Number: 16/05725

Client Project Name: Lady Ann Road, Batley

Client Project Ref: Not specified

Lab Sample ID	16/05725/17								Units	Method ref
Client Sample No										
Client Sample ID	TP29									
Depth to Top	0.05									
Depth To Bottom										
Date Sampled	22-Aug-16									
Sample Type	Soil									
Sample Matrix Code	4AE									
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^\#$	NAD									A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A									Gravimetry

Envirolab Job Number: 16/05725

Client Project Name: Lady Ann Road, Batley

Client Project Ref: Not specified

Lab Sample ID	16/05725/17								Units	Method ref
Client Sample No										
Client Sample ID	TP29									
Depth to Top	0.05									
Depth To Bottom										
Date Sampled	22-Aug-16									
Sample Type	Soil									
Sample Matrix Code	4AE									
PAH 16										
Acenaphthene$_A^{M\#}$	0.20								mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	0.03								mg/kg	A-T-019s
Anthracene$_A^{M\#}$	0.43								mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	1.17								mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	1.06								mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	1.19								mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.50								mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.57								mg/kg	A-T-019s
Chrysene$_A^{M\#}$	1.37								mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.11								mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	2.43								mg/kg	A-T-019s
Fluorene$_A^{M\#}$	0.14								mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.64								mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	0.11								mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	1.58								mg/kg	A-T-019s
Pyrene$_A^{M\#}$	2.07								mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	13.6								mg/kg	A-T-019s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,
E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

APPENDIX 4

GroundSure Geo-Insight and Enviro-Insight Reports

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

424995,424546,

Order Details

Date: 09/11/2022

Your ref: Lady_Ann_Road_-_Batley

Our Ref: HMD-354-9188062

Site Details

Location: 424988 424556

Area: 3.3 ha

Authority: Kirklees Council



Summary of findings p. 2

OS MasterMap site plan p.12

Aerial image p. 8

groundsure.com/insightuserguide

Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
13	1.1	Historical industrial land uses	9	20	62	140	-
22	1.2	Historical tanks	0	6	27	41	-
25	1.3	Historical energy features	0	0	10	18	-
26	1.4	Historical petrol stations	0	0	0	0	-
27	1.5	Historical garages	0	0	0	18	-
28	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
29	2.1	Historical industrial land uses	12	26	81	185	-
40	2.2	Historical tanks	0	14	50	66	-
45	2.3	Historical energy features	0	0	33	31	-
48	2.4	Historical petrol stations	0	0	0	0	-
48	2.5	Historical garages	0	0	0	32	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
50	3.1	Active or recent landfill	0	0	0	0	-
50	3.2	Historical landfill (BGS records)	0	0	1	0	-
51	3.3	Historical landfill (LA/mapping records)	0	0	0	4	-
51	3.4	Historical landfill (EA/NRW records)	0	0	2	0	-
52	3.5	Historical waste sites	0	0	0	6	-
53	3.6	Licensed waste sites	0	0	0	3	-
54	3.7	Waste exemptions	0	0	0	11	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
56	4.1	Recent industrial land uses	0	4	8	-	-
57	4.2	Current or recent petrol stations	0	0	0	2	-
58	4.3	Electricity cables	0	0	0	0	-
58	4.4	Gas pipelines	0	0	0	0	-
58	4.5	Sites determined as Contaminated Land	0	0	0	0	-

58	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
58	4.7	Regulated explosive sites	0	0	0	0	-
59	4.8	Hazardous substance storage/usage	0	0	0	0	-
59	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
59	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
59	**4.11**	**Licensed pollutant release (Part A(2)/B)**	0	0	0	1	-
60	4.12	Radioactive Substance Authorisations	0	0	0	0	-
60	**4.13**	**Licensed Discharges to controlled waters**	0	1	0	0	-
60	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
60	4.15	Pollutant release to public sewer	0	0	0	0	-
61	4.16	List 1 Dangerous Substances	0	0	0	0	-
61	**4.17**	**List 2 Dangerous Substances**	0	0	0	1	-
61	**4.18**	**Pollution Incidents (EA/NRW)**	0	0	1	4	-
62	4.19	Pollution inventory substances	0	0	0	0	-
62	4.20	Pollution inventory waste transfers	0	0	0	0	-
62	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
63	**5.1**	**Superficial aquifer**	Identified (within 500m)				
65	**5.2**	**Bedrock aquifer**	Identified (within 500m)				
67	**5.3**	**Groundwater vulnerability**	Identified (within 50m)				
68	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
68	5.5	Groundwater vulnerability- local information	None (within 0m)				
69	**5.6**	**Groundwater abstractions**	0	0	0	0	23
75	**5.7**	**Surface water abstractions**	0	0	0	0	1
76	5.8	Potable abstractions	0	0	0	0	0
76	5.9	Source Protection Zones	0	0	0	0	-
76	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
77	**6.1**	**Water Network (OS MasterMap)**	2	4	17	-	-

79	6.2	Surface water features	1	0	5	-	-
80	6.3	WFD Surface water body catchments	1	-	-	-	-
80	6.4	WFD Surface water bodies	1	0	0	-	-
80	6.5	WFD Groundwater bodies	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
82	7.1	Risk of flooding from rivers and the sea	High (within 50m)				
83	7.2	Historical Flood Events	0	0	0	-	-
83	7.3	Flood Defences	0	0	0	-	-
83	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
83	7.5	Flood Storage Areas	0	0	0	-	-
84	7.6	Flood Zone 2	Identified (within 50m)				
85	7.7	Flood Zone 3	Identified (within 50m)				
Page	Section	Surface water flooding					
86	8.1	Surface water flooding	1 in 30 year, Greater than 1.0m (within 50m)				
Page	Section	Groundwater flooding					
88	9.1	Groundwater flooding	Low (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
89	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
90	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
90	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
90	10.4	Special Protection Areas (SPA)	0	0	0	0	0
90	10.5	National Nature Reserves (NNR)	0	0	0	0	0
91	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
91	10.7	Designated Ancient Woodland	0	0	0	0	6
91	10.8	Biosphere Reserves	0	0	0	0	0
92	10.9	Forest Parks	0	0	0	0	0
92	10.10	Marine Conservation Zones	0	0	0	0	0
92	10.11	Green Belt	1	2	1	0	1
92	10.12	Proposed Ramsar sites	0	0	0	0	0

93	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
93	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
93	10.15	Nitrate Sensitive Areas	0	0	0	0	0
93	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
94	**10.17**	**SSSI Impact Risk Zones**	1	-	-	-	-
95	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
96	11.1	World Heritage Sites	0	0	0	-	-
97	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
97	11.3	National Parks	0	0	0	-	-
97	**11.4**	**Listed Buildings**	0	0	3	-	-
98	**11.5**	**Conservation Areas**	0	0	2	-	-
98	11.6	Scheduled Ancient Monuments	0	0	0	-	-
98	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
99	**12.1**	**Agricultural Land Classification**	Grade 3 (within 250m)				
100	12.2	Open Access Land	0	0	0	-	-
100	12.3	Tree Felling Licences	0	0	0	-	-
100	12.4	Environmental Stewardship Schemes	0	0	0	-	-
100	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
101	**13.1**	**Priority Habitat Inventory**	0	3	6	-	-
102	13.2	Habitat Networks	0	0	0	-	-
102	13.3	Open Mosaic Habitat	0	0	0	-	-
102	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
103	**14.1**	**10k Availability**	Identified (within 500m)				
105	**14.2**	**Artificial and made ground (10k)**	1	3	4	11	-
107	**14.3**	**Superficial geology (10k)**	2	0	1	3	-

108	14.4	Landslip (10k)	0	0	0	0	-
109	14.5	Bedrock geology (10k)	6	3	8	21	-
111	14.6	Bedrock faults and other linear features (10k)	3	2	5	26	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
114	15.1	50k Availability	Identified (within 500m)				
115	15.2	Artificial and made ground (50k)	0	1	1	3	-
116	15.3	Artificial ground permeability (50k)	0	1	-	-	-
117	15.4	Superficial geology (50k)	1	0	0	1	-
118	15.5	Superficial permeability (50k)	Identified (within 50m)				
118	15.6	Landslip (50k)	0	0	0	0	-
118	15.7	Landslip permeability (50k)	None (within 50m)				
119	15.8	Bedrock geology (50k)	4	2	6	13	-
121	15.9	Bedrock permeability (50k)	Identified (within 50m)				
121	15.10	Bedrock faults and other linear features (50k)	2	2	2	16	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
123	16.1	BGS Boreholes	0	6	5	-	-
Page	Section	Natural ground subsidence					
125	17.1	Shrink swell clays	Very low (within 50m)				
127	17.2	Running sands	Low (within 50m)				
129	17.3	Compressible deposits	Moderate (within 50m)				
131	17.4	Collapsible deposits	Very low (within 50m)				
132	17.5	Landslides	Moderate (within 50m)				
134	17.6	Ground dissolution of soluble rocks	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
136	18.1	Natural cavities	0	0	0	0	-
137	18.2	BritPits	0	0	0	3	-
137	18.3	Surface ground workings	0	8	42	-	-
139	18.4	Underground workings	0	0	4	2	25
141	18.5	Historical Mineral Planning Areas	0	0	0	0	-

141	18.6	Non-coal mining	0	0	0	0	0
141	18.7	Mining cavities	0	0	0	0	0
141	18.8	JPB mining areas	None (within 0m)				
142	**18.9**	**Coal mining**	Identified (within 0m)				
142	18.10	Brine areas	None (within 0m)				
142	18.11	Gypsum areas	None (within 0m)				
142	18.12	Tin mining	None (within 0m)				
142	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
143	**19.1**	**Radon**	Between 3% and 5% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
144	**20.1**	**BGS Estimated Background Soil Chemistry**	13	7	-	-	-
145	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
145	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
146	21.1	Underground railways (London)	0	0	0	-	-
146	21.2	Underground railways (Non-London)	0	0	0	-	-
147	21.3	Railway tunnels	0	0	0	-	-
147	**21.4**	**Historical railway and tunnel features**	0	4	44	-	-
149	21.5	Royal Mail tunnels	0	0	0	-	-
149	**21.6**	**Historical railways**	0	1	1	-	-
149	**21.7**	**Railways**	0	0	9	-	-
150	21.8	Crossrail 1	0	0	0	0	-
150	21.9	Crossrail 2	0	0	0	0	-
150	21.10	HS2	0	0	0	0	-

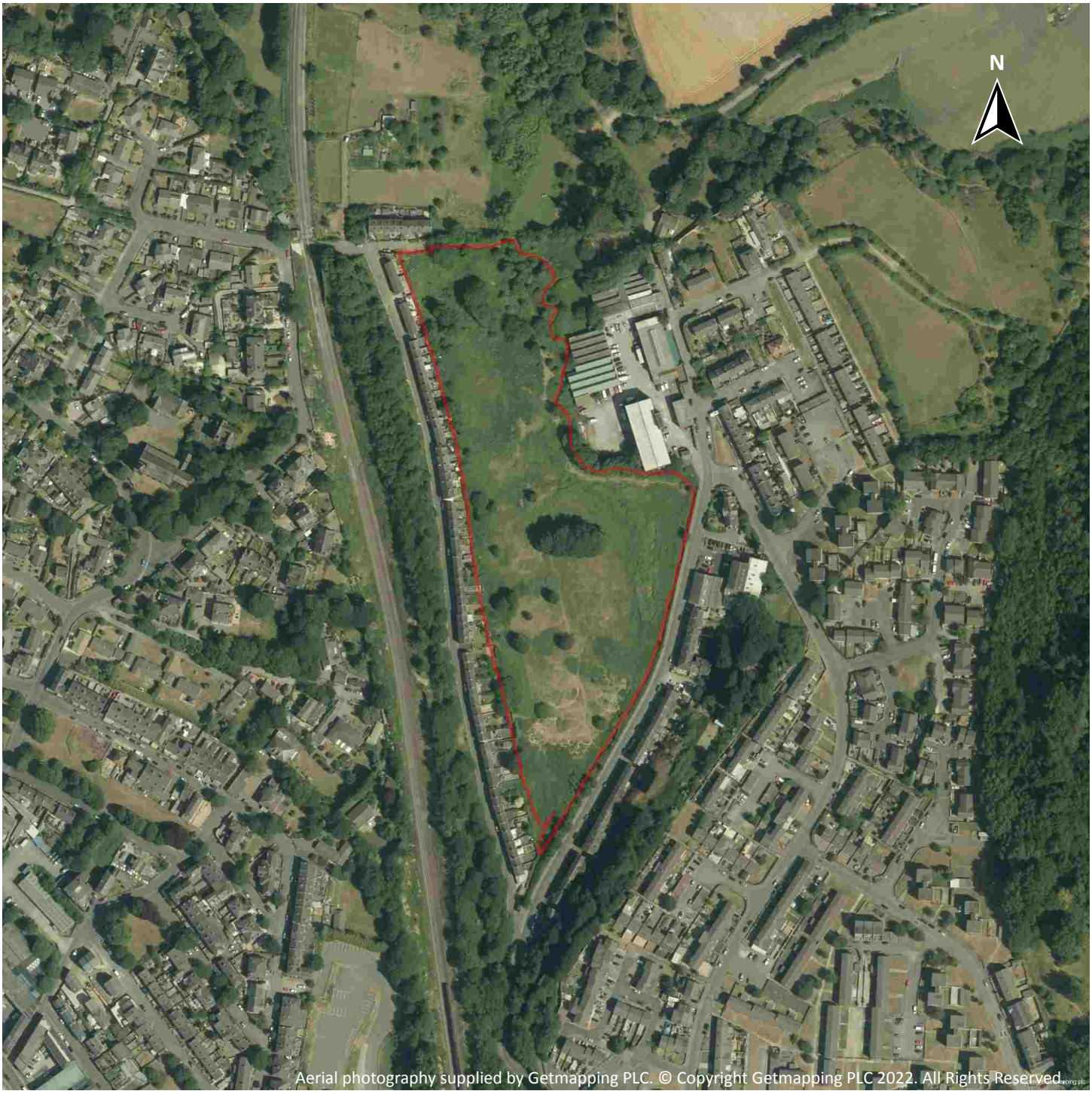
Recent aerial photograph



Capture Date: 30/05/2021

Site Area: 3.3ha

Recent site history - 2018 aerial photograph



Capture Date: 02/07/2018

Site Area: 3.3ha

Recent site history - 2012 aerial photograph



Capture Date: 26/03/2012

Site Area: 3.3ha

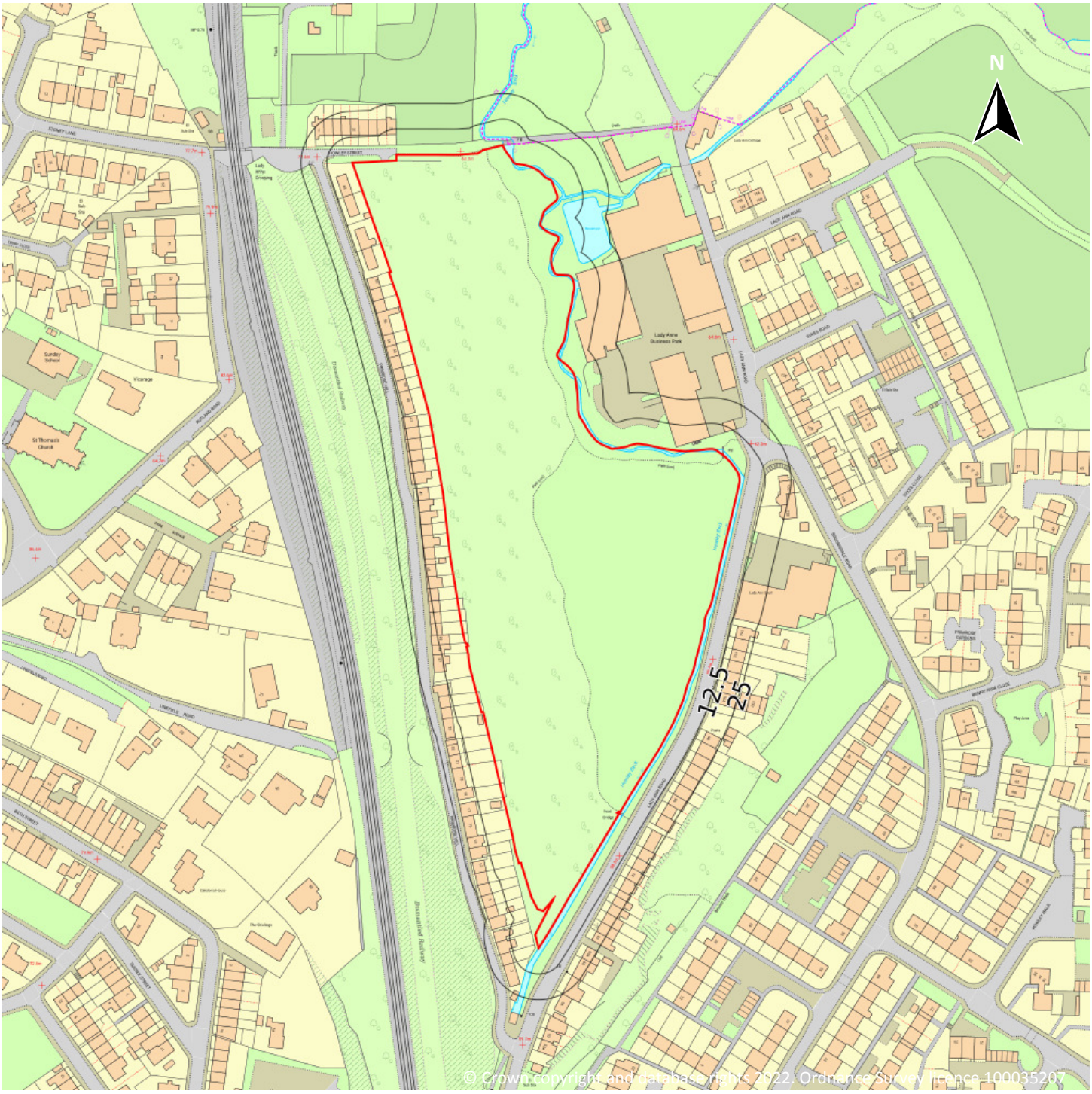
Recent site history - 1999 aerial photograph



Capture Date: 10/07/1999

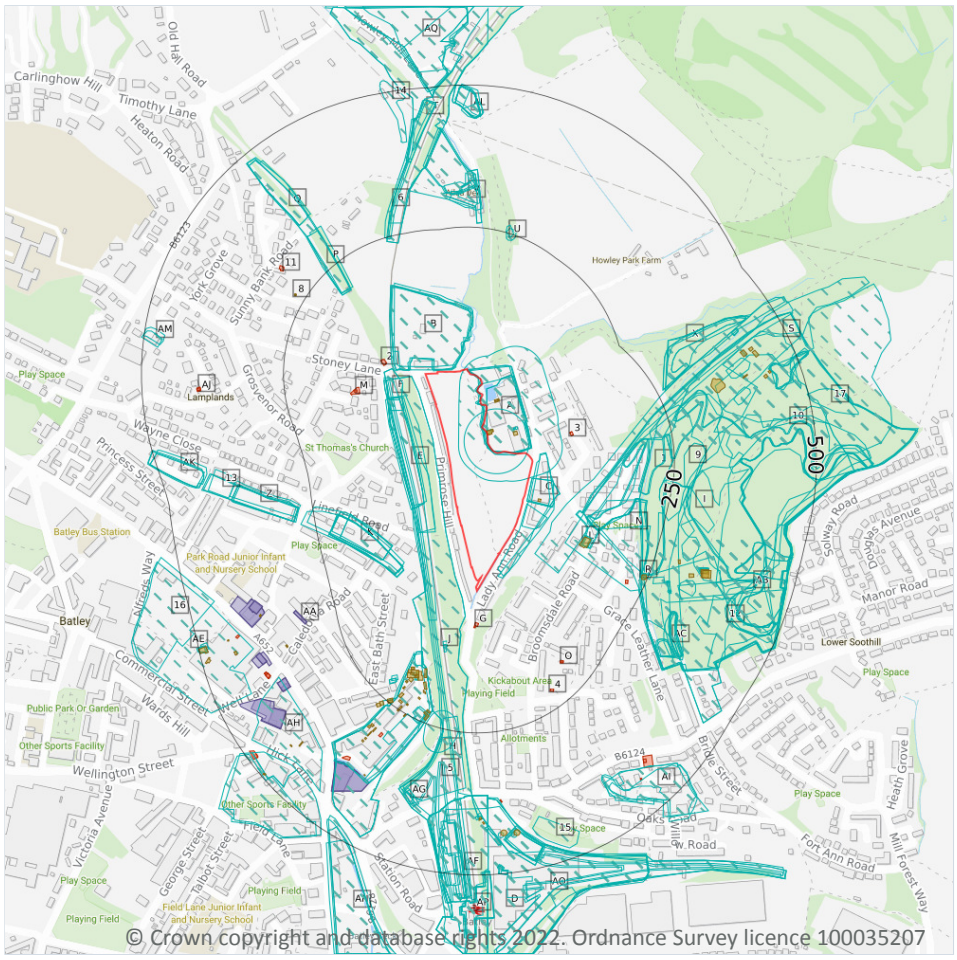
Site Area: 3.3ha

OS MasterMap site plan



Site Area: 3.3ha

1 Past land use



1.1 Historical industrial land uses

Records within 500m	231

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Unspecified Mills**	**1931**	**1480200**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Unspecified Mills**	**1957**	**1483045**
A	**On site**	**Unspecified Tanks**	**1948**	**1483847**
A	**On site**	**Unspecified Mills**	**1948**	**1514784**
A	**On site**	**Unspecified Mills**	**1980 - 1992**	**1524070**
A	**On site**	**Unspecified Mills**	**1971**	**1527341**
A	**On site**	**Unspecified Mills**	**1892 - 1931**	**1538828**
A	**On site**	**Unspecified Tanks**	**1948**	**1540344**
A	**On site**	**Unspecified Mills**	**1948**	**1547816**
B	2m N	Nursery	1948	1500127
B	3m N	Nursery	1892 - 1931	1525016
B	4m N	Nursery	1948	1476295
B	4m N	Nursery	1931	1484375
C	6m E	Unspecified Disused Mills	1931	1506292
C	6m E	Unspecified Disused Mills	1948	1532023
C	7m SE	Cuttings	1892	1409826
C	8m E	Unspecified Mills	1892 - 1905	1555269
C	9m SE	Unspecified Disused Mills	1948	1500300
B	9m N	Nursery	1955 - 1967	1468403
C	12m E	Unspecified Disused Mills	1931	1511660
C	18m S	Unspecified Ground Workings	1905	1414247
D	22m W	Railway Sidings	1931	1459157
D	22m W	Railway Sidings	1905	1521857
E	40m NW	Cuttings	1967 - 1981	1481857
E	40m W	Cuttings	1988	1533483
A	41m NE	Unspecified Tank	1905	1554303
A	42m NE	Unspecified Tank	1905	1485106
F	43m NW	Railway Sidings	1967	1522956
F	43m NW	Railway Sidings	1955	1549704

ID	Location	Land use	Dates present	Group ID
E	51m SW	Cuttings	1948 - 1955	1537261
1	53m SE	Railway Sidings	1892 - 1905	1550398
E	54m W	Cuttings	1892 - 1931	1501618
E	54m W	Railway Sidings	1948	1525099
E	55m W	Cuttings	1931	1488688
H	64m NW	Railway Sidings	1931	1475857
H	67m NW	Railway Sidings	1948	1521812
I	92m SE	Old Colliery	1931	1477621
I	96m SE	Old Colliery	1948	1530852
I	98m SE	Old Colliery	1931	1535919
J	103m S	Railway Building	1955	1554629
I	107m E	Disused Colliery	1948	1431706
I	107m E	Refuse Heaps	1948	1481900
J	109m S	Railway Building	1905	1519903
K	113m SW	Cuttings	1955	1519228
I	115m SE	Refuse Heap	1948	1480976
I	117m SE	Refuse Heap	1931	1471453
K	117m SW	Cuttings	1931	1464862
K	117m SW	Cuttings	1931	1493261
K	117m SW	Cuttings	1905	1504970
I	117m SE	Refuse Heaps	1931	1509263
K	117m SW	Cuttings	1948	1547487
K	119m SW	Cuttings	1892	1509079
L	120m SE	Unspecified Tanks	1948	1493174
N	121m SE	Cuttings	1957	1409823
L	122m SE	Unspecified Tanks	1931	1510425
L	123m SE	Unspecified Tanks	1948	1533995
K	126m SW	Cuttings	1967 - 1974	1515854

ID	Location	Land use	Dates present	Group ID
K	126m SW	Cuttings	1981	1530536
K	126m SW	Cuttings	1988	1539372
H	144m S	Unspecified Mills	1981 - 1988	1458880
H	144m S	Unspecified Commercial/Industrial	1974	1480165
H	144m S	Unspecified Mills	1967	1542985
H	147m S	Unspecified Commercial/Industrial	1905 - 1931	1466332
H	156m S	Unspecified Industrial/Commercial	1931	1443826
H	177m S	Unspecified Tanks	1931	1469133
H	178m S	Unspecified Tanks	1948	1529040
I	198m E	Colliery	1892 - 1905	1499678
N	198m E	Refuse Heap	1892 - 1905	1554243
P	198m NW	Cuttings	1948 - 1955	1523645
P	198m NW	Cuttings	1892 - 1931	1539236
Q	201m NW	Cuttings	1948	1516122
Q	201m NW	Cuttings	1931	1502239
H	204m S	Unspecified Tanks	1955	1507951
H	209m S	Unspecified Tanks	1931	1484636
H	210m S	Unspecified Tanks	1948	1525907
H	219m S	Unspecified Tanks	1931	1425855
5	224m S	Railway Sidings	1955 - 1967	1555835
H	227m S	Unspecified Tanks	1931	1464803
H	228m S	Unspecified Tanks	1948 - 1955	1557645
S	229m E	Unspecified Heaps	1957	1439546
H	229m S	Unspecified Tanks	1948	1541164
R	235m SE	Unspecified Tank	1948	1460129
T	236m N	Railway Sidings	1931	1475297
T	236m N	Railway Sidings	1905 - 1906	1551410
R	237m SE	Unspecified Tank	1931	1469659

ID	Location	Land use	Dates present	Group ID
R	238m SE	Unspecified Tank	1948	1479488
U	238m N	Unspecified Pit	1892 - 1905	1507718
U	245m N	Unspecified Ground Workings	1957	1414243
6	246m N	Railway Sidings	1931	1458672
7	246m N	Railway Sidings	1948	1496125
H	248m S	Unspecified Disused Mills	1892	1456873
V	257m N	Unspecified Disused Mill	1966	1435609
V	257m N	Unspecified Mill	1951	1488733
R	260m SE	Unspecified Old Shafts	1931	1408940
W	261m S	Railway Sidings	1948	1528485
X	261m NE	Refuse Heap	1948	1514662
X	261m NE	Refuse Heap	1931	1546150
X	264m NE	Refuse Heap	1905 - 1931	1518394
X	266m NE	Refuse Heap	1892	1472147
9	267m E	Unspecified Heap	1905	1417461
Y	269m N	Railway Sidings	1951 - 1966	1479058
Z	270m W	Cuttings	1955	1491234
Z	274m W	Cuttings	1892	1518491
Z	275m W	Cuttings	1905 - 1931	1481675
Z	275m W	Cuttings	1948	1511156
Z	275m W	Cuttings	1931	1513153
I	275m E	Unspecified Heaps	1957	1439547
10	276m E	Refuse Heap	1971	1467827
Z	279m W	Cuttings	1948	1458407
V	280m N	Unspecified Mill	1974 - 1994	1533228
X	282m NE	Refuse Heap	1948	1471530
R	283m SE	Unspecified Old Shafts	1948	1511716
V	284m N	Unspecified Mill	1905 - 1931	1507721

ID	Location	Land use	Dates present	Group ID
R	285m SE	Unspecified Old Shafts	1948	1505500
R	285m SE	Unspecified Old Shafts	1931	1498995
R	292m SE	Unspecified Old Shafts	1948	1474362
V	293m N	Unspecified Mill	1892	1473800
R	294m SE	Unspecified Old Shafts	1931	1556117
AB	304m SE	Tramway Sidings	1905	1430804
R	307m SE	Unspecified Pit	1957	1452088
V	308m N	Unspecified Mill	1948	1530561
V	309m N	Lower Mill	1931	1514296
V	310m N	Lower Mill	1948	1524648
AC	312m SE	Refuse Heap	1905	1478486
AC	313m SE	Refuse Heap	1948	1497161
AC	315m SE	Refuse Heap	1931	1508924
AC	316m SE	Refuse Heap	1948	1517989
AC	316m SE	Unspecified Heap	1948	1487958
AC	318m SE	Unspecified Heap	1931	1542108
AC	318m SE	Refuse Heap	1931	1464622
AC	322m SE	Unspecified Heap	1931	1541588
R	329m SE	Unspecified Tank	1948	1503857
R	331m SE	Unspecified Tank	1931	1481925
R	333m SE	Unspecified Tanks	1931	1425856
R	333m SE	Unspecified Tank	1948	1547375
AD	343m NW	Cuttings	1892 - 1931	1484017
AD	343m NW	Cuttings	1948 - 1951	1524717
I	346m E	Refuse Heap	1905	1538653
12	360m SE	Unspecified Pit	1957	1452085
W	360m S	Railway Sidings	1971 - 1974	1498050
W	360m S	Railway Sidings	1955 - 1957	1522408

ID	Location	Land use	Dates present	Group ID
AF	360m S	Railway Sidings	1981	1505073
AF	360m S	Railway Sidings	1967	1554869
W	365m S	Unspecified Works	1971	1438265
W	365m S	Unspecified Commercial/Industrial	1992	1512060
I	366m E	Shale Tip	1948	1521211
AB	366m SE	Refuse Heap	1892	1557393
AG	367m S	Railway Building	1955	1462572
I	368m E	Shale Tip	1931	1512029
AF	369m S	Unspecified Industrial/Commercial	1931	1443827
AG	369m S	Railway Building	1967 - 1988	1474722
S	371m E	Refuse Heap	1957	1547864
Y	371m N	Railway Sidings	1948	1460317
Y	371m N	Railway Sidings	1892	1515975
13	372m W	Cuttings	1981	1512628
AG	374m S	Railway Building	1905 - 1931	1548807
AH	375m SW	Unspecified Commercial/Industrial	1931	1410951
S	376m E	Unspecified Pit	1905	1452087
W	382m S	Railway Sidings	1892	1502651
Y	390m N	Railway Sidings	1931	1466350
W	391m S	Unspecified Tank	1931	1496099
AI	393m S	Unspecified Disused Quarry	1905 - 1931	1540612
AF	393m S	Railway Building	1981 - 1988	1548332
AI	395m S	Unspecified Disused Quarry	1948	1504224
W	395m S	Unspecified Tank	1948	1462279
W	396m S	Railway Building	1905	1429156
AF	405m S	Railway Building	1948 - 1974	1507690
AI	406m SE	Unspecified Disused Quarry	1931	1518603
AE	406m SW	Unspecified Commercial/Industrial	1931	1410955

ID	Location	Land use	Dates present	Group ID
14	408m N	Unspecified Ground Workings	1931	1527629
AF	409m S	Railway Building	1905	1483121
AF	409m S	Railway Building	1931	1491428
15	412m S	Unspecified Heap	1957	1417466
AI	413m SE	Unspecified Quarry	1892	1427970
W	415m S	Railway Buildings	1905 - 1931	1540639
S	416m NE	Railway Building	1948	1517317
S	417m NE	Railway Building	1931	1537617
AK	419m W	Cuttings	1948 - 1955	1494567
W	419m S	Goods Shed	1931	1543478
W	423m S	Goods Shed	1948	1479859
W	424m S	Railway Building	1892 - 1905	1480263
AK	424m W	Cuttings	1892 - 1931	1521087
W	426m S	Railway Building	1957	1518135
AK	426m W	Cuttings	1931	1492155
W	427m S	Unspecified Tank	1992	1433523
AK	427m W	Cuttings	1948	1504782
W	429m S	Unspecified Tank	1992	1433522
AF	434m S	Railway Building	1892	1460859
AL	441m N	Unspecified Pit	1974 - 1994	1513576
AL	442m N	Unspecified Pit	1905 - 1931	1520067
AL	442m N	Unspecified Heap	1948	1538757
AL	442m N	Unspecified Heap	1892	1550242
AL	442m N	Unspecified Pit	1948	1467992
AL	442m N	Unspecified Pit	1931	1518517
AL	445m N	Unspecified Pit	1966	1543854
AL	445m N	Unspecified Pit	1951	1470756
S	446m E	Refuse Heap	1931	1503548

ID	Location	Land use	Dates present	Group ID
S	448m E	Refuse Heap	1948	1519009
AH	448m SW	Unspecified Mills	1974 - 1988	1525128
AH	448m SW	Unspecified Works	1974 - 1988	1550540
S	448m E	Refuse Heap	1948	1510151
S	450m E	Refuse Heap	1931	1489484
16	454m SW	Unspecified Mills	1967 - 1974	1538105
AM	464m NW	Unspecified Pit	1955	1527229
AM	467m NW	Unspecified Pit	1931	1479731
AF	468m S	Railway Building	1892	1547450
AN	472m SW	Unspecified Mills	1967	1545833
AO	477m S	Railway Sidings	1931	1473776
AO	478m S	Railway Sidings	1948	1504497
AN	479m SW	Unspecified Commercial/Industrial	1948	1552046
AE	482m SW	Unspecified Tanks	1948 - 1955	1518473
AN	483m S	Unspecified Commercial/Industrial	1905 - 1931	1495214
T	483m N	Refuse Heap	1931	1461744
W	483m S	Railway Buildings	1931	1481996
W	484m S	Railway Building	1905	1429157
W	485m S	Railway Buildings	1948	1553490
AE	486m SW	Unspecified Tanks	1931	1532397
AE	487m SW	Unspecified Tanks	1931	1483521
AH	487m SW	Unspecified Commercial/Industrial	1905 - 1931	1520477
AE	489m SW	Unspecified Tanks	1948	1505023
AP	490m S	Railway Station	1955	1550662
AQ	492m N	Ground Workings and Refuse Heap	1931	1500015
AQ	493m N	Refuse Heap	1948	1533289
AP	494m S	Railway Station	1931	1483351
W	494m S	Railway Buildings	1957	1553758

ID	Location	Land use	Dates present	Group ID
AP	495m S	Railway Station	1948	1471201
AP	495m S	Railway Station	1905 - 1931	1502303
AN	497m S	Unspecified Mills	1892	1504230
AF	497m S	Railway Building	1948	1493152
AQ	497m N	Ground Workings and Refuse Heap	1948	1480906
17	498m E	Refuse Heap	1948	1463618

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	**74**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
A	0m N	Unspecified Tanks	1939	233152
A	1m N	Unspecified Tank	1922 - 1933	242892
A	17m N	Unspecified Tank	1955 - 1995	242665
A	18m N	Unspecified Tank	1969	245155
C	25m SE	Unspecified Tank	1907 - 1939	244986
A	31m NE	Unspecified Tanks	1907	233155
L	117m SE	Unspecified Tanks	1922 - 1933	246177
H	163m S	Unspecified Tank	1955 - 1969	238429
H	172m S	Tanks	1955 - 1969	246869
H	173m S	Unspecified Tanks	1922	245233
H	173m S	Unspecified Tank	1955 - 1969	242658
H	174m S	Tanks	1955	230653

ID	Location	Land use	Dates present	Group ID
H	179m S	Unspecified Tanks	1933	239489
H	180m S	Unspecified Tank	1922 - 1933	247860
H	181m S	Tanks	1955 - 1969	235025
H	182m S	Tanks	1955	230654
H	184m S	Unspecified Tank	1922 - 1933	246358
H	191m S	Tanks	1955 - 1969	243159
H	199m S	Unspecified Tank	1955 - 1969	234815
H	200m S	Unspecified Tank	1922 - 1933	243318
H	211m S	Unspecified Tank	1922 - 1933	243988
H	213m S	Unspecified Tank	1907	223883
H	222m S	Unspecified Tank	1955 - 1969	241929
H	226m S	Unspecified Tank	1955 - 1969	242284
H	231m S	Unspecified Tanks	1922	233156
H	233m S	Unspecified Tank	1955	243760
H	233m S	Unspecified Tank	1969	244892
H	234m S	Unspecified Tank	1955	234691
H	235m S	Unspecified Tank	1907	223884
R	239m SE	Unspecified Tank	1933 - 1955	239615
H	240m S	Tanks	1955 - 1969	248414
H	242m S	Unspecified Tank	1955 - 1969	246950
H	243m S	Tanks	1955	238246
H	251m S	Tanks	1955 - 1969	240963
H	251m S	Tanks	1955	247699
H	254m SW	Unspecified Tank	1955 - 1969	235841
H	261m SW	Unspecified Tank	1922 - 1933	250333
8	266m NW	Unspecified Tank	1894	223882
R	290m SE	Unspecified Tank	1933	223860
H	297m SW	Unspecified Tank	1955 - 1977	246837

ID	Location	Land use	Dates present	Group ID
H	299m S	Unspecified Tank	1955 - 1977	245101
H	303m SW	Unspecified Tank	1933	223838
H	309m S	Unspecified Tank	1933	223839
R	316m SE	Unspecified Tanks	1922	233157
H	324m SW	Unspecified Tank	1907	223836
H	330m SW	Unspecified Tank	1922	223837
R	334m SE	Unspecified Tanks	1907 - 1922	244884
R	334m SE	Unspecified Tank	1933 - 1939	245783
R	337m SE	Unspecified Tank	1894	245460
S	341m E	Unspecified Tanks	1922	233153
AE	347m SW	Unspecified Tank	1977 - 1999	235458
H	379m S	Unspecified Tank	1977	223835
AE	379m SW	Unspecified Tank	1977	245187
AE	380m SW	Unspecified Tank	1995	241344
AE	380m SW	Unspecified Tank	1999	246141
AE	380m SW	Unspecified Tank	1989	248339
S	399m E	Unspecified Tank	1922	223861
W	399m S	Unspecified Tank	1922	223859
AH	405m SW	Unspecified Tanks	1907	233120
W	406m S	Unspecified Tank	1939	223858
S	412m NE	Unspecified Tanks	1907	233151
W	423m S	Unspecified Tank	1987 - 1995	236455
AH	425m SW	Unspecified Tank	1933	236073
AH	425m SW	Unspecified Tank	1922	244239
W	426m S	Unspecified Tank	1987 - 1995	240074
S	428m NE	Unspecified Tanks	1922	233150
S	431m NE	Unspecified Tanks	1907	233154
S	434m E	Unspecified Tanks	1922	233148

ID	Location	Land use	Dates present	Group ID
AE	436m SW	Unspecified Tank	1922 - 1933	239083
S	444m E	Unspecified Tanks	1922	233149
AE	445m SW	Unspecified Tank	1894 - 1907	246089
AE	484m SW	Unspecified Tanks	1922	233119
AE	485m SW	Unspecified Tanks	1922 - 1933	247889
AH	492m SW	Unspecified Tank	1977 - 1999	236688

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	**28**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
G	56m S	Electricity Substation	1977 - 1999	135474
G	62m S	Electricity Substation	1955 - 1969	146191
2	71m NW	Electricity Substation	1968 - 1997	142948
3	81m E	Electricity Substation	1969 - 1995	145853
M	119m NW	Electricity Substation	1968 - 1997	134699
M	124m NW	Electricity Substation	1987	143613
O	192m SE	Electricity Substation	1969 - 1996	143596
O	192m SE	Electricity Substation	1970	135030
4	216m S	Electricity Substation	1969 - 1996	134590
R	216m SE	Electricity Substation	1969 - 1996	146468
H	301m S	Electricity Substation	1977	129180
11	309m NW	Electricity Substation	1968 - 1997	142117

ID	Location	Land use	Dates present	Group ID
H	368m SW	Electricity Substation	1999	129179
W	370m S	Electricity Substation	1987 - 1995	141164
AE	393m SW	Electricity Substation	1955 - 1969	139388
AE	394m SW	Electricity Substation	1977 - 1989	134409
AJ	397m W	Electricity Substation	1996	133824
AE	397m SW	Electricity Substation	1999	133259
AE	397m SW	Electricity Substation	1995	133933
AJ	397m W	Electricity Substation	1969 - 1986	141521
AJ	397m W	Electricity Substation	1969	144648
AI	412m SE	Electricity Substation	1969	136493
AI	416m SE	Electricity Substation	1970 - 1996	141052
AE	425m SW	Electricity Substation	1977	129189
AI	438m SE	Electricity Substation	1955	133320
AI	438m SE	Electricity Substation	1955	132951
AH	483m SW	Electricity Substation	1977	139260
AH	483m SW	Electricity Substation	1989 - 1999	135694

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	**0**

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	18

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
AA	304m SW	Garage	1955	43620
AA	304m SW	Garage	1955 - 1969	45283
AE	368m SW	Garage	1955 - 1969	44962
AE	369m SW	Garage	1955 - 1999	45383
AE	369m SW	Garage	1989	42774
AE	372m SW	Garage	1977 - 1999	45014
AE	373m SW	Garage	1989 - 1995	45191
AE	374m SW	Garage	1955	42739
AE	374m SW	Garage	1955 - 1969	46848
H	379m SW	Garage	1989	44186
H	380m SW	Garage	1999	43332
H	381m SW	Garage	1995	44917
AE	383m SW	Garage	1995 - 1999	45196
AE	390m SW	Garage	1955 - 1989	46813
AE	390m SW	Garage	1977	43152
AH	397m SW	Garage	1989	43941
AH	397m SW	Garage	1995 - 1999	46209
AH	399m SW	Garage	1977	41849

This data is sourced from Ordnance Survey / Groundsure.

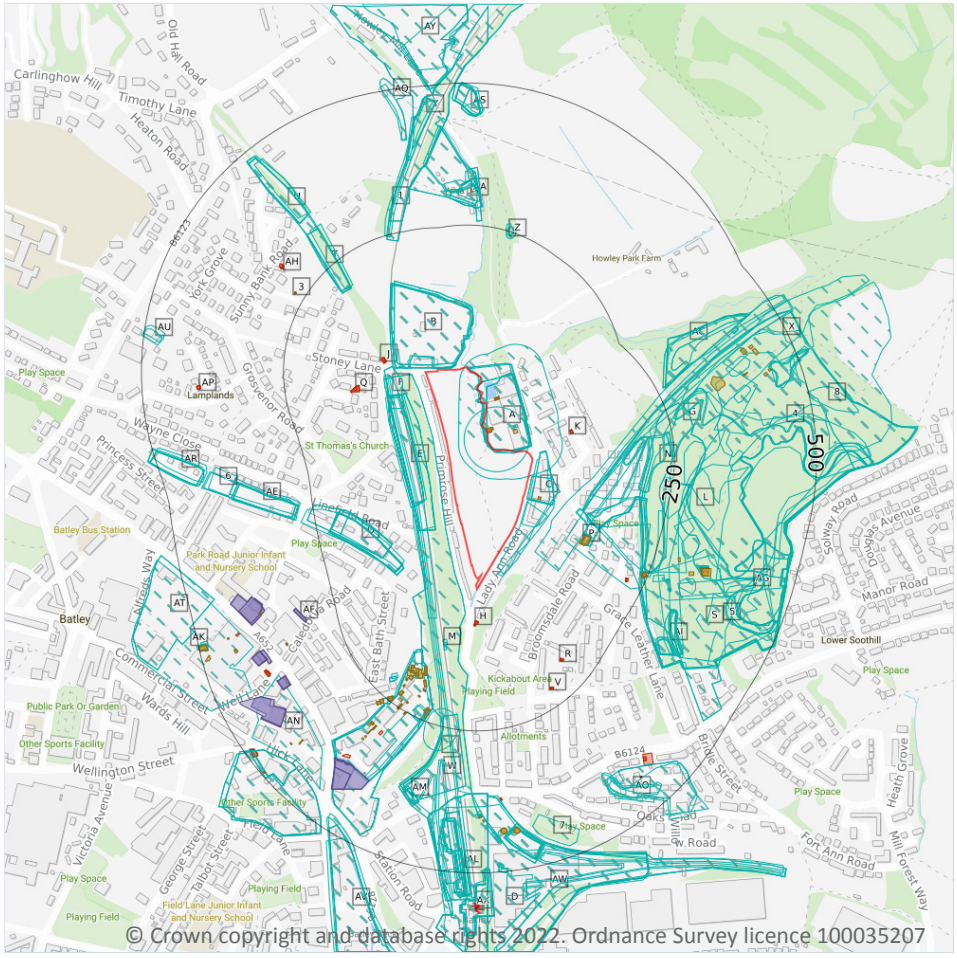
1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



2.1 Historical industrial land uses

Records within 500m	304

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 29**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Unspecified Mills**	**1992**	**1524070**
A	**On site**	**Unspecified Mills**	**1971**	**1527341**
A	**On site**	**Unspecified Mills**	**1957**	**1483045**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Unspecified Tanks**	**1948**	**1483847**
A	**On site**	**Unspecified Mills**	**1948**	**1514784**
A	**On site**	**Unspecified Tanks**	**1948**	**1540344**
A	**On site**	**Unspecified Mills**	**1931**	**1480200**
A	**On site**	**Unspecified Mills**	**1948**	**1547816**
A	**On site**	**Unspecified Mills**	**1905**	**1538828**
A	**On site**	**Unspecified Mills**	**1892**	**1538828**
A	**On site**	**Unspecified Mills**	**1980**	**1524070**
A	**On site**	**Unspecified Mills**	**1931**	**1538828**
B	2m N	Nursery	1948	1500127
B	3m N	Nursery	1905	1525016
B	3m N	Nursery	1892	1525016
B	3m N	Nursery	1931	1525016
B	4m N	Nursery	1948	1476295
B	4m N	Nursery	1931	1484375
C	6m E	Unspecified Disused Mills	1948	1532023
C	6m E	Unspecified Disused Mills	1931	1506292
C	7m SE	Cuttings	1892	1409826
C	8m E	Unspecified Mills	1892	1555269
C	9m SE	Unspecified Disused Mills	1948	1500300
B	9m N	Nursery	1967	1468403
B	9m N	Nursery	1955	1468403
C	12m E	Unspecified Mills	1905	1555269
C	12m E	Unspecified Disused Mills	1931	1511660
C	18m S	Unspecified Ground Workings	1905	1414247
D	22m W	Railway Sidings	1905	1521857
D	22m W	Railway Sidings	1931	1459157
E	40m NW	Cuttings	1981	1481857

ID	Location	Land Use	Date	Group ID
E	40m NW	Cuttings	1974	1481857
E	40m NW	Cuttings	1967	1481857
E	40m W	Cuttings	1988	1533483
A	41m NE	Unspecified Tank	1905	1554303
A	42m NE	Unspecified Tank	1905	1485106
F	43m NW	Railway Sidings	1967	1522956
F	43m NW	Railway Sidings	1955	1549704
E	51m SW	Cuttings	1955	1537261
G	53m SE	Railway Sidings	1905	1550398
E	54m W	Cuttings	1948	1537261
E	54m W	Cuttings	1905	1501618
E	54m W	Cuttings	1892	1501618
E	54m W	Cuttings	1931	1501618
E	54m W	Railway Sidings	1948	1525099
E	55m W	Cuttings	1931	1488688
E	58m W	Cuttings	1948	1537261
I	64m NW	Railway Sidings	1931	1475857
I	67m NW	Railway Sidings	1948	1521812
L	92m SE	Old Colliery	1931	1477621
L	96m SE	Old Colliery	1948	1530852
L	98m SE	Old Colliery	1931	1535919
M	103m S	Railway Building	1955	1554629
L	107m E	Disused Colliery	1948	1431706
L	107m E	Refuse Heaps	1948	1481900
M	109m S	Railway Building	1905	1519903
N	113m E	Railway Sidings	1892	1550398
O	113m SW	Cuttings	1955	1519228
L	115m SE	Refuse Heap	1948	1480976

ID	Location	Land Use	Date	Group ID
L	117m SE	Refuse Heap	1931	1471453
O	117m SW	Cuttings	1931	1464862
O	117m SW	Cuttings	1905	1504970
O	117m SW	Cuttings	1931	1493261
L	117m SE	Refuse Heaps	1931	1509263
O	117m SW	Cuttings	1948	1547487
O	119m SW	Cuttings	1948	1547487
O	119m SW	Cuttings	1892	1509079
P	120m SE	Unspecified Tanks	1948	1493174
N	121m SE	Cuttings	1957	1409823
P	122m SE	Unspecified Tanks	1931	1510425
P	122m SE	Unspecified Tanks	1931	1510425
P	123m SE	Unspecified Tanks	1948	1533995
O	126m SW	Cuttings	1988	1539372
O	126m SW	Cuttings	1981	1530536
O	126m SW	Cuttings	1974	1515854
O	126m SW	Cuttings	1967	1515854
I	144m S	Unspecified Mills	1988	1458880
I	144m S	Unspecified Mills	1981	1458880
I	144m S	Unspecified Commercial/Industrial	1974	1480165
I	144m S	Unspecified Mills	1967	1542985
I	147m S	Unspecified Commercial/Industrial	1905	1466332
I	147m S	Unspecified Commercial/Industrial	1931	1466332
I	156m S	Unspecified Industrial/Commercial	1931	1443826
I	177m S	Unspecified Tanks	1931	1469133
I	178m S	Unspecified Tanks	1948	1529040
N	198m E	Refuse Heap	1892	1554243
S	198m E	Colliery	1892	1499678

ID	Location	Land Use	Date	Group ID
T	198m NW	Cuttings	1948	1523645
T	198m NW	Cuttings	1905	1539236
T	198m NW	Cuttings	1892	1539236
T	198m NW	Cuttings	1931	1539236
T	200m NW	Cuttings	1955	1523645
U	201m NW	Cuttings	1948	1516122
U	201m NW	Cuttings	1931	1502239
L	202m E	Colliery	1905	1499678
I	204m S	Unspecified Tanks	1955	1507951
N	206m E	Refuse Heap	1905	1554243
I	209m S	Unspecified Tanks	1931	1484636
I	210m S	Unspecified Tanks	1948	1525907
I	219m S	Unspecified Tanks	1931	1425855
W	224m S	Railway Sidings	1967	1555835
W	224m S	Railway Sidings	1955	1555835
I	227m S	Unspecified Tanks	1931	1464803
I	228m S	Unspecified Tanks	1955	1557645
X	229m E	Unspecified Heaps	1957	1439546
I	229m S	Unspecified Tanks	1948	1541164
I	235m S	Unspecified Tanks	1948	1557645
S	235m SE	Unspecified Tank	1948	1460129
Y	236m N	Railway Sidings	1905	1551410
Y	236m N	Railway Sidings	1931	1475297
S	237m SE	Unspecified Tank	1931	1469659
S	238m SE	Unspecified Tank	1931	1469659
S	238m SE	Unspecified Tank	1948	1479488
Z	238m N	Unspecified Pit	1905	1507718
Z	242m N	Unspecified Pit	1892	1507718

ID	Location	Land Use	Date	Group ID
Z	245m N	Unspecified Ground Workings	1957	1414243
1	246m N	Railway Sidings	1931	1458672
2	246m N	Railway Sidings	1948	1496125
I	248m S	Unspecified Disused Mills	1892	1456873
AA	257m N	Unspecified Disused Mill	1966	1435609
AA	257m N	Unspecified Mill	1951	1488733
S	260m SE	Unspecified Old Shafts	1931	1408940
AB	261m S	Railway Sidings	1948	1528485
AC	261m NE	Refuse Heap	1948	1514662
AC	261m NE	Refuse Heap	1931	1546150
AC	264m NE	Refuse Heap	1905	1518394
AC	264m NE	Refuse Heap	1931	1518394
AC	266m NE	Refuse Heap	1892	1472147
G	267m E	Unspecified Heap	1905	1417461
AD	269m N	Railway Sidings	1966	1479058
AD	269m N	Railway Sidings	1951	1479058
AE	270m W	Cuttings	1955	1491234
AE	274m W	Cuttings	1892	1518491
AE	275m W	Cuttings	1948	1511156
AE	275m W	Cuttings	1905	1481675
AE	275m W	Cuttings	1931	1513153
L	275m E	Unspecified Heaps	1957	1439547
4	276m E	Refuse Heap	1971	1467827
AE	279m W	Cuttings	1931	1481675
AE	279m W	Cuttings	1948	1458407
AA	280m N	Unspecified Mill	1994	1533228
AA	280m N	Unspecified Mill	1974	1533228
AA	280m N	Unspecified Mill	1985	1533228

ID	Location	Land Use	Date	Group ID
AC	282m NE	Refuse Heap	1948	1471530
S	283m SE	Unspecified Old Shafts	1948	1511716
AA	284m N	Unspecified Mill	1905	1507721
AA	284m N	Unspecified Mill	1931	1507721
S	285m SE	Unspecified Old Shafts	1948	1505500
S	285m SE	Unspecified Old Shafts	1931	1498995
S	292m SE	Unspecified Old Shafts	1948	1474362
AA	293m N	Unspecified Mill	1892	1473800
S	294m SE	Unspecified Old Shafts	1931	1556117
AG	304m SE	Tramway Sidings	1905	1430804
S	307m SE	Unspecified Pit	1957	1452088
AA	308m N	Unspecified Mill	1948	1530561
AA	309m N	Lower Mill	1931	1514296
AA	310m N	Lower Mill	1948	1524648
AI	312m SE	Refuse Heap	1905	1478486
AI	313m SE	Refuse Heap	1948	1497161
AI	315m SE	Refuse Heap	1931	1508924
AI	316m SE	Refuse Heap	1948	1517989
AI	316m SE	Unspecified Heap	1948	1487958
AI	318m SE	Unspecified Heap	1931	1542108
AI	318m SE	Refuse Heap	1931	1464622
AI	321m SE	Unspecified Heap	1948	1487958
AI	322m SE	Unspecified Heap	1931	1541588
S	329m SE	Unspecified Tank	1948	1503857
S	331m SE	Unspecified Tank	1931	1481925
S	333m SE	Unspecified Tanks	1931	1425856
S	333m SE	Unspecified Tank	1948	1547375
AJ	343m NW	Cuttings	1948	1524717

ID	Location	Land Use	Date	Group ID
AJ	343m NW	Cuttings	1905	1484017
AJ	343m NW	Cuttings	1892	1484017
AJ	343m NW	Cuttings	1931	1484017
L	346m E	Refuse Heap	1905	1538653
AJ	347m NW	Cuttings	1951	1524717
5	360m SE	Unspecified Pit	1957	1452085
AL	360m S	Railway Sidings	1981	1505073
AL	360m S	Railway Sidings	1974	1498050
AL	360m S	Railway Sidings	1967	1554869
AL	360m S	Railway Sidings	1955	1522408
AB	364m S	Railway Sidings	1957	1522408
AB	365m S	Unspecified Commercial/Industrial	1992	1512060
AB	365m S	Unspecified Works	1971	1438265
AB	365m S	Railway Sidings	1971	1498050
L	366m E	Shale Tip	1948	1521211
AG	366m SE	Refuse Heap	1892	1557393
AM	367m S	Railway Building	1955	1462572
L	368m E	Shale Tip	1931	1512029
AL	369m S	Unspecified Industrial/Commercial	1931	1443827
AM	369m S	Railway Building	1988	1474722
AM	369m S	Railway Building	1981	1474722
AM	369m S	Railway Building	1974	1474722
AM	369m S	Railway Building	1967	1474722
X	371m E	Refuse Heap	1957	1547864
AD	371m N	Railway Sidings	1948	1460317
AD	371m N	Railway Sidings	1892	1515975
6	372m W	Cuttings	1981	1512628
AM	374m S	Railway Building	1905	1548807

ID	Location	Land Use	Date	Group ID
AM	374m S	Railway Building	1931	1548807
AN	375m SW	Unspecified Commercial/Industrial	1931	1410951
X	376m E	Unspecified Pit	1905	1452087
AB	382m S	Railway Sidings	1892	1502651
AD	390m N	Railway Sidings	1931	1466350
AB	391m S	Unspecified Tank	1931	1496099
AO	393m S	Unspecified Disused Quarry	1931	1540612
AL	393m S	Railway Building	1988	1548332
AL	393m S	Railway Building	1981	1548332
AO	395m S	Unspecified Disused Quarry	1948	1504224
AB	395m S	Unspecified Tank	1948	1462279
AB	396m S	Railway Building	1905	1429156
AB	396m S	Unspecified Tank	1931	1496099
AO	405m SE	Unspecified Disused Quarry	1948	1504224
AL	405m S	Railway Building	1974	1507690
AL	405m S	Railway Building	1967	1507690
AL	405m S	Railway Building	1955	1507690
AO	406m SE	Unspecified Disused Quarry	1931	1518603
AK	406m SW	Unspecified Commercial/Industrial	1931	1410955
AO	407m SE	Unspecified Disused Quarry	1905	1540612
AQ	408m N	Unspecified Ground Workings	1931	1527629
AL	408m S	Railway Building	1948	1507690
AL	409m S	Railway Building	1948	1507690
AL	409m S	Railway Building	1905	1483121
AL	409m S	Railway Building	1931	1491428
AQ	410m N	Unspecified Ground Workings	1931	1527629
7	412m S	Unspecified Heap	1957	1417466
AO	413m SE	Unspecified Quarry	1892	1427970

ID	Location	Land Use	Date	Group ID
AB	415m S	Railway Buildings	1931	1540639
X	416m NE	Railway Building	1948	1517317
X	417m NE	Railway Building	1931	1537617
AR	419m W	Cuttings	1955	1494567
AB	419m S	Goods Shed	1931	1543478
AB	423m S	Goods Shed	1948	1479859
AB	424m S	Goods Shed	1948	1479859
AB	424m S	Railway Building	1905	1480263
AB	424m S	Railway Building	1892	1480263
AB	424m S	Goods Shed	1931	1543478
AR	424m W	Cuttings	1948	1494567
AR	424m W	Cuttings	1905	1521087
AR	424m W	Cuttings	1892	1521087
AR	424m W	Cuttings	1931	1521087
AB	426m S	Railway Building	1957	1518135
AR	426m W	Cuttings	1931	1492155
AB	427m S	Unspecified Tank	1992	1433523
AR	427m W	Cuttings	1948	1504782
AB	429m S	Unspecified Tank	1992	1433522
AB	429m S	Railway Buildings	1905	1540639
AL	434m S	Railway Building	1892	1460859
AS	441m N	Unspecified Pit	1994	1513576
AS	441m N	Unspecified Pit	1974	1513576
AS	441m N	Unspecified Pit	1985	1513576
AS	442m N	Unspecified Heap	1948	1538757
AS	442m N	Unspecified Pit	1905	1520067
AS	442m N	Unspecified Heap	1892	1550242
AS	442m N	Unspecified Pit	1931	1520067

ID	Location	Land Use	Date	Group ID
AS	442m N	Unspecified Pit	1948	1467992
AS	442m N	Unspecified Pit	1931	1518517
AS	445m N	Unspecified Pit	1966	1543854
AS	445m N	Unspecified Pit	1951	1470756
X	446m E	Refuse Heap	1931	1503548
X	448m E	Refuse Heap	1948	1519009
AN	448m SW	Unspecified Works	1988	1550540
AN	448m SW	Unspecified Mills	1988	1525128
AN	448m SW	Unspecified Mills	1981	1525128
AN	448m SW	Unspecified Works	1981	1550540
AN	448m SW	Unspecified Works	1974	1550540
AN	448m SW	Unspecified Mills	1974	1525128
X	448m E	Refuse Heap	1948	1510151
X	450m E	Refuse Heap	1931	1489484
AT	454m SW	Unspecified Mills	1974	1538105
AT	454m SW	Unspecified Mills	1967	1538105
AU	464m NW	Unspecified Pit	1955	1527229
AU	467m NW	Unspecified Pit	1931	1479731
AL	468m S	Railway Building	1892	1547450
AV	472m SW	Unspecified Mills	1967	1545833
AW	477m S	Railway Sidings	1931	1473776
AW	478m S	Railway Sidings	1948	1504497
AV	479m SW	Unspecified Commercial/Industrial	1948	1552046
AK	482m SW	Unspecified Tanks	1955	1518473
AV	483m S	Unspecified Commercial/Industrial	1905	1495214
AV	483m S	Unspecified Commercial/Industrial	1931	1495214
Y	483m N	Refuse Heap	1931	1461744
AB	483m S	Railway Buildings	1931	1481996

ID	Location	Land Use	Date	Group ID
AB	484m S	Railway Building	1905	1429157
AB	485m S	Railway Buildings	1948	1553490
AK	486m SW	Unspecified Tanks	1931	1532397
AK	487m SW	Unspecified Tanks	1931	1483521
AK	487m SW	Unspecified Tanks	1948	1518473
AN	487m SW	Unspecified Commercial/Industrial	1905	1520477
AN	487m SW	Unspecified Commercial/Industrial	1931	1520477
AK	489m SW	Unspecified Tanks	1948	1505023
AX	490m S	Railway Station	1955	1550662
AY	492m N	Ground Workings and Refuse Heap	1931	1500015
AY	493m N	Refuse Heap	1948	1533289
AX	494m S	Railway Station	1931	1483351
AB	494m S	Railway Buildings	1957	1553758
AX	495m S	Railway Station	1948	1471201
AX	495m S	Railway Station	1905	1502303
AX	495m S	Railway Station	1931	1502303
AX	495m S	Railway Station	1948	1471201
AV	497m S	Unspecified Mills	1892	1504230
AL	497m S	Railway Building	1948	1493152
AY	497m N	Ground Workings and Refuse Heap	1948	1480906
8	498m E	Refuse Heap	1948	1463618

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**130**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 29**

ID	Location	Land Use	Date	Group ID
A	0m N	Unspecified Tanks	1939	233152
A	1m N	Unspecified Tank	1922	242892
A	4m N	Unspecified Tank	1933	242892
A	17m N	Unspecified Tank	1955	242665
A	17m N	Unspecified Tank	1955	242665
A	17m N	Unspecified Tank	1970	242665
A	17m N	Unspecified Tank	1995	242665
A	17m N	Unspecified Tank	1992	242665
A	17m N	Unspecified Tank	1995	242665
A	17m N	Unspecified Tank	1994	242665
A	18m N	Unspecified Tank	1969	245155
C	25m SE	Unspecified Tank	1939	244986
C	25m SE	Unspecified Tank	1907	244986
A	31m NE	Unspecified Tanks	1907	233155
P	117m SE	Unspecified Tanks	1922	246177
P	121m SE	Unspecified Tanks	1933	246177
I	163m S	Unspecified Tank	1955	238429
I	163m S	Unspecified Tank	1969	238429
I	163m S	Unspecified Tank	1955	238429
I	172m S	Tanks	1955	246869
I	172m S	Tanks	1969	246869
I	173m S	Unspecified Tanks	1922	245233
I	173m S	Unspecified Tank	1955	242658
I	173m S	Unspecified Tank	1969	242658
I	174m S	Tanks	1955	230653
I	179m S	Unspecified Tanks	1933	239489
I	180m S	Unspecified Tank	1933	247860
I	181m S	Unspecified Tank	1922	247860

ID	Location	Land Use	Date	Group ID
I	181m S	Tanks	1955	235025
I	181m S	Tanks	1969	235025
I	182m S	Tanks	1955	230654
I	184m S	Unspecified Tank	1933	246358
I	184m S	Unspecified Tank	1922	246358
I	191m S	Tanks	1955	243159
I	191m S	Tanks	1969	243159
I	199m S	Unspecified Tank	1955	234815
I	199m S	Unspecified Tank	1969	234815
I	199m S	Unspecified Tank	1955	234815
I	200m S	Unspecified Tank	1933	243318
I	200m S	Unspecified Tank	1922	243318
I	211m S	Unspecified Tank	1933	243988
I	211m S	Unspecified Tank	1922	243988
I	213m S	Unspecified Tank	1907	223883
I	222m S	Unspecified Tank	1955	241929
I	222m S	Unspecified Tank	1969	241929
I	223m S	Unspecified Tank	1955	241929
I	226m S	Unspecified Tank	1955	242284
I	226m S	Unspecified Tank	1955	242284
I	226m S	Unspecified Tank	1969	242284
I	231m S	Unspecified Tanks	1922	233156
I	233m S	Unspecified Tank	1955	243760
I	233m S	Unspecified Tank	1969	244892
I	234m S	Unspecified Tank	1955	234691
I	235m S	Unspecified Tank	1907	223884
S	239m SE	Unspecified Tank	1933	239615
S	239m SE	Unspecified Tank	1939	239615

ID	Location	Land Use	Date	Group ID
I	240m S	Tanks	1955	248414
I	240m S	Tanks	1969	248414
S	240m SE	Unspecified Tank	1955	239615
S	240m SE	Unspecified Tank	1955	239615
I	242m S	Unspecified Tank	1955	246950
I	242m S	Unspecified Tank	1969	246950
I	243m S	Unspecified Tank	1955	246950
I	243m S	Tanks	1955	238246
I	251m S	Tanks	1955	240963
I	251m S	Tanks	1969	240963
I	251m S	Tanks	1955	247699
I	254m SW	Unspecified Tank	1955	235841
I	254m SW	Unspecified Tank	1969	235841
I	255m SW	Unspecified Tank	1955	235841
I	261m SW	Unspecified Tank	1933	250333
I	261m SW	Unspecified Tank	1922	250333
3	266m NW	Unspecified Tank	1894	223882
S	290m SE	Unspecified Tank	1933	223860
I	297m SW	Unspecified Tank	1955	246837
I	297m SW	Unspecified Tank	1969	246837
I	298m SW	Unspecified Tank	1977	246837
I	298m SW	Unspecified Tank	1955	246837
I	299m S	Unspecified Tank	1955	245101
I	299m S	Unspecified Tank	1969	245101
I	299m S	Unspecified Tank	1977	245101
I	299m S	Unspecified Tank	1955	245101
I	303m SW	Unspecified Tank	1933	223838
I	309m S	Unspecified Tank	1933	223839

ID	Location	Land Use	Date	Group ID
S	316m SE	Unspecified Tanks	1922	233157
I	324m SW	Unspecified Tank	1907	223836
I	330m SW	Unspecified Tank	1922	223837
S	334m SE	Unspecified Tanks	1922	244884
S	334m SE	Unspecified Tank	1933	245783
S	335m SE	Unspecified Tank	1939	245783
S	335m SE	Unspecified Tanks	1907	244884
S	337m SE	Unspecified Tank	1894	245460
X	341m E	Unspecified Tanks	1922	233153
AK	347m SW	Unspecified Tank	1977	235458
AK	347m SW	Unspecified Tank	1995	235458
AK	347m SW	Unspecified Tank	1999	235458
AK	347m SW	Unspecified Tank	1989	235458
I	379m S	Unspecified Tank	1977	223835
AK	379m SW	Unspecified Tank	1977	245187
AK	380m SW	Unspecified Tank	1995	241344
AK	380m SW	Unspecified Tank	1999	246141
AK	380m SW	Unspecified Tank	1989	248339
X	399m E	Unspecified Tank	1922	223861
AB	399m S	Unspecified Tank	1922	223859
AN	405m SW	Unspecified Tanks	1907	233120
AB	406m S	Unspecified Tank	1939	223858
X	412m NE	Unspecified Tanks	1907	233151
AB	423m S	Unspecified Tank	1995	236455
AB	423m S	Unspecified Tank	1995	236455
AB	424m S	Unspecified Tank	1987	236455
AN	425m SW	Unspecified Tank	1933	236073
AN	425m SW	Unspecified Tank	1922	244239

ID	Location	Land Use	Date	Group ID
AB	426m S	Unspecified Tank	1995	240074
AB	426m S	Unspecified Tank	1995	240074
AB	426m S	Unspecified Tank	1987	240074
X	428m NE	Unspecified Tanks	1922	233150
X	431m NE	Unspecified Tanks	1907	233154
X	434m E	Unspecified Tanks	1922	233148
AK	436m SW	Unspecified Tank	1933	239083
AK	436m SW	Unspecified Tank	1922	239083
X	444m E	Unspecified Tanks	1922	233149
AK	445m SW	Unspecified Tank	1894	246089
AK	445m SW	Unspecified Tank	1907	246089
AK	484m SW	Unspecified Tanks	1922	233119
AK	485m SW	Unspecified Tanks	1922	247889
AK	485m SW	Unspecified Tanks	1933	247889
AN	492m SW	Unspecified Tank	1977	236688
AN	492m SW	Unspecified Tank	1995	236688
AN	492m SW	Unspecified Tank	1999	236688
AN	493m SW	Unspecified Tank	1989	236688

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m **64**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 29**

ID	Location	Land Use	Date	Group ID
H	56m S	Electricity Substation	1977	135474
H	56m S	Electricity Substation	1989	135474

ID	Location	Land Use	Date	Group ID
H	58m S	Electricity Substation	1995	135474
H	58m S	Electricity Substation	1999	135474
H	62m S	Electricity Substation	1955	146191
H	62m S	Electricity Substation	1955	146191
H	62m S	Electricity Substation	1969	146191
J	71m NW	Electricity Substation	1969	142948
J	72m NW	Electricity Substation	1997	142948
J	72m NW	Electricity Substation	1968	142948
J	74m NW	Electricity Substation	1987	142948
K	81m E	Electricity Substation	1970	145853
K	81m E	Electricity Substation	1995	145853
K	81m E	Electricity Substation	1994	145853
K	81m E	Electricity Substation	1995	145853
K	81m E	Electricity Substation	1992	145853
K	82m E	Electricity Substation	1969	145853
Q	119m NW	Electricity Substation	1969	134699
Q	120m NW	Electricity Substation	1968	134699
Q	120m NW	Electricity Substation	1997	134699
Q	124m NW	Electricity Substation	1987	143613
R	192m SE	Electricity Substation	1996	143596
R	192m SE	Electricity Substation	1995	143596
R	192m SE	Electricity Substation	1970	135030
R	192m SE	Electricity Substation	1969	143596
V	216m S	Electricity Substation	1996	134590
V	216m S	Electricity Substation	1995	134590
S	216m SE	Electricity Substation	1996	146468
S	216m SE	Electricity Substation	1995	146468
V	216m S	Electricity Substation	1970	134590

ID	Location	Land Use	Date	Group ID
V	217m S	Electricity Substation	1969	134590
S	217m SE	Electricity Substation	1970	146468
S	217m SE	Electricity Substation	1969	146468
I	301m S	Electricity Substation	1977	129180
AH	309m NW	Electricity Substation	1997	142117
AH	310m NW	Electricity Substation	1968	142117
AH	312m NW	Electricity Substation	1987	142117
I	368m SW	Electricity Substation	1999	129179
AB	370m S	Electricity Substation	1987	141164
AB	370m S	Electricity Substation	1995	141164
AB	370m S	Electricity Substation	1995	141164
AK	393m SW	Electricity Substation	1955	139388
AK	393m SW	Electricity Substation	1969	139388
AK	393m SW	Electricity Substation	1955	139388
AK	394m SW	Electricity Substation	1977	134409
AK	394m SW	Electricity Substation	1989	134409
AP	397m W	Electricity Substation	1996	133824
AK	397m SW	Electricity Substation	1995	133933
AK	397m SW	Electricity Substation	1999	133259
AP	397m W	Electricity Substation	1969	141521
AP	397m W	Electricity Substation	1969	144648
AP	398m W	Electricity Substation	1985	141521
AP	398m W	Electricity Substation	1986	141521
AO	412m SE	Electricity Substation	1969	136493
AO	416m SE	Electricity Substation	1996	141052
AO	416m SE	Electricity Substation	1995	141052
AO	417m SE	Electricity Substation	1970	141052
AK	425m SW	Electricity Substation	1977	129189

ID	Location	Land Use	Date	Group ID
AO	438m SE	Electricity Substation	1955	133320
AO	438m SE	Electricity Substation	1955	132951
AN	483m SW	Electricity Substation	1977	139260
AN	483m SW	Electricity Substation	1989	135694
AN	483m SW	Electricity Substation	1995	135694
AN	483m SW	Electricity Substation	1999	135694

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	**0**

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	**32**

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

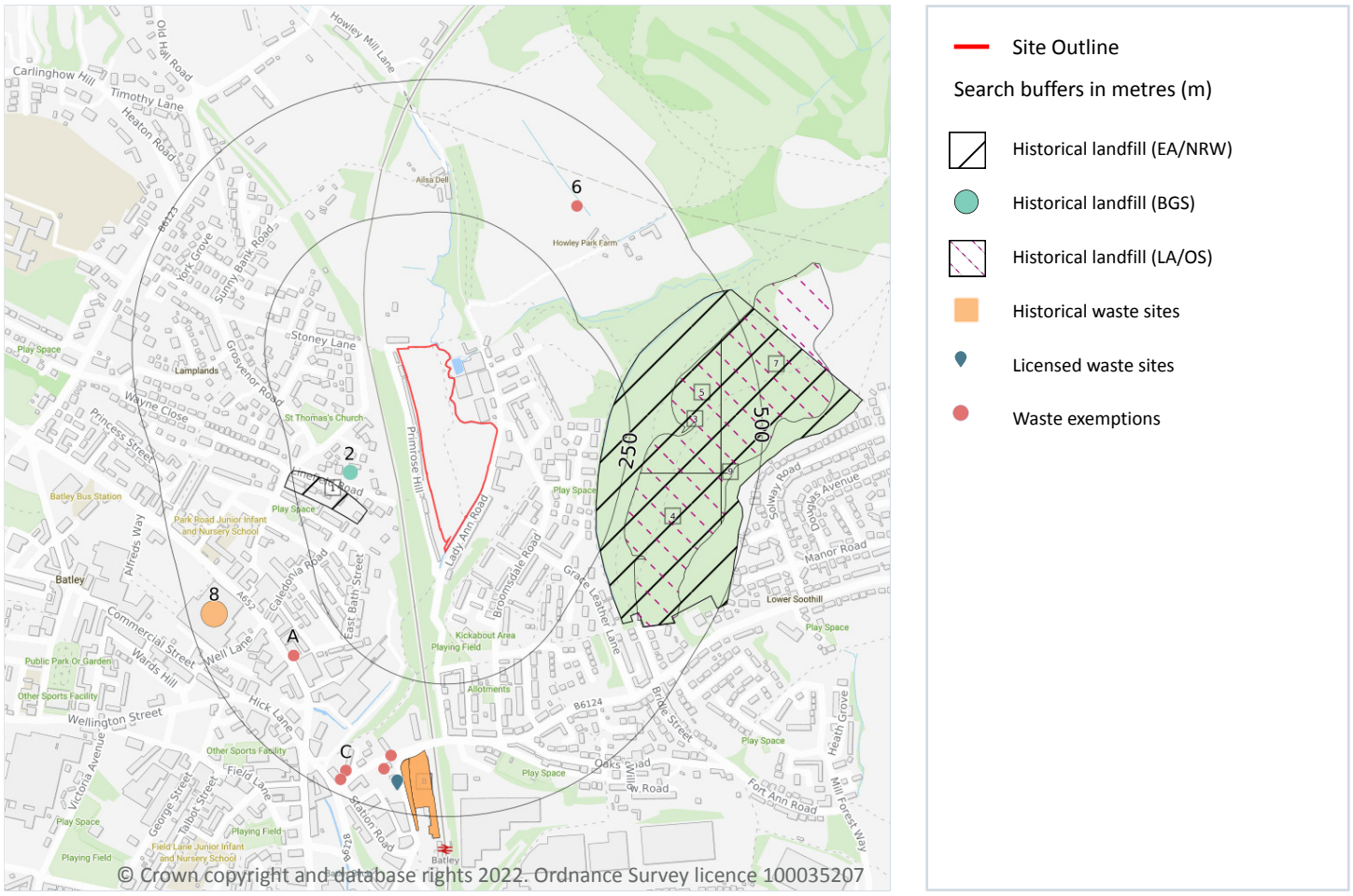
Features are displayed on the Past land use - un-grouped map on **page 29**

ID	Location	Land Use	Date	Group ID
AF	304m SW	Garage	1955	43620
AF	304m SW	Garage	1955	45283
AF	304m SW	Garage	1969	45283
AK	368m SW	Garage	1955	44962
AK	368m SW	Garage	1969	44962
AK	369m SW	Garage	1999	45383
AK	369m SW	Garage	1995	45383

ID	Location	Land Use	Date	Group ID
AK	369m SW	Garage	1977	45383
AK	369m SW	Garage	1955	45383
AK	369m SW	Garage	1989	42774
AK	372m SW	Garage	1977	45014
AK	373m SW	Garage	1989	45191
AK	374m SW	Garage	1955	42739
AK	374m SW	Garage	1955	46848
AK	374m SW	Garage	1969	46848
AK	375m SW	Garage	1995	45191
AK	375m SW	Garage	1999	45014
I	379m SW	Garage	1989	44186
I	380m SW	Garage	1999	43332
I	381m SW	Garage	1995	44917
AK	383m SW	Garage	1999	45196
AK	383m SW	Garage	1995	45196
AK	390m SW	Garage	1955	46813
AK	390m SW	Garage	1955	46813
AK	390m SW	Garage	1969	46813
AK	390m SW	Garage	1977	43152
AK	391m SW	Garage	1989	46813
I	395m SW	Garage	1995	44917
AN	397m SW	Garage	1989	43941
AN	397m SW	Garage	1999	46209
AN	397m SW	Garage	1995	46209
AN	399m SW	Garage	1977	41849

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	1

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

Features are displayed on the Waste and landfill map on **page 50**

ID	Location	Address	BGS Number	Risk	Waste Type
2	143m W	Bridge Street, Batley, Yorks	1457	No risk to aquifer	N/A

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	**4**

Landfill sites identified from Local Authority records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 50**

ID	Location	Site address	Source	Data type
4	276m SE	Refuse Tip	1969 mapping	Polygon
5	281m E	Refuse Tip	1969 mapping	Polygon
7	422m E	Refuse Tip	1969 mapping	Polygon
9	429m E	Refuse Tip	1969 mapping	Polygon

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	**2**

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

Features are displayed on the Waste and landfill map on **page 50**

ID	Location	Details		
1	125m SW	Site Address: Bridge Street, Batley, Yorkshire Licence Holder Address: -	Waste Licence: - Site Reference: - Waste Type: Liquid sludge Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -	Operator: James Duncan Limited Licence Holder: - First Recorded 30/06/1968 Last Recorded: -

ID	Location	Details		
3	201m E	Site Address: Soothill Tip, Oakwood Road, Lower Soothill, Batley Licence Holder Address: -	Waste Licence: - Site Reference: - Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -	Operator: - Licence Holder: - First Recorded - Last Recorded: 31/12/1968

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	**6**

Waste site records derived from Local Authority planning records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 50**

ID	Location	Address	Further Details	Date
B	376m S	Site Address: N/A	Type of Site: Scrap Metal Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1980
B	376m S	Site Address: N/A	Type of Site: Scrap Metal Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1981
B	395m S	Site Address: N/A	Type of Site: Scrap Metal Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1973
B	396m S	Site Address: N/A	Type of Site: Scrap Metal Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1997
B	396m S	Site Address: N/A	Type of Site: Scrap Metal Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1995

ID	Location	Address	Further Details	Date
8	426m SW	Site Address: Tesco Stores Ltd, Bradford Road, BATLEY, West Yorkshire, WF17 5JU	Type of Site: Waste Transfer Station Planning application reference: 2007/62/94380/E1 Description: Scheme comprises re-siting of recycling area including replacement of recycling units with a single tomra recycling unit including associated enabling works and recycling area to be reinstated with 11 parking bays. Construction - black top surfacing works. An application (ref: 2007/62/94380/E1) for detailed planning permission was refused by Kirklees B.C. Planning decision obtained Data source: Historic Planning Application Data Type: Point	-

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	**3**

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

Features are displayed on the Waste and landfill map on **page 50**

ID	Location	Details		
B	444m S	Site Name: - Site Address: 54, Upper Station Road, Batley, West Yorkshire, WF17 5TA Correspondence Address: 54, Upper Station Road, Batley, West Yorkshire, WF17 5TA	Type of Site: Material Recycling Treatment Facility Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: RSP002 EPR reference: - Operator: R Spivey & Sons Limited Waste Management licence No: 61030 Annual Tonnage: 0	Issue Date: 04/01/1994 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
B	444m S	Site Name: - Site Address: 54, Upper Station Road, Batley, West Yorkshire, WF17 5TA Correspondence Address: 54, Upper Station Road, Batley, West Yorkshire, WF17 5TA	Type of Site: Material Recycling Treatment Facility Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: RSP002 EPR reference: - Operator: R Spivey & Son Limited Waste Management licence No: 61030 Annual Tonnage: 0	Issue Date: 04/01/1994 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued

ID	Location	Details		
B	444m S	Site Name: Upper Station Road Site Address: 54, Upper Station Road, Batley, West Yorkshire, WF17 5TA Correspondence Address: -	Type of Site: Material Recycling Treatment Facility Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: RSP002 EPR reference: EA/EPR/TP3095ZD/V003 Operator: R Spivey & Son Ltd Waste Management licence No: 61030 Annual Tonnage: 4999	Issue Date: 04/01/1994 Effective Date: - Modified: 29/02/2016 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m **11**

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

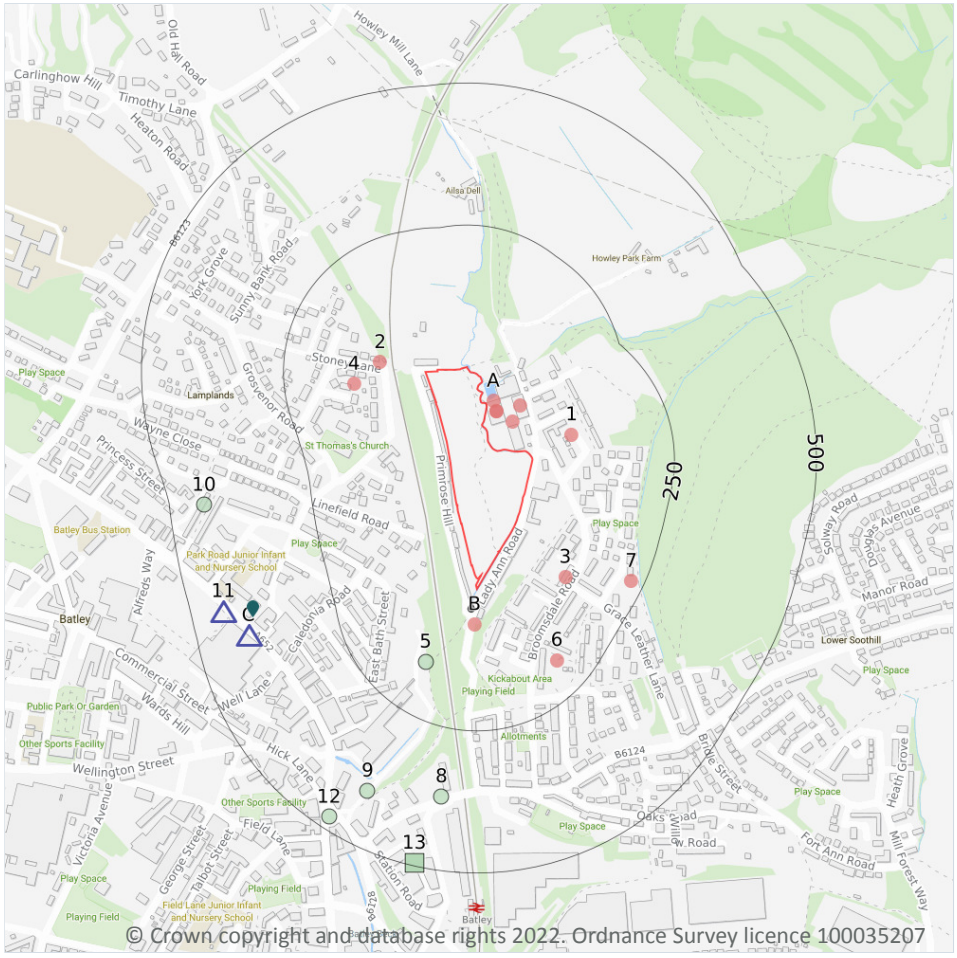
Features are displayed on the Waste and landfill map on **page 50**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	348m SW	422, Bradford road, Dewsbury, Wf17 5ls	WEX062064	Treating waste exemption	Not on a farm	Manual treatment of waste
A	348m SW	Unit 422j, BRADFORD ROAD, BATLEY, WF17 5LS	WEX015871	Storing waste exemption	Not on a farm	Storage of waste in a secure place
A	348m SW	Unit 422j, BRADFORD ROAD, BATLEY, WF17 5LS	WEX015871	Treating waste exemption	Not on a farm	Sorting mixed waste
A	348m SW	Unit 422j, BRADFORD ROAD, BATLEY, WF17 5LS	WEX015871	Treating waste exemption	Not on a farm	Recovery of textiles
A	348m SW	Unit 422j, BRADFORD ROAD, BATLEY, WF17 5LS	WEX015871	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)
6	368m NE	TOPCLIFFE GRANGE FARM, DEWSBURY ROAD, TINGLEY, WAKEFIELD, WF3 1SH	WEX163848	Storing waste exemption	On a Farm	Storage of sludge
B	400m S	3/5 oxford Terrace off Soothill Lane Batley West Yorkshire WF17 5ST	EPR/XE5144HU/A001	Treating waste exemption	Non-Agricultural Waste Only	Sorting and de-naturing of controlled drugs for disposal

ID	Location	Site	Reference	Category	Sub-Category	Description
B	427m S	3-5, Oxford Terrace, off Soothill Lane, Batley, WF17 5ST	WEX118757	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
C	455m S	3-5, OXFORD TERRACE, BATLEY, WF17 5SR	WEX297188	Treating waste exemption	Not on a Farm	Sorting and de-naturing of controlled drugs for disposal
C	455m S	3-5, OXFORD TERRACE, BATLEY, WF17 5SR	WEX162639	Treating waste exemption	Not on a Farm	Sorting and de-naturing of controlled drugs for disposal
C	474m S	3-5, Oxford Terrace, off Soothill Lane, Batley, WF17 5ST	WEX259856	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



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4.1 Recent industrial land uses

Records within 250m	12

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 56**

ID	Location	Company	Address	Activity	Category
A	13m N	Tank	West Yorkshire, WF17	Tanks (Generic)	Industrial Features
A	18m N	Bond Fabs Ltd	Unit 8e Lady Ann Mills, Lady Ann Road, Soothill, Batley, West Yorkshire, WF17 0PS	Metalworkers Including Blacksmiths	Construction Services
A	18m N	D Middleton & Son	Unit 5 Lady Ann Mills, Lady Ann Road, Soothill, Batley, West Yorkshire, WF17 0PS	General Construction Supplies	Industrial Products

ID	Location	Company	Address	Activity	Category
A	47m NE	Business Park	West Yorkshire, WF17	Business Parks and Industrial Estates	Industrial Features
A	59m NE	Norbake Services Ltd	Unit 1 Lady Ann Mills, Lady Ann Road, Soothill, Batley, West Yorkshire, WF17 0PS	Food and Beverage Industry Machinery	Industrial Products
B	62m S	Electricity Sub Station	West Yorkshire, WF17	Electrical Features	Infrastructure and Facilities
1	81m E	Electricity Sub Station	West Yorkshire, WF17	Electrical Features	Infrastructure and Facilities
2	82m NW	Electricity Sub Station	West Yorkshire, WF17	Electrical Features	Infrastructure and Facilities
3	122m SE	Budget Computer Repairs & Re-builds	59, Broomsdale Road, Soothill, Batley, West Yorkshire, WF17 6PT	Electrical Equipment Repair and Servicing	Repair and Servicing
4	128m NW	Electricity Sub Station	West Yorkshire, WF17	Electrical Features	Infrastructure and Facilities
6	188m S	Electricity Sub Station	West Yorkshire, WF17	Electrical Features	Infrastructure and Facilities
7	227m SE	Electricity Sub Station	West Yorkshire, WF17	Electrical Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	**2**

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 56**

ID	Location	Company	Address	LPG	Status
C	410m SW	OBSOLETE	425, Bradford Road, Batley, West Yorkshire, WF17 5LN	Not Applicable	Obsolete
11	444m SW	BP	450, Bradford Road, Batley, West Yorkshire, WF17 5LW	No	Open

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	1

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 56**

ID	Location	Address	Details	
C	392m SW	Star Petroleum, Upper Batley Service Station, Bradford Road, Upper Batley, WF17 5LW	Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	1

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 56**

ID	Location	Address	Details	
B	33m S	YWS UNKNOWN SITES DEFAULT, DO NOT DELETE/REPLACE SITE	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 2634 Permit Version: 1 Receiving Water: BATLEY BECK TO RIVER CALDER	Status: TRANSFERRED FROM R(PP)A 1951-1961 Issue date: 08/06/1970 Effective Date: 08/06/1970 Revocation Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	1

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 56**

ID	Location	Name	Status	Receiving Water	Authorised Substances
13	495m S	R Spivey & Son Ltd, Station Road, Batley	Not Active	Unknown	Chromium, Copper, Lead, Zinc, Xylene

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	5

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 56**

ID	Location	Details	
5	156m S	Incident Date: 19/06/2004 Incident Identification: 245599 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 2 (Significant) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
8	370m S	Incident Date: 16/04/2002 Incident Identification: 72262 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
9	404m S	Incident Date: 15/10/2002 Incident Identification: 114943 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

ID	Location	Details	
10	439m W	Incident Date: 12/06/2001 Incident Identification: 8816 Pollutant: Oils and Fuel Pollutant Description: Petrol	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
12	478m SW	Incident Date: 22/07/2005 Incident Identification: 332006 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 2 (Significant) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

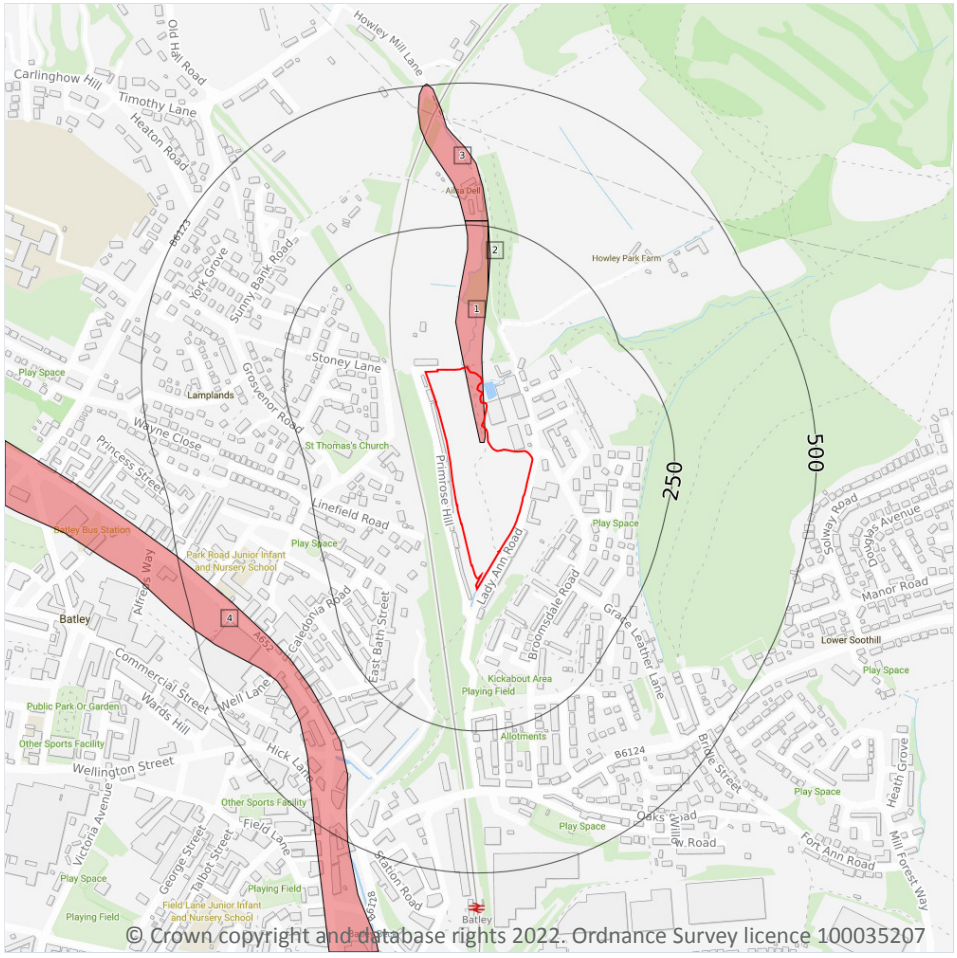
4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



5.1 Superficial aquifer

Records within 500m	4

Aquifer status of groundwater held within superficial geology.

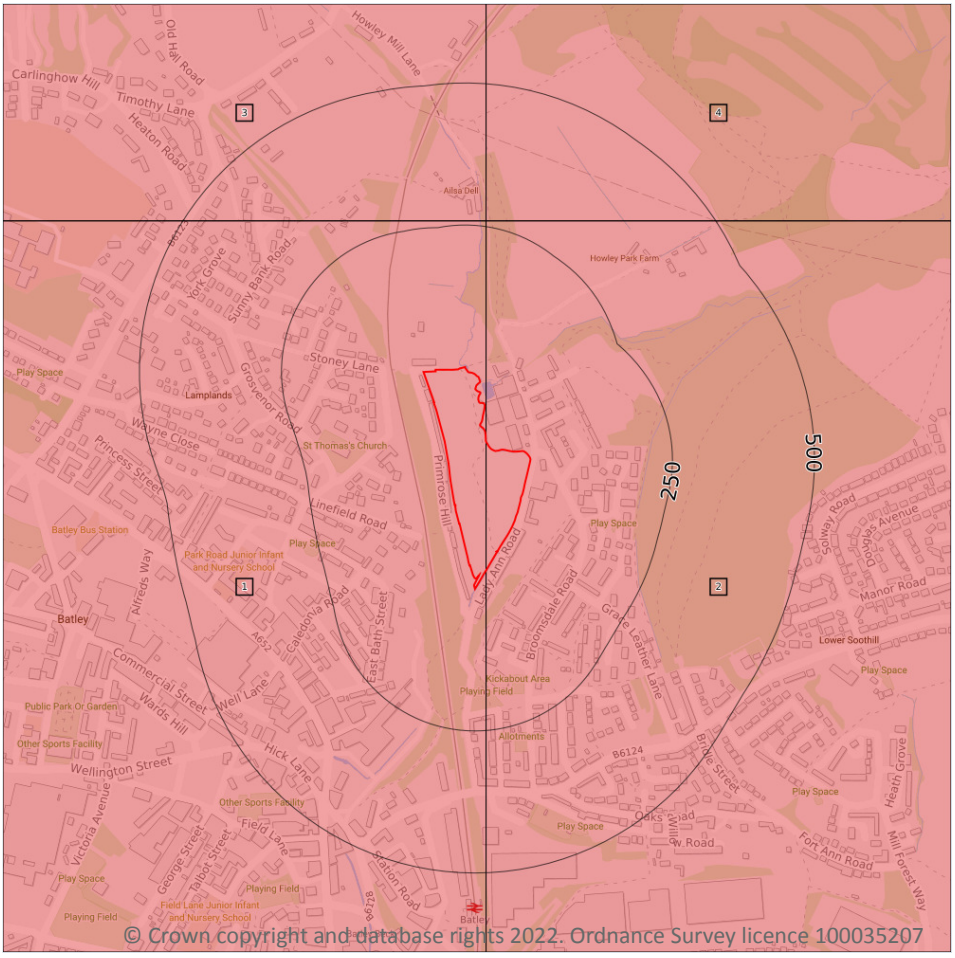
Features are displayed on the Hydrogeology map on **page 63**

ID	Location	Designation	Description
1	**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	141m N	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

ID	Location	Designation	Description
3	257m N	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
4	340m SW	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

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



5.2 Bedrock aquifer

Records within 500m	4

Aquifer status of groundwater held within bedrock geology.

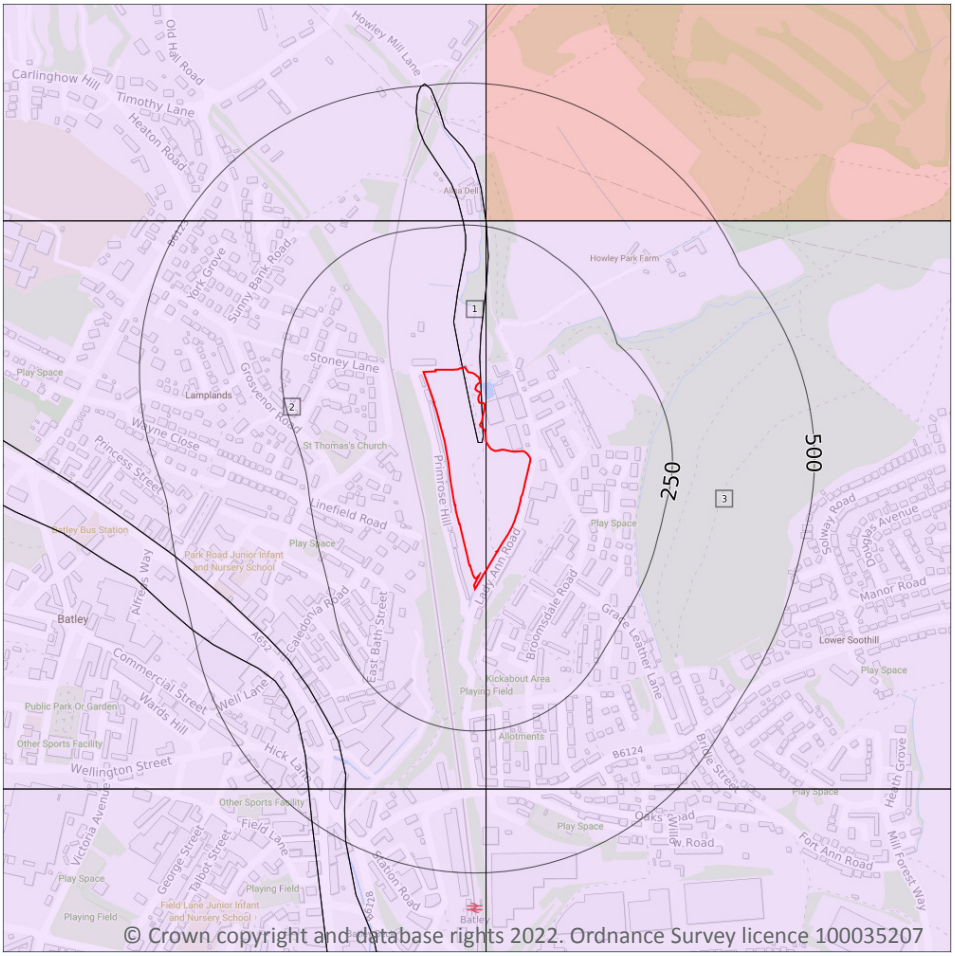
Features are displayed on the Bedrock aquifer map on **page 65**

ID	Location	Designation	Description
1	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	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

ID	Location	Designation	Description
3	257m N	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
4	260m N	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

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability

- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability

- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information

- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	3

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 67**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary bedrock aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: 300-550mm/year	Vulnerability: Low Aquifer type: Secondary Thickness: <3m Patchiness value: <90% Recharge potential: No Data	Vulnerability: Medium Aquifer type: Secondary Flow mechanism: Well connected fractures
2	On site	Summary Classification: Secondary bedrock aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, No Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: 300-550mm/year	Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data	Vulnerability: Medium Aquifer type: Secondary Flow mechanism: Well connected fractures
3	On site	Summary Classification: Secondary bedrock aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, No Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: 300-550mm/year	Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data	Vulnerability: Medium Aquifer type: Secondary Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

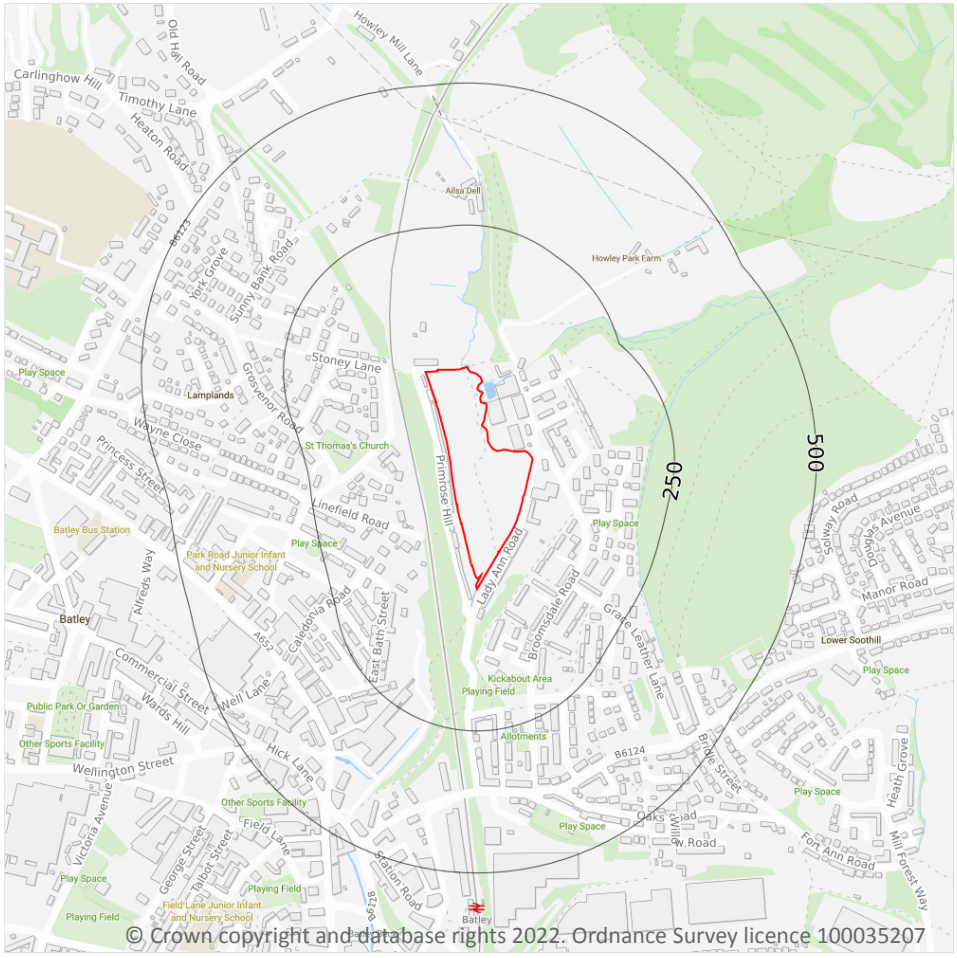
5.5 Groundwater vulnerability- local information

Records on site	0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	23

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 69**

ID	Location	Details	
-	914m SE	Status: Historical Licence No: 2/27/13/143 Details: General use relating to Secondary Category (High Loss) Direct Source: GROUNDWATERS Point: BOREHOLE Data Type: Point Name: WHARFEDALE FINANCE COMPANY Easting: 425500 Northing: 423600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 27/09/1977 Expiry Date: - Issue No: 100 Version Start Date: 21/05/1990 Version End Date: -
-	914m SE	Status: Historical Licence No: 2/27/13/143 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE Data Type: Point Name: WHARFEDALE FINANCE COMPANY Easting: 425500 Northing: 423600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 27/09/1977 Expiry Date: - Issue No: 100 Version Start Date: 21/05/1990 Version End Date: -
-	914m SE	Status: Historical Licence No: 2/27/13/143 Details: General use relating to Secondary Category (High Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - COAL MEASURES - BATLEY Data Type: Point Name: WHARFEDALE FINANCE COMPANY Easting: 425500 Northing: 423600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 27/09/1977 Expiry Date: - Issue No: 100 Version Start Date: 21/05/1990 Version End Date: -
-	914m SE	Status: Historical Licence No: 2/27/13/143 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - COAL MEASURES - BATLEY Data Type: Point Name: WHARFEDALE FINANCE CO Easting: 425500 Northing: 423600	Annual Volume (m^3): 227000 Max Daily Volume (m^3): 621.92 Original Application No: - Original Start Date: 27/09/1977 Expiry Date: - Issue No: 100 Version Start Date: 21/05/1990 Version End Date: -

ID	Location	Details	
-	928m NE	Status: Historical Licence No: 2/27/13/004 Details: Spray Irrigation - Direct Direct Source: GROUNDWATERS Point: BOREHOLE Data Type: Point Name: HOWLEY HALL GOLF CLUB LTD Easting: 425500 Northing: 425500	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 01/12/1965 Version End Date: -
-	928m NE	Status: Active Licence No: 2/27/13/004 Details: Spray Irrigation - Direct Direct Source: GROUNDWATERS Point: BOREHOLE - COAL MEASURES - MORLEY Data Type: Point Name: HOWLEY HALL GOLF CLUB LTD Easting: 425500 Northing: 425500	Annual Volume (m^3): 6,364 Max Daily Volume (m^3): 63.64 Original Application No: 244 Original Start Date: 01/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 01/12/1965 Version End Date: -
-	1392m NE	Status: Historical Licence No: 2/27/13/223 Details: Mineral Washing Direct Source: GROUNDWATERS Point: BOREHOLE - COAL MEASURES - DEWSBURY Data Type: Point Name: Marshalls Mono Ltd Easting: 426150 Northing: 425490	Annual Volume (m^3): 150000 Max Daily Volume (m^3): 500 Original Application No: - Original Start Date: 03/03/2007 Expiry Date: 31/03/2015 Issue No: 2 Version Start Date: 15/10/2014 Version End Date: -
-	1392m NE	Status: Active Licence No: 2/27/13/223/R01 Details: General Washing/Process Washing Direct Source: GROUNDWATERS Point: BOREHOLE - COAL MEASURES - DEWSBURY Data Type: Point Name: Marshalls Mono Ltd Easting: 426150 Northing: 425490	Annual Volume (m^3): 60,225 Max Daily Volume (m^3): 165 Original Application No: NPS/WR/016690 Original Start Date: 01/04/2015 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 01/04/2015 Version End Date: -
-	1392m NE	Status: Active Licence No: 2/27/13/223/R01 Details: Mineral Washing Direct Source: GROUNDWATERS Point: BOREHOLE - COAL MEASURES - DEWSBURY Data Type: Point Name: Marshalls Mono Ltd Easting: 426150 Northing: 425490	Annual Volume (m^3): 60,225 Max Daily Volume (m^3): 165 Original Application No: NPS/WR/016690 Original Start Date: 01/04/2015 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 01/04/2015 Version End Date: -

ID	Location	Details	
-	1492m NE	Status: Historical Licence No: 2/27/13/057 Details: General Use Relating To Secondary Category (High Loss) Direct Source: GROUNDWATERS Point: CATCHPIT - COAL MEASURES - WOODKIRK - DEWSBURY Data Type: Point Name: Hanson Building Products Ltd Easting: 426250 Northing: 425520	Annual Volume (m^3): 22730 Max Daily Volume (m^3): 81.828 Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 103 Version Start Date: 18/12/2012 Version End Date: -
-	1494m NE	Status: Active Licence No: 2/27/13/057 Details: General Use Relating To Secondary Category (High Loss) Direct Source: GROUNDWATERS Point: CATCHPIT - COAL MEASURES - WOODKIRK - DEWSBURY Data Type: Point Name: Forterra Building Products Ltd Easting: 426251 Northing: 425522	Annual Volume (m^3): 22,730 Max Daily Volume (m^3): 81.90 Original Application No: NPS/WR/024478 Original Start Date: 20/01/1966 Expiry Date: - Issue No: 105 Version Start Date: 10/08/2016 Version End Date: -
-	1524m NE	Status: Historical Licence No: 2/27/13/057 Details: General use relating to Secondary Category (High Loss) Direct Source: GROUNDWATERS Point: CATCHPITS X 4-COAL MEASURES - QUARRIES AT WOODKIRK DEWSBURY Data Type: Point Name: MARSHALLS CLAY PRODUCTS Easting: 426300 Northing: 425500	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 04/09/2000 Version End Date: -
-	1524m NE	Status: Historical Licence No: 2/27/13/057 Details: General use relating to Secondary Category (High Loss) Direct Source: GROUNDWATERS Point: CATCHPITS X 4- COAL MEASURES - QUARRIES AT WOODKIRK DEWSBURY Data Type: Point Name: MARSHALLS CLAY PRODUCTS Easting: 426300 Northing: 425500	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 04/09/2000 Version End Date: -

ID	Location	Details	
-	1524m NE	Status: Historical Licence No: 2/27/13/057 Details: General use relating to Secondary Category (High Loss) Direct Source: GROUNDWATERS Point: CATCHPITS X 4- COAL MEASURES - QUARRIES AT WOODKIRK DEWSBURY Data Type: Point Name: MARSHALLS CLAY PRODUCTS Easting: 426300 Northing: 425500	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 04/09/2000 Version End Date: -
-	1601m NE	Status: Active Licence No: NE/027/0013/025 Details: Dewatering Direct Source: GROUNDWATERS Point: HOWLEY PARK QUARRY, DEWSBURY, LEEDS Data Type: Poly4 Name: MARSHALLS GROUP LIMITED Easting: 426498 Northing: 425707	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: NPS/NA/001086 Original Start Date: 31/03/2021 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 31/03/2021 Version End Date: -
-	1644m NE	Status: Active Licence No: NE/027/0013/024 Details: Dust Suppression Direct Source: GROUNDWATERS Point: HOWLEY PARK QUARRY, DEWSBURY, LEEDS POINT B Data Type: Point Name: MARSHALLS GROUP LIMITED Easting: 426390 Northing: 425583	Annual Volume (m^3): 135,600 Max Daily Volume (m^3): 565 Original Application No: NPS/NA/001085 Original Start Date: 31/03/2021 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 31/03/2021 Version End Date: -
-	1663m NE	Status: Active Licence No: NE/027/0013/024 Details: Mineral Washing Direct Source: GROUNDWATERS Point: HOWLEY PARK QUARRY, DEWSBURY, LEEDS Data Type: Point Name: MARSHALLS GROUP LIMITED Easting: 426531 Northing: 425392	Annual Volume (m^3): 135,600 Max Daily Volume (m^3): 565 Original Application No: NPS/NA/001085 Original Start Date: 31/03/2021 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 31/03/2021 Version End Date: -

ID	Location	Details	
-	1879m S	Status: Historical Licence No: 2/27/13/046 Details: General use relating to Secondary Category (High Loss) Direct Source: GROUNDWATERS Point: BOREHOLE Data Type: Point Name: JOSHUA ELLIS & COMPANY LIMITED Easting: 424300 Northing: 422600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 22/10/1997 Version End Date: -
-	1879m S	Status: Historical Licence No: 2/27/13/046 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE Data Type: Point Name: JOSHUA ELLIS & COMPANY LIMITED Easting: 424300 Northing: 422600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 22/10/1997 Version End Date: -
-	1879m S	Status: Historical Licence No: 2/27/13/046 Details: Process water Direct Source: GROUNDWATERS Point: BOREHOLE Data Type: Point Name: JOSHUA ELLIS & COMPANY LIMITED Easting: 424300 Northing: 422600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 22/10/1997 Version End Date: -
-	1879m S	Status: Historical Licence No: 2/27/13/046 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - COAL MEASURES - DEWSBURY Data Type: Point Name: JOSHUA ELLIS & COMPANY LIMITED Easting: 424300 Northing: 422600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 22/10/1997 Version End Date: -

ID	Location	Details	
-	1879m S	Status: Historical Licence No: 2/27/13/046 Details: General use relating to Secondary Category (High Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - COAL MEASURES - DEWSBURY Data Type: Point Name: JOSHUA ELLIS & COMPANY LIMITED Easting: 424300 Northing: 422600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 22/10/1997 Version End Date: -
-	1879m S	Status: Historical Licence No: 2/27/13/046 Details: Process water Direct Source: GROUNDWATERS Point: BOREHOLE - COAL MEASURES - DEWSBURY Data Type: Point Name: JOSHUA ELLIS & COMPANY LIMITED Easting: 424300 Northing: 422600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 22/10/1997 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	**1**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 69**

ID	Location	Details	
-	878m S	Status: Historical Licence No: 2/27/13/206 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: BATLEY BECK Data Type: Point Name: CULLINGWORTH SUMMERS & CO LTD Easting: 424810 Northing: 423490	Annual Volume (m^3): 11500 Max Daily Volume (m^3): 60 Original Application No: - Original Start Date: 21/08/2001 Expiry Date: 31/03/2015 Issue No: 2 Version Start Date: 23/05/2005 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	0

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	0

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

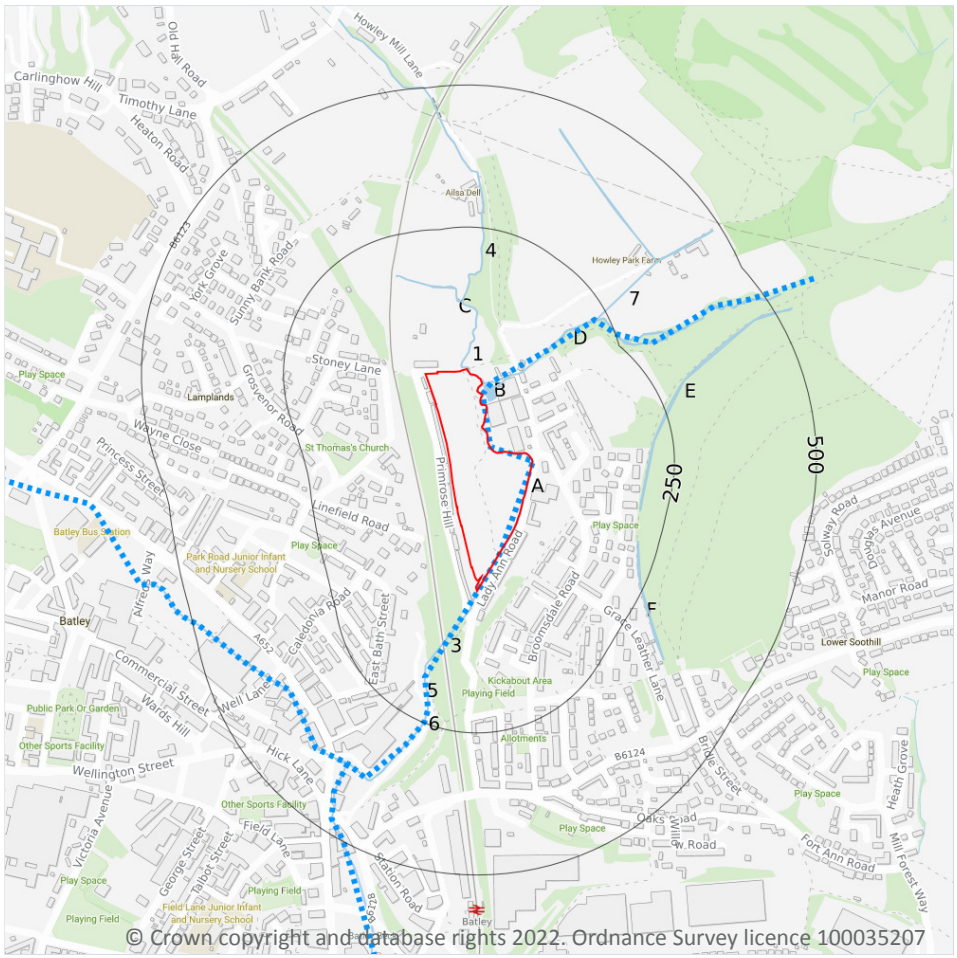
5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	23

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 77**

ID	Location	Type of water feature	Ground level	Permanence	Name
1	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**Howley Beck**

ID	Location	Type of water feature	Ground level	Permanence	Name
A	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**Howley Beck**
B	2m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Lady Ann Dike
B	8m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	31m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Lady Ann Dike
3	33m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Howley Beck
B	56m N	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	Lady Ann Dike
B	66m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Lady Ann Dike
4	118m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Howley Beck
C	118m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	135m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Lady Ann Dike
C	143m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	143m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	151m N	Marsh. An area that is predominantly waterlogged by freshwater.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
5	158m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Howley Beck
C	167m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	168m N	Marsh. An area that is predominantly waterlogged by freshwater.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	178m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	201m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
6	208m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Howley Beck
F	213m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
7	229m NE	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
D	229m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Lady Ann Dike

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	**6**

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 77**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 77**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	**On site**	**River**	**Batley Beck from Source to River Calder**	**GB104027062670**	**Calder Lower**	**Aire and Calder**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 77**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
2	**On site**	**River**	**Batley Beck from Source to River Calder**	**GB104027062670**	**Moderate**	**Fail**	**Moderate**	**2019**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1

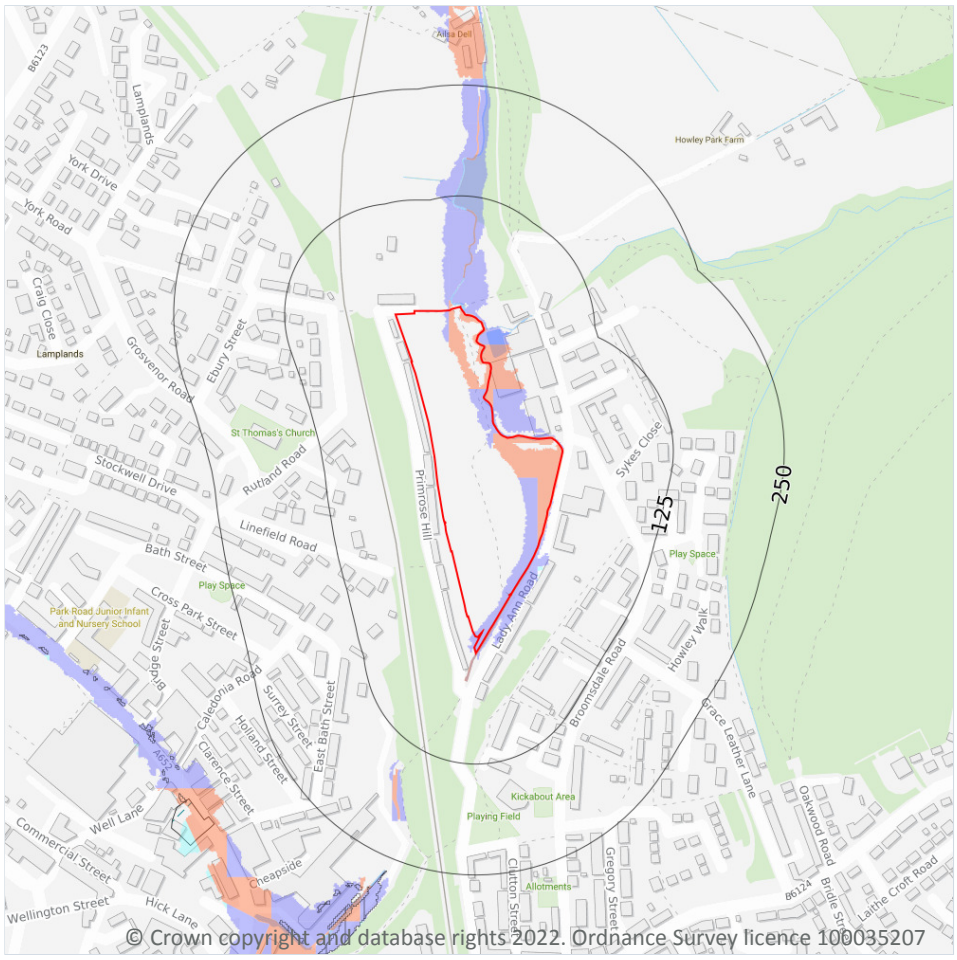
Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 77**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	**On site**	**Aire & Calder Carb Limestone / Millstone Grit / Coal Measures.**	**GB40402G700400**	**Poor**	**Poor**	**Good**	**2019**

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding



Site Outline

Search buffers in metres (m)

River and coastal flooding:

- High
- Medium
- Low
- Very Low
- Historical Flood Events
- Areas Used for Flood Storage
- Areas Benefiting from Flood Defences
- Flood Defences

7.1 Risk of flooding from rivers and the sea

Records within 50m	42

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

Features are displayed on the River and coastal flooding map on **page 82**

Distance	Flood risk category
On site	**High**
0 - 50m	High

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	**0**

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	**0**

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	**0**

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

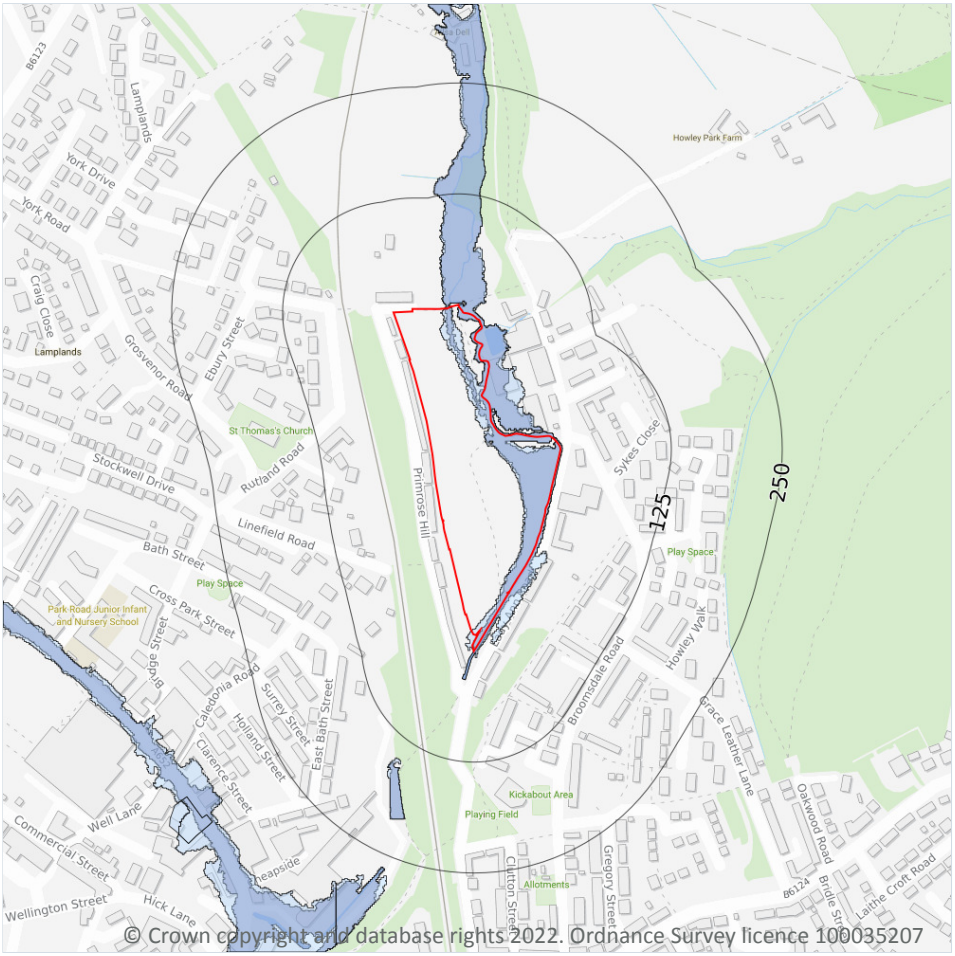
7.5 Flood Storage Areas

Records within 250m	**0**

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones



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7.6 Flood Zone 2

Records within 50m	1

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

Features are displayed on the River and coastal flooding map on **page 82**

Location	Type
On site	**Zone 2 - (Fluvial /Tidal Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m	1

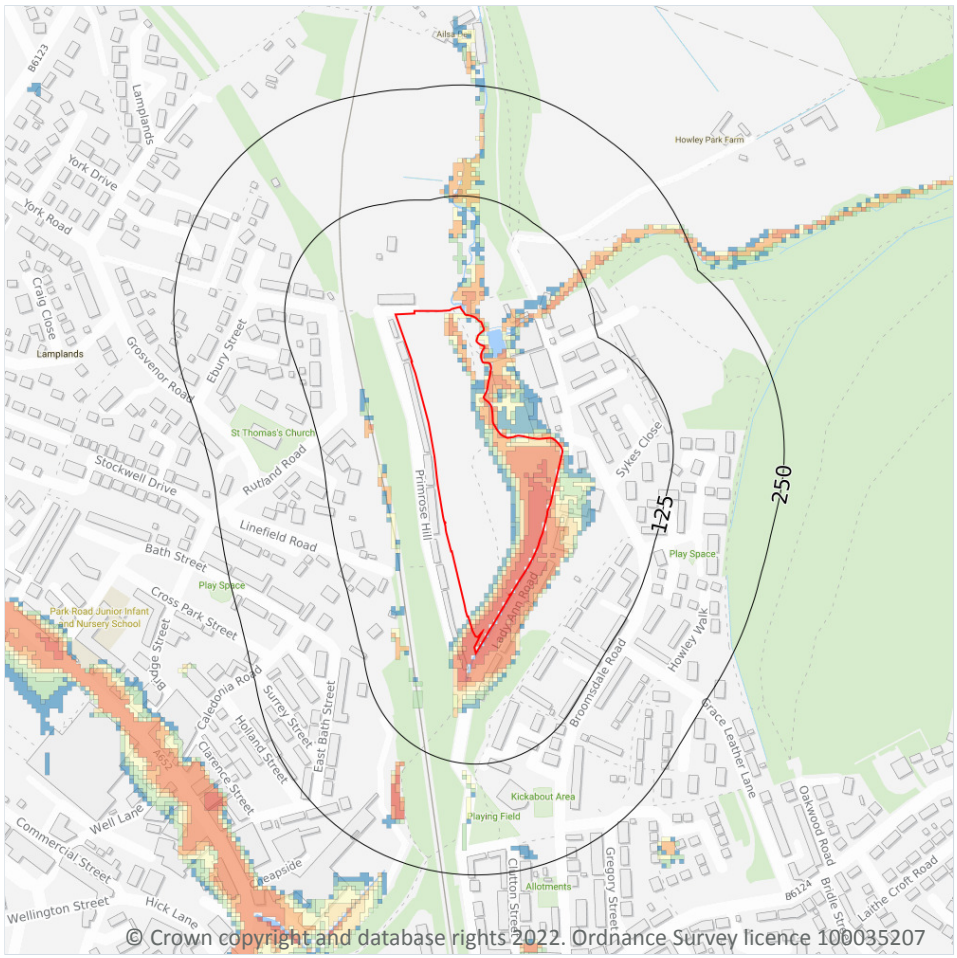
Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 82**

Location	Type
On site	**Zone 3 - (Fluvial Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



8.1 Surface water flooding

Highest risk on site	**1 in 30 year, Greater than 1.0m**
Highest risk within 50m	**1 in 30 year, Greater than 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 86**

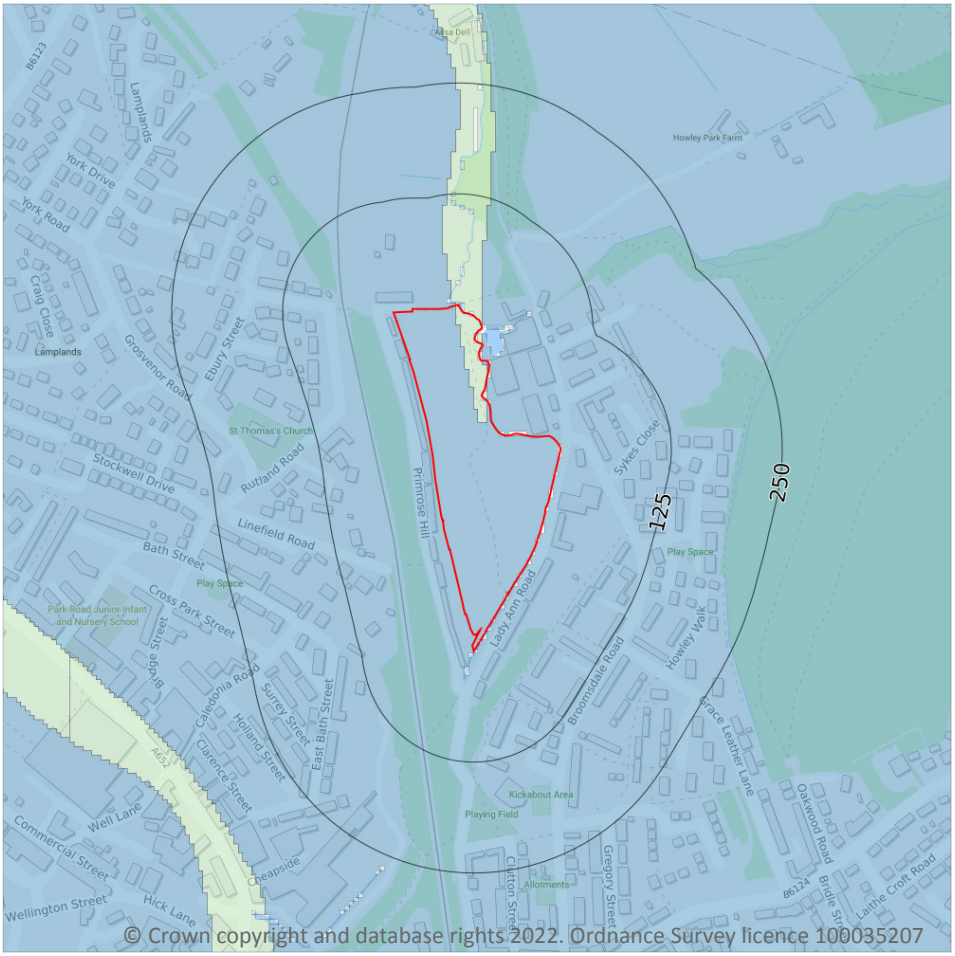
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Greater than 1.0m
1 in 250 year	Greater than 1.0m
1 in 100 year	Greater than 1.0m
1 in 30 year	Greater than 1.0m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



9.1 Groundwater flooding

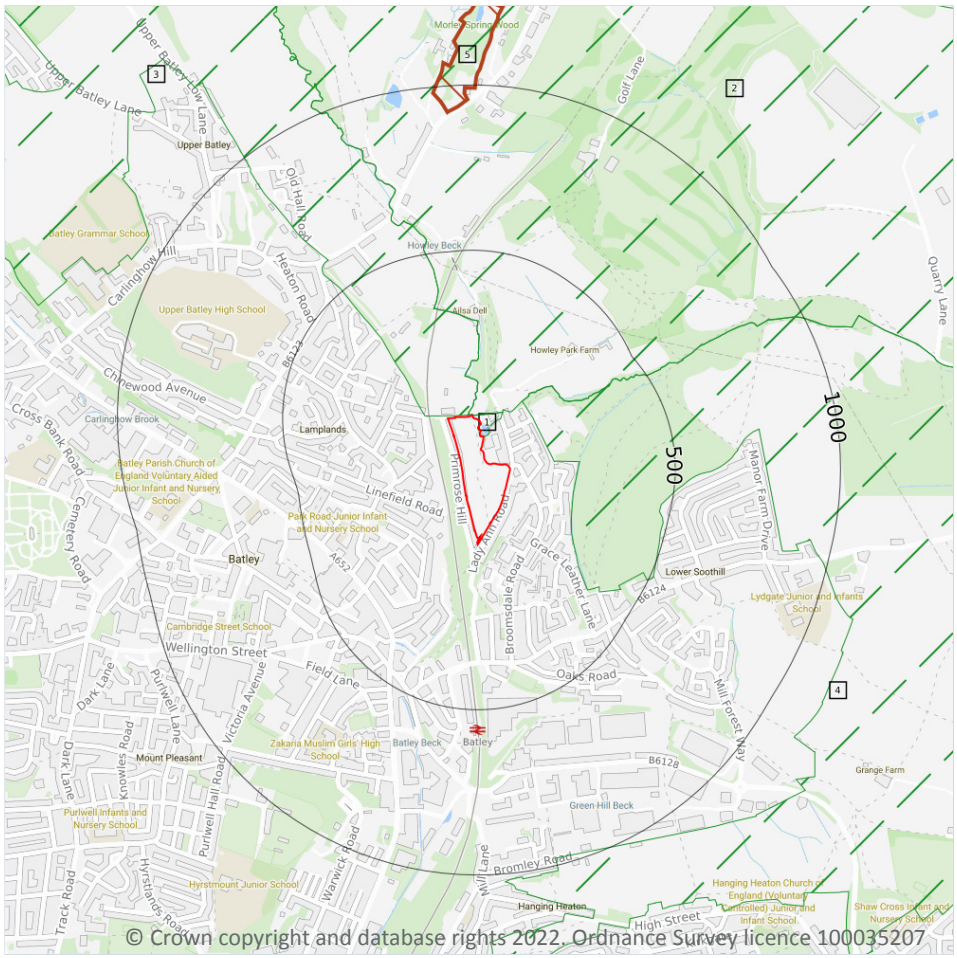
Highest risk on site	**Low**
Highest risk within 50m	**Low**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 88**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	6

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 89**

ID	Location	Name	Woodland Type
5	921m N	Morley Spring Wood	Ancient Replanted Woodland
-	1267m N	Morley Spring Wood	Ancient Replanted Woodland
-	1349m N	Unknown	Ancient & Semi-Natural Woodland
-	1530m E	Soothill Wood	Ancient & Semi-Natural Woodland
-	1635m N	Birkby Brow Wood	Ancient Replanted Woodland
-	1965m E	Scargill Wood	Ancient & Semi-Natural Woodland

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	5

Areas designated to prevent urban sprawl by keeping land permanently open.

Features are displayed on the Environmental designations map on **page 89**

ID	Location	Name	Local Authority name
1	**On site**	**South and West Yorkshire**	**Kirklees**
2	3m N	South and West Yorkshire	Leeds
3	4m N	South and West Yorkshire	Kirklees
4	130m E	South and West Yorkshire	Kirklees
-	1736m W	South and West Yorkshire	Kirklees

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

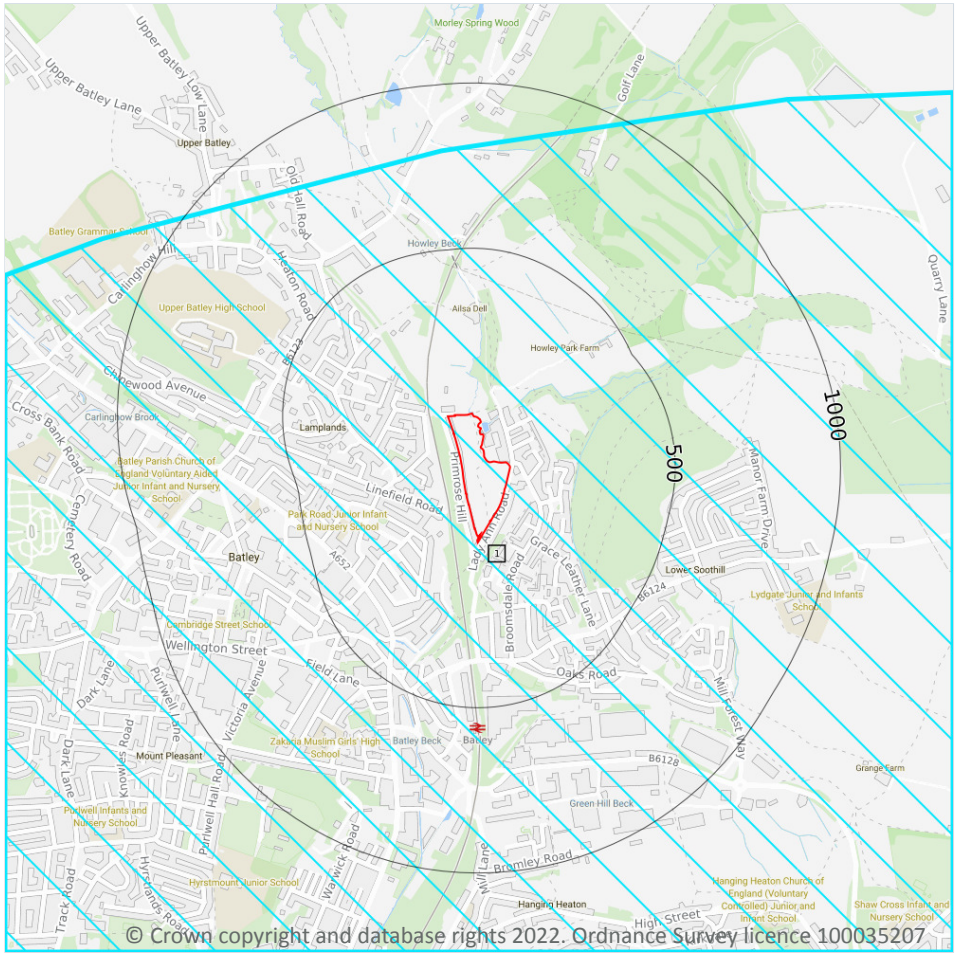
10.16 Nitrate Vulnerable Zones

Records within 2000m	0

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



Site Outline

Search buffers in metres (m)

SSSI Impact Risk Zones

SSSI Units

- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site	1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 94**

ID	Location	Type of developments requiring consultation
1	On site	**Air pollution - Livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 4000m². Combustion - General combustion processes >50mw energy input. incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.**

This data is sourced from Natural England.

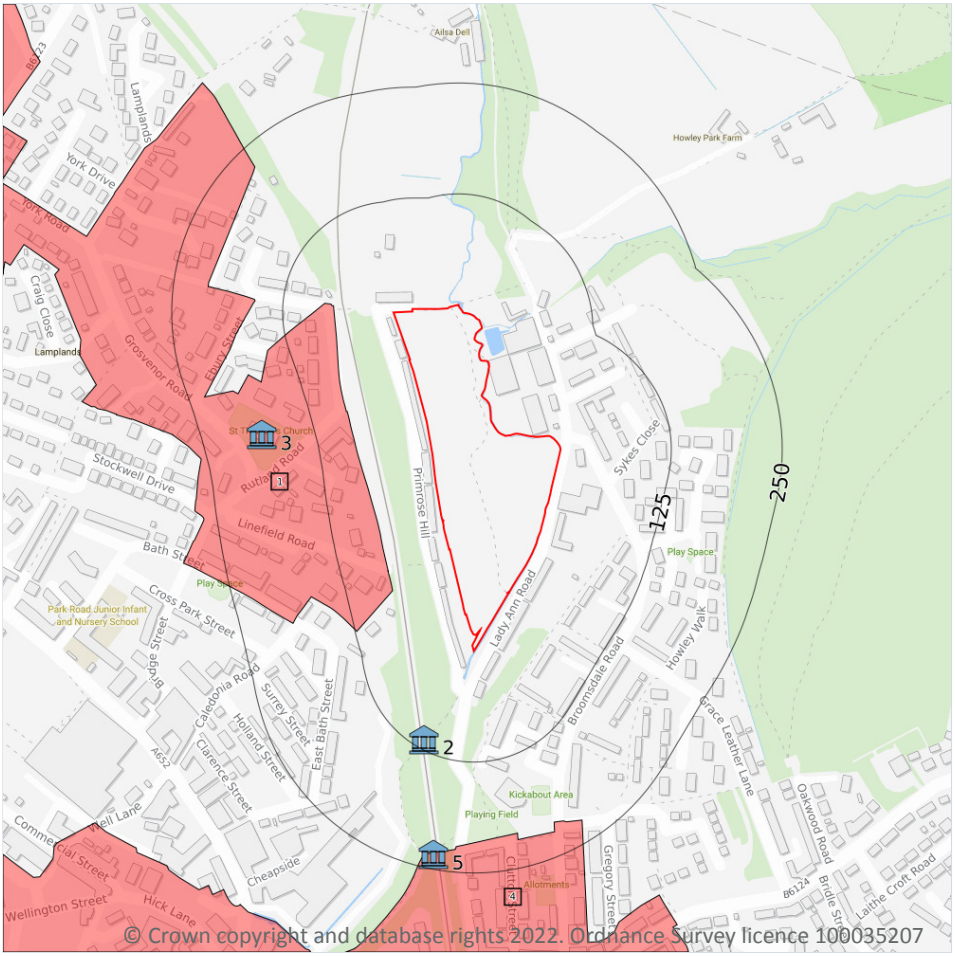
10.18 SSSI Units

Records within 2000m	0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations



Site Outline

Search buffers in metres (m)

- Listed buildings
- Conservation areas
- Conservation areas - no data
- National Parks
- Areas of Outstanding Natural Beauty
- Registered parks and gardens
- Scheduled Monuments
- World Heritage Sites

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	3

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on **page 96**

ID	Location	Name	Grade	Reference Number	Listed date
2	115m S	Railway Subway Mdl1/31, Lady Ann Road Subway, Batley, Kirklees, WF17	II	1452197	23/03/2018
3	184m W	Church of St Thomas, Batley, Kirklees, WF17	II	1134644	13/01/1984
5	233m S	Railway Subway Mdl1/30, West Street Subway, Batley, Kirklees, WF17	II	1452195	23/03/2018

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	2

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

Features are displayed on the Visual and cultural designations map on **page 96**

ID	Location	Name	District	Date of designation
1	67m NW	Upper Batley	Kirklees	05/11/1979
4	211m S	Station Road	Kirklees	27/02/1987

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

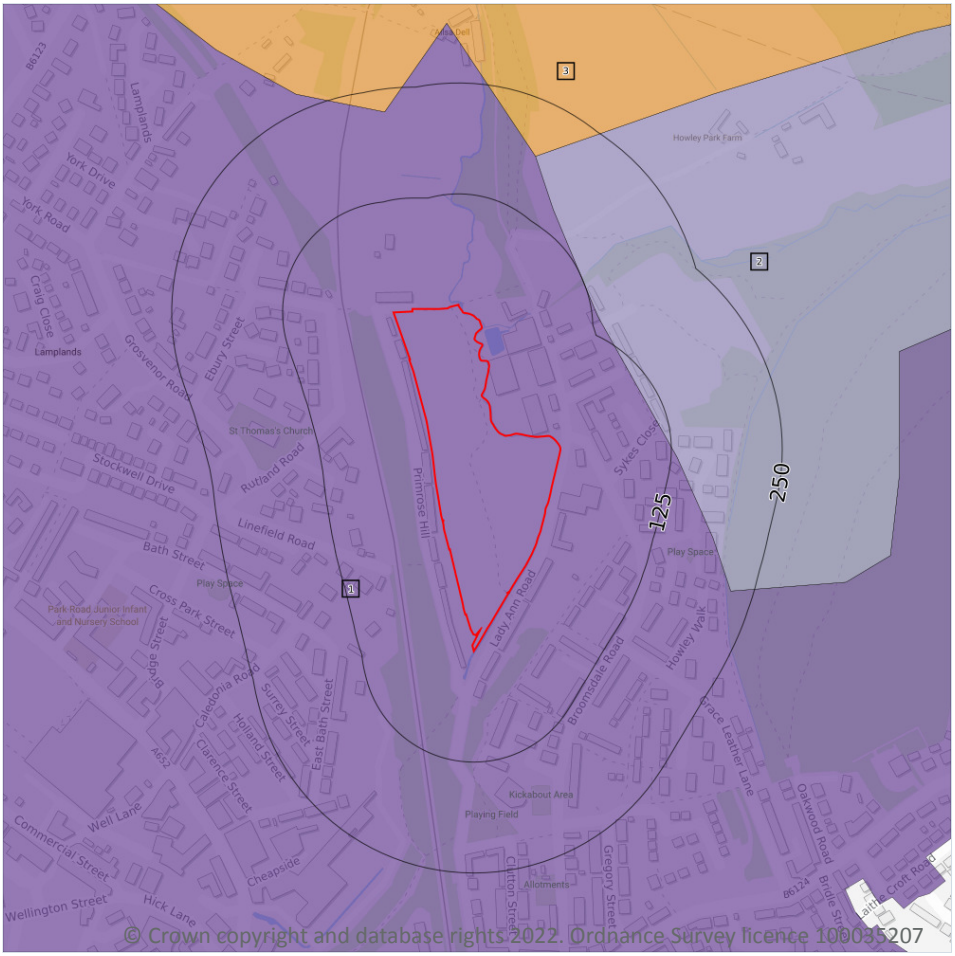
11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations



- Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	3

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 99**

ID	Location	Classification	Description
1	**On site**	**Urban**	**-**
2	109m E	Non Agricultural	-

ID	Location	Classification	Description
3	189m N	Grade 3	Good to moderate quality agricultural land. Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

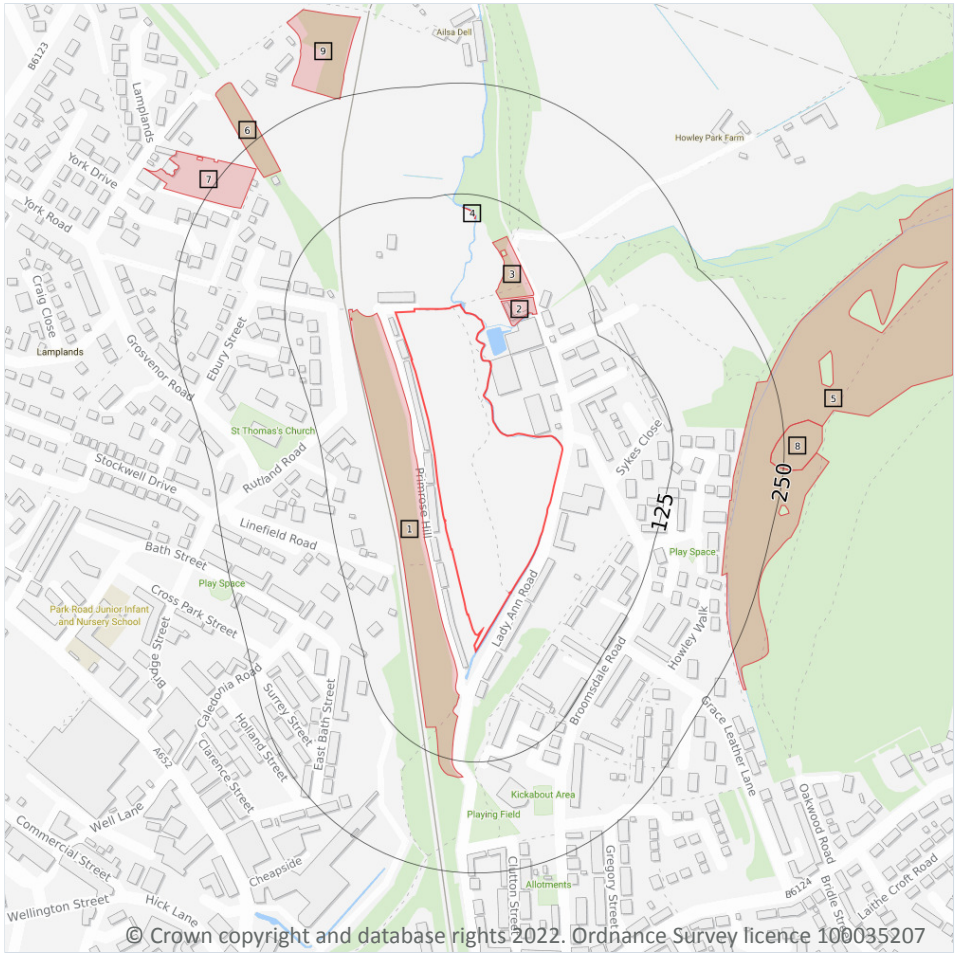
12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations



13.1 Priority Habitat Inventory

Records within 250m	9

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 101**

ID	Location	Main Habitat	Other habitats
1	18m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
2	29m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
3	32m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
4	98m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

ID	Location	Main Habitat	Other habitats
5	195m E	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
6	206m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
7	210m NW	No main habitat but additional habitats present	Main habitat: DWOOD (INV > 50%)
8	235m E	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
9	249m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

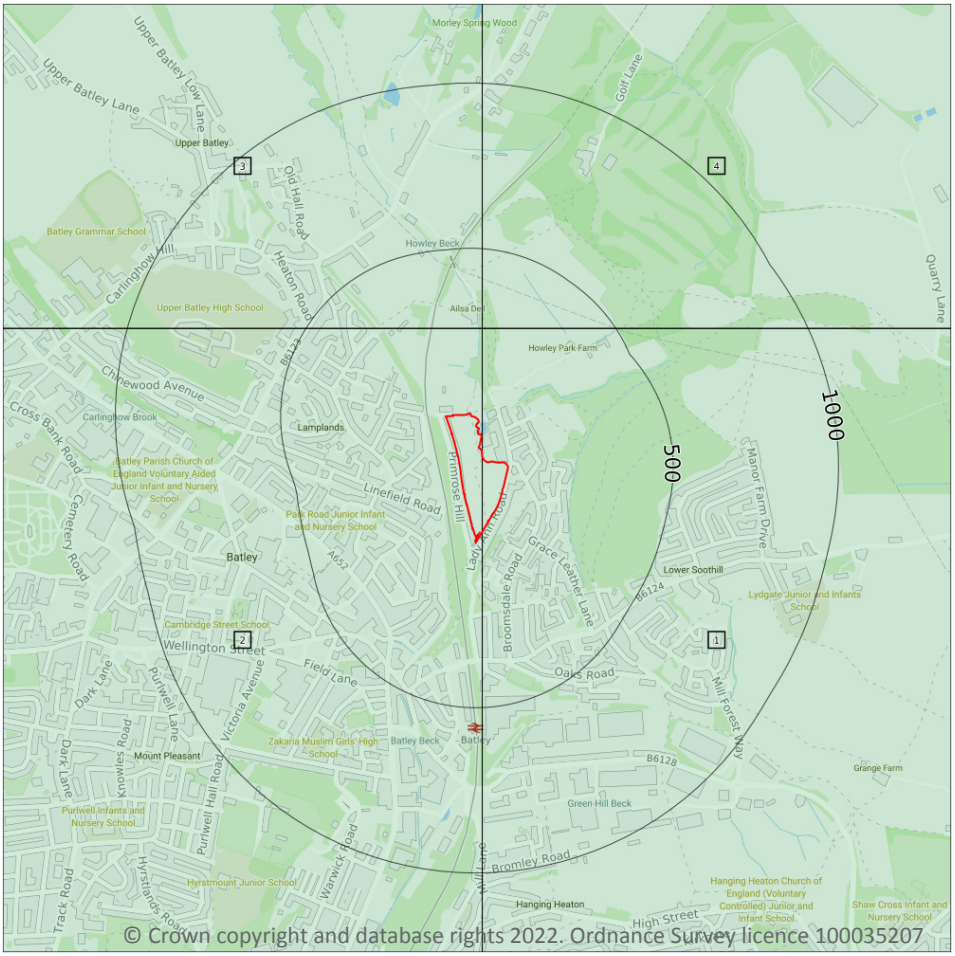
13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



14.1 10k Availability

Records within 500m **4**

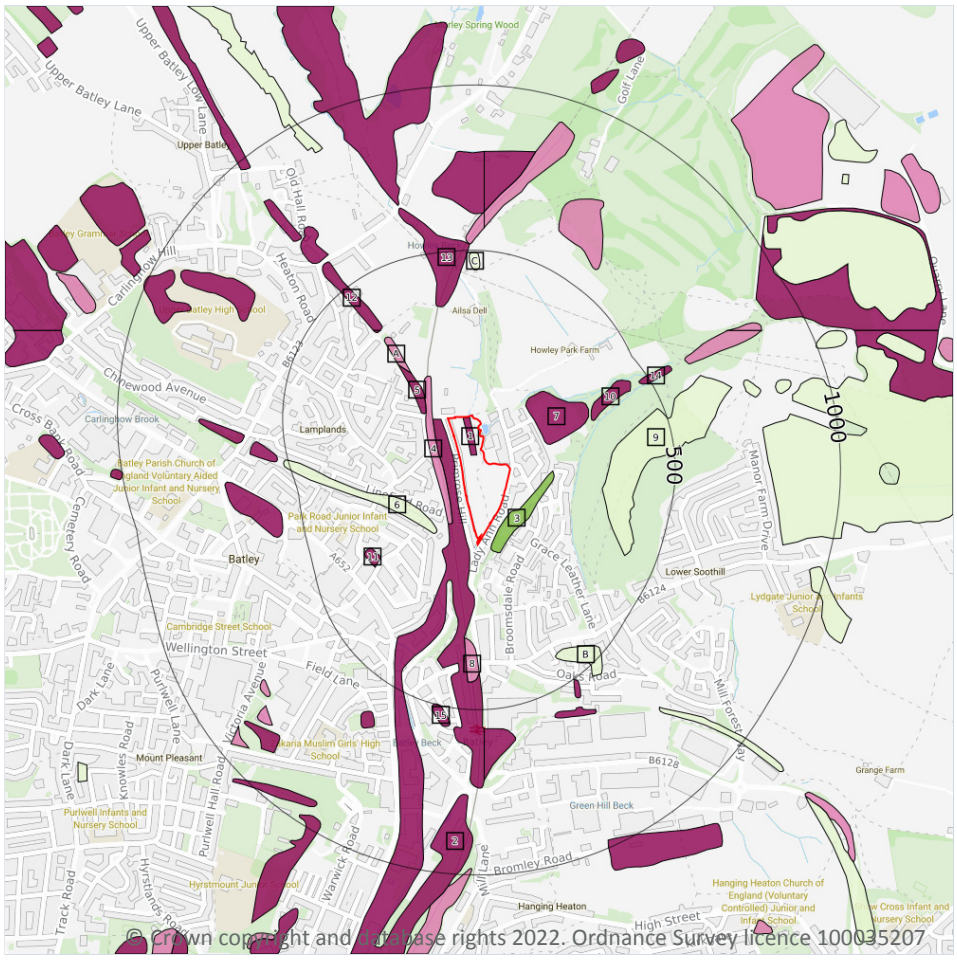
An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 103**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**No coverage**	**SE22SE**
2	**On site**	**Full**	**Full**	**Full**	**Full**	**SE22SW**
3	257m N	Full	Full	Full	No coverage	SE22NW
4	260m N	Full	Full	Full	No coverage	SE22NE

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground



Site Outline

Search buffers in metres (m)

- Reclaimed ground
- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m	19

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

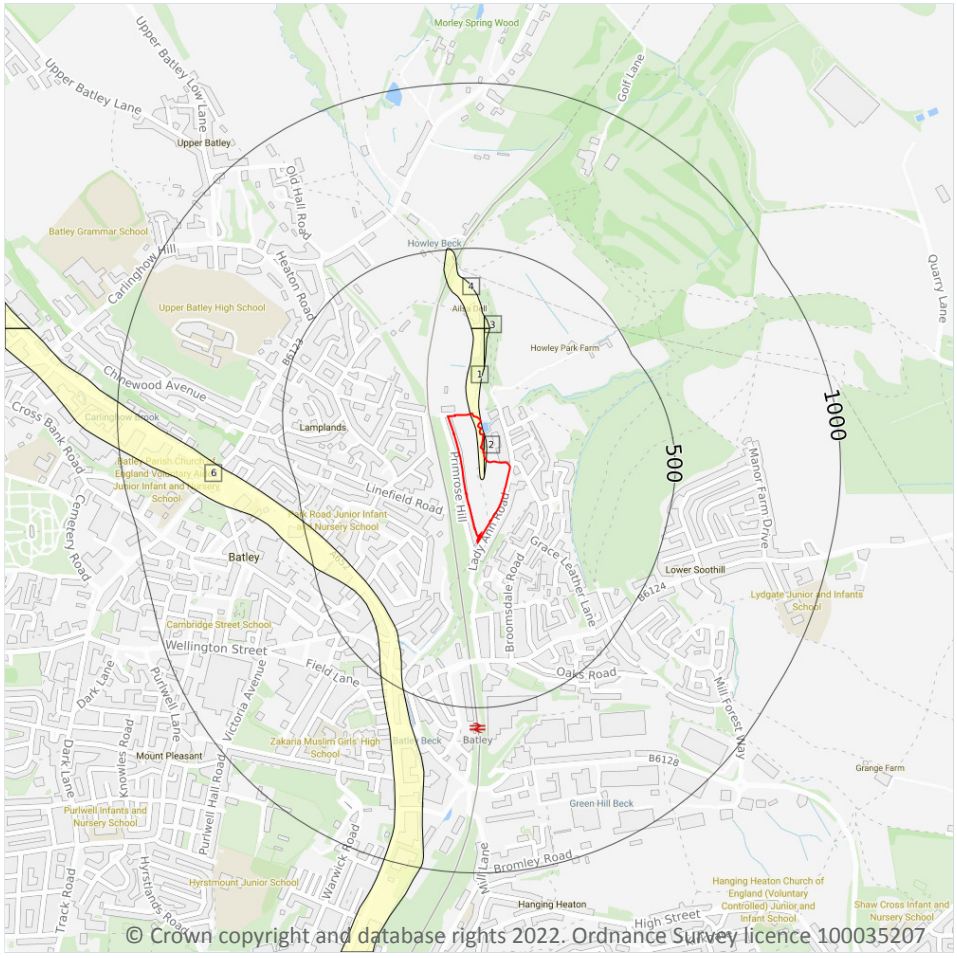
Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 105**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**MGR-ARTDP**	**Made Ground (Undivided)**	**Artificial Deposit**
2	19m NW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
3	30m S	DDGR-UKNOWN	Disturbed Ground (Undivided)	Unknown/unclassified Entry
4	46m NW	WGR-VOID	Worked Ground (Undivided)	Void

ID	Location	LEX Code	Description	Rock description
5	68m NW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
6	110m SW	WMGR-ARTDP	Infilled Ground	Artificial Deposit
7	133m NE	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
A	176m NW	WGR-VOID	Worked Ground (Undivided)	Void
8	284m S	WGR-VOID	Worked Ground (Undivided)	Void
9	285m E	WMGR-ARTDP	Infilled Ground	Artificial Deposit
10	288m NE	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
11	294m SW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
A	335m NW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
12	335m NW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
13	336m N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
B	407m SE	WMGR-ARTDP	Infilled Ground	Artificial Deposit
C	440m N	WMGR-ARTDP	Infilled Ground	Artificial Deposit
14	470m NE	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
15	498m S	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



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Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m **6**

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 107**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**ALV-XCSV**	**Alluvium - Clay, Sand And Gravel**	**Clay, Sand And Gravel**
2	**On site**	**ALV-XCSV**	**Alluvium - Clay, Sand And Gravel**	**Clay, Sand And Gravel**
3	143m N	ALV-XCSV	Alluvium - Clay, Sand And Gravel	Clay, Sand And Gravel
4	257m N	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel

ID	Location	LEX Code	Description	Rock description
5	260m N	ALV-XCSV	Alluvium - Clay, Sand And Gravel	Clay, Sand And Gravel
6	344m SW	ALV-XCSV	Alluvium - Clay, Sand And Gravel	Clay, Sand And Gravel

This data is sourced from the British Geological Survey.

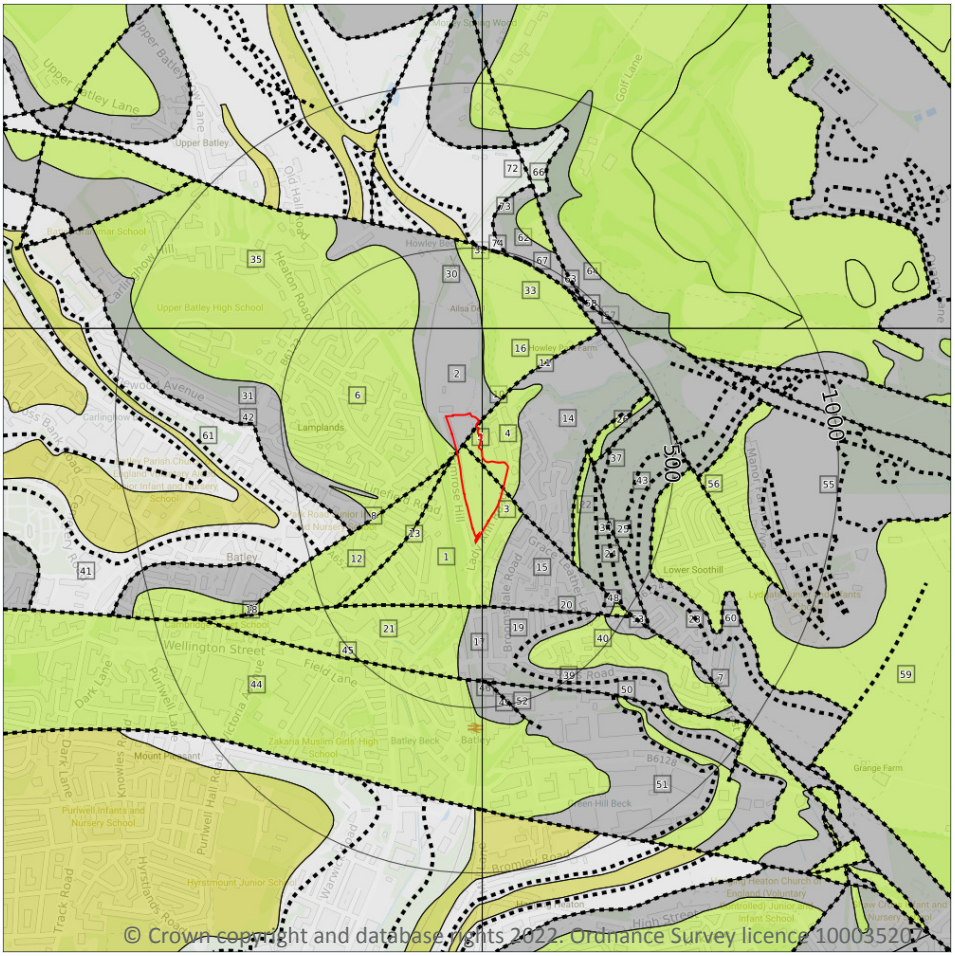
14.4 Landslip (10k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m **38**

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 109**

ID	Location	LEX Code	Description	Rock age
1	On site	TR-SDST	Thornhill Rock - Sandstone	Duckmantian Sub-age
2	On site	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
3	On site	TR-SDST	Thornhill Rock - Sandstone	Duckmantian Sub-age

ID	Location	LEX Code	Description	Rock age
4	**On site**	**TR-SDST**	**Thornhill Rock - Sandstone**	**Duckmantian Sub-age**
5	**On site**	**TR-SDST**	**Thornhill Rock - Sandstone**	**Duckmantian Sub-age**
6	**On site**	**TR-SDST**	**Thornhill Rock - Sandstone**	**Duckmantian Sub-age**
10	13m N	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
12	16m NW	TR-SDST	Thornhill Rock - Sandstone	Duckmantian Sub-age
14	35m SE	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
15	76m SE	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
16	89m N	TR-SDST	Thornhill Rock - Sandstone	Duckmantian Sub-age
17	194m S	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
19	195m S	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
21	196m S	TR-SDST	Thornhill Rock - Sandstone	Duckmantian Sub-age
22	217m E	HMR-SDST	Haigh Moor Rock - Sandstone	Duckmantian Sub-age
24	237m E	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
26	248m E	HMR-SDST	Haigh Moor Rock - Sandstone	Duckmantian Sub-age
28	256m E	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
30	257m N	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
31	259m W	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
32	260m N	TR-SDST	Thornhill Rock - Sandstone	Duckmantian Sub-age
33	260m N	TR-SDST	Thornhill Rock - Sandstone	Duckmantian Sub-age
35	282m NW	TR-SDST	Thornhill Rock - Sandstone	Duckmantian Sub-age
36	282m E	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
40	357m S	HMR-SDST	Haigh Moor Rock - Sandstone	Duckmantian Sub-age

ID	Location	LEX Code	Description	Rock age
41	361m SW	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
44	415m S	TR-SDST	Thornhill Rock - Sandstone	Duckmantian Sub-age
46	416m S	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
49	420m S	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
51	424m S	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
53	447m SE	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
54	451m SE	HMR-SDST	Haigh Moor Rock - Sandstone	Duckmantian Sub-age
55	454m NE	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
57	454m NE	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
59	458m E	PMCM-SDST	Pennine Middle Coal Measures Formation - Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
62	477m NE	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
64	479m NE	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
72	492m N	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m **36**

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 109**

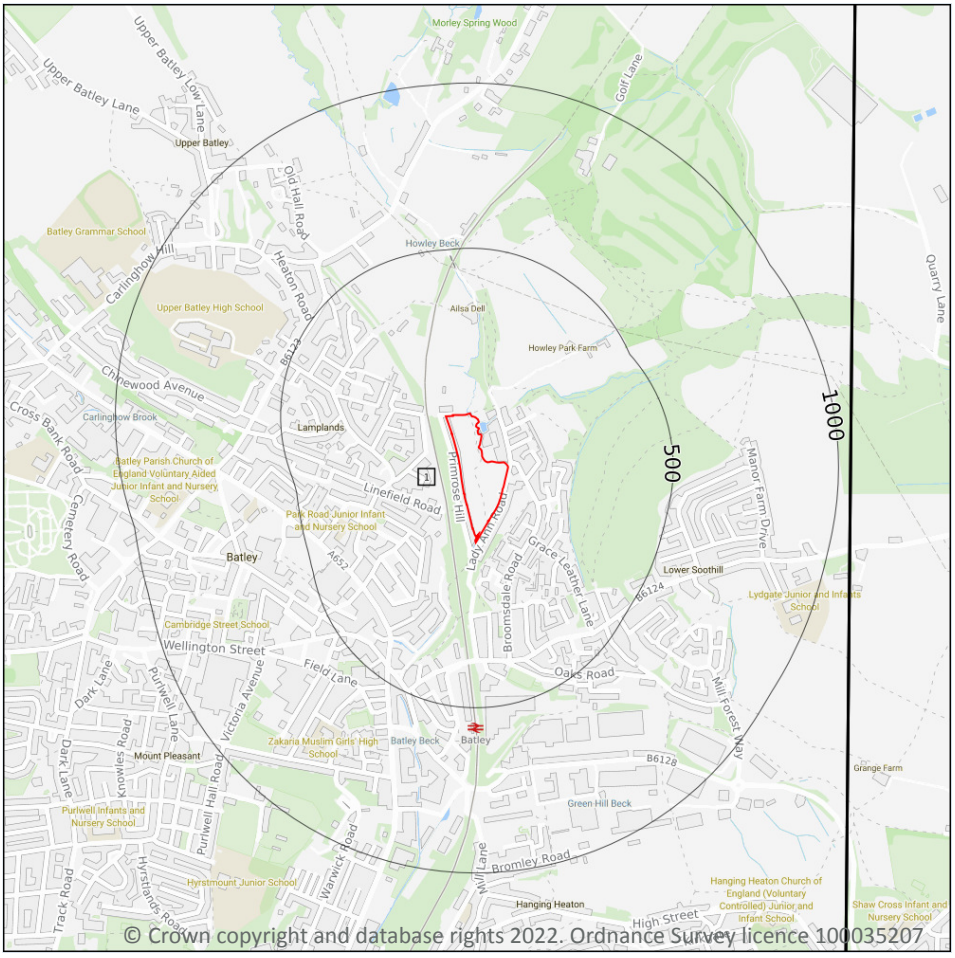
ID	Location	Category	Description
7	**On site**	**FAULT**	**Normal fault, inferred**

ID	Location	Category	Description
8	**On site**	**FAULT**	**Normal fault, inferred; downthrow not specified**
9	**On site**	**FAULT**	**Normal fault, inferred; downthrow not specified**
11	13m N	FAULT	Normal fault, inferred
13	16m NW	FAULT	Normal fault, inferred; downthrow not specified
18	194m S	FAULT	Normal fault, inferred; downthrow not specified
20	195m S	FAULT	Normal fault, inferred
23	217m E	ROCK	Coal seam, inferred
25	245m E	FAULT	Normal fault, inferred
27	248m E	ROCK	Coal seam, inferred
29	256m E	FAULT	Normal fault, inferred
34	271m E	ROCK	Coal seam, inferred
37	285m E	ROCK	Coal seam, observed
38	323m E	ROCK	Coal seam, inferred
39	336m S	ROCK	Coal seam, inferred
42	361m SW	ROCK	Coal seam, inferred
43	380m E	ROCK	Coal seam, observed
45	415m S	FAULT	Normal fault, inferred; downthrow not specified
47	417m E	ROCK	Coal seam, inferred
48	420m SE	ROCK	Coal seam, inferred
50	420m S	FAULT	Normal fault, inferred
52	424m S	FAULT	Normal fault, inferred
56	454m NE	FAULT	Normal fault, inferred
58	454m NE	FAULT	Normal fault, inferred
60	458m E	ROCK	Coal seam, inferred
61	469m SW	ROCK	Coal seam, inferred
63	477m NE	FAULT	Normal fault, inferred
65	479m NE	FAULT	Normal fault, inferred
66	479m NE	FAULT	Normal fault, inferred

ID	Location	Category	Description
67	481m N	FAULT	Normal fault, inferred
68	487m N	FAULT	Normal fault, inferred
69	488m N	FAULT	Normal fault, inferred
70	490m N	FAULT	Normal fault, inferred
71	490m N	FAULT	Normal fault, inferred
73	492m N	ROCK	Coal seam, inferred coincident with bedrock geology boundary
74	496m N	FAULT	Normal fault, inferred

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

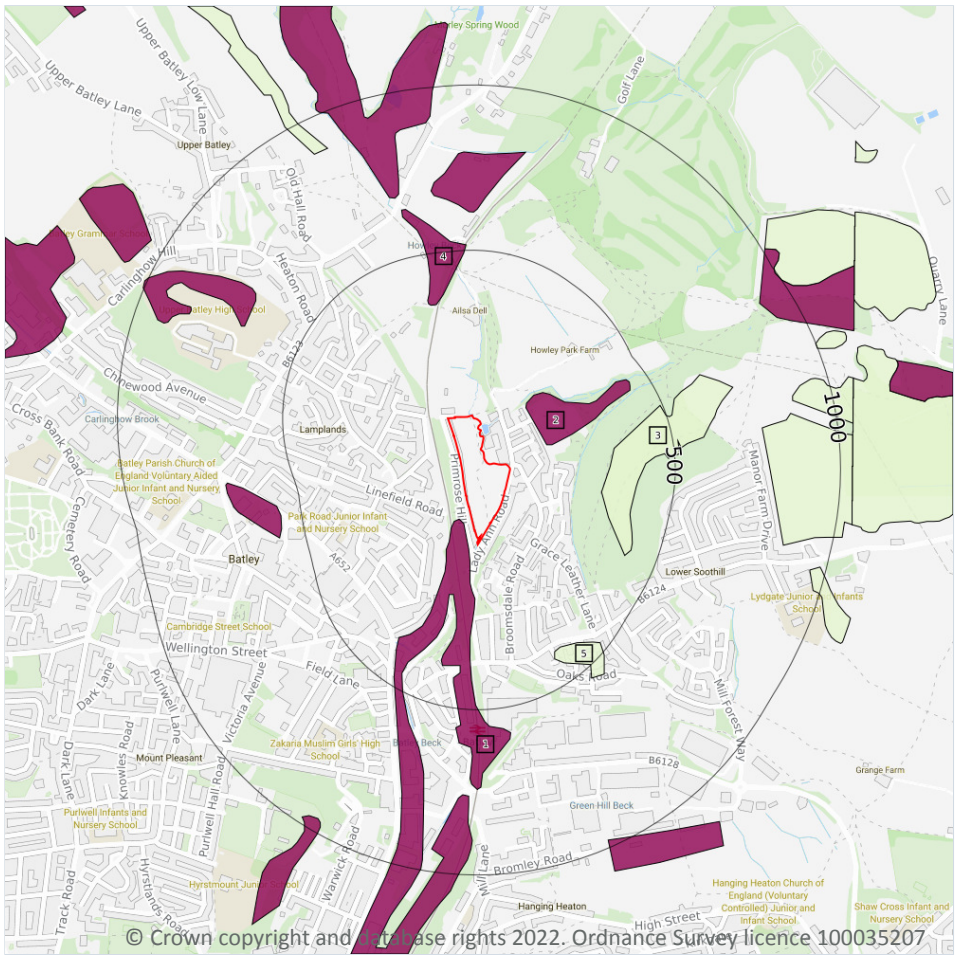
An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 114**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**EW077_huddersfield_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground



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Site Outline

Search buffers in metres (m)

- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

15.2 Artificial and made ground (50k)

Records within 500m	5

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on **page 115**

ID	Location	LEX Code	Description	Rock description
1	27m S	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
2	132m NE	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
3	285m E	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT
4	345m N	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

ID	Location	LEX Code	Description	Rock description
5	398m SE	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

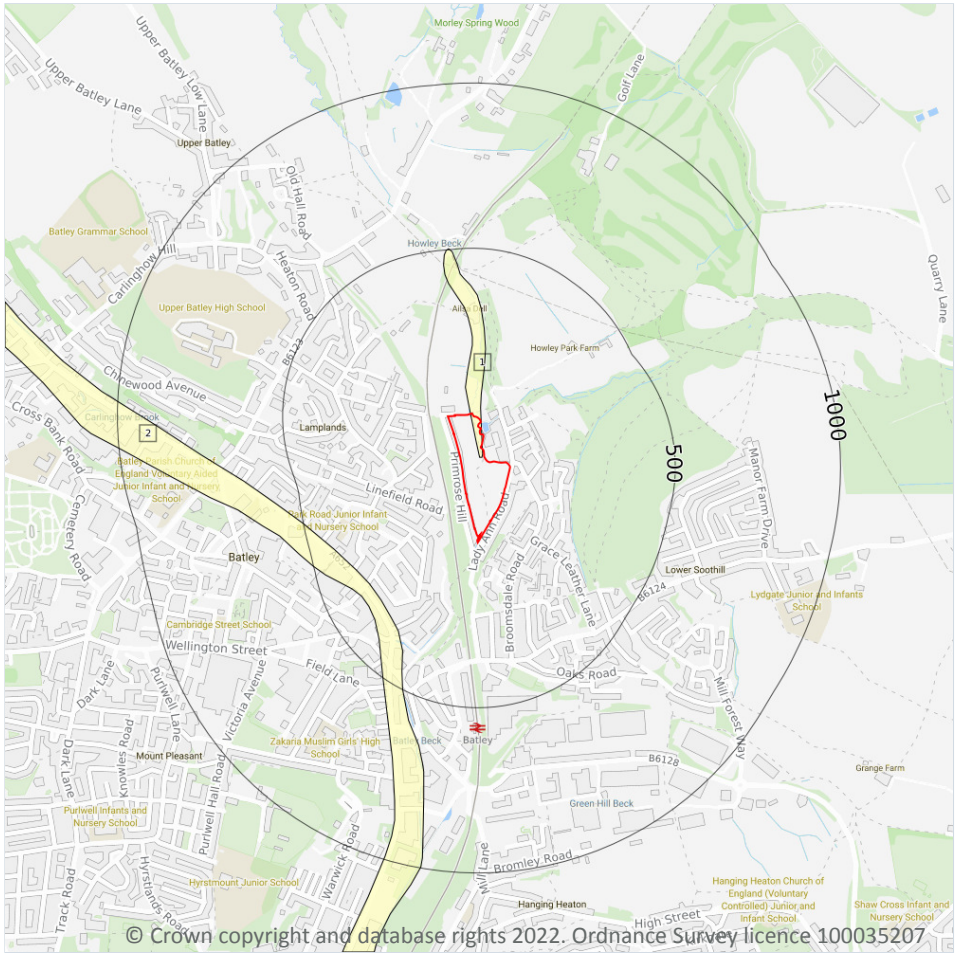
Records within 50m	**1**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
27m S	Mixed	Very High	Low

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m	2

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 117**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**ALV-XCZSV**	**ALLUVIUM**	**CLAY, SILT, SAND AND GRAVEL**
2	340m SW	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Intergranular**	**High**	**Very Low**

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

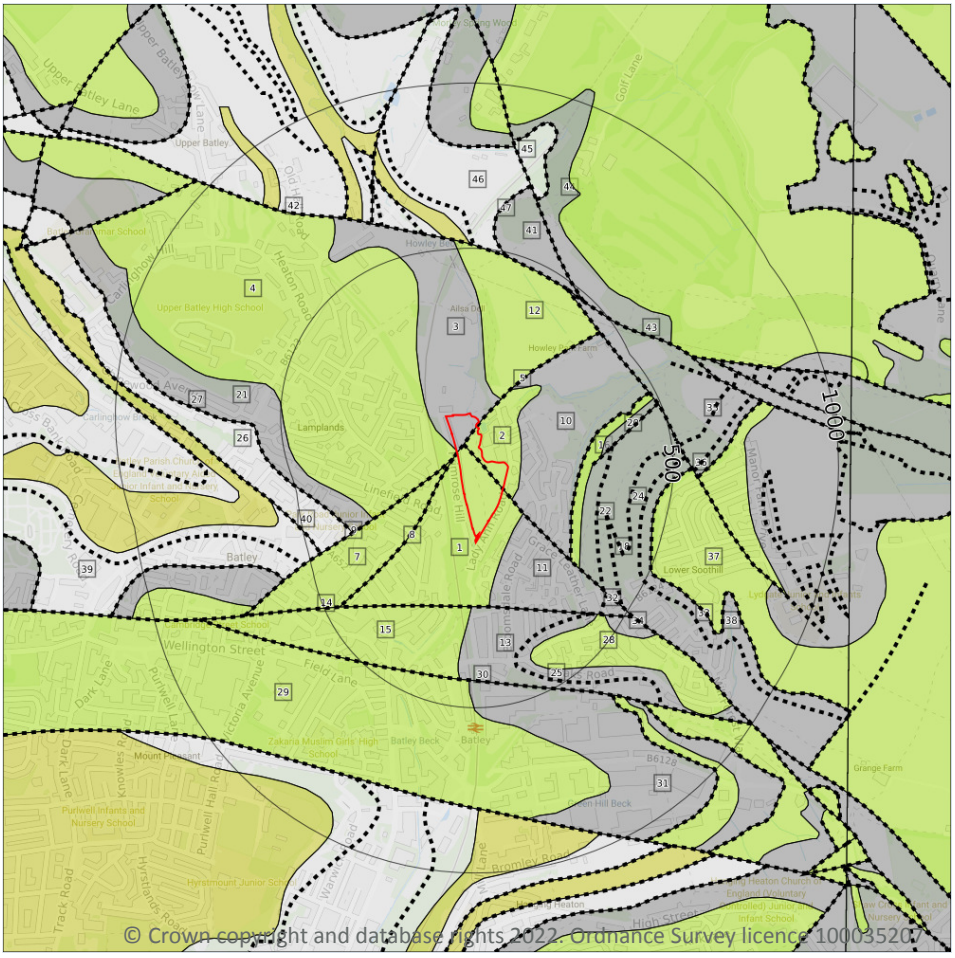
15.7 Landslip permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock


500
1000
Upper Batley Lane
Upper Batley
Upper Batley High School
Heaton Road
Lamplands
Batley
Wellington Street
Field Lane
Purwell Lane
Purwell Infants and Nursery School
Hyrstmount Junior School
Bromley Road
Grange Farm
Lower Soothill
Track Road
Dark Lane
Mount Pleasant
Batley Beck
Golf Lane
Howley Park
Howley Park Road
Grove Street
Bond Street
Rose Hill
Lady Anne Road
Primrose Hill
Soothill Lane
Purwell Hall Road
Victoria Avenue
Knowles Lane
Hyrstlands Road
Wellington Road
Bradford Road
Batley Girls' High School
Zakaria Muslim Girls' High School
Batley Parish CE (VC) Primary School
Batley Grammar School
Batley Boys' Grammar School
Batley Nursery
Batley Infant School
Batley Junior School
Batley Technology High School
Batley Girls' High School
Batley Boys' Grammar School
Ashton Hill Beck
Soothill Beck
Ailsa Dr

ID	Location	LEX Code	Description	Rock age
4	**On site**	**TR-SDST**	**THORNHILL ROCK - SANDSTONE**	**WESTPHALIAN**
7	17m NW	TR-SDST	THORNHILL ROCK - SANDSTONE	WESTPHALIAN
10	35m SE	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
11	78m SE	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
12	90m N	TR-SDST	THORNHILL ROCK - SANDSTONE	WESTPHALIAN
13	194m S	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
15	195m S	TR-SDST	THORNHILL ROCK - SANDSTONE	WESTPHALIAN
16	213m E	HMR-SDST	HAIGH MOOR ROCK - SANDSTONE	WESTPHALIAN
18	243m E	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
20	283m E	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
21	285m SW	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
26	354m SW	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
28	363m S	HMR-SDST	HAIGH MOOR ROCK - SANDSTONE	WESTPHALIAN
29	417m S	TR-SDST	THORNHILL ROCK - SANDSTONE	WESTPHALIAN
31	417m S	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
34	447m SE	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
35	453m NE	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
37	460m E	HRR-SDST	HORBURY ROCK - SANDSTONE	WESTPHALIAN
39	465m SW	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
41	474m N	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
44	479m NE	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN

ID	Location	LEX Code	Description	Rock age
46	489m N	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	**5**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**High**	**Moderate**
On site	**Fracture**	**High**	**Moderate**
On site	**Fracture**	**Moderate**	**Low**
12m N	Fracture	Moderate	Low
35m SE	Fracture	Moderate	Low

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	**22**

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

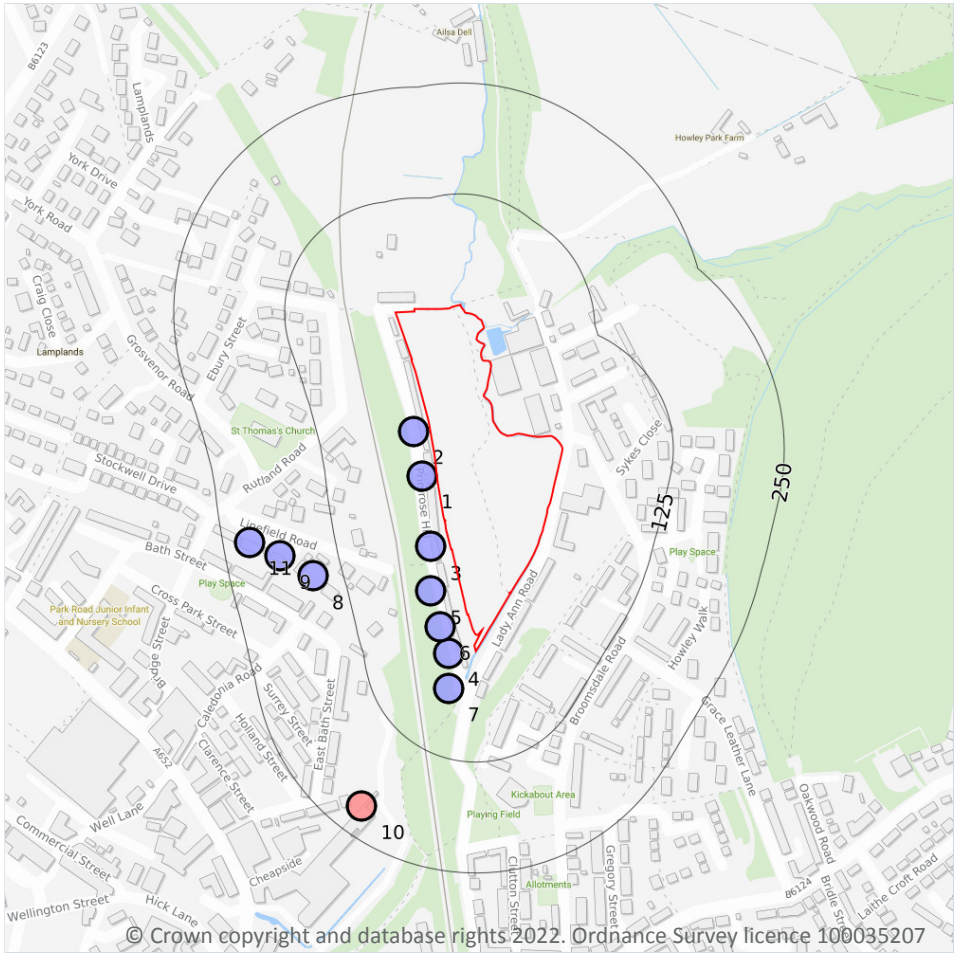
Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 119**

ID	Location	Category	Description
5	**On site**	**FAULT**	**Fault, inferred**
6	**On site**	**FAULT**	**Fault, inferred**
8	17m NW	FAULT	Fault, inferred, displacement unknown
9	17m NW	FAULT	Fault, inferred, displacement unknown
14	194m S	FAULT	Fault, inferred
17	213m E	ROCK	Coal seam, inferred

ID	Location	Category	Description
19	256m E	FAULT	Fault, inferred, displacement unknown
22	285m E	ROCK	Coal seam, inferred
23	323m E	ROCK	Coal seam, inferred
24	323m E	ROCK	Coal seam, inferred
25	334m S	ROCK	Coal seam, inferred
27	354m SW	ROCK	Coal seam, inferred
30	417m S	FAULT	Fault, inferred
32	420m SE	ROCK	Coal seam, inferred
33	425m E	ROCK	Coal seam, inferred
36	453m NE	FAULT	Fault, inferred
38	460m E	ROCK	Coal seam, inferred
40	465m SW	ROCK	Coal seam, inferred
42	474m N	FAULT	Fault, inferred
43	477m NE	FAULT	Fault, inferred
45	479m NE	FAULT	Fault, inferred
47	489m N	ROCK	Coal seam, inferred

This data is sourced from the British Geological Survey.

16 Boreholes



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16.1 BGS Boreholes

Records within 250m	11

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

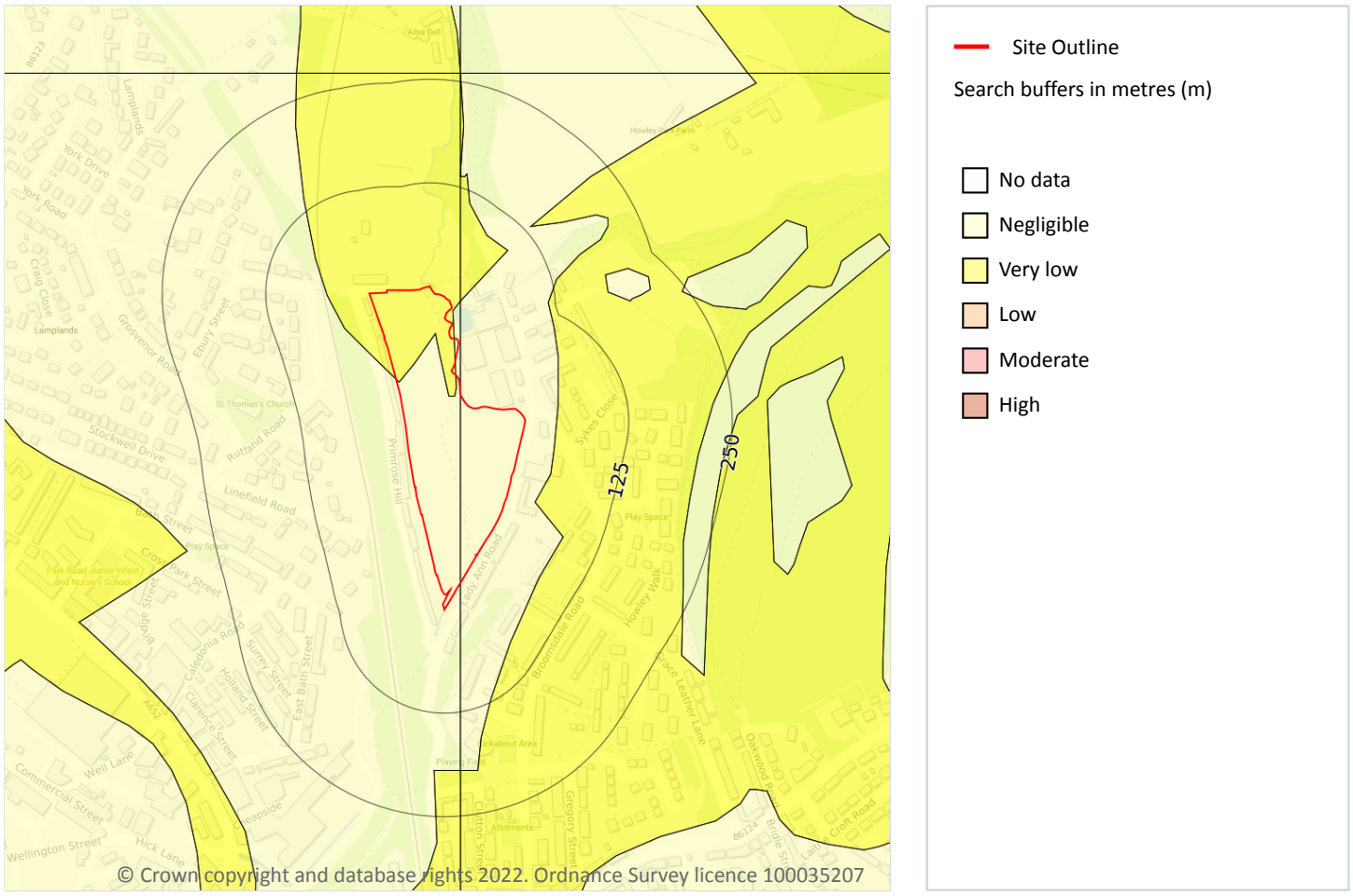
Features are displayed on the Boreholes map on **page 123**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	17m W	424920 424550	PRIMROSE HILL BATLEY TP 1PH6	2.2	N	13331332
2	19m NW	424910 424600	PRIMROSE HILL BATLEY TP 1PH7	1.7	N	13331336
3	21m SW	424930 424470	PRIMROSE HILL BATLEY TP 1PH5	1.6	N	13331329

ID	Location	Grid reference	Name	Length	Confidential	Web link
4	30m S	424950 424350	PRIMROSE HILL BATLEY TP 1PH2	1.8	N	13331315
5	34m S	424930 424420	PRIMROSE HILL BATLEY TP 1PH4	1.8	N	13331321
6	34m S	424940 424380	PRIMROSE HILL BATLEY TP 1PH3	1.8	N	13331319
7	52m S	424950 424310	PRIMROSE HILL BATLEY TP 1PH1	1.7	N	13331306
8	158m SW	424797 424437	BRIDGE STREET BATLEY TP 13	2.7	N	17989281
9	189m SW	424760 424460	BRIDGE STREET BATLEY TP 12	3.3	N	17989280
10	217m S	424852 424178	BATLEY CHEAPSIDE MILLS	103.63	N	77488
11	221m W	424725 424475	BRIDGE STREET BATLEY TP 11	3.5	N	17989279

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



17.1 Shrink swell clays

Records within 50m	4

The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

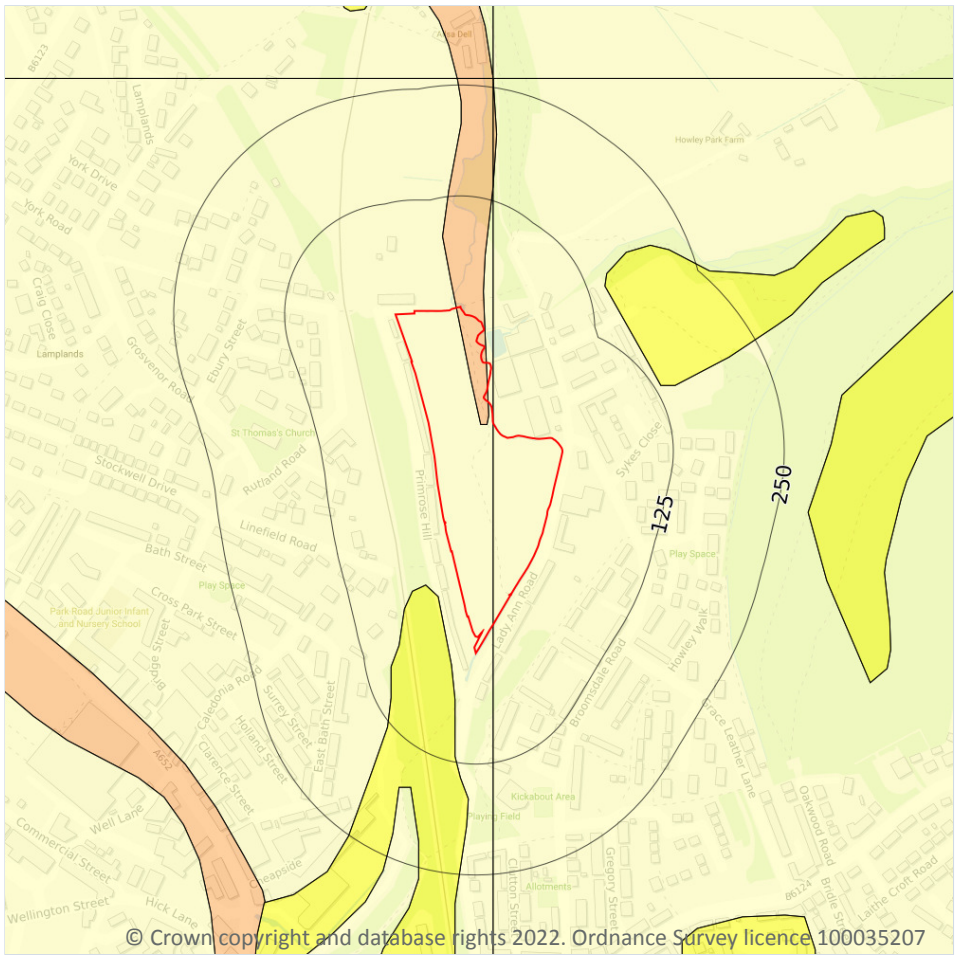
Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 125**

Location	Hazard rating	Details
On site	**Negligible**	**Ground conditions predominantly non-plastic.**
On site	**Very low**	**Ground conditions predominantly low plasticity.**
12m N	Very low	Ground conditions predominantly low plasticity.

Location	Hazard rating	Details
35m SE	Very low	Ground conditions predominantly low plasticity.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	3

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

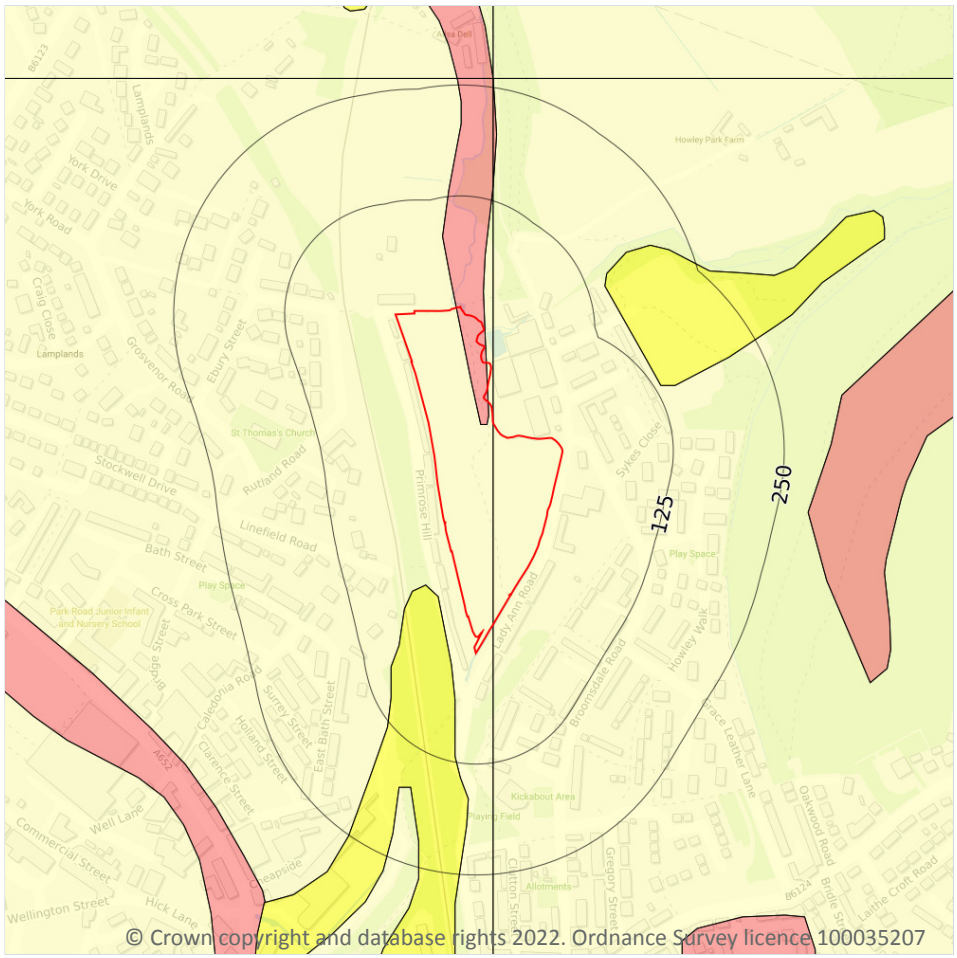
Features are displayed on the Natural ground subsidence - Running sands map on **page 127**

Location	Hazard rating	Details
On site	**Negligible**	**Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.**

Location	Hazard rating	Details
On site	**Low**	**Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.**
27m S	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	3

The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

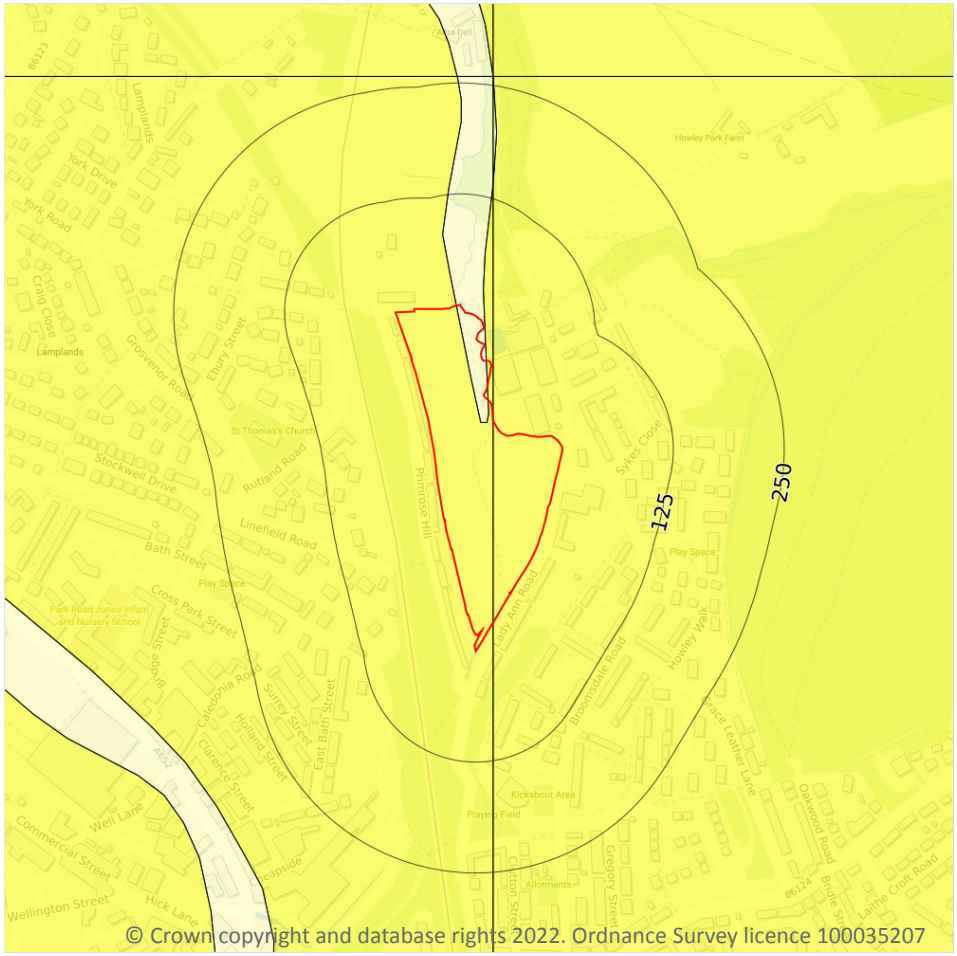
Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 129**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**
On site	**Moderate**	**Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.**

Location	Hazard rating	Details
27m S	Very low	Compressibility and uneven settlement problems are not likely to be significant on the site for most land uses.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	2

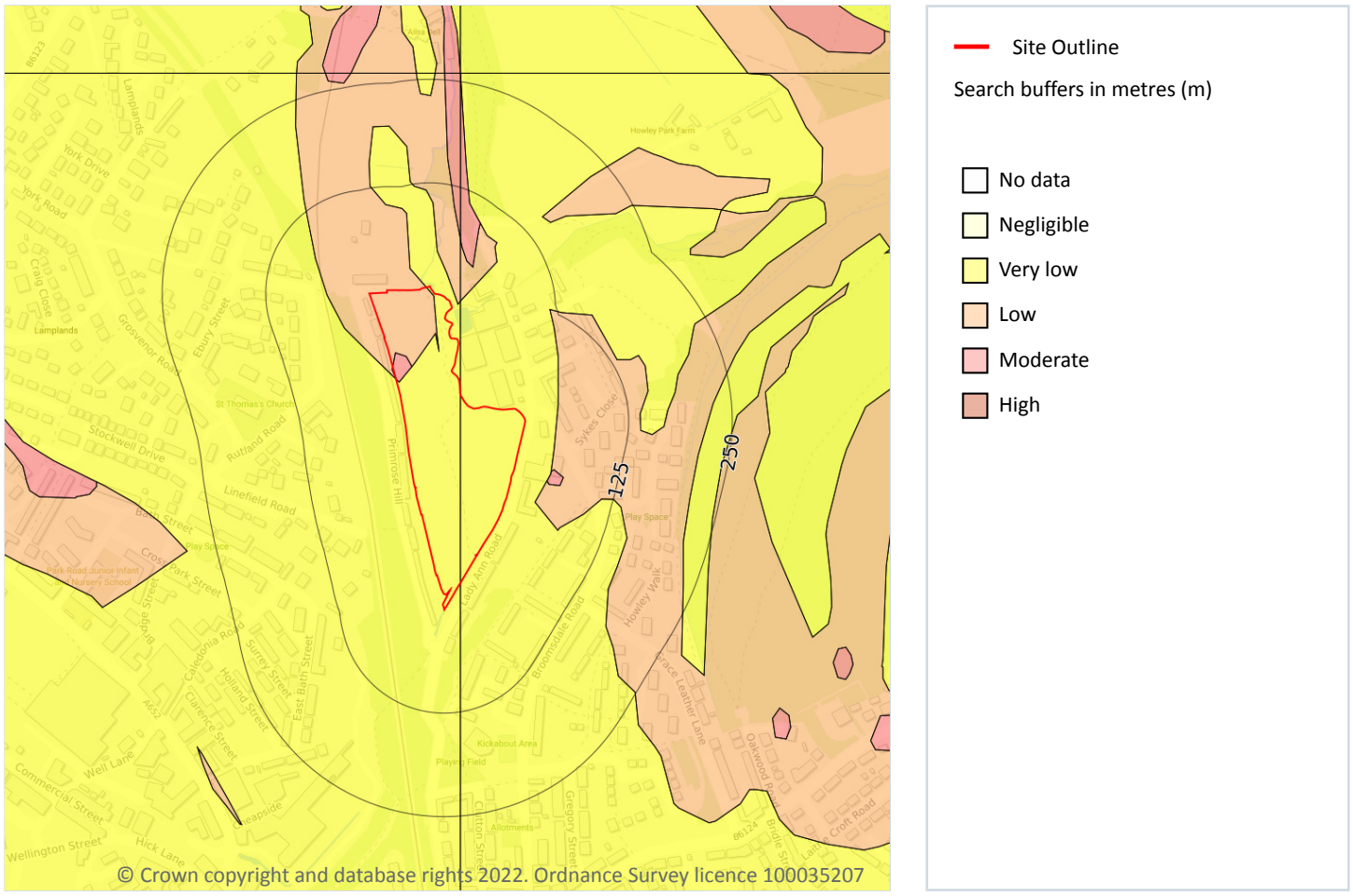
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 131**

Location	Hazard rating	Details
On site	**Negligible**	**Deposits with potential to collapse when loaded and saturated are believed not to be present.**
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



17.5 Landslides

Records within 50m	7

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 132**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

Location	Hazard rating	Details
On site	**Low**	**Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.**
On site	**Moderate**	**Slope instability problems are probably present or have occurred in the past. Land use should consider specifically the stability of the site.**
12m N	Low	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.
35m SE	Low	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.
42m SE	Moderate	Slope instability problems are probably present or have occurred in the past. Land use should consider specifically the stability of the site.
50m N	Moderate	Slope instability problems are probably present or have occurred in the past. Land use should consider specifically the stability of the site.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

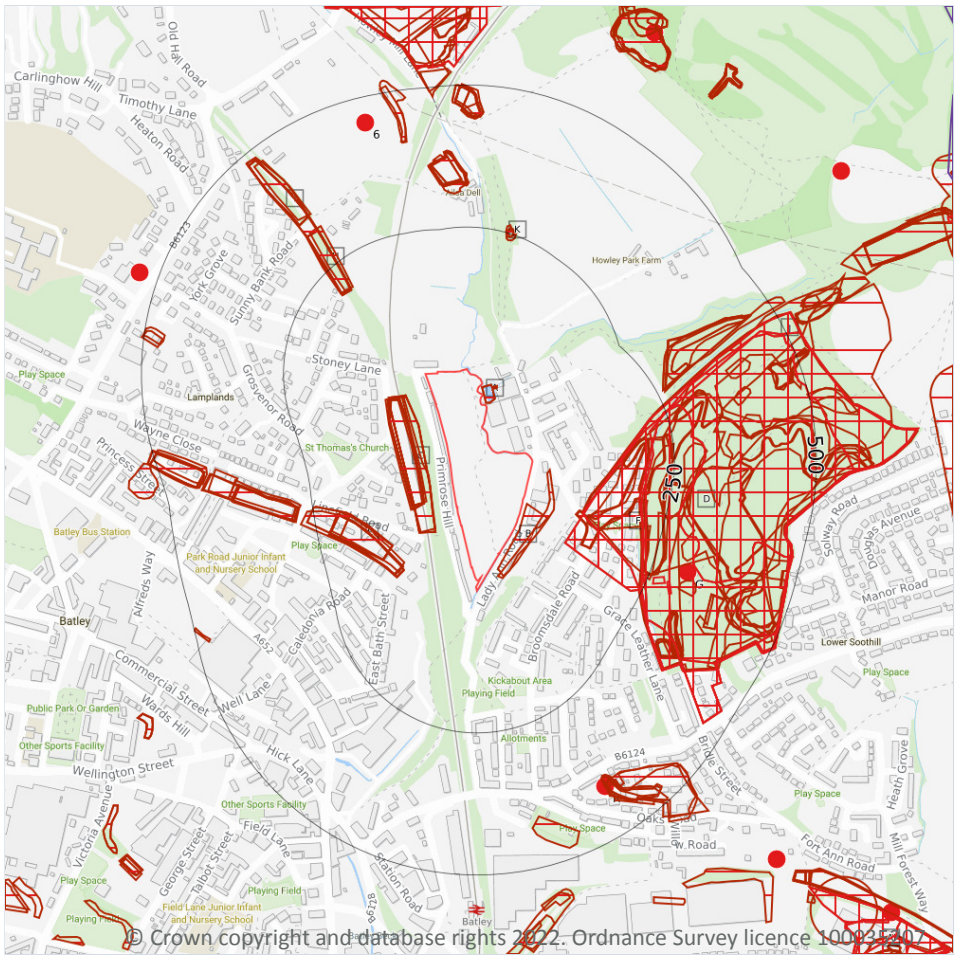
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 134**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m	3

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

Features are displayed on the Mining, ground workings and natural cavities map on **page 136**

ID	Location	Details	Description
G	312m SE	Name: Lower Soothill Address: Soothill, BATLEY, West Yorkshire Commodity: Coal, Deep Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
R	411m S	Name: Soothill Hall Address: Batley, BATLEY, West Yorkshire Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
6	455m N	Name: Lamp Lands Address: BATLEY, West Yorkshire Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	50

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 136**

ID	Location	Land Use	Year of mapping	Mapping scale
A	3m N	Pond	1931	1:10560
A	3m N	Pond	1905	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
B	7m SE	Cuttings	1892	1:10560
B	18m S	Unspecified Ground Workings	1905	1:10560
C	40m NW	Cuttings	1981	1:10000
C	40m NW	Cuttings	1974	1:10000
C	40m NW	Cuttings	1967	1:10560
C	40m W	Cuttings	1988	1:10000
C	51m SW	Cuttings	1955	1:10560
C	54m W	Cuttings	1931	1:10560
C	54m W	Cuttings	1948	1:10560
C	54m W	Cuttings	1905	1:10560
C	54m W	Cuttings	1892	1:10560
C	55m W	Cuttings	1931	1:10560
C	58m W	Cuttings	1948	1:10560
D	92m SE	Old Colliery	1931	1:10560
D	96m SE	Old Colliery	1948	1:10560
D	98m SE	Old Colliery	1931	1:10560
D	107m E	Disused Colliery	1948	1:10560
D	107m E	Refuse Heaps	1948	1:10560
E	113m SW	Cuttings	1955	1:10560
D	115m SE	Refuse Heap	1948	1:10560
D	117m SE	Refuse Heap	1931	1:10560
E	117m SW	Cuttings	1931	1:10560
E	117m SW	Cuttings	1931	1:10560
E	117m SW	Cuttings	1905	1:10560
D	117m SE	Refuse Heaps	1931	1:10560
E	117m SW	Cuttings	1948	1:10560
E	119m SW	Cuttings	1948	1:10560
E	119m SW	Cuttings	1892	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
F	121m SE	Cuttings	1957	1:10560
E	126m SW	Cuttings	1988	1:10000
E	126m SW	Cuttings	1981	1:10000
E	126m SW	Cuttings	1974	1:10000
E	126m SW	Cuttings	1967	1:10560
F	198m E	Refuse Heap	1892	1:10560
G	198m E	Colliery	1892	1:10560
H	198m NW	Cuttings	1931	1:10560
H	198m NW	Cuttings	1948	1:10560
H	198m NW	Cuttings	1905	1:10560
H	198m NW	Cuttings	1892	1:10560
H	200m NW	Cuttings	1955	1:10560
I	201m NW	Cuttings	1948	1:10560
I	201m NW	Cuttings	1931	1:10560
D	202m E	Colliery	1905	1:10560
F	206m E	Refuse Heap	1905	1:10560
J	229m E	Unspecified Heaps	1957	1:10560
K	238m N	Unspecified Pit	1905	1:10560
K	242m N	Unspecified Pit	1892	1:10560
K	245m N	Unspecified Ground Workings	1957	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	**31**

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

Features are displayed on the Mining, ground workings and natural cavities map on **page 136**

ID	Location	Land Use	Year of mapping	Mapping scale
D	92m SE	Old Colliery	1931	1:10560
D	107m E	Disused Colliery	1948	1:10560
G	198m E	Colliery	1892	1:10560
D	202m E	Colliery	1905	1:10560
G	260m SE	Unspecified Old Shafts	1931	1:10560
G	285m SE	Unspecified Old Shafts	1948	1:10560
10	533m N	Unspecified Workings	1974	1:10000
AD	638m N	Colliery	1906	1:10560
14	640m N	Colliery	1948	1:10560
-	646m N	Colliery	1892	1:10560
15	661m N	Colliery	1906	1:10560
AI	785m SE	Colliery	1905	1:10560
-	799m N	Colliery	1892	1:10560
-	814m N	Disused Colliery	1951	1:10560
AN	845m NE	Tunnel	1966	1:10560
AN	845m NE	Tunnel	1957	1:10560
-	859m NE	Tunnel	1892	1:10560
-	860m NE	Tunnel	1948	1:10560
-	860m NE	Tunnel	1931	1:10560
-	871m N	Tunnel	1892	1:10560
AI	872m SE	Disused Colliery	1948	1:10560
-	872m N	Tunnel	1948	1:10560
-	872m N	Tunnel	1906	1:10560
-	872m N	Tunnel	1932	1:10560
AI	878m SE	Colliery	1892	1:10560
-	880m N	Tunnel	1990	1:10000
-	880m N	Tunnel	1975	1:10000
-	880m N	Tunnel	1995	1:10000

ID	Location	Land Use	Year of mapping	Mapping scale
-	880m N	Tunnel	1966	1:10560
-	880m N	Tunnel	1957	1:10560
AI	918m SE	Disused Colliery	1931	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	**0**

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	**0**

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	**0**

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site	**0**

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	1

Areas which could be affected by past, current or future coal mining.

Location	Details
On site	**The site is located within a coal mining area as defined by the Coal Authority. A Consultants Coal Mining Report is recommended to further assess coal mining issues at the site. This can be ordered directly through Groundsure or your preferred search provider.**

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

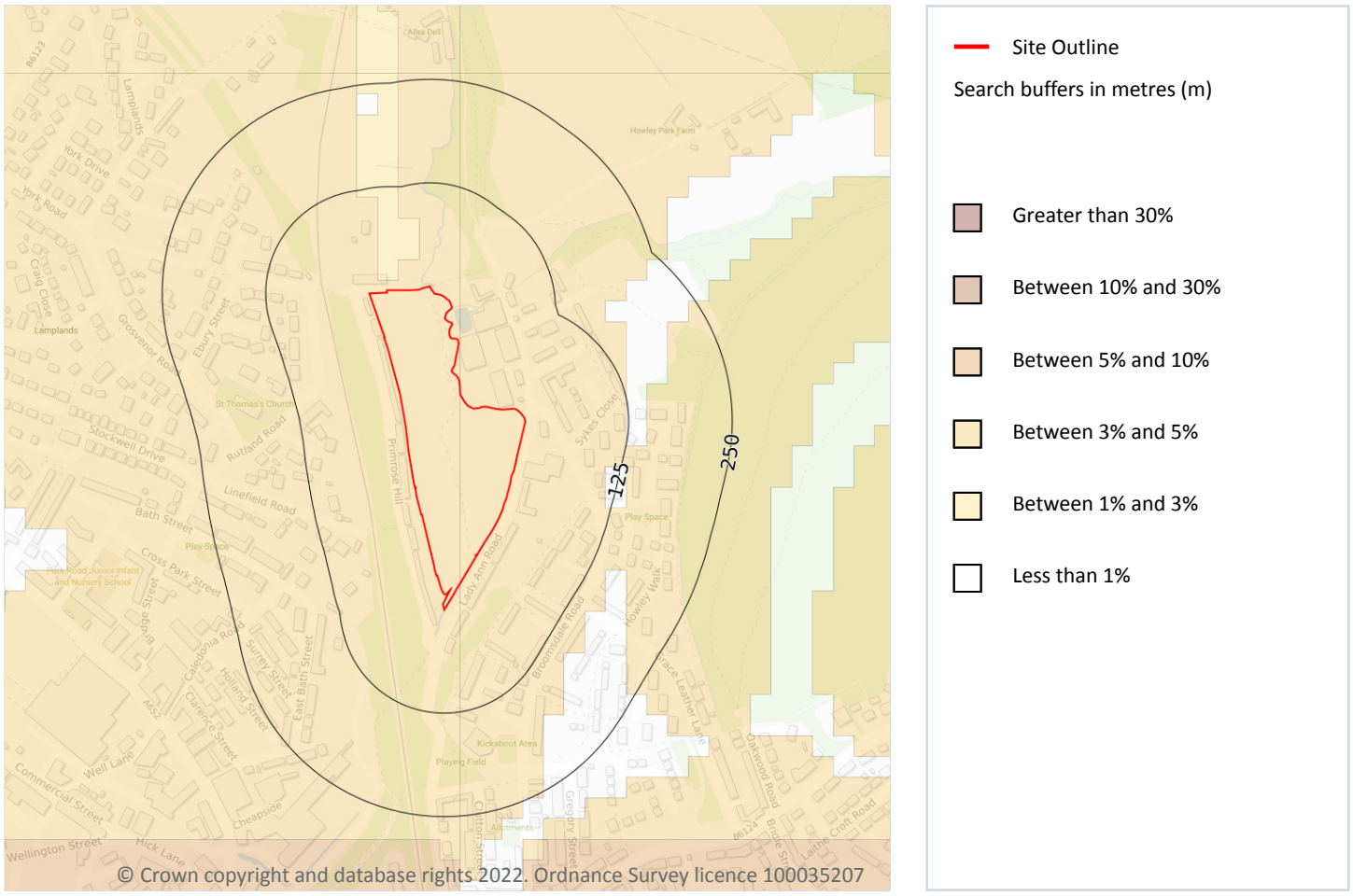
18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



19.1 Radon

Records on site	1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 143**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Between 3% and 5%**	**Basic**

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	20

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	25 - 35 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**25 - 35 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**30 - 45 mg/kg**
1m N	25 - 35 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
12m N	25 - 35 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
12m N	25 - 35 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
15m SE	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
17m NW	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
35m SE	25 - 35 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
38m E	25 - 35 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	**0**

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

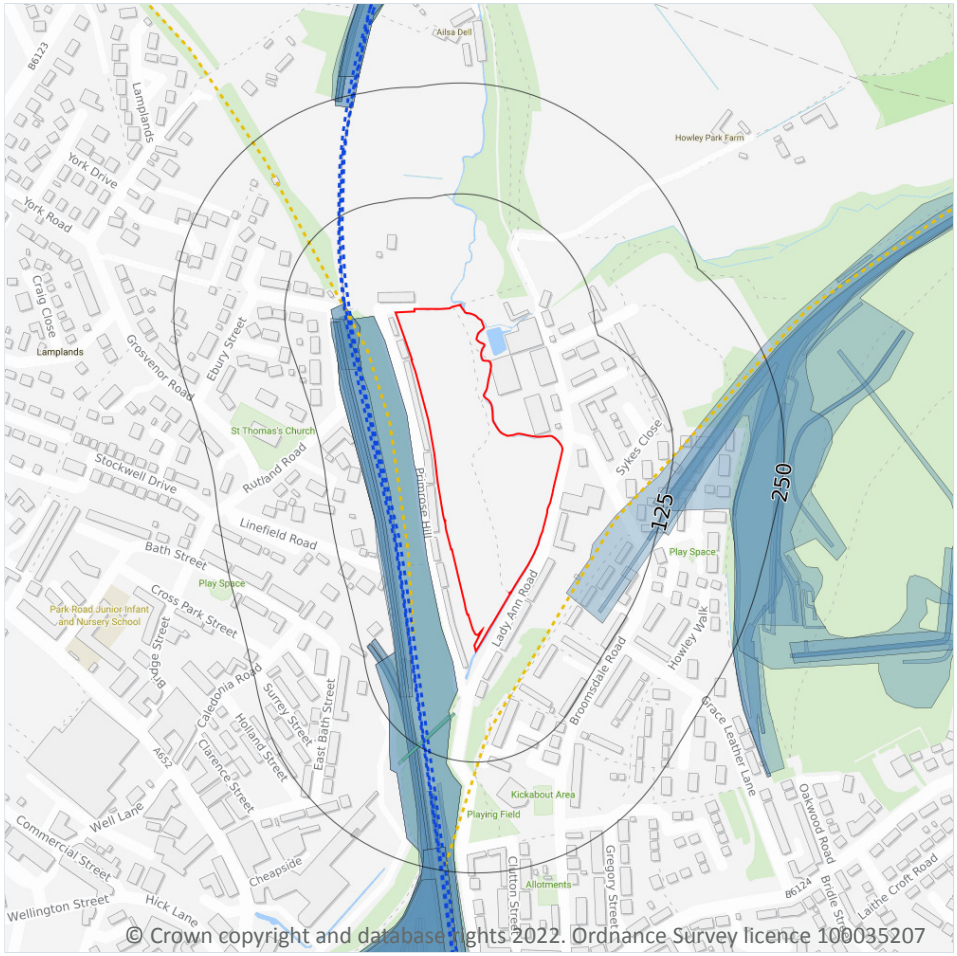
20.3 BGS Measured Urban Soil Chemistry

Records within 50m	**0**

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects



- Site Outline
- Search buffers in metres (m)
- Crossrail 1 Stations
- Crossrail 1 Route
- Crossrail 2 Stations
- Crossrail 2 Route
- Crossrail 2 Worksites
- Crossrail 2 Safeguarding
- Crossrail 2 Headhouses
- Railway stations
- Active railways
- Active tunnels
- Abandoned railways
- Historic railways
- Historic tunnels
- Underground stations
- Underground Lines
- Royal Mail tunnels
- HS2 optimised route
- HS2 Stations
- HS2 Depots
- HS2 Surface Safeguarding
- HS2 Subsurface Safeguarding

21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	48

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on **page 146**

Location	Land Use	Year of mapping	Mapping scale
22m W	Railway Sidings	1905	10560
22m W	Railway Sidings	1931	10560
43m NW	Railway Sidings	1967	10560
43m NW	Railway Sidings	1955	10560
53m SE	Railway Sidings	1905	10560
54m W	Railway Sidings	1948	10560
59m NW	Railway Sidings	1955	1250
59m NW	Railway Sidings	1955	2500
63m NW	Railway Sidings	1907	2500
64m NW	Railway Sidings	1931	10560
64m NW	Railway Sidings	1933	2500
64m NW	Railway Sidings	1894	2500
64m NW	Railway Sidings	1922	2500
67m NW	Railway Sidings	1948	10560
74m S	Tunnel	1955	2500
74m S	Tunnel	1969	2500
74m S	Tunnel	1955	1250

Location	Land Use	Year of mapping	Mapping scale
78m S	Railway Sidings	1907	2500
79m S	Tunnel	1933	2500
79m S	Railway Sidings	1933	2500
79m S	Railway Sidings	1922	2500
79m S	Tunnel	1922	2500
92m S	Railway Sidings	1955	1250
93m S	Railway Sidings	1955	2500
94m SE	Mineral Railway Sidings	1907	2500
98m S	Railway Sidings	1907	2500
99m S	Railway Sidings	1933	2500
99m S	Railway Sidings	1922	2500
113m E	Railway Sidings	1892	10560
116m SE	Railway Sidings	1922	2500
126m E	Railway Sidings	1894	2500
154m S	Railway Sidings	1969	2500
167m S	Railway Sidings	1922	2500
168m S	Railway Sidings	1907	2500
168m S	Railway Sidings	1933	2500
171m S	Railway Sidings	1894	2500
173m S	Railway Sidings	1894	2500
224m S	Railway Sidings	1967	10560
224m S	Railway Sidings	1955	10560
236m N	Railway Sidings	1905	10560
236m N	Railway Sidings	1931	10560
242m E	Tramway Sidings	1922	2500
244m N	Railway Sidings	1922	2500
246m N	Railway Sidings	1931	10560
246m N	Railway Sidings	1948	10560

Location	Land Use	Year of mapping	Mapping scale
247m N	Railway Sidings	1907	2500
247m N	Railway Sidings	1894	2500
247m N	Railway Sidings	1933	2500

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	2

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

Features are displayed on the Railway infrastructure and projects map on **page 146**

Location	Description
43m NW	Abandoned
58m SE	Abandoned

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	9

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

Features are displayed on the Railway infrastructure and projects map on **page 146**

Location	Name	Type
51m NW	Huddersfield Line	rail

Location	Name	Type
54m NW	Not given	Multi Track
56m NW	Huddersfield Line	rail
59m NW	Not given	Multi Track
78m NW	Not given	Multi Track
106m S	Not given	Multi Track
120m NW	Not given	Multi Track
189m NW	Not given	Multi Track
231m S	Not given	Multi Track

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

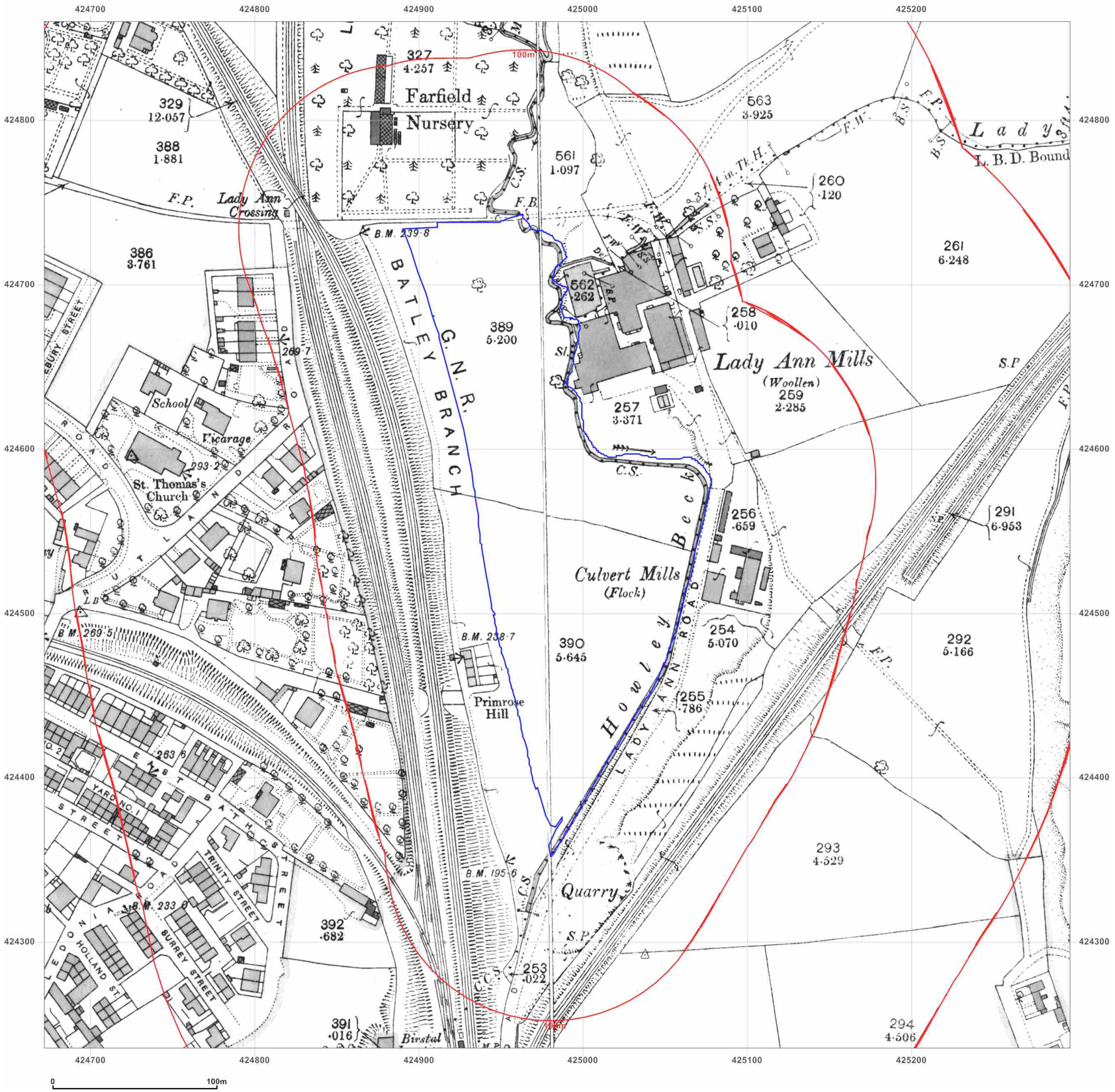
Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference.

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APPENDIX 5

Historical Mapping



mdja

Site Details:

424995, 424546

Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: County Series

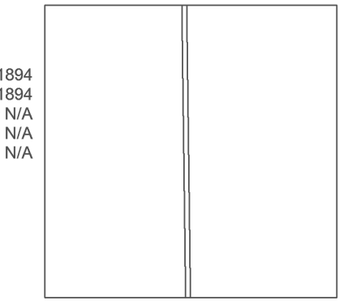
Map date: **1894**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1894
Revised 1894
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1894
Revised 1894
Edition N/A
Copyright N/A
Levelled N/A

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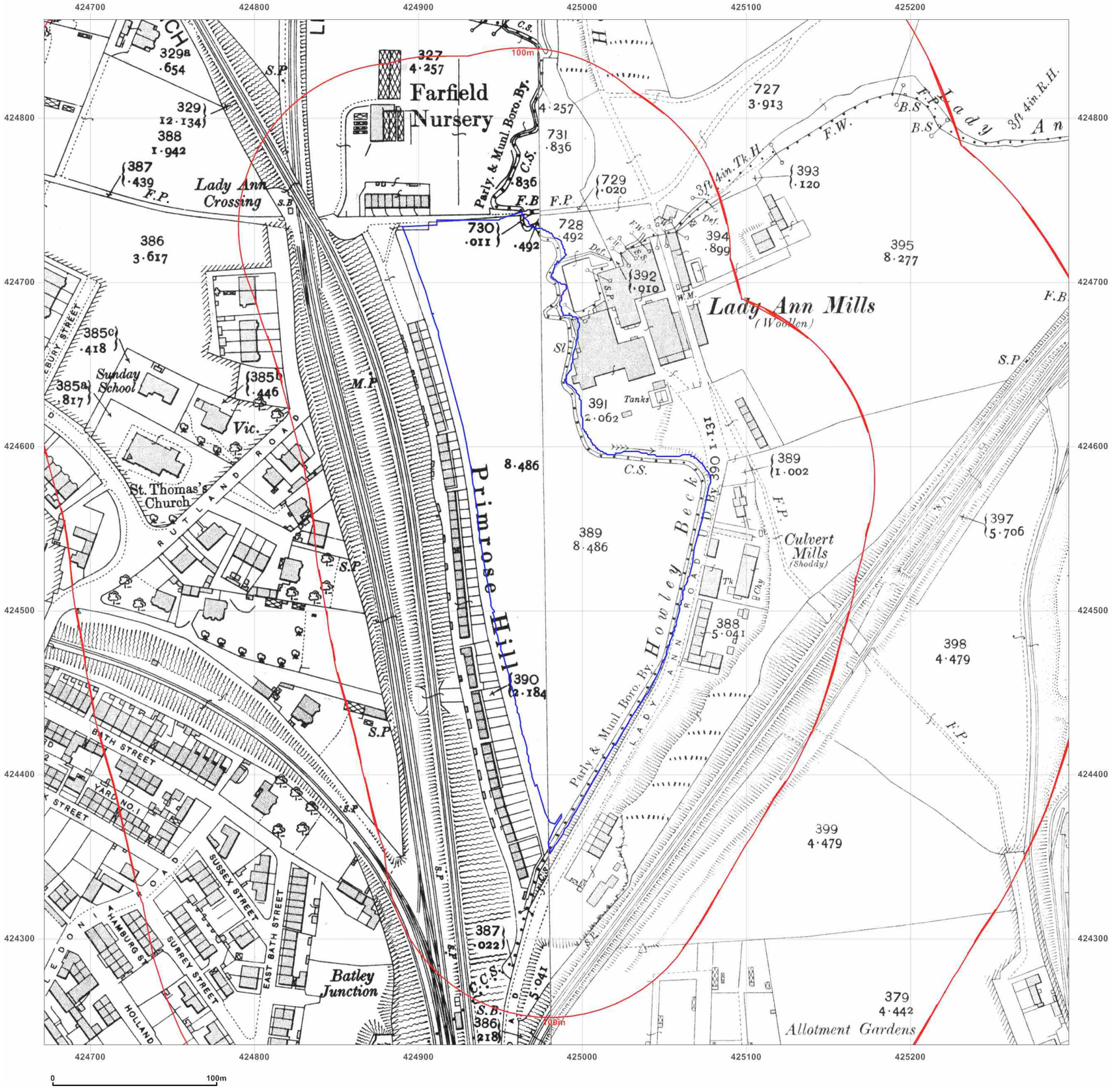
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Site Details:

424995, 424546

Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: County Series

Map date: **1907**

Scale: 1:2,500

Printed at: 1:2,500

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

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

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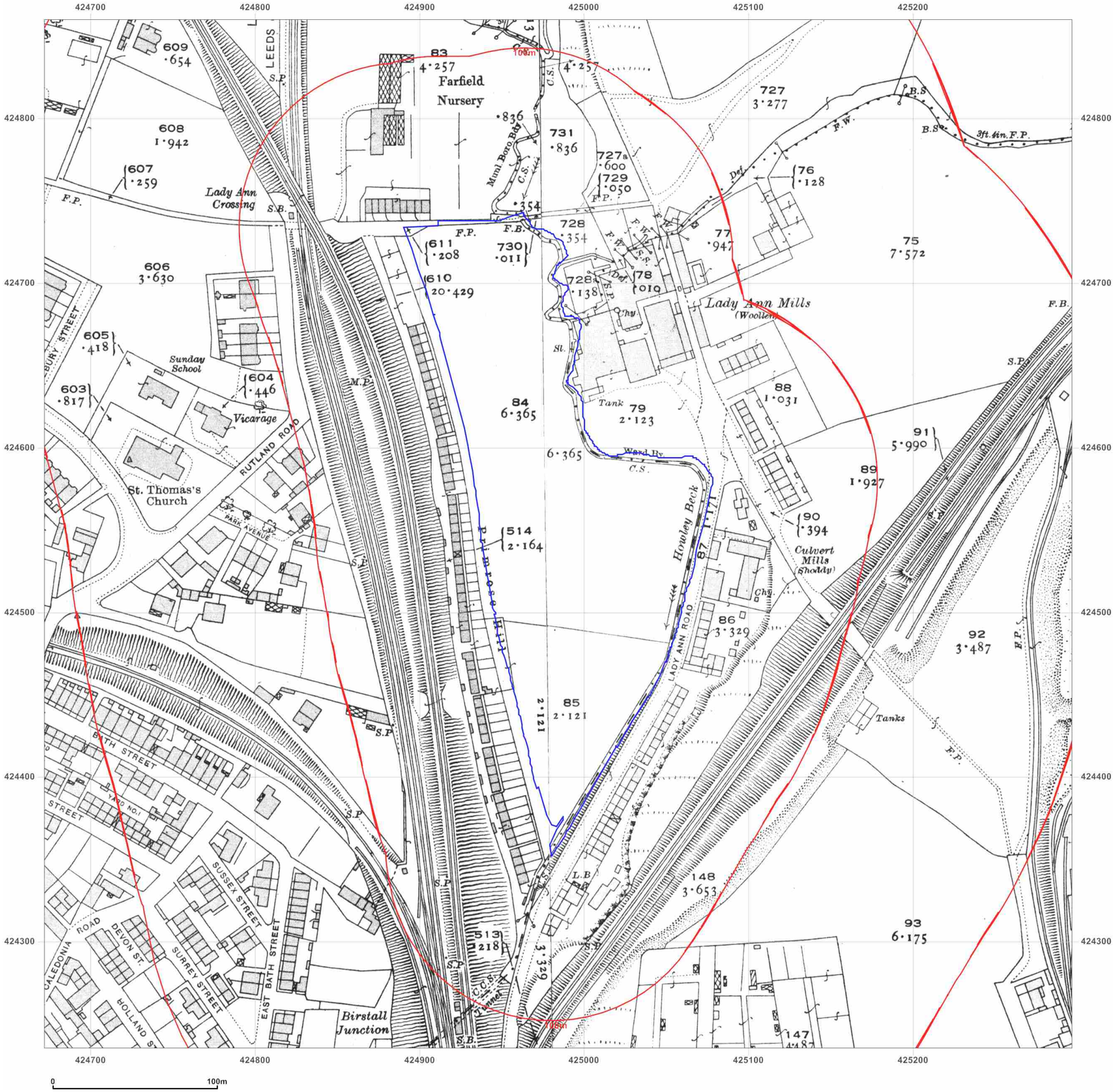
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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: County Series

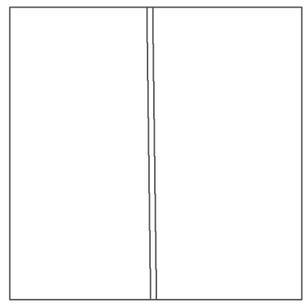
Map date: **1922**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1922
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1922
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

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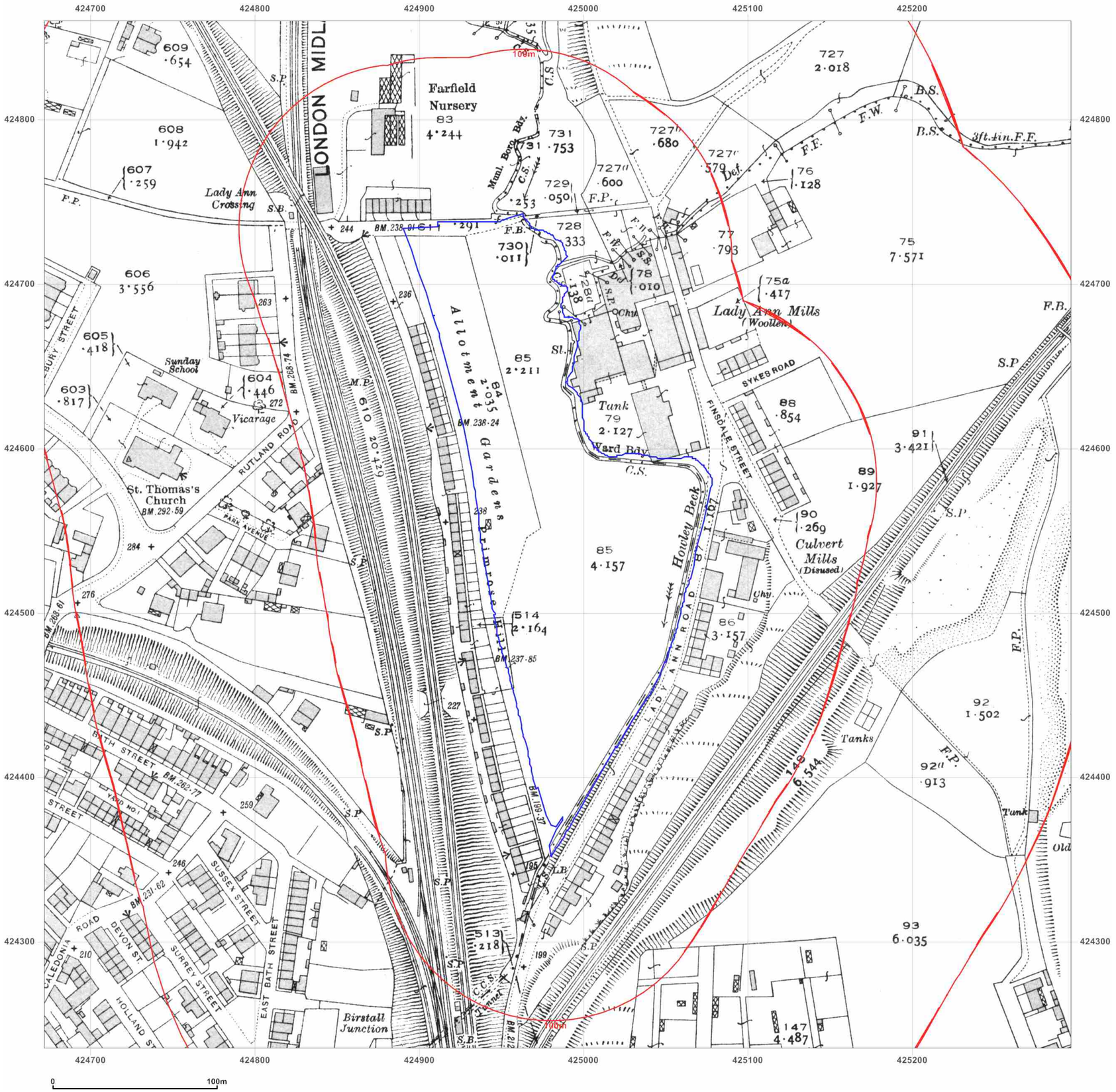
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Site Details:

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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: County Series

Map date: **1933**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1933
Revised 1933
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1933
Revised 1933
Edition N/A
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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

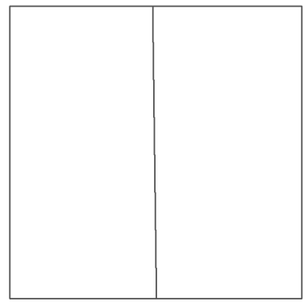
Map Name: County Series

Map date: **1939**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1939
Revised 1939
Edition N/A
Copyright N/A
Levelled N/A

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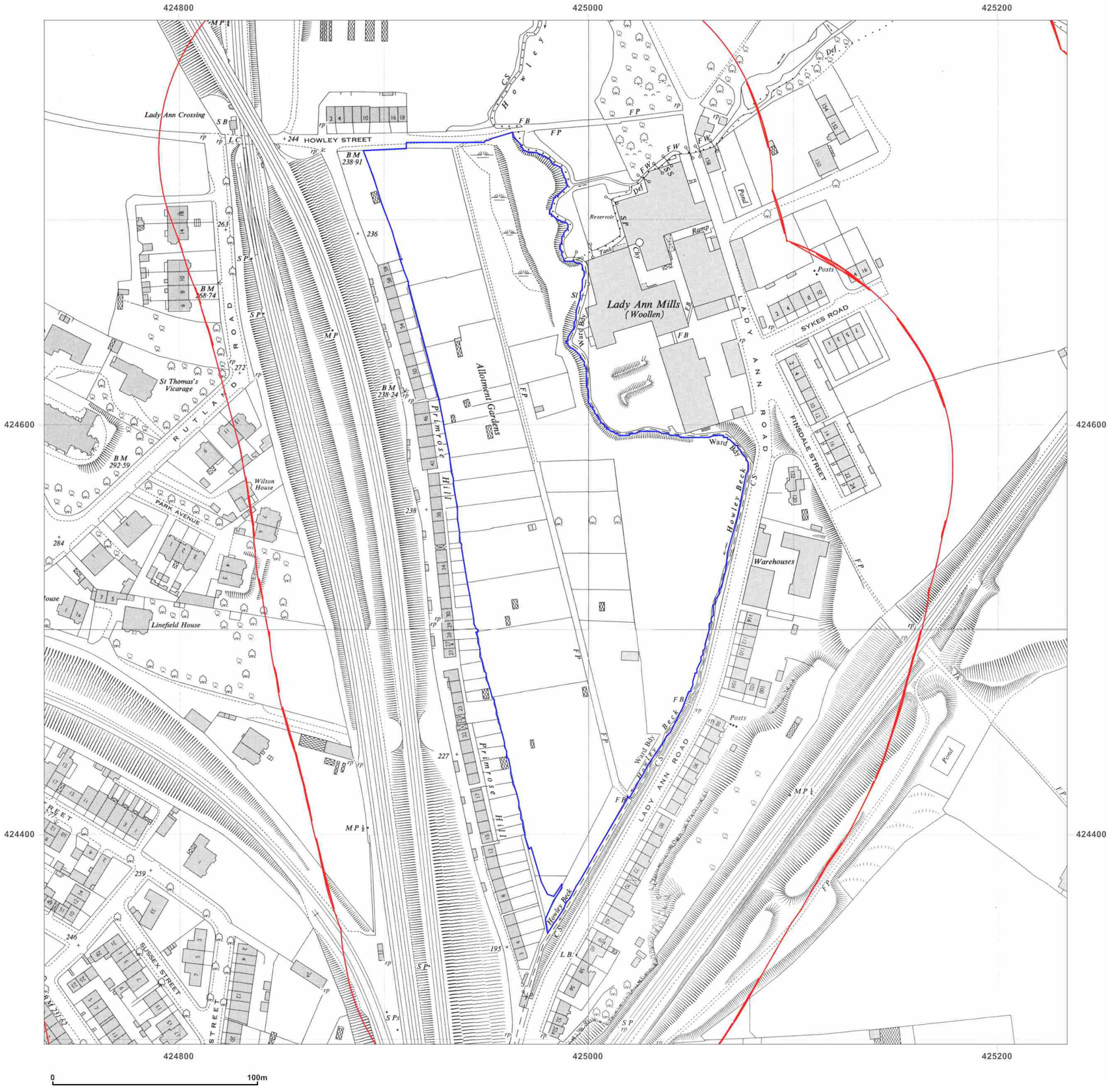
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Site Details:

424995, 424546

Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: National Grid

Map date: **1955**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1955 Revised 1955 Edition N/A Copyright N/A Levelled N/A	Surveyed 1955 Revised 1955 Edition N/A Copyright N/A Levelled 1931
Surveyed 1955 Revised 1955 Edition N/A Copyright N/A Levelled 1931	Surveyed 1955 Revised 1955 Edition N/A Copyright N/A Levelled 1931

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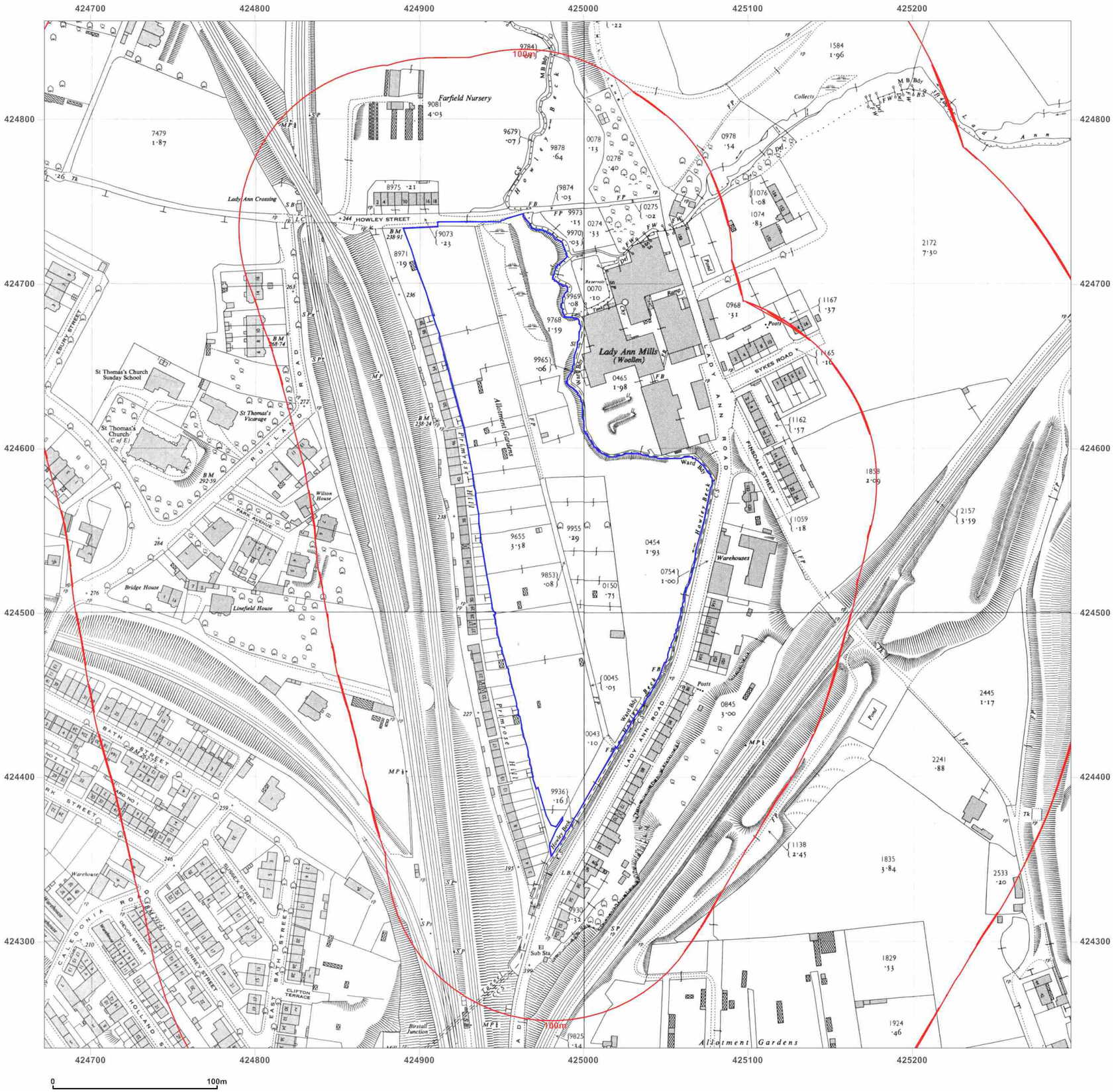
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Site Details:

424995, 424546

Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: National Grid

Map date: **1955**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1955 Revised 1955 Edition 1931 Copyright N/A Levelled 1956	Surveyed 1955 Revised 1955 Edition 1956 Copyright N/A Levelled 1931

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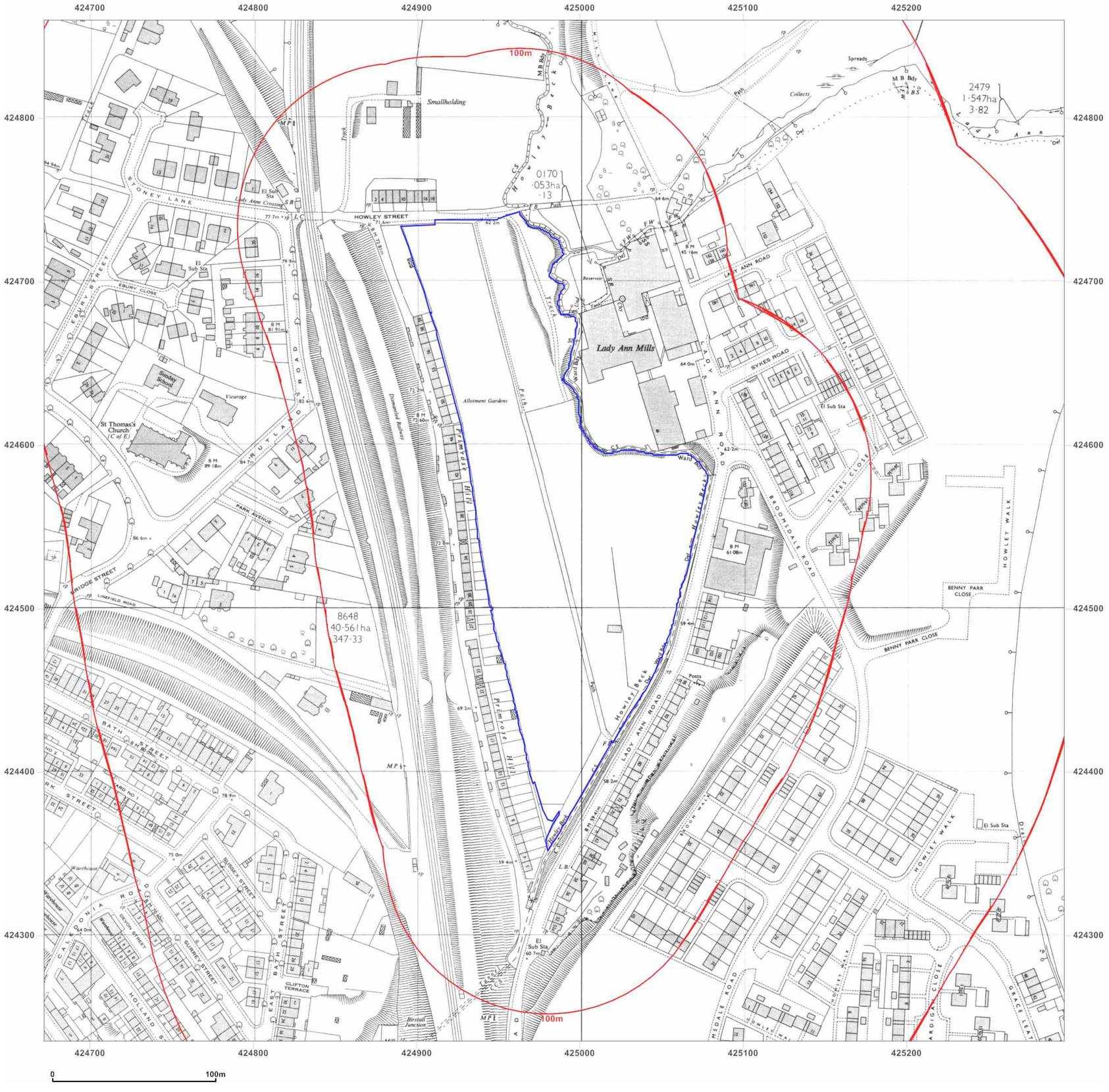
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Site Details:

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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: National Grid

Map date: **1969**

Scale: 1:2,500

Printed at: 1:2,500

N
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Revised 1969
Edition N/A
Copyright 1971
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Site Details:

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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: National Grid

Map date: **1968-1970**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1955
Revised 1967
Edition N/A
Copyright 1968
Levelled 1962

Surveyed 1955
Revised 1969
Edition N/A
Copyright 1970
Levelled 1962

Surveyed 1962
Revised 1969
Edition N/A
Copyright 1970
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Site Details:

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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

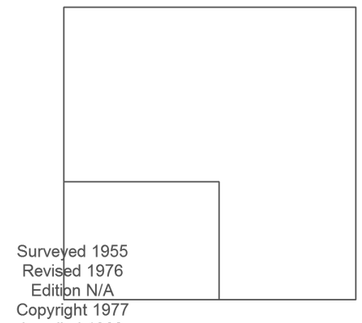
Map Name: National Grid

Map date: **1977**

Scale: 1:1,250

Printed at: 1:2,000

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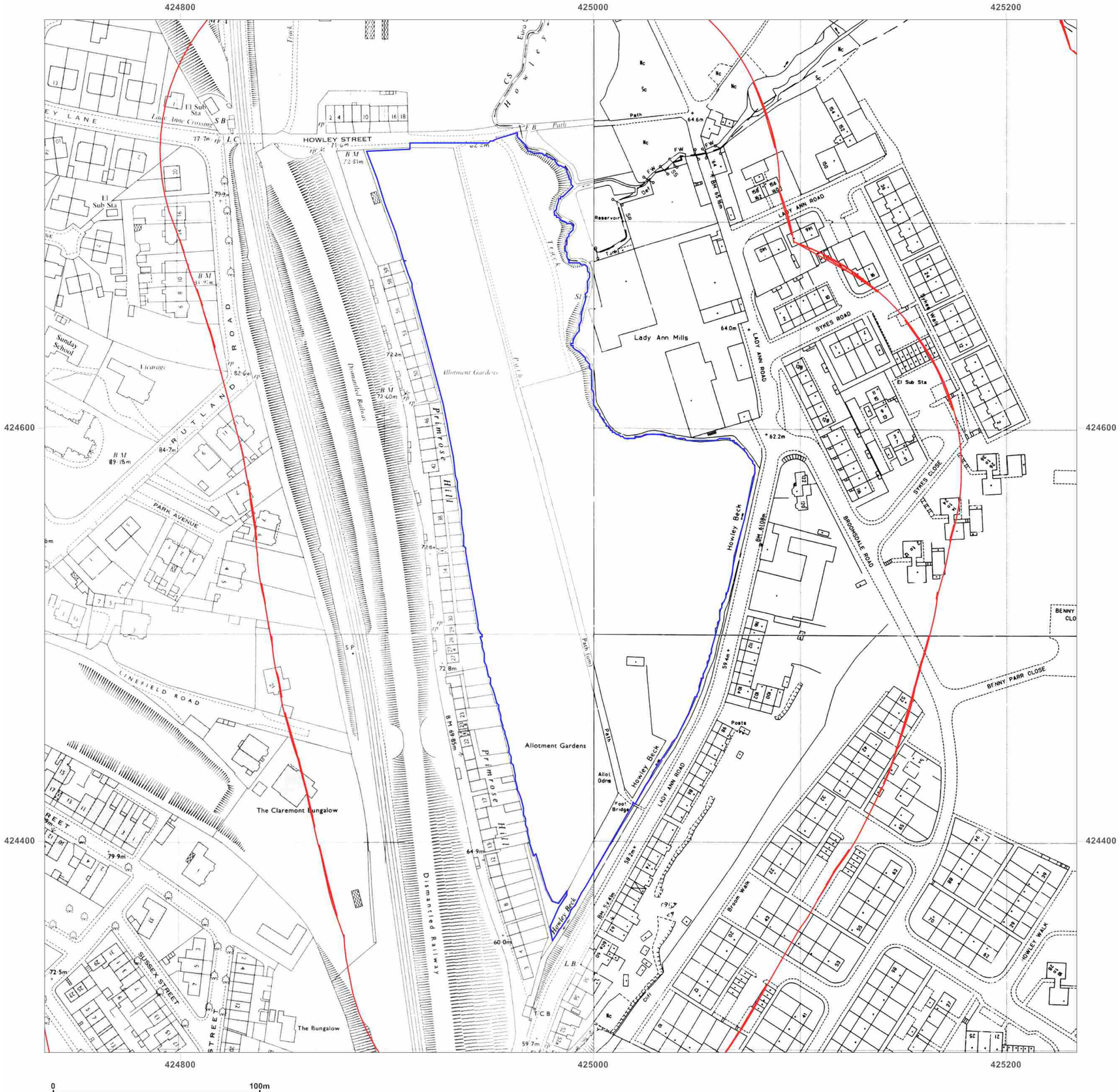
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Production date: 12 August 2016

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Site Details:

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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: National Grid

Map date: **1987-1992**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A Revised N/A Edition N/A Copyright 1987 Levelled 1962	Surveyed 1992 Revised N/A Edition N/A Copyright 1992 Levelled N/A
Surveyed 1962 Revised 1989 Edition N/A Copyright 1989 Levelled 1962	Surveyed N/A Revised N/A Edition N/A Copyright 1992 Levelled N/A

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Site Details:

424995, 424546

Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

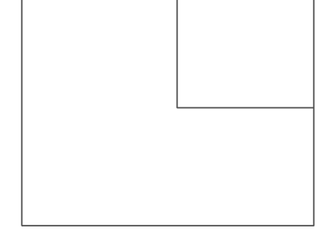
Map Name: National Grid

Map date: **1995**

Scale: 1:1,250

Printed at: 1:2,000

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

Groundsure INSIGHTS

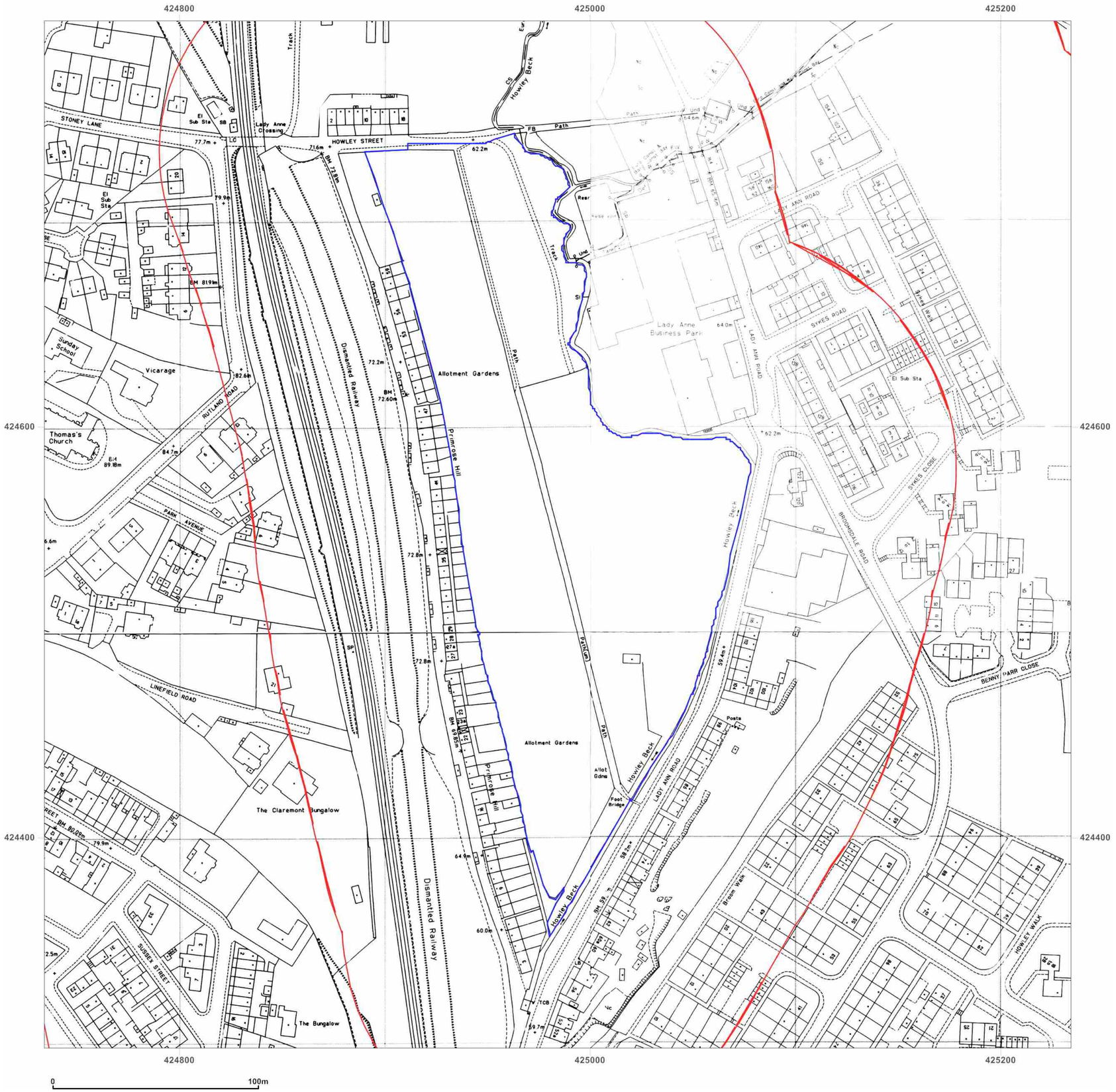
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Production date: 12 August 2016

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mdja

Site Details:

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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: National Grid

Map date: **1992-1995**

Scale: 1:1,250

Printed at: 1:2,000

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S

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

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

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

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

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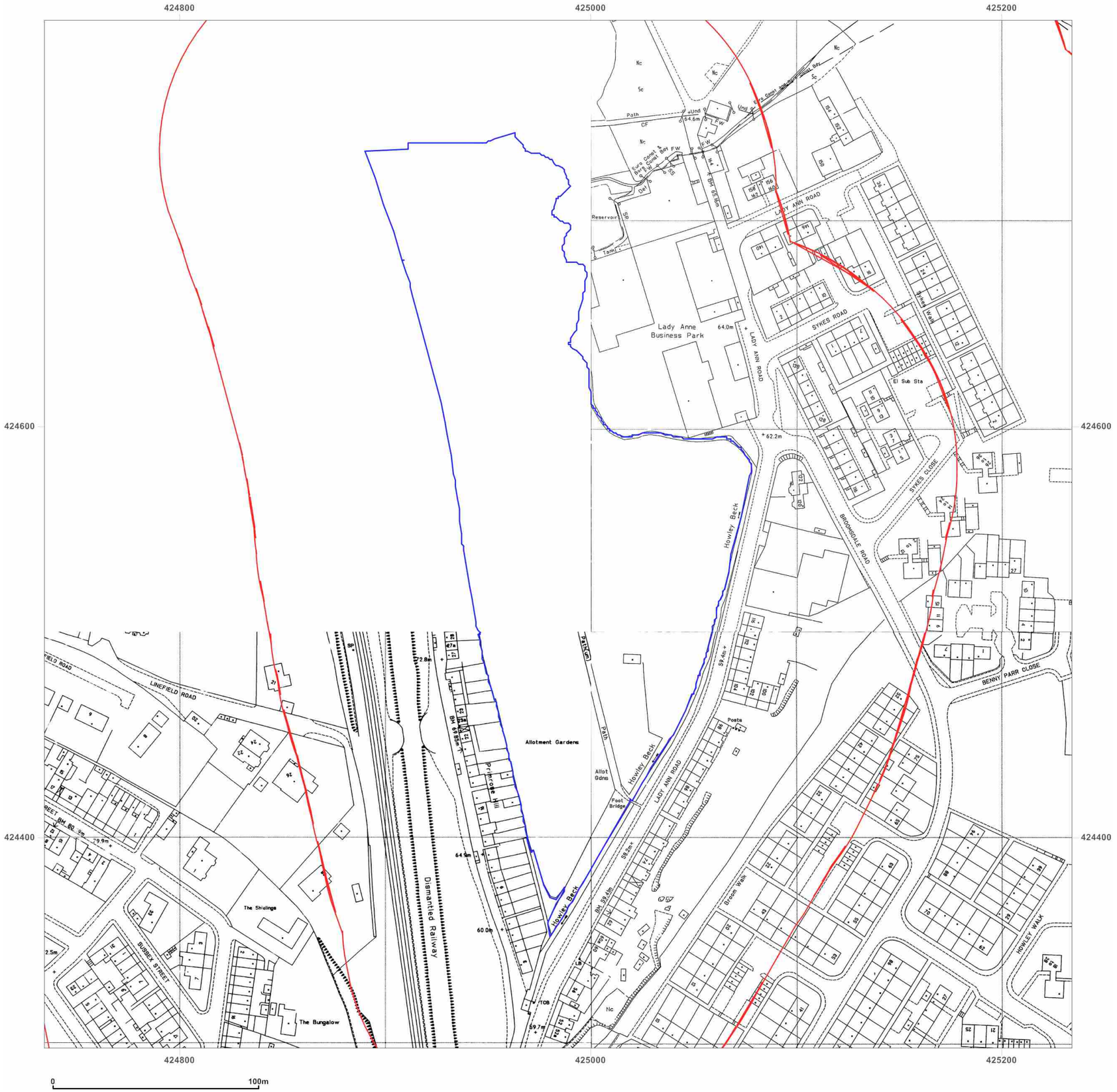
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Site Details:

424995, 424546

Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: National Grid

Map date: **1994-1995**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
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Surveyed 1994
Revised 1994
Edition N/A
Copyright 1994
Levelled N/A

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

Surveyed N/A
Revised 1992
Edition N/A
Copyright 1995
Levelled N/A

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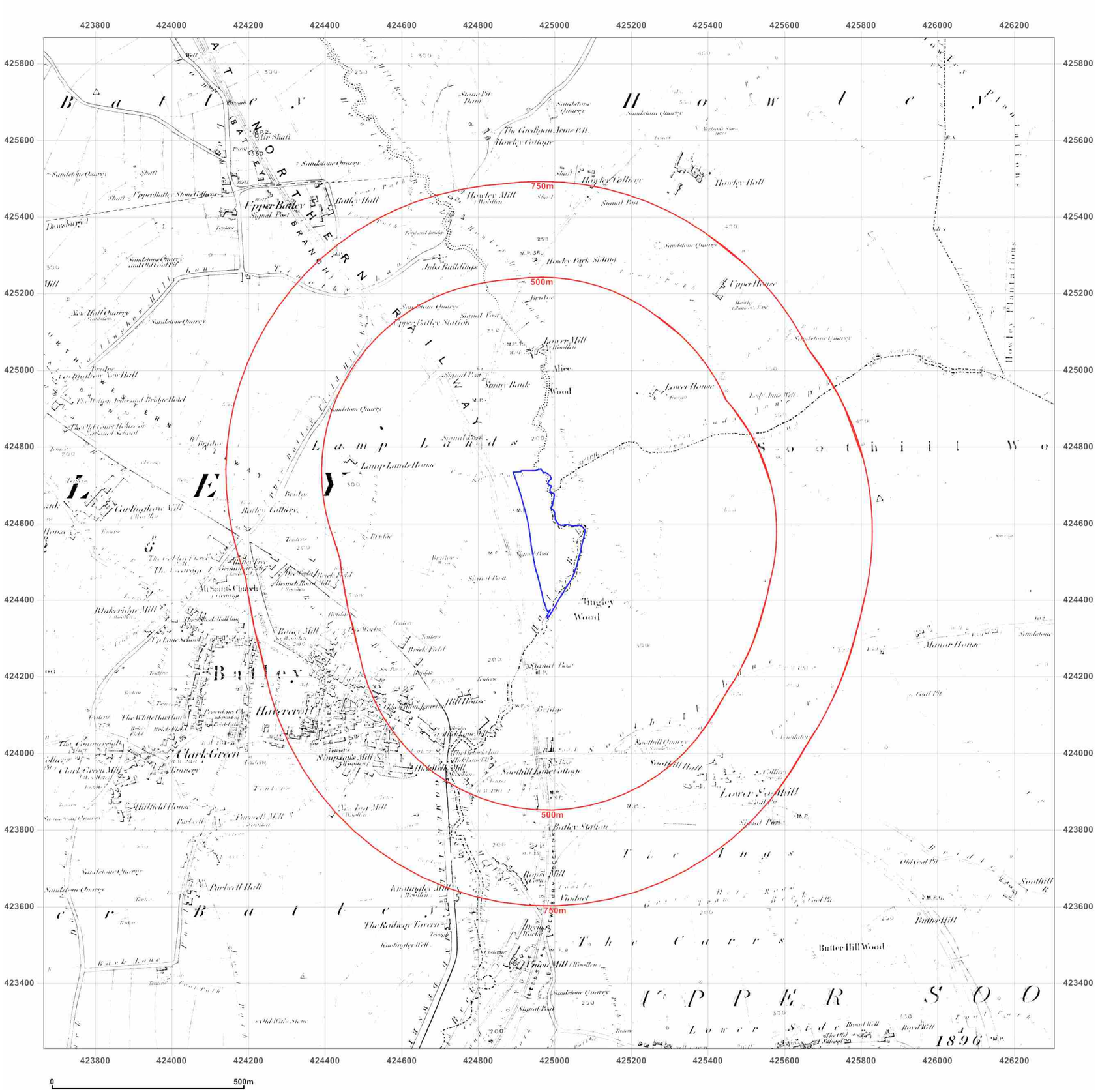
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Site Details:

424995, 424546

Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: County Series

Map date: **1854**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1847
Revised N/A
Edition 1854
Copyright N/A
Levelled N/A

Groundsure INSIGHTS

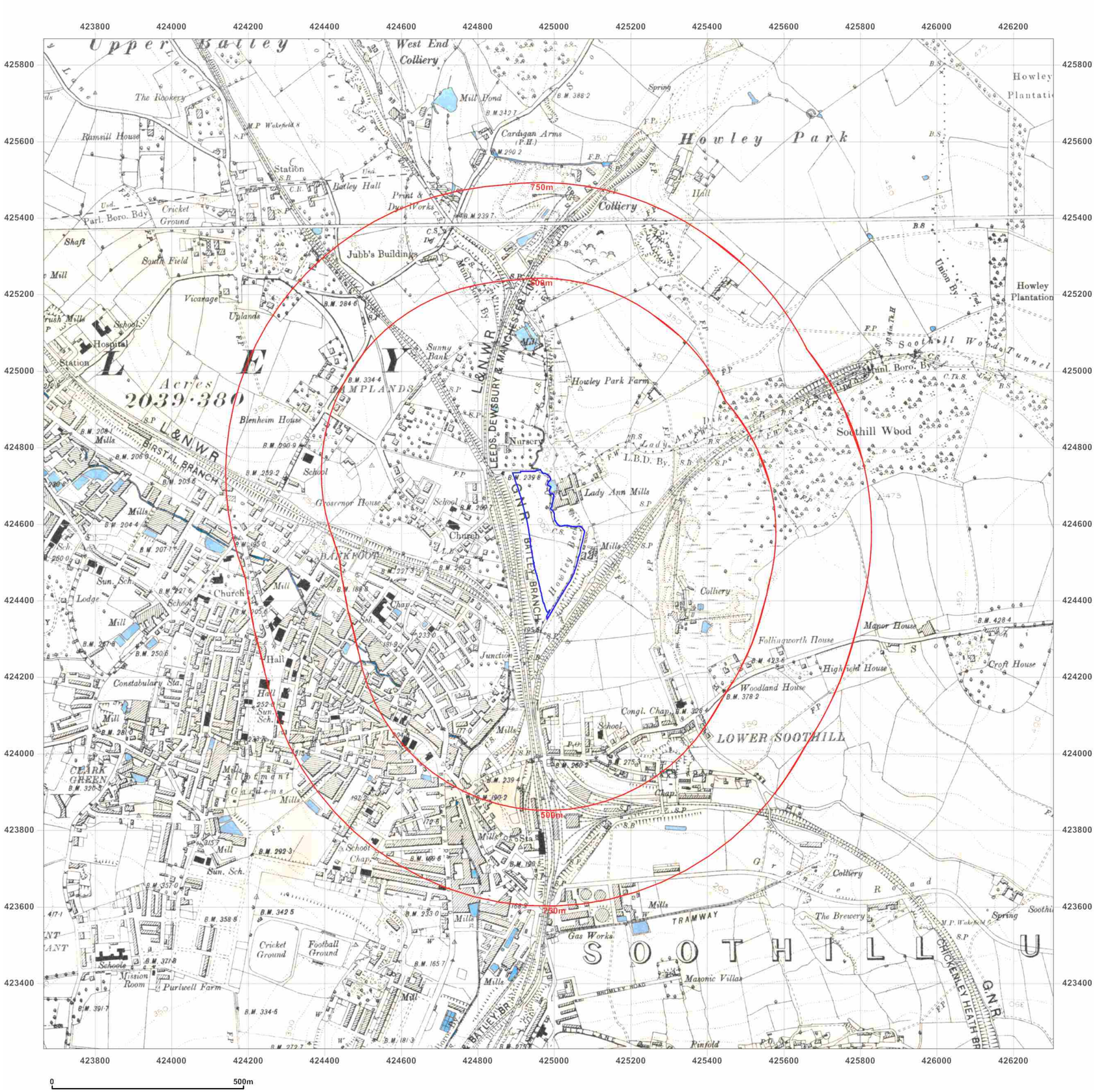
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Site Details:

424995, 424546

Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: County Series

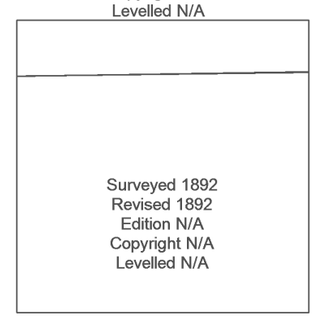
Map date: **1892**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

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



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

Groundsure INSIGHTS

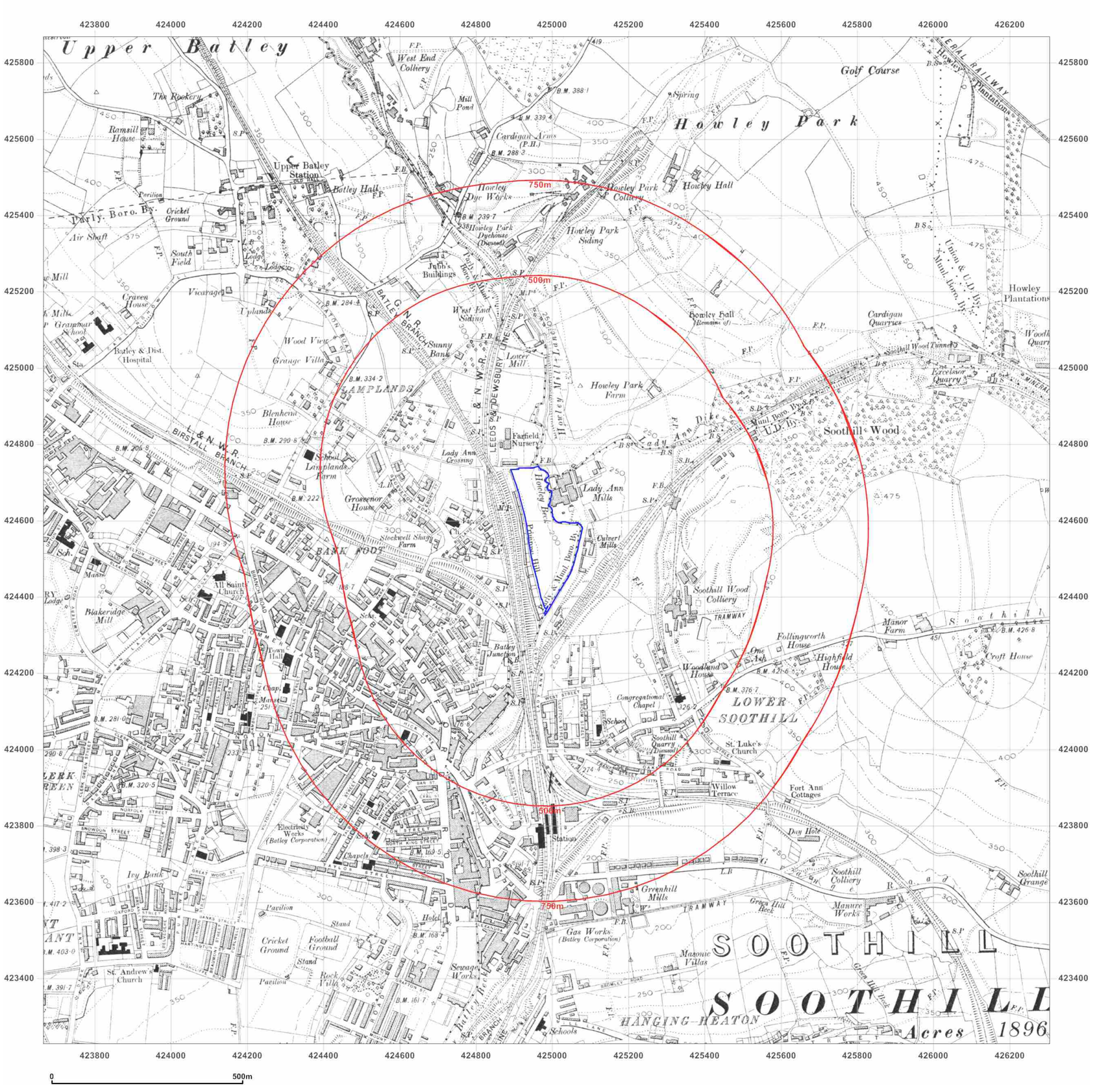
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Production date: 12 August 2016

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mdja

Site Details:

424995, 424546

Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: County Series

Map date: **1905-1906**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1889
Revised 1906
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1889
Revised 1905
Edition N/A
Copyright N/A
Levelled N/A

Groundsure INSIGHTS

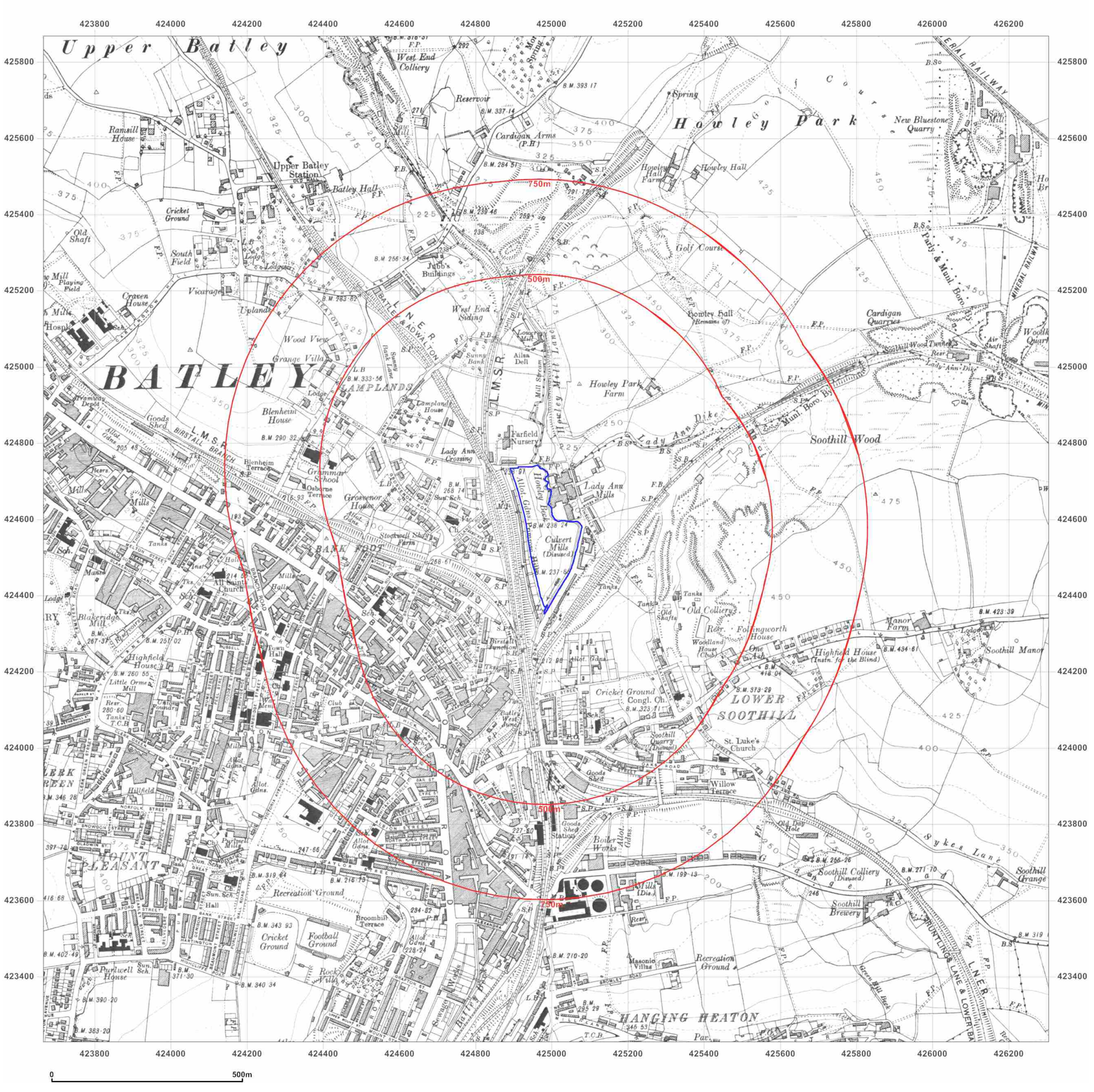
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424995, 424546

Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: County Series

Map date: **1931-1932**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1850
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1851
Revised 1931
Edition N/A
Copyright N/A
Levelled N/A

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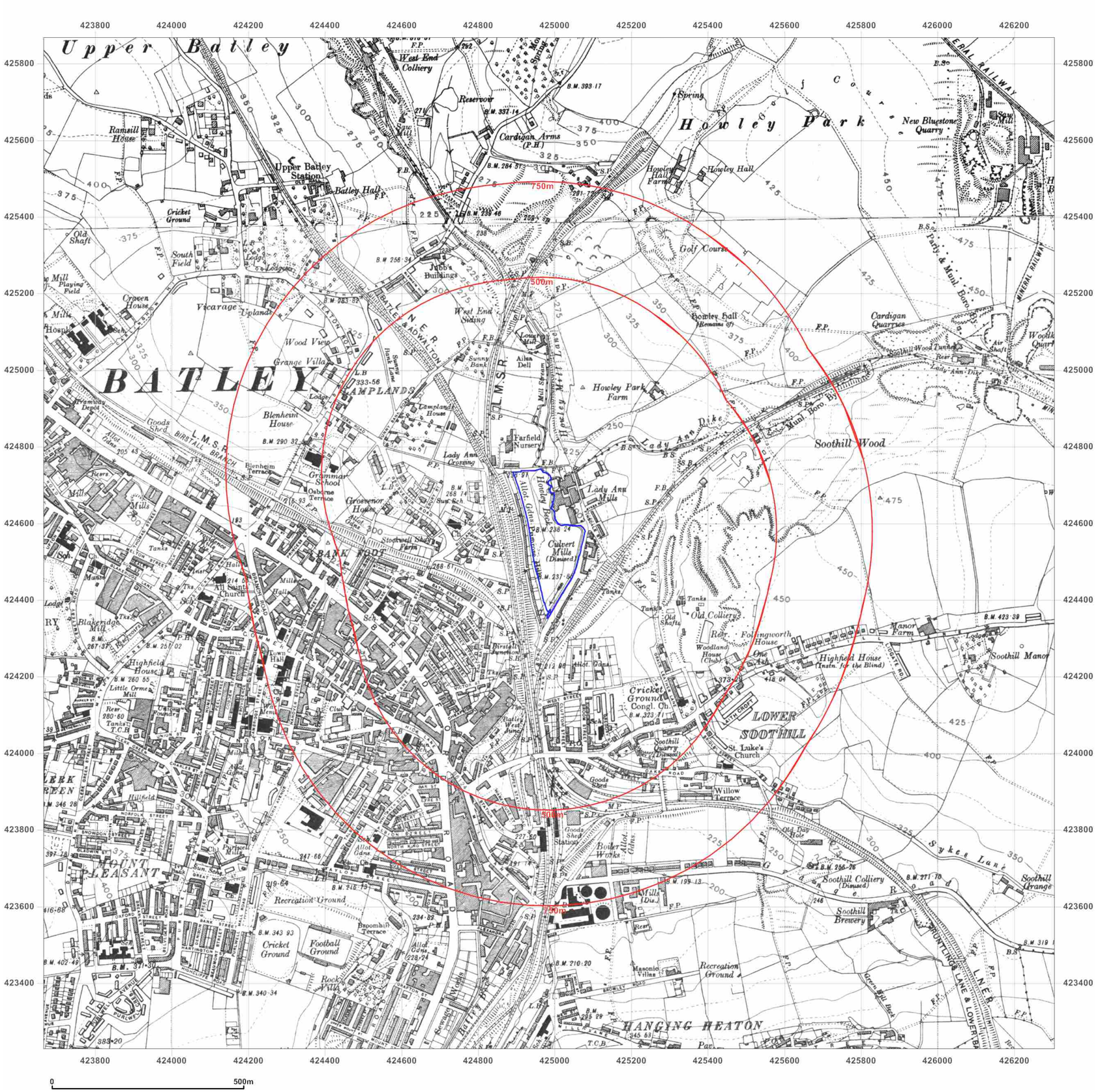
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Site Details:

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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1850
Revised 1938
Edition 1938
Copyright N/A
Levelled 1932

Surveyed 1851
Revised 1938
Edition N/A
Copyright N/A
Levelled 1931

Groundsure INSIGHTS

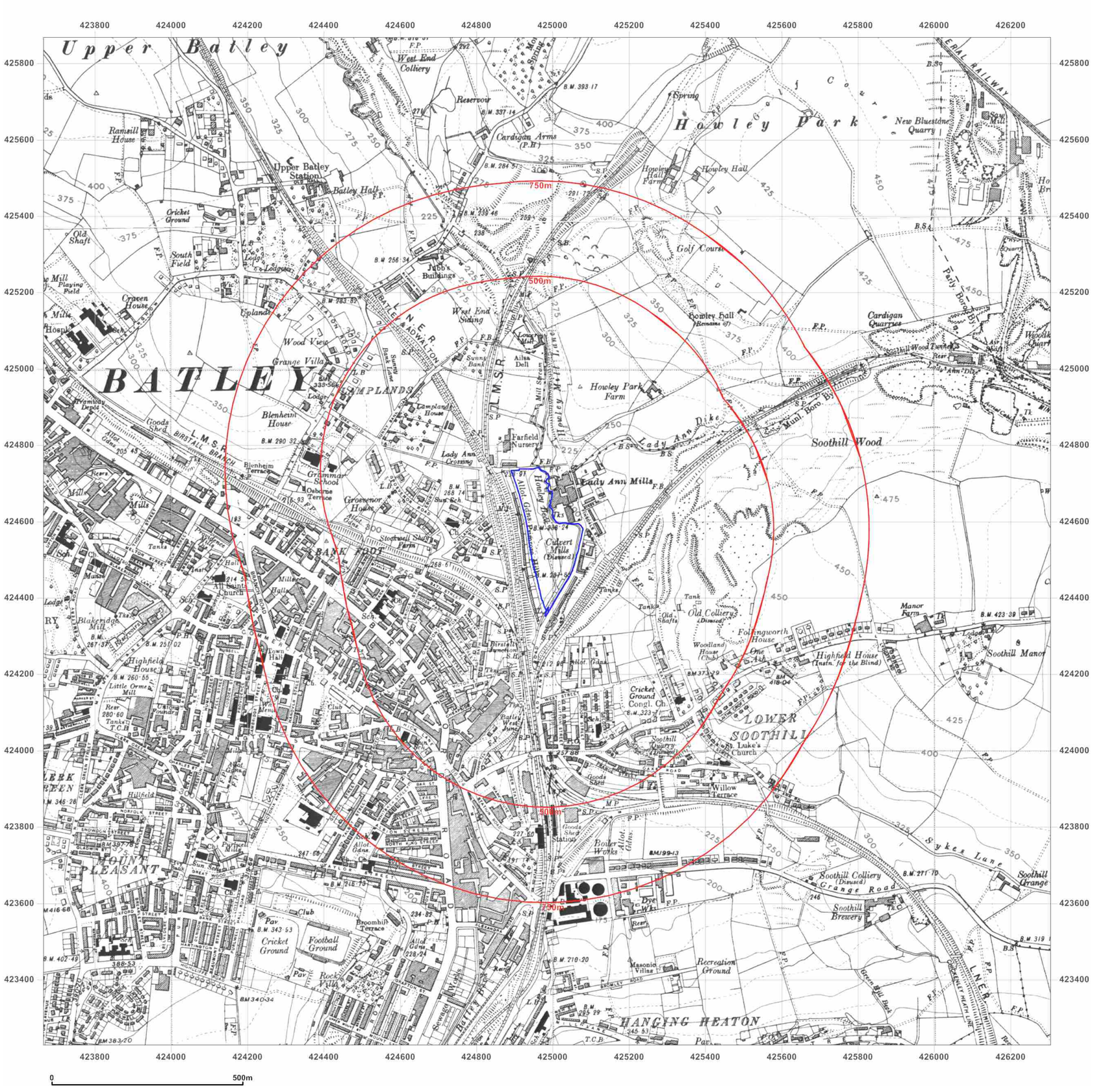
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Site Details:

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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: County Series

Map date: **1948**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1850
Revised 1948
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1851
Revised 1948
Edition N/A
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Levelled N/A

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Site Details:

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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: Provisional

Map date: **1955-1957**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1951
Revised 1951
Edition N/A
Copyright 1955
Levelled N/A

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

Surveyed 1951
Revised 1955
Edition N/A
Copyright N/A
Levelled N/A

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

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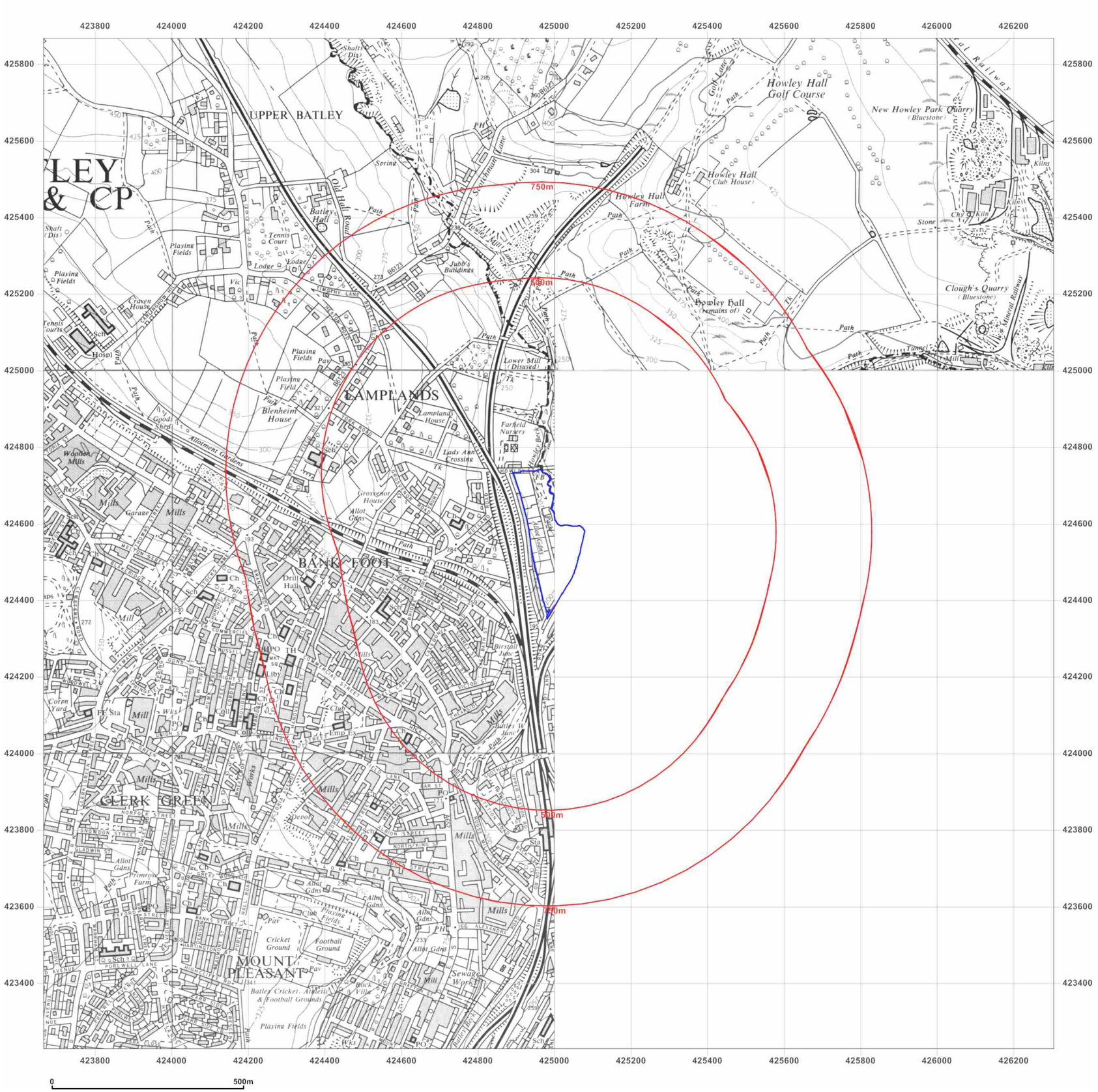
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Site Details:

424995, 424546

Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: Provisional

Map date: **1966-1967**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1966
Revised 1966
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1966
Revised 1966
Edition N/A
Copyright N/A
Levelled N/A

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

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Site Details:

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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: National Grid

Map date: **1971-1975**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
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Surveyed 1973
Revised 1974
Edition N/A
Copyright N/A
Levelled N/A

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

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

Surveyed 1971
Revised 1971
Edition N/A
Copyright N/A
Levelled N/A

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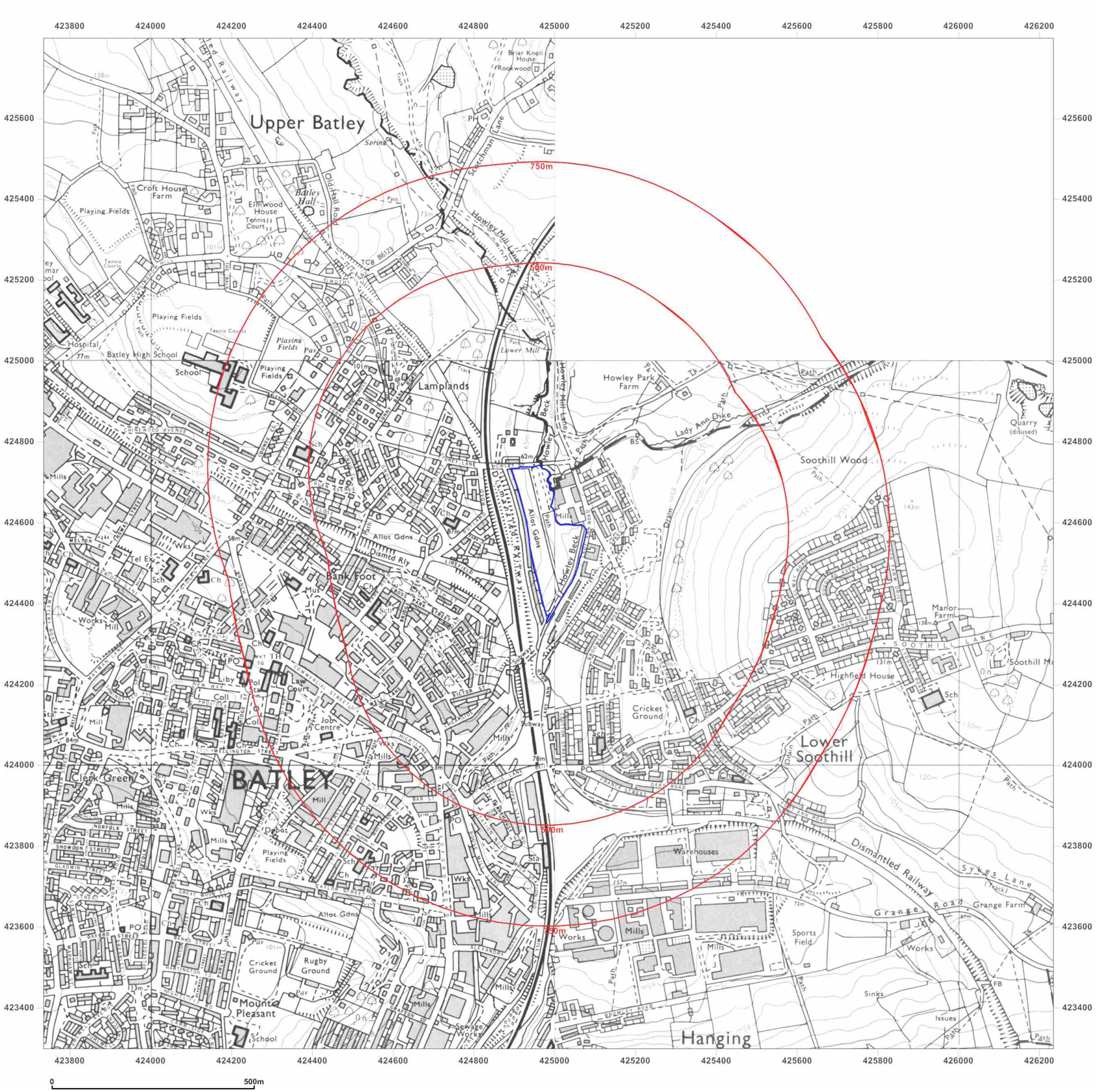
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Site Details:

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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: National Grid

Map date: **1980-1985**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
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Surveyed 1985
Revised 1985
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1977
Revised 1981
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1979
Revised 1980
Edition N/A
Copyright N/A
Levelled N/A

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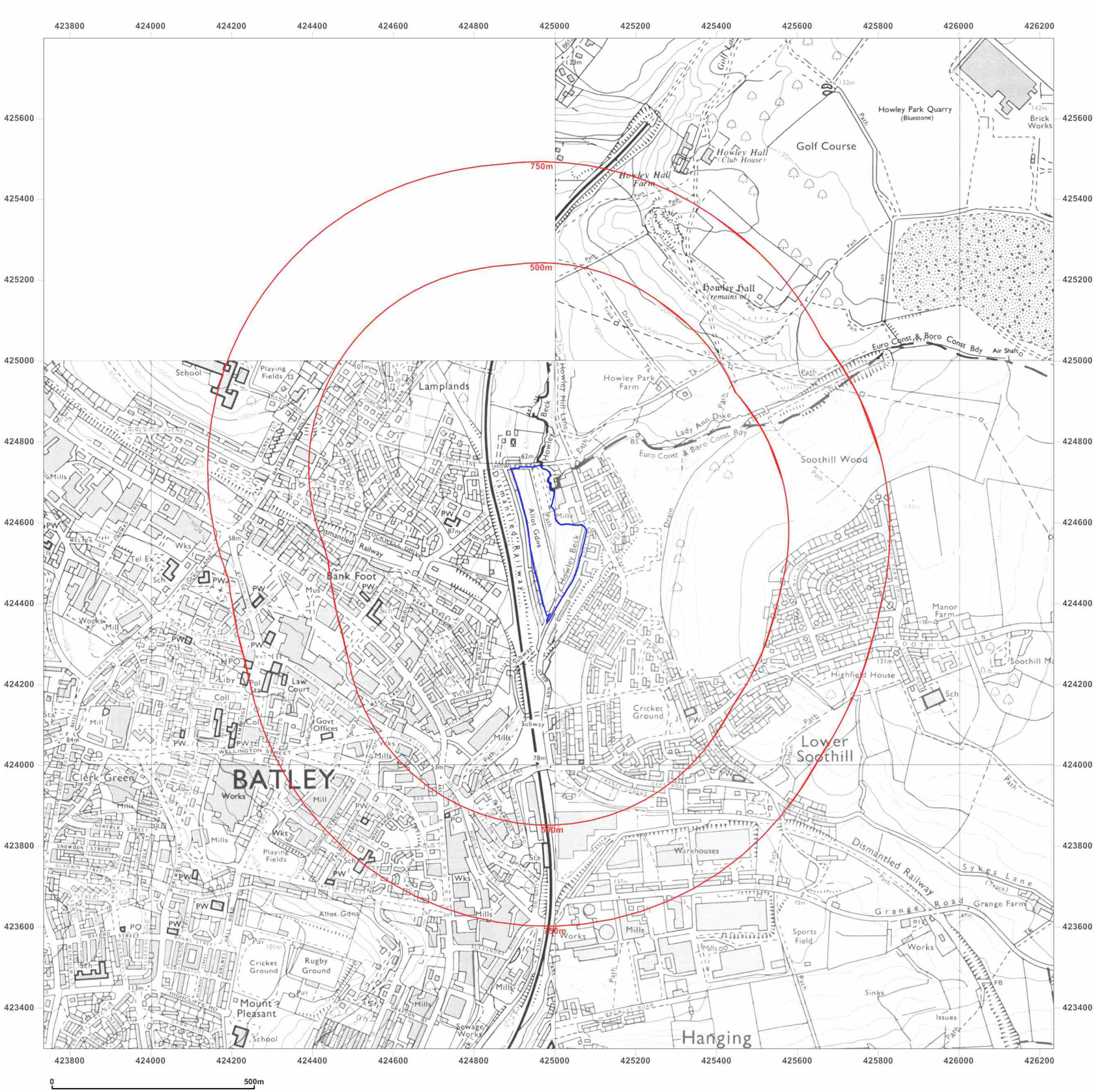
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Site Details:

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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: National Grid

Map date: **1988-1992**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1989
Revised 1990
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1985
Revised 1988
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1989
Revised 1992
Edition N/A
Copyright N/A
Levelled N/A

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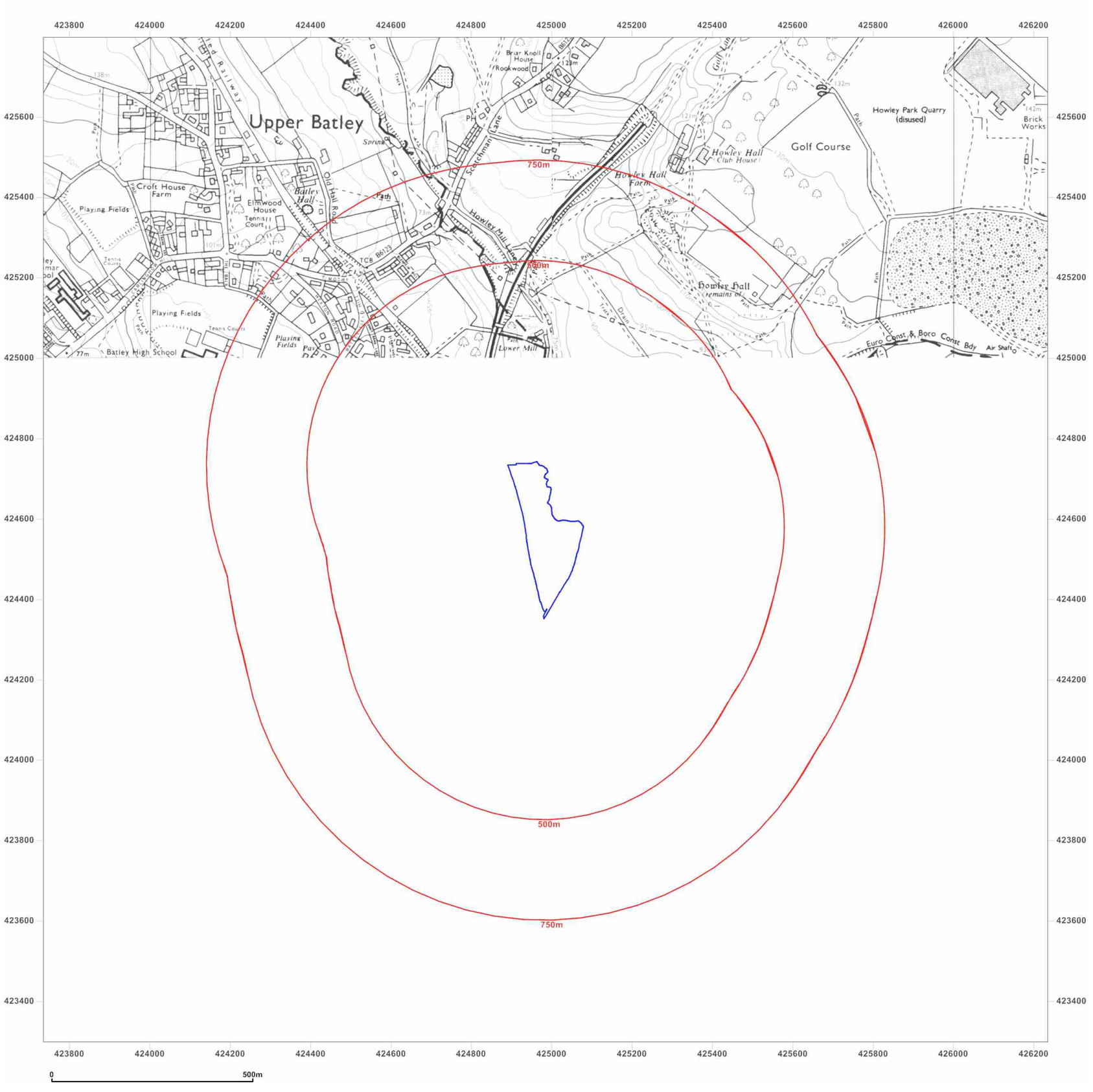
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Site Details:

424995, 424546

Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: National Grid

Map date: **1994-1995**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
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Surveyed 1985
Revised 1994
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1989
Revised 1995
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: 1:10,000 Raster

Map date: **2002**

Scale: 1:10,000

Printed at: 1:10,000

N
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2002

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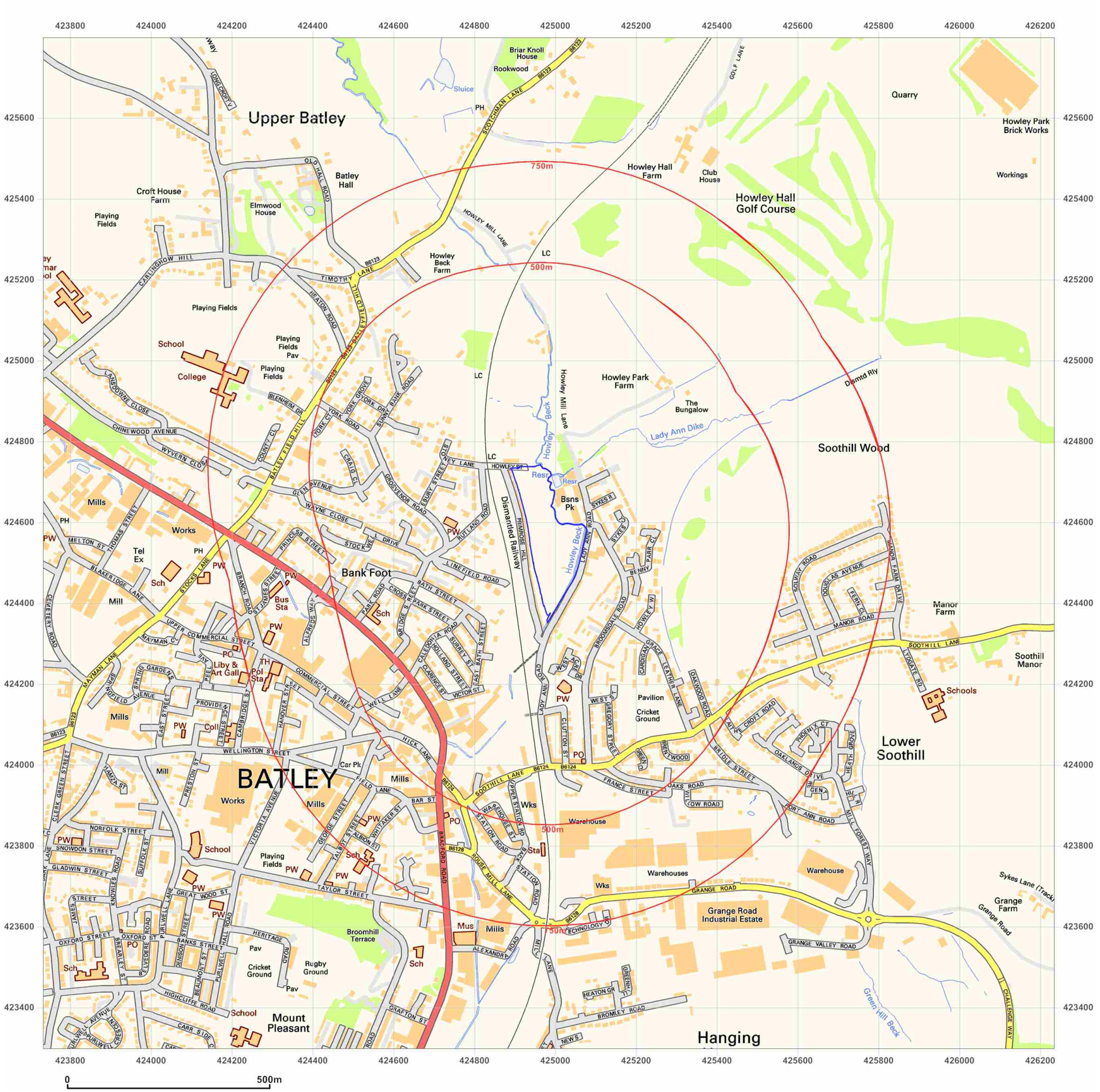
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Site Details:

424995, 424546

Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

N
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2010

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Site Details:

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Client Ref: Lady_Ann_Road_-_Batley
Report Ref: HMD-354-3227311
Grid Ref: 424984, 424548

Map Name: National Grid

Map date: **2014**

Scale: 1:10,000

Printed at: 1:10,000

N
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2014

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APPENDIX 6

Coal Authority Mining Report

The Coal Authority

Resolving the impacts of mining

CON29M Non-Residential Mining Report





424995, 424546
WEST YORKSHIRE



Date of enquiry:	15 August 2016
Date enquiry received:	15 August 2016
Issue date:	15 August 2016
Our reference:	51001237652001
Your reference:	HMD-354-3227312

CON29M Non-Residential Mining Report

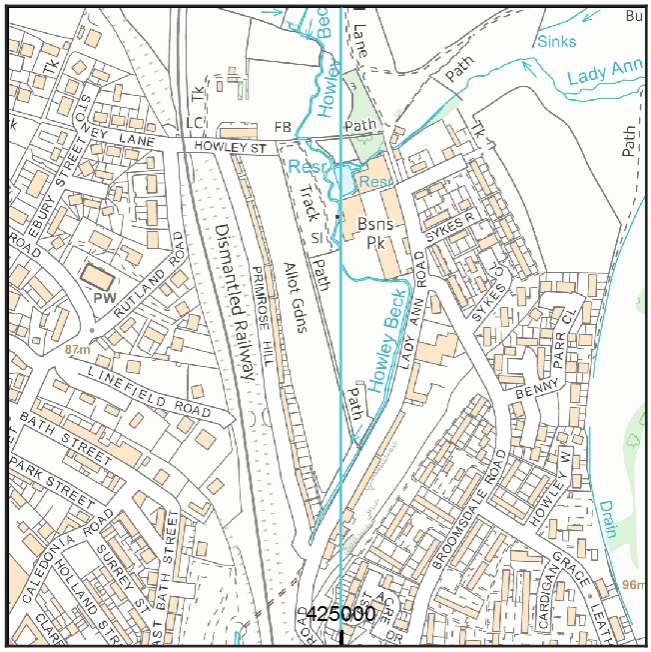
This report is based on, and limited to, the records held by the Coal Authority and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Client name

GROUNDSURE LIMITED

Enquiry address

424995, 424546, WEST YORKSHIRE



Approximate position of property

Mapping sourced from Ordnance Survey

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Mansfield
Nottinghamshire
NG18 4RG

www.gov.uk/coalauthority

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/thecoalauthority
/coalauthority

Summary

Has the search report highlighted evidence or potential of		
1	Past underground coal mining	Yes
2	Present underground coal mining	No
3	Future underground coal mining	Yes
4	Mine entries	Yes
5	Coal mining geology	No
6	Past opencast coal mining	No
7	Present opencast coal mining	No
8	Future opencast coal mining	No
9	Coal mining subsidence	No
10	Mine gas	No
11	Hazards related to coal mining	No
12	Withdrawal of support	No
13	Working facilities order	No
14	Payments to owners of former copyhold land	No
15	Information from the Cheshire Brine Subsidence Compensation Board	No

For detailed findings, please go to page 4.

Detailed findings

1. Past underground coal mining

The property is in a surface area that could be affected by underground mining in 3 seams of coal at 50m to 300m depth, and last worked in 1907.

Any movement in the ground due to coal mining activity should have stopped.

2. Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3. Future underground coal mining

The property is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods.

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

The property is not in an area likely to be affected from any planned future underground coal mining.

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

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

4. Mine entries

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

There may however be mine entries/additional mine entries in the local area which the Coal Authority has no knowledge of.

5. Coal mining geology

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

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

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

8. Future opencast coal mining
There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

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

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

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

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

10. Mine gas
The Coal Authority has no record of a mine gas emission requiring action.

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

12. Withdrawal of support
The property is not in an area where a notice to withdraw support has been given.

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

13. Working facilities order
The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

14. Payments to owners of former copyhold land

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

15. Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

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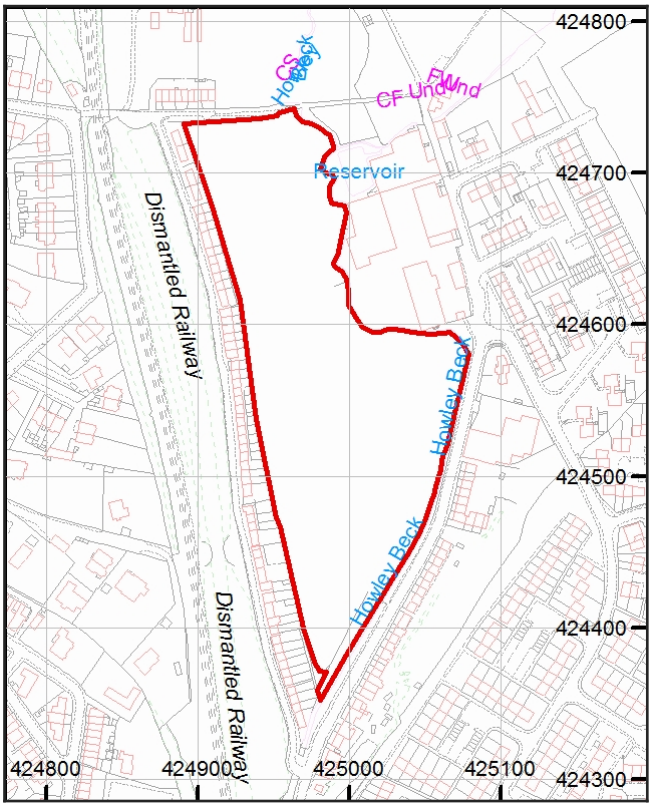
Alternative formats

If you would like this report in an alternative format, please contact our communications team.

Enquiry boundary

Key

Approximate position of enquiry boundary shown



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Standard Appendices

A and B

STANDARD APPENDIX A

NOTES ON SITE INVESTIGATION PROCEDURE (June 2021)

1. **GENERAL.** The ground investigation has been carried out in accordance with the requirements of BS5930: 2015 and BS10175: 2011+A1: 2020. By its very nature, any ground investigation only samples a small percentage of the ground. Consequently, changes in ground conditions and soil properties can occur between any two exploratory points, for example local features such as soft ground, pockets of contamination and faults. This is also true of the exploration of mineworkings and such features can extend beneath parts of the site not investigated. Unrecorded bell pits and shafts can also exist between exploratory points. The ground investigation is designed to minimise such risks but they cannot be eliminated.

2. **GROUND INVESTIGATION.**

2.1 **BOREHOLE AND TRIAL PIT RECORDS.** These illustrate the ground conditions only at the location of the particular borehole or trial pit. Correlation between boreholes is for guidance only and its accuracy cannot be guaranteed.

2.2 **SHELL AND AUGER BORING.** This technique uses a tripod winch and an essentially percussive action using a variety of tools. Disturbed and undisturbed samples can be taken. This is the most suitable method for soft ground investigation, enabling the maximum amount of information to be obtained. However, minor changes in lithology may be overlooked unless continuous undisturbed sampling is used.

2.3 **GROUNDWATER**. Groundwater levels vary seasonally and the details given on the borehole logs relate only to the dates and the conditions described in the borehole records. The rate of boring may not have allowed an equilibrium water level to be established and the use of casing may seal off certain seepages.

2.4 **SAMPLING.** Disturbed samples of soils are taken for identification and classification purposes. In cohesive soils 'undisturbed' samples 100mm in diameter are taken by open drive sampler for laboratory testing of strength, permeability and consolidation characteristics.

2.5 **STANDARD PENETRATION TESTS**. S.P.T tests are used in granular and cohesive materials and in soft or weathered rocks. Difficulties in obtaining true 'N' values mean they must only be used as a guide and not as an absolute value in foundation design.

2.6 **ROTARY DRILLING.** Two main types of rotary drilling are carried out in rock. Rock coring using diamond or tungsten carbide tipped core bits provides samples and information on rock types, fissuring and weathering. Openhole drilling only produces small particles for identification purposes and the information gained is therefore limited. The latter is, however, useful as a quick method for detecting major strata changes and for the location of coal seams and old workings. Water, air, foam or drilling muds may be used as the flushing medium in either case.

2.7 **PERMEABILITY TESTS.** These can be carried out in boreholes or trial pits and gives a good indication of in-situ permeability.

2.8 **TRIAL PITTING.** This enables soil conditions to be closely examined at any specific point and samples taken. It also gives useful information on the stability of excavations and ingress of water.

2.9 **WINDOW SAMPLING**. Window sampling consists of driving a series of 1m-long tubes into the ground using a dropping weight. On completion of each 1m run, the tube is withdrawn. The next tube is then inserted and the process repeated to provide a continuous profile of the ground. On each run the tube diameter is reduced in order to assist in its recovery.

2.10 **GAS MONITORING.** This is routinely carried out in trial pits or probe holes to check for elevated levels of methane and carbon dioxide or oxygen deficiency, particularly since risks can exist from natural gases, landfill sites and rising groundwater levels in mine workings below ground. Longer term monitoring is carried out with gas monitoring standpipes.

3. **SOIL DESCRIPTION.** Samples from borings or trial pits are described as specified in the standard procedure outlined in the British Standards. The description includes colour, consistency, structure, weathering, lithological type, inclusions and origin. All descriptions are based on visual and manual identification.

Fire Soils (Cohesive Soils)

The following field terms are used:

Soil Type	Description
Very soft	Exudes between fingers
Soft	Moulded by light finger pressure
Firm	Cannot be moulded by the fingers but can be rolled in hand to 3mm threads.
Stiff	Crumbles and breaks when rolled to 3mm threads but can be remoulded to a lump.
Very stiff	No longer moulded but crumbles under pressure. Can be indented with thumbs.

The following terms are used in accordance with the results of laboratory and field tests.

Description	Undrained Shear Strength Cu (kPa)
Extremely Low	<10
Very Low	10 - 20
Low	20 - 40
Medium	40 - 75
High	75 - 150
Very High	150 - 300
Extremely High	>300

Fine soils can also be classified according to their sensitivity, which is the ratio between undisturbed and remoulded undrained shear strength.

Sensitivity	Ratio
Low	8
Medium	8 - 30
High	>30
Quick	>50

Granular Soils (Non-Cohesive)

The following descriptions are used for granular soils.

Description	Normalised Blow Count (N_1) 60
Very Loose	0 - 3
Loose	3 - 8
Medium	8 - 25
Dense	25 - 42
Very Dense	42 - 58

4. **NATURAL OR IN-SITU MOISTURE CONTENT**. The natural or in-situ moisture content of a soil is defined as the weight of water contained in the pore space, expressed as a percentage of the dry weight of solid matter present in the soil. Soil properties are greatly affected by the moisture content and the test can help to give an indication of likely engineering behaviour.

5. **LIQUID AND PLASTIC LIMITS**. Two simple classification tests are known as the liquid and plastic limits. If a cohesive soil is remoulded with increasing amounts of water, a point will be reached at which it ceases to behave as a plastic material and becomes essentially a viscous fluid. The moisture content corresponding to this change is arbitrarily determined by the liquid limit test. 'Fat' clays, which have high contents of colloidal particles, have high liquid limits; 'lean' clays, having low colloidal particle contents have correspondingly low liquid limits. An increase in the organic content of a clay is reflected by an increase in the liquid and plastic limits.

   If a cohesive soil is allowed to dry progressively, a point is reached at which it ceases to behave as a plastic material, which can be moulded in the fingers, and it becomes friable. The moisture content of the soil at this point is known as the 'plastic limit' of the soil.

   The range of water content over which a cohesive soil behaves plastically, i.e. the range lying between the liquid and plastic limits, is defined as the plasticity index.

   A cohesive soil with a natural water content towards its liquid limit will, in general, be an extremely soft material whereas a cohesive soil with a natural water content below its plastic limit will tend to be a stiff material.

6. **PARTICLE-SIZE DISTRIBUTION.** A knowledge of particle-size distribution is used to classify soils and to indicate likely engineering behaviour. British Standards define soils in relation to their particle-size as shown below:-

Boulders	>200mm	Coarse Sand	2.0 to 0.63mm
Cobbles	200 to 63mm	Medium Sand	0.63 to 0.2mm
		Fine Sand	0.2 to 0.063mm
Coarse Gravel	63 to 20mm	Coarse Silt	0.063 to 0.02mm
Medium Gravel	20 to 6.3mm	Medium Silt	0.02 to 0.0063mm
Fine Gravel	6.3 to 2mm	Fine Silt	0.0063 to 0.002mm
		Clay	<0.002mm

7. **BULK DENSITY.** The bulk density of a material is the weight of that material per unit volume and includes the effects of voids whether filled with air or water. The 'dry density' of a soil is defined as the weight of solids contained in a unit volume of the soil.

8. **PERMEABILITY.** The permeability of a material is defined as the rate at which water flows through it per unit area of soil under unit hydraulic gradient.

9. **CONSOLIDATION CHARACTERISTICS.** When subjected to pressure, a soil tends to consolidate as the air or water in the pore space is forced out and the grains assume a denser state of packing. The decrease in volume per unit of pressure is defined as the 'compressibility' of the soil, and a measure of the rate at which consolidation proceeds is given by the 'coefficient of consolidation' of the soil. These two characteristics Mv and Cv are determined in the consolidation test and the results are used to determine settlement of structures or earthworks.

10. **STRENGTH CHARACTERISTICS.** The strength of geological materials is generally expressed as the maximum resistance that they offer to deformation or fracture by applied shear or compressive stress. The strength characteristics of geological materials depend to an important degree on their previous history and on the conditions under which they will be stressed in practice. Consequently, it is necessary to simulate in the laboratory tests the conditions under which the material will be stressed in the field.

In general, the only test carried out on hard rocks is the determination of their compressive strength but consideration must be given to fissuring, jointing and bedding planes.

The tests at present in use for soils and soft rocks fall into two main categories. Firstly, those in which the material is stressed under conditions of no moisture content change, and secondly those in which full opportunity is permitted for moisture content changes under the applied stresses. Tests in the first category are known as undrained (immediate or quick) tests, while those in the second category are known as drained (slow or equilibrium) tests. The tests are normally carried out in the triaxial compression apparatus but granular materials may be tested in the shear box apparatus.

The undrained triaxial test gives the apparent cohesion C_u and the angle of shearing resistance $\emptyset_u$. In dry sands, $C_u = 0$ and $\emptyset_u$ is equal to the angle of internal friction whereas with saturated non-fissured clays $\emptyset u$ tends to 0 and the apparent cohesion C_u is equal to one-half the unconfined compression strength qu. On site the vane test gives an approximate measure of shear strength.

For some stability problems use is made of a variant of the undrained triaxial test in which the specimen is allowed to consolidate fully under the hydrostatic pressure and is then tested to failure under conditions of no moisture content change. This is known as the consolidated undrained triaxial test. Pore water pressures may be measured during this test or a fully drained test may be carried out. In either case the effective shear strength parameters C' and $\emptyset$' can be obtained which can be used to calculate shear strength at any given pore water pressure.

11. **COMPACTION.** The density at which any soil can be placed in an earth dam, embankment or road depends on its moisture content and on the amount of work which is used in compaction. The influence of these two factors can be studied in compaction tests, which can determine the maximum dry density (MDD) achievable at a certain optimum moisture content (OMC).

12. **CALIFORNIA BEARING RATIO TEST.** In flexible pavement design a knowledge of the bearing capacity of the subgrade is necessary to enable the thickness of pavement for any particular combination of traffic and site conditions to be determined. The quality of the subgrade can be assessed by means of the California Bearing Ratio Test or approximately by the MEXE cone penetrometer.

13. **ROCK DESCRIPTION.** This is based on;

i. Colour (minor then principal colour).
ii. Grain Size.

Description	Predominate Grain Size (mm)
Very Coarse - grained	>63
Coarse - grained	63 - 2
Medium - grained	2 - 0.063
Fine - grained	0.063 - 0.002
Very Fine - grained	<0.002

iii. Matrix.
iv. Weathering.

Term	Description
Fresh	No visible sign of weathering/alteration of the rock material.
Discoloured	The colour of the original fresh rock material is changed and is evidence of weathering/alteration. The degree of change from the original colour should be indicated. If the colour change is confined to particular mineral constituents, this should be mentioned.
Disintegrated	The rock material is broken up by physical weathering, so that bonding between grains is lost and the rock is weathered/altered towards the condition of a soil in which the original material fabric is still intact. The rock material is friable but the grains are not decomposed.
Decomposed	The rock material is weathered by the chemical alteration of the mineral grains to the condition of a sol in which the original material fabric is still intact; some or all of the grains are decomposed.

v. Carbonate Content.
vi. Stability of Rock Material.

Stable indicates no changes when sample left in water for 24 hours. Fairly stable indicates fissuring and crumbling of surfaces. Unstable indicates complete disintegration of the sample.

vii. Unconfined Compressive Strength.

Term	Field Identification	Unconfined Compressive Strength (MPa)
Extremely Weak[a]	Indented by thumbnail.	Less than 1
Very Weak	Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife.	1 to 5
Weak	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer.	5 to 25
Medium Strong	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer.	25 to 50
Strong	Specimen required more than one blow of geological hammer to fracture it.	50 to 100
Very Strong	Specimen requires many blows of geological hammer to fracture it.	100 to 250
Extremely Strong	Specimen can only be chipped with geological hammer.	Greater than 250

[a] Some extremely weak rocks will behave as soils and should be described as soils.

viii. Structure.

Sedimentary	Metamorphic	Igneous
Bedded	Cleaved	Massive
Interbedded	Foliated	Flowbanded
Laminated	Schistose	Folded
Folded	Banded	Lineated
Massive	Lineated	
Graded	Gneissose	
	Folded	

ix. Discontinuities.
x. Discontinuity Spacing, persistence and roughness, infilling and seepage.
xi. Weathering of the Rock Mass.

Term	Description	Grades
Fresh	No visible sign of rock material weathering; perhaps slight discolouration on major discontinuity surfaces.	0
Slightly weathered	Discolouration indicates weathering of rock material and discontinuity surfaces.	1
Moderately weathered	Less than half of the rock material is decomposed or disintegrated. Fresh or discoloured rock is present either as a continuous framework or as core stones.	2
Highly weathered	More than half of the rock material is decomposed or disintegrated. Fresh or discoloured rock is present either as a continuous framework or as core stones.	3
Completely weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.	4
Residual soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soils has not been significantly transported.	5

xii. Rock Mass Permeability

14. **CHEMICAL TESTS.** A knowledge of total soluble sulphate content and pH of soils and groundwater is important in determining the protection required for concrete or steel in contact with the ground. Other specialist tests may be carried out on sites suspected of being contaminated by toxic materials (see standard appendix B).

15. **REFERENCES**

BS5930: 2015+A1:2020 British Standard Code of Practice for Site Investigations
BS10175: 2011+A2:2017 British Standard Code of Practice for the Investigation of Potentially Contaminated Sites

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STANDARD APPENDIX B

NOTES ON CONTAMINATION INVESTIGATION PROCEDURE (June 2021)

mdja

1. **GENERAL.** The desk study and/or intrusive ground investigation is typically carried out in accordance with the Environment Agency's "Land Contamination Risk Management (LCRM) documents and the requirements of BS5930: 2015 and BS10175: 2011+A1: 2020. In relation to contamination the desk study is referred to as the preliminary investigation in BS10175 and the intrusive ground investigation is referred to as the Exploratory Investigation. This appendix briefly describes the nature of the work carried out and explains the standards against which contamination data has been assessed. The nature of any contamination investigation is such that only a small percentage of the ground, and therefore potential contamination, is sampled. Consequently variations in both ground conditions and contaminant levels can occur between any two sampling positions. The contamination investigation is designed to minimise such risks, but they cannot be eliminated.

2. **REVIEW OF CONTAMINATION ISSUES –** The National Planning Policy Framework (NPPF) and Part 2A of the Environmental Protection Act 1990 create a new regime for the identification and remediation of contaminated land. It introduced a definition of contaminated land described in Section 78A(2) of the Act of:

"any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or

(b) significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused:

Both Part 2A and the planning regime embrace the "suitable for use" approach. In the context of Part IIA, action is necessary only where there are unacceptable risks to health or to the environment, taking into account the current use of the land and its environmental setting.

For humans, significant harm is defined as "death, disease, serious injury ". Specifically, disease is taken to mean an unhealthy condition of the body or part of it. "Significant possibility of significant harm" is described as health effects arising from the intake of a contaminant or other direct bodily contact with the contaminant where the intake or exposure is unacceptable. The assessment should also take into account the total intake from all sources, the relative contribution of the pollutant linkage in question, and the duration of intake or exposure. The various statutory definitions are given overleaf.

The presence of unnatural substances does not automatically constitute a risk unless there is a link or pathway between the contamination (the hazard) and the receptor (the target) be it humans, the environment or property. Therefore the assessment needs to determine whether a hazard is present and whether the necessary pathway exists the so-called "pollution linkage" or "conceptual site model".

The effect of any hazard on a site depends primarily on the site use and groundwater conditions since these determine who and what may be at risk and the routes by which they may be exposed to the hazard. Site uses can include allotments, domestic gardens on residential developments, amenity and recreational areas, public open space and industrial and commercial buildings. On any site, the potential contaminants have to be identified together with the potential receptors. The pathway for that contaminant to reach its target has then to be considered.

3. **PRELIMINARY INVESTIGATION.** The preliminary Phase I Geoenvironmental Assessment (desk study) report normally considers the following key sections:

Introduction	
The Site	Contaminated Land
Site History	Radon
Geology and Mining	Geoenvironmental Risk Assessment
Hydrogeology	Geotechnical Assessment
Groundsure Geo-Insight and Enviro-Insight	Ground Investigation (Recommendations)

The report will summarise the findings and also relate our opinions to the potential for a site to be geoenvironmentally impaired, at levels likely to warrant mitigation or further consideration appropriate to the current or future use. Findings are based on information obtained and described during the desk study and site inspection without intrusive ground investigation. It is possible that further information exists. The absence of indicators of impairment does not mean that such impairment does not exist. Additional investigation including intrusive methods can reduce the risks but cannot eliminate them and may not be cost effective. We can advise on the additional research opportunities, their cost and their possible impact on mitigating risk. Recommendations are normally given based on the redevelopment proposals for the site.

Type of Receptor	Description of harm that is to be regarded as significant harm	Conditions For There Being A Significant Possibility Of Significant Harm
1. Human beings	Death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. For these purposes, disease is to be taken to mean an unhealthy condition of the body or a part of it and can include, for example, cancer, liver dysfunction or extensive skin ailments. Mental dysfunction is included only insofar as it is attributable to the effects of a pollutant on the body of the person concerned.	If the amount of the pollutant in the pollutant linkage represents an unacceptable intake or direct bodily contact, assessed on the basis of relevant information on the toxicological properties of that pollutant. Such an assessment should take into account: • the likely total intake of, or exposure to, the substance or substances which form the pollutant, from all sources including that from the pollutant linkage in question; • the relative contribution of the pollutant linkage in question to the likely aggregate intake of, or exposure to, the relevant substance or substances; and • the duration of intake or exposure resulting from the pollutant linkage in question. The question of whether an intake or exposure is unacceptable is independent of the number of people who might experience or be affected by that intake or exposure. Toxicological properties should be taken to include carcinogenic, mutagenic, teratogenic, pathogenic, endocrine-disrupting and other similar properties.
2. All other human health effects (particularly by way of explosion or fire)		If the probability, or frequency, of significant harm of that description is unacceptable. The pollutant linkage might cause "significant harm which" • would be irreversible or incapable of being treated; • would affect a substantial number of people; • would result from a single incident such as a fire or an explosion; or • would be likely to result from a short-term (lees than 24-hour) exposure to the pollutant.
3. Any ecological system, or living organism forming part of such a system, within a location which is protected.	For any protected location: • harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or • harm which affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location.	If either: • significant harm of that description is more likely than not to result from the pollutant linkage; or • there is a reasonable possibility of significant harm of that description being caused, and if that harm were to occur, it would result in such a degree of damage to features of special interest at the location in question that they would be beyond any practicable possibility of restoration.
4. Property in the form of: • crops, including timber; • produce grown domestically, or on allotments, for consumption; • livestock; • other owned or domesticated animals; • wild animals which are the subject of shooting or fishing rights.	For crops, a substantial diminution in yield or other substantial loss in the value resulting from death, disease or other physical damage. For domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage.	If significant harm of that description is more likely than not to result from the pollutant linkage in question.
5. Property in the form of buildings.	Structural failure, substantial damage or substantial interference with any right of occupation.	If significant harm of that description is more likely than not to result from the pollutant linkage in question during the expected economic life of the building.
6. Controlled waters.		

4. **INTRUSIVE INVESTIGATION.** BS10175 describes this as an exploratory investigation. Intrusive ground investigation is described in Standard Appendix A. During the investigation representative or indicative samples are obtained for testing by an accredited laboratory. The aim is to determine (with a degree of confidence appropriate to the objectives), the presence, concentration and distribution of contaminants in respect of those points investigated. The extent of any necessary intrusive investigation will depend on the size of the site and any hazards, either known or suspected.

5. **ASSESSMENT OF CONTAMINATION.** The assessment of contaminated land under the terms of Part II A of the Environmental Protection Act 1990 is based upon pollution linkage (source - pathway - receptor model) and the principles of the Environment Agency's "Contamination Land Risk Management" documentation.

DEFRA previously issued "Outcome of the Way Forward Exercise on Soil Guideline Values". This document was intended to provide guidance to determine if there is a Significant Possibility of Significant Harm (SPOSH) i.e. whether land meets the legal trigger of being contaminated land.

In the context of Part 2A, a risk assessor using an SGV would conclude the following (DEFRA, 2008).

- At a representative average soil concentration at or below an SGV, it is very unlikely that there will be a *significant possibility of significant harm (SPOSH)*.

- At a representative average soil concentration above an SGV, there *might* be a *significant possibility of significant harm* with the significance linked to the margin of exceedance, the duration and frequency of exposure, and other site-specific factors that the enforcing authority may wish to take into account. Further investigation and/or detailed evaluation will usually be required.

It should be stressed that where there is any uncertainty as to whether or not there is a SPOSH, it was the policy of this practice to adopt a conservative approach, particularly in the adoption of clean cover systems.

In April 2012, Defra both published new Statutory Guidance which forms a major part of their contaminated land regimes under Part 2A of the Environment Protection Act 1990. The regime provides a means of dealing with contaminated land which poses a significant risk to human health or the environment where there is no alternative solution. It also works alongside planning rules and building regulations to help ensure that affected land is made suitable for use when it is redeveloped.

Since the regime was introduced in 2000 there has been considerable uncertainty over how to decide when land is, and is not contaminated land on grounds of the legal test of *significant possibility of significant harm to human health or the environment*.

To help address this, one of the main changes set out in the new Statutory Guidance, is the introduction of a new four category test to help decide when land is, and is not, contaminated land on grounds of *significant possibility of significant harm to human health*. Under the new four category test:

- Category 1 describes land that is clearly contaminated land, for example because similar land is known to have caused significant harm in the past.

- Categories 2 and 3 cover less straightforward land where more detailed consideration is needed before the regulator can decide either: (a) that there is a strong case for regulatory action, in which case the land would be in Category 2 and be classified as contaminated land under Part 2A; or (b) that such a case does not exist, in which case the land would be in Category 3 and not be classified as contaminated land under Part 2A.

- Category 4 describes land that is clearly not contaminated land, as discussed below.

One of the main purposes of including the Categories in the Statutory Guidance is to provide a legal framework against which new technical tools can be developed by the land contamination sector to describe the Categories in more detail with regard to specific substances and/or situations.

The new Category 4 test is particularly important in terms of reducing uncertainty over when land is definitely not caught by the regime.

The new Statutory Guidance makes clear what land should be placed into Category 4, for example:

(a) Land where no relevant contaminant linkage has been established.

(b) Land where there are only normal levels of contaminants in soil (as explained in Section 3 of the guidance), unless there is a particular reason to consider otherwise. In other words land with normal background concentrations in the soil.

(c) Land that has been excluded from the need for further inspection and assessment under Part 2A because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of the guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of the guidance, e.g. Category 4 Screening Levels.

(d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed to in the normal course of their lives).

The guidance clarifies how generic assessment criteria (including the currently available SGVs/GACs) should and should not be used. It states that:

3.27 It is common practice in contaminated land risk assessment to use "generic assessment criteria" (GACs) as screening tools in generic quantitative human health risk assessment to help assessors decide when land can be excluded from the need for further inspection and assessment, or when further work may be warranted.

3.28 Local authorities may use GACs and other technical tools to inform certain decisions under the Part 2A regime, provided: (i) they understand how they were derived and how they can be used appropriately; (ii) they have been produced in an objective, scientifically robust and expert manner by reputable organizations; and (iii) they are only used in a manner that is in accordance with Part 2A and this Guidance.

3.29 GACs relating to human health risk assessment represent cautious estimates of levels of contaminants in soil at which there is considered to be no risk to health or, at most, a minimal risk to health. With regard to such GACs:

(a) They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.

(b) They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which GACs are exceeded (in itself) as being particularly relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.

(c) They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risks to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.

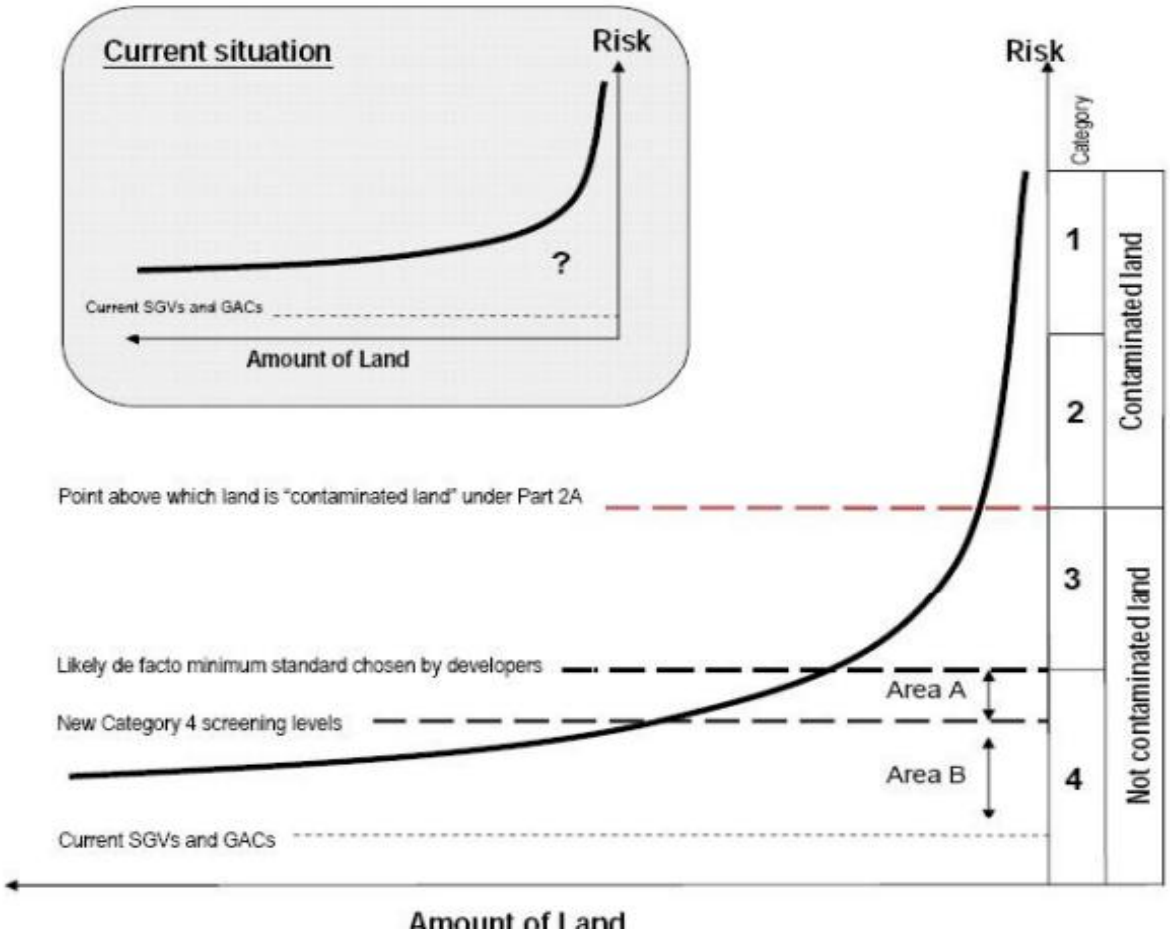
(d) They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.

(e) They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.

The way in which the new four category system is intended to operate and the place of the C4SLs within that system, was explained in detail in the Impact Assessment which accompanied the Statutory Guidance. Please note that although the detail of the Impact Assessment is included here to provide clarity on the job expected of C4SLs, the Statutory Guidance, itself, sets out the regime that needs to be delivered under Part 2A.

Paragraph 47 of the Impact Assessment describes the diagram in detail. Of particular relevance to this project is the description of the overall diagram (sub-paragraph a), description of category 4 (sub-paragraphs c (part iv) and h) and the description of how the monetised benefits of the new system will be realised (sub-paragraph h). These sub-paragraphs are reproduced below.

Diagram showing the new Category 1-4 system (compared to current situation)



The diagram above seeks to illustrate, in a simplified manner, broadly what the changes to the statutory guidance on significant possibility of significant harm to human health are intended to achieve. To explain:

(a) The curved line and axes illustrate the spectrum of risk presented by land contamination. The idea is to show that a very large amount of land is low risk, and only a small amount of land would pose sufficient risk to be contaminated land in the legal sense. The axes and lines in the diagrams are not to scale, and they have been compressed for the purposes of illustration (in reality the risks on Category 1 land would probably be orders of magnitude above Category 4 risks, and vastly more land would be in Category 4 compared to the other Categories).

(b) The smaller diagram summarizes the current situation. In the area below the SGV/GACs there is near certainty that land is not contaminated land, however, above the line there is increasing uncertainty. As explained above, currently remediation usually occurs to just below the SGV/GAC level because they are perceived as offering the only cast-iron guarantee of when land is definitely not contaminated land. Sometimes consultants are employed to justify remediating to levels above the SGV/GACs, however the further they go away from the SGV/GACs the more legal risk they and their clients are exposed to.

(c) The new statutory guidance will end the current situation, and it would not be legally possible e.g. for individual regulators to ignore the changes being made. For example, as explained above, the new statutory guidance will specifically say:

(i) that Part 2A cannot be used to force remediation to below a point where it ceases to be contaminated land in the legal sense i.e. the Category 2/3 border in terms of the diagram), although responsible parties can choose to go further;

(ii) that SGV/GACs cannot be used as one size fits all remediation thresholds under either Part 2A of the planning system;

(iii) that normal background levels of contamination are not caught by Part 2A; and

(iv) that SGV/GACs are well into Category 4, sometimes by only a few times and sometimes by orders of magnitude. These changes and others also provide the legal backing for the development e.g. of Category 4 screening levels, as discussed below.

(d) The new Category 1-4 system divides the spectrum of risk posed by contaminated land into four different categories, and the statutory guidance will explain how to decide when land falls into each Category. This is more sophisticated than the current statutory guidance, which in effect has only two categories (contaminated land or not) and does not explain how to decide which category land falls into. The new Category 1-4 system

reflects what assessors find when they investigate real sites i.e. some are clearly contaminated land (Category 1) ; some clearly are not (Category 4) and some are less-straightforward and need some level of detailed assessment before a decision can be taken as to whether or not they are contaminated land (Categories 2 and 3).

(e) In the case of Category 2 and 3 sites, the regulator will have flexibility to take decisions within the parameters set by the new Guidance. There would be less flexibility for Category 2 and 3 sites that clearly pose either a high or low risk. However, the regulator will have considerable flexibility for sites closer to the Category 2/3 border to judge which side of the border a site would fall (e.g. taking account of their understanding of the risks, uncertainties and the interests of the local community). These are often complex decisions which need to be taken case-by-case given the many factors involved.

(f) In the case of Categories 1 and 4 the regulator will have far less flexibility. For example, if a regulator claimed that a site matching the Category 1 description was not contaminated land, or that a site matching the Category 4 description was contaminated land, they would be acting directly against the statutory guidance which the Act requires that they follow, and decisions could be challenged (e.g. in a law court) with a high chance that the challenge would be successful. Among other things, the intention of doing this is to create far more legal certainty around when land is definitely not contaminated land in the legal sense. With the specific wording of the new statutory guidance, and the supporting tools such as the new Category 4 screening levels, it would be very difficult for a regulator e.g. to threaten landowners with the Part 2A regime, and if they tried to determine land as contaminated land they would be operating in direct opposition to the statutory guidance.

(g) In the many consultation meetings held in developing the Category 1-4 system, all the developers, landowners and consultants we spoke to were strongly of the view that they would want the ensure their land is safely within Category 4 (even though in theory they could remediate to a level within Category 3 and still satisfy Part 2A and planning rules). They would do this for various reasons, including the fact that the flexibility granted to regulators in Categories 2 and 3 means that the further into Category 3 a site gets, the greater the risk that the regulator might decide it is in Category 2. Also they would want to be in Category 4 for reasons of marketability, future proofing etc. So developers and others would have a strong incentive to seek the regulatory certainty of being safely within Category 4. Thus, as far as development taking place under the planning system is concerned, Category 3 would, in effect, normally be a buffer which provides added reassurance that development falling within Category 4 will not be caught by the Part 2A regime.

(h) The new statutory guidance will bring about a situation where the current SGV/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land. Above the C4SLs, in Area A on the diagram, there will be much stronger legal backing for experts to use their judgement to make sensible and precautionary decisions on when land should be considered to be towards the top end of Category 4, without fear that land may be caught as contaminated land. This recognizes that the generic C4SLs will not be able to describe the Category 3/4 border itself because they are generic and would therefore have to err on the side of caution whilst a detailed site specific assessment would be able to push further by looking at specific circumstances relating to a specific site.

(i) The very large majority of the monetized benefits of the changes to the regime discussed in this Impact Assessment manifest themselves in Category 4, and in particular in Areas A and B on the diagram. The main effects of moving to the new system would include Low risk land falling within Area B (pre-development) on the diagram would no longer have to be remediated because it would fall below the new C4SLs. Similarly land which is in Area A pre-development would no longer need to be remediated if justified by a detailed site-specific assessment. For these sites the cost of remediation would be removed altogether. The cost of remediating land which is initially in Categories 3, 2 or 1 would fall because it would be remediated to the new C4SL levels (or somewhere within Area A if there has been a detailed assessment) rather than the SGV/GAC level. This will have the overall effect of reducing the cost of remediation, with the effect varying according to specific site circumstances, the type of remediation etc. Generally the cost of remediation would fall for many affected brownfield land sites. This would have the general effect of making such land more economically viable for development. It would also mean that some land that is not currently economically viable to develop becomes reduce pressure to develop Greenfield land in some cases. The C4SLs will also speed up regulatory decisions on the reuse of brownfield land by providing a simple remediation standard.

The C4SLs are intended as "*relevant technical tools*" (in relation to Paragraph 4.2.1(c)) provides to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

The Impact Assessment (IA), which accompanied the revised SG (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that:

> *"The new statutory guidance with bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land".*

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

> *"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soils that, unless stated otherwise, are tolerable or pose a minimal risk to human health".*

C4SLs, therefore, should not be viewed as "SPOSH levels" and they should not be used as a legal trigger for the determination of land under Part 2A.

CL:AIRE (Contaminated Land: Application in Real Environments) has published "*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*". In it a series of C4SLs were proposed as follows;

Analyte	Residential (with home grown produce) (mg/kg)	Residential (without home grown produce) (mg/kg)	Allotments (mg/kg)	Commercial (mg/kg)	POS (mg/kg)
Arsenic	37	40	49	640	79
Benzene	0.87	3.3	0.18	98	140
Benzo(a)Pyrene	5	5.3	5.7	77	10
Cadmium	22	150	3.9	410	880
Chromium (vi)	21	21	170	49	21
Lead	200	310	80	2300	630

Where C4SL's are not available, Generic Assessment Criteria have been used as follows;

Generic Assessment Criteria for Human Health Risk Assessment Comparison
METALS/CYANIDE

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and based on 6% soil organic matter (SOM)
Values are expressed in mg/kg

	S4UL						C4SL						EA SGV			EIC/AGS/CL:AIRE or *ATRISKSOIL		
	Residential with homegrown produce	Residential without homegrown produce	Allotment	Commercial	POSresi	POSpark	Residential with homegrown produce	Residential without homegrown produce	Allotment	Commercial	POSresi	POSpark	Residential	Allotment	Commercial	Residential without consumption of homegrown produce	Allotment	Commercial
Antimony[1]																550	ND	7500
Arsenic (6% SOM)	37	40	43	640	79	170	37	40	49	640	79	170	32	43	640			
Barium[1]																1300	ND	22000
Beryllium (6% SOM)	1.7	1.7	35	12	2.2	63												
Boron (6% SOM)	290	11000	45	240000	21000	46000												
Cadmium (6% SOM)	11	85	1.9	190	120	560	22	150	3.9	410	220	880	10	1.8	230			
Chromium (III) (6% SOM)	910	910	18000	8600	1500	33000												
Chromium (VI) (6% SOM)	6	6	1.8	33	7.7	220	21	21	170	49	21	250						
Copper (6% SOM)	2400	7100	520	68000	12000	44000												
Cyanide (AtriskSoil)																34*	34*	34*
Lead (6% SOM)							200	310	80	2300	630	1300						
Nickel (6%SOM)	130	180	53	980	230	800												
Mercury (Elemental) (6% SOM)	1.2	1.2	21	58	16	30							1.0	26	26			
Mercury (Inorganic) (6% SOM)	40	56	19	1100	120	240							170	80	3600			
Mercury (Methyl) (6% SOM)	11	15	6	320	40	68							11	8	410			
Molybdbenum[1]																670	ND	17000
Selenium (6% SOM)	250	430	88	12000	1100	1800							350	120	13000			
Vanadium (6% SOM)	410	1200	91	9000	2000	5000												
Zinc (6% SOM)	3700	40000	620	730000	81000	170000												

Additional notes for EIC/AGS/CL:AIRE GAC

1 Due to the limitations in time and scope of the EIC/AGS/CL:AIRE project, plant uptake factors were not derived for metals and therefore the metals GAC have only been produced for residential without consumption of homegrown produce and commercial land-uses. Note that the derived GAC are not dependent on SOM.

PETROLEUM HYDROCARBONS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM).
SGVs based on 6% SOM, at a lower SOM the SGV may not be sufficiently protective.
Generic assessment criteria for Petroleum Hydrocarbons will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 10

	S4UL						C4SL						EA SGV			EIC/AGS/CL:AIRE			
Compound	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential**	**Allotment**	**Commercial**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Aliphatic EC 5-6 (1% SOM)	42	42	730	3200 (340)	570000 (304)	95000 (304)													
Aliphatic EC 5-6 (2.5% SOM)	78	78	1700	5900 (558)	590000	130000 (558)													
Aliphatic EC 5-6 (6% SOM)	160	160	3900	12000 (1150)	600000	18000 (1550)													
Aliphatic EC>6-8 (1% SOM)	100	100	2300	7800 (144)	600000	150000 (144)													
Aliphatic EC>6-8 (2.5% SOM)	230	230	5600	17000 (322)	610000	220000 (322)													
Aliphatic EC>6-8 (6% SOM)	530	530	13000	40000 (736)	620000	320000 (736)													
Aliphatic EC>8-10 (1% SOM)	27	27	320	2000 (78)	13000	14000 (78)													
Aliphatic EC>8-10 (2.5% SOM)	65	65	770	4800 (190)	13000	18000 (190)													
Aliphatic EC>8-10 (6% SOM)	150	150	1700	11000 (451)	13000	21000 (451)													
Aliphatic EC>10-12 (1% SOM)	130 (48)	130 (48)	2200	9700 (48)	13000	21000 (48)													
Aliphatic EC>10-12 (2.5% SOM)	330 (118)	330 (118)	4400	23000 (118)	13000	23000 (118)													
Aliphatic EC>10-12 (6%SOM)	760 (283)	770 (283)	7300	47000 (283)	13000	24000 (283)													
Aliphatic EC>12-16 (1% SOM)	1100 (24)	1100 (24)	11000	59000 (24)	13000	25000 (24)													
Aliphatic EC>12-16 (2.5% SOM)	2400 (59)	2400 (59)	13000	82000 (59)	13000	25000 (59)													
Aliphatic EC>12-16 (6% SOM)	4300 (142)	4300 (142)	13000	90000 (142)	13000	26000 (142)													
Aliphatic EC>16-35 (1% SOM)	65000 (8.48)	65000 (8.48)	260000	1600000	250000	450000													
Aliphatic EC>16-35 (2.5% SOM)	92000 (21)	92000 (21)	270000	1700000	250000	480000													
Aliphatic EC>16-35 (6% SOM)	110000	110000	270000	1800000	250000	490000													
Aliphatic EC>35-44 (1% SOM)	65000 (8.48)	65000 (8.48)	260000	1600000	250000	450000													
Aliphatic EC>35-44 (2.5% SOM)	92000 (21)	92000 (21)	270000	1700000	250000	480000													
Aliphatic EC>35-44 (6% SOM)	110000	110000	270000	1800000	250000	490000													
Aromatic EC 5-7 (1% SOM)	70	370	13	26000 (1220)	56000	76000 (1220)													
Aromatic EC 5-7 (2.5% SOM)	140	690	27	46000 (2260)	56000	84000 (2260)													
Aromatic EC 5-7 (6% SOM)	300	1400	57	86000 (4710)	56000	92000 (4710)													
Aromatic EC>7-8 (1% SOM)	130	860	22	56000 (869)	56000	87000 (869)													
Aromatic EC>7-8 (2.5% SOM)	290	1800	51	110000 (1920)	56000	95000 (1920)													
Aromatic EC>7-8 (6% SOM)	660	3900	120	180000 (4360)	56000	100000 (4360)													
Aromatic EC>8-10 (1% SOM)	34	47	8.6	3500 (613)	5000	7200 (613)													
Aromatic EC>8-10 (2.5% SOM)	83	110	21	8100 (1500)	5000	8500 (1500)													
Aromatic EC>8-10 (6% SOM)	190	270	51	17000 (3580)	5000	9300 (3580)													
Aromatic EC>10-12 (1% SOM)	74	250	13	16000 (364)	5000	9200 (364)													
Aromatic EC>10-12 (2.5% SOM)	180	590	31	28000 (899)	5000	9700 (899)													
Aromatic EC>10-12 (6% SOM)	380	1200	74	34000 (2150)	5000	10000													
Aromatic EC>12-16 (1% SOM)	140	1800	23	36000 (169)	5100	10000													
Aromatic EC>12-16 (2.5% SOM)	330	2300 (419)	57	37000	5100	10000													
Aromatic EC>12-16 (6% SOM)	660	2500	130	38000	5000	10000													
Aromatic EC>16-21 (1% SOM)	260	1900	46	28000	3800	7600													
Aromatic EC>16-21 (2.5% SOM)	540	1900	110	28000	3800	7700													
Aromatic EC>16-21 (6% SOM)	930	1900	260	28000	3800	7800													
Aromatic EC>21-35 (1% SOM)	1100	1900	370	28000	3800	7800													
Aromatic EC>21-35 (2.5% SOM)	1500	1900	820	28000	3800	7800													
Aromatic EC>21-35 (6% SOM)	1700	1900	1600	28000	3800	7900													
Aromatic EC>35-44 (1% SOM)	1100	1900	370	28000	3800	7800													
Aromatic EC>35-44 (2.5% SOM)	1500	1900	820	28000	3800	7800													
Aromatic EC>35-44 (6% SOM)	1700	1900	1600	28000	3800	7900													
Aliphatic + Aromatic EC>44-70 (	1600	1900	1200	28000	3800	7800													
Aliphatic + Aromatic EC>44-70 (	1800	1900	2100	28000	3800	7800													
Aliphatic + Aromatic EC>44-70 (	1900	1900	3000	28000	3800	7800													

	S4UL						C4SL						EA SGV			EIC/AGS/CL:AIRE			
Compound	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential**	**Allotment**	**Commercial**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Benzene (1% SOM)	0.087	0.38	0.017	27	72	90													
Benzene (2.5% SOM)	0.17	0.7	0.034	47	72	100													
Benzene (6% SOM)	0.37	1.4	0.075	90	73	110	0.87	3.3	0.18	98	140	230	0.33	0.07	95				
Toluene (1% SOM)	130	880 (869)	22	56000 (869)	56000	87000 (869)													
Toluene (2.5% SOM)	290	1900	51	110000 (1920)	56000	95000 (1920)													
Toluene (6% SOM)	660	3900	120	180000 (4360)	56000	100000 (4360)							610	120	$4.4x10^3$				
Ethyl benzene (1% SOM)	47	83	16	5700 (518)	24000	17000 (518)													
Ethyl benzene (2.5% SOM)	110	190	39	13000 (1220)	24000	22000 (1220)													
Ethyl benzene (6% SOM)	260	440	91	27000 (2840)	25000	27000 (2840)							350	90	$2.8x10^3$				
o-xylene (1%SOM)	60	88	28	6600 (478)	41000	17000 (478)													
o-xylene (2.5% SOM)	140	210	67	15000 (1120)	42000	24000 (1120)													
o-xylene (6% SOM)	330	480	160	33000 (2620)	43000	33000 (2620)							250	160	$2.6x10^3$				
m-xylene (1% SOM)	59	82	31	6200 (625)	41000	17000 (625)													
m-xylene (2.5% SOM)	140	190	74	14000 (1470)	42000	24000 (1470)													
m-xylene (6% SOM)	320	450	170	31000 (3460)	43000	32000 (3469)							240	180	$3.5x10^3$				
p-xylene (1% SOM)	56	79	29	5900 (576)	41000	17000 (478)													
p-xylene (2.5% SOM)	130	180	69	14000 (1350)	42000	23000 (1350)													
p-xylene (6% SOM)	310	430	160	30000 (3170)	43000	31000 (3170)							230	160	$3.2x10^3$				
Methyl tert-butyl ether (1% SOM)																49	73	23	7900
Methyl tert-butyl ether (2.5% SOM)																84	120	44	13000
Methyl tert-butyl ether (6% SOM)																160	220	90	24000

Additional Notes for LQM/CIEH Generic Assessment Criteria

1 For residential land use the inhalation of vapours indoors exposure pathway is the most significant exposure pathway for the lighter end aliphatic and aromatic fractions (up to aliphatic EC>12-16 and aromatic EC>10-12). The ingestion of soil and indoor dust and consumption of homegrown produce exposure pathways are the most significant for the higher end fractions (aliphatics EC>16-35 and EC>35-44; aromatics EC>12-16, EC16-21, EC>21-35, EC>35-44 and EC44-70).

2 For the allotment land use the consumption of homegrown produce exposure pathway is the most significant for the aromatic and lighter end aliphatic fractions. The ingestion of soil and and indoor dust is the most significant exposure pathway for the higher end aliphatics EC>12-16, EC>16-35 and EC35-44.

3 For the commercial land use the indoor inhalation of vapour exposure pathway is a significant exposure pathway for the lighter end aliphatic and aromatic fractions (up to aliphatic EC>12-16 and aromatic EC>10-12.

4 Background exposure represents a significant proportion of the total exposure for all fractions expect aromatic fractions EC>5-7 and EC>7-8 in all land uses.

Notes for SGVs

1 Based on a sandy loam as defined in Environment Agency (2009b) and 6% SOM. At a lower SOM, SGVs may not be sufficient protective.
2 Generic assessment criteria will vary according to SOM for all land uses.
3 SGVs assume that free phase contamination is not present.
4 SGVs based on a sub-surface soil to indoor air correction air correction factor of 10.
5 SGV presented for Toluene Commercial based on the vapour saturation limit.
6 SGV presented for Ethylbenzene Allotment and Xylene Allotment - in applying the rules for non-soil background, the inhalation background ADE is limited to being no larger than the contribution of the inhalation soil ADE.
7 Exposure of all isomers of xylene should be considered together, because the HCV applied is based on intake of total xylene and not an individual isomer in isolation.

Notes for EIC/AGS/CL:AIRE Generic Assessment Criteria

1 GAC have been derived for 4 generic land uses; residential with consumption of homegrown produce, residential without consumption of homegrown produce, allotments and commercial land-use.

POLYAROMATIC HYDROCARBONS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria for Polycyclic Aromatic Hydrocarbons will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	LQM/CIEH						C4SL					
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**
Acenaphthene (1% SOM)	210	3000 (57)	34	84000 (57)	15000	29000						
Acenaphthene (2.5% SOM)	510	4700 (141)	85	97000 (141)	15000	30000						
Acenaphthene (6% SOM)	1100	6000 (336)	200	100000	15000	30000						
Acenaphthylene (1% SOM)	170	2900 (86.1)	28	83000 (86.1)	15000	29000						
Acenaphthylene (2.5% SOM)	420	4600 (212)	69	97000 (212)	15000	30000						
Acenaphthylene (6% SOM)	920	6000 (506)	160	100000	15000	30000						
Anthracene (1% SOM)	2400	31000 (1.17)	380	520000	74000	150000						
Anthracene (2.5% SOM)	5400	35000	950	540000	74000	150000						
Anthracene (6% SOM)	11000	37000	2200	540000	74000	150000						
Benz(a)anthracene (1% SOM)	7.2	11	2.9	170	29	49						
Benz(a)anthracene (2.5% SOM)	11	14	6.5	170	29	56						
Benz(a)anthracene (6% SOM)	13	15	13	180	29	62						
Benzo(a)pyrene (1% SOM)	2.2	3.2	0.97	35	5.7	11						
Benzo(a)pyrene (2.5% SOM)	2.7	3.2	2.0	35	5.7	12						
Benzo(a)pyrene (6% SOM)	3.0	3.2	3.5	36	5.7	13	5.0	5.3	5.7	77	10	21
Benzo(b)fluoranthene (1% SOM)	2.6	3.9	0.99	44	7.1	13						
Benzo(b)fluoranthene (2.5% SOI	3.3	4.0	2.1	44	7.2	15						
Benzo(b)fluoranthene (6% SOM)	3.7	4.0	3.9	45	7.2	16						
Benzo(ghi)perylene (1% SOM)	320	360	290	3900	640	1400						
Benzo(ghi)perylene (2.5% SOM)	340	360	470	4000	640	1500						
Benzo(ghi)perylene (6% SOM)	350	360	640	4000	640	1600						
Benzo(k)fluoranthene (1% SOM)	77	110	37	1200	190	370						
Benzo(k)fluoranthene (2.5% SOI	93	110	75	1200	190	410						
Benzo(k)fluoranthene (6% SOM)	100	110	130	1200	190	440						
Chrysene (1% SOM)	15	30	4.1	350	57	93						
Chrysene (2.5% SOM)	22	31	9.4	350	57	110						
Chrysene (6% SOM)	27	32	19	350	57	120						
Dibenzo(ah)anthracene (1% SOI	0.24	0.31	0.14	3.5	0.57	1.1						
Dibenzo(ah)anthracene (2.5% S	0.28	0.32	0.27	3.6	0.57	1.3						
Dibenzo(ah)anthracene (6% SOI	0.3	0.32	0.43	3.6	0.58	1.4						
Fluoranthene (1% SOM)	280	1500	52	23000	3100	6300						
Fluoranthene (2.5% SOM)	560	1600	130	23000	3100	6300						
Fluoranthene (6% SOM)	890	1600	290	23000	3100	6400						
Fluorene (1% SOM)	170	2800 (30.9)	27	63000 (30.9)	9900	20000						
Fluorene (2.5% SOM)	400	3800 (76.5)	67	68000	9900	20000						
Fluorene (6% SOM)	860	4500 (183)	160	71000	9900	20000						
Indeno(123cd)pyrene (1% SOM)	27	45	9.5	500	82	150						
Indeno(123cd)pyrene (2.5% SOI	36	46	21	510	82	170						
Indeno(123cd)pyrene (6% SOM)	41	46	39	510	82	180						
Naphthalene (1% SOM)	2.3	2.3	4.1	190 (76.4)	4900	1200 (76.4)						
Naphthalene (2.5% SOM)	5.6	5.6	10	460 (183)	4900	1900 (183)						
Naphthalene (6% SOM)	13	13	24	1100 (432)	4900	3000						
Phenanthrene (1% SOM)	95	1300 (36)	15	22000	3100	6200						
Phenanthrene (2.5% SOM)	220	1500	38	22000	3100	6200						
Phenanthrene (6% SOM)	440	1500	90	22000	3100	6300						
Pyrene (1% SOM)	620	3700	110	54000	7400	15000						
Pyrene (2.5% SOM)	1200	3800	270	54000	7400	15000						
Pyrene (6% SOM)	2000	3800	620	54000	7400	15000						
Coal Tar (BaP as surrogate marl	0.79	1.2	0.32	15	2.2	4.4						
Coal Tar (BaP as surrogate marl	0.98	1.2	0.67	15	2.2	4.7						
Coal Tar (BaP as surrogate marl	1.1	1.2	1.2	15	2.2	4.9						

CHLOROALCANES AND ALKANES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
1,1-Dichloroethane (1% SOM)							2.4	2.5	9.2	280
1,1-Dichloroethane (2.5% SOM)							3.9	4.1	17	450
1,1-Dichloroethane (6% SOM)							7.4	7.7	35	850
1,2-Dichloroethane (1% SOM)	0.0071	0.0092	0.0046	0.67	29	21				
1,2-Dichloroethane (2.5% SOM)	0.011	0.013	0.0083	0.97	29	24				
1,2-Dichloroethane (6% SOM)	0.019	0.023	0.016	1.7	29	28				
1,1,1-Trichloroethane (1% SOM)	8.8	9	48	660	140000	57000 (1425)				
1,1,1-Trichloroethane (2.5% SOI	18	18	110	1300	140000	76000 (2915)				
1,1,1-Trichloroethane (6% SOM)	39	40	240	3000	140000	100000 (6392)				
1,1,2-Trichloroethane (1% SOM)							0.6	0.88	0.28	94
1,1,2-Trichloroethane (2.5% SOM)							1.2	1.8	0.61	190
1,1,2-Trichloroethane (6% SOM)							2.7	3.9	1.4	400
1,1,1,2-Tetrachloroethane (1% S	1.2	1.5	0.79	110	1400	1500				
1,1,1,2-Tetrachloroethane (2.5%	2.8	3.5	1.9	250	1400	1800				
1,1,1,2-Tetrachloroethane (6% S	6.4	8.2	4.4	560	1400	2100				
1,1,2,2-Tetrachloroethane (1%SI	1.6	3.9	0.41	270	1400	1800				
1,1,2,2-Tetrachloroethane (2.5%	3.4	8.0	0.89	550	1400	2100				
1,1,2,2-Tetrachloroethane (6%SI	7.5	17	2.0	1100	1400	2300				
1,1-Dichloroethene (1% SOM)							0.23	0.23	2.8	26
1,1-Dichloroethene (2.5% SOM)							0.40	0.41	5.6	46
1,1-Dichloroethene (6% SOM)							0.82	0.82	12	92
Tetrachloroethene (1% SOM)	0.18	0.18	0.65	19	1400	810 (424)				
Tetrachloroethene (2.5% SOM)	0.39	0.40	1.5	42	1400	1100 (951)				
Tetrachloroethene (6% SOM)	0.9	0.92	3.6	95	1400	1500				
Tetrachloromethane (1% SOM)	0.026	0.026	0.45	2.9	890	190				
Tetrachloromethane (2.5% SOM	0.056	0.056	1.0	6.3	920	270				
Tetrachloromethane (6% SOM)	0.13	0.13	2.4	14	950	400				
Trichloroethene (1% SOM)	0.016	0.017	0.041	1.2	120	70				
Trichloroethene (2.5% SOM)	0.034	0.036	0.091	2.6	120	91				
Trichloroethene (6% SOM)	0.075	0.080	0.21	5.7	120	120				
Trichloromethane (1% SOM)	0.91	1.2	0.42	99	2500	2600				
Trichloromethane (2.5% SOM)	1.7	2.1	0.83	170	2500	2800				
Trichloromethane (6% SOM)	3.4	4.3	1.7	350	2500	3100				
Vinyl Chloride (1% SOM)	0.00064	0.00077	0.00055	0.059	3.5	4.8				
Vinyl Chloride (2.5% SOM)	0.00087	0.0010	0.0010	0.077	3.5	5.0				
Vinyl Chloride (6% SOM)	0.0014	0.0015	0.0018	0.12	3.5	5.4				
Chloroethane (1% SOM)							8.3	8.4	110	960
Chloroethane (2.5% SOM)							11	11	200	1300
Chloroethane (6% SOM)							18	18	380	2100
1,2-Dichloropropane (1% SOM)							0.024	0.024	0.62	3.3
1,2-Dichloropropane (2.5% SOM)							0.042	0.042	1.2	5.9
1,2-Dichloropropane (6% SOM)							0.084	0.085	2.6	12
2-Chloronaphthalene (1% SOM)							3.7	3.8	40	390
2-Chloronaphthalene (2.5% SOM)							9.2	9.3	98	960
2-Chloronaphthalene (6% SOM)							22	22	230	2200
Bromodichloromethane (1% SOM)							0.016	0.019	0.016	2.1
Bromodichloromethane (2.5% SOM)							0.030	0.034	0.032	3.7
Bromodichloromethane (6% SOM)							0.061	0.07	0.068	7.6
Chloromethane (1% SOM)							0.0083	0.0085	0.066	1
Chloromethane (2.5% SOM)							0.0098	0.0099	0.13	1.2
Chloromethane (6% SOM)							18	18	380	2100

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
cis -1,2 Dichloroethene (2.5% SOM)							0.19	0.20	0.50	24
cis -1,2 Dichloroethene (6% SOM)							0.37	0.39	1.0	47
trans -1,2 Dichloroethene (1% SOM)							0.19	0.19	0.93	22
trans -1,2 Dichloroethene (2.5% SOM)							0.34	0.35	1.9	40
trans -1,2 Dichloroethene (6% SOM)							0.70	0.71	4.0	81
Dichloromethane (1% SOM)							0.58	2.1	0.1	270
Dichloromethane (2.5% SOM)							0.98	2.8	0.19	360
Dichloromethane (6% SOM)							1.7	4.5	0.34	560
Hexachloroethane (1% SOM)							0.2	0.22	0.27	22
Hexachloroethane (2.5% SOM)							0.48	0.54	0.67	53
Hexachloroethane (6% SOM)							1.1	1.3	1.6	120

Notes for EIC/AGS/CL:AIRE Generic Assessment Criteria

1 GAC have been derived for 4 generic land uses; residential with consumption of homegrown produce, residential without consumption of homegrown produce, allotments and commercial land-use.

EXPLOSIVES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL					
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**
RDX (1% SOM)	120	13000	17	210000	210000	210000
RDX (2.5% SOM)	250	13000	38	210000	26000	49000 (18.7)
RDX (6% SOM)	540	13000	85.0	210000	27000	53000
HMX (1% SOM)	5.7	6700	0.86	110000	13000	23000 (0.35)
HMX (2.5% SOM)	13	6700	1.9	110000	13000	23000 (0.39)
HMX (6% SOM)	26	6700	3.9	110000	13000	24000 (0.48)

PESTICIDES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

Compound	S4UL Residential with home grown produce	Residential without home grown produce	Allotment	Commercial	POSresi	POSpark
Aldrin (1% SOM)	5.7	7.3	3.2	170	18	30
Aldrin (2.5% SOM)	6.6	7.4	6.1	170	18	31
Aldrin (6% SOM)	7.1	7.5	9.6	170	18	31
Dieldrin (1% SOM)	0.97	7	0.17	170	18	30
Dieldrin (2.5% SOM)	2	7.3	0.41	170	18	30
Dieldrin (6% SOM)	3.5	7.4	0.96	170	18	31
Atrazine (1% SOM)	3.3	610	0.5	9300	1200	2300
Atrazine (2.5% SOM)	7.6	620	1.2	9400	1200	2400
Atrazine (6% SOM)	17.4	620	2.7	9400	1200	2400
Dichlorovos (1% SOM)	0.032	6.4	0.0049	140	16	26
Dichlorovos (2.5% SOM)	0.066	6.5	0.010	140	16	26
Dichlorovos (6% SOM)	0.14	6.6	0.022	140	16	27
Alpha-Endosulfan (1% SOM)	7.4	160 (0.003)	1.2	5600 (0.003)	1200	2400
Alpha-Endosulfan (2.5% SOM)	18	280 (0.007)	2.9	7400 (0.007)	1200	2400
Alpha-Endosulfan (6% SOM)	41	410 (0.016)	6.8	8400 (0.016)	1200	2500
Beta-Endosulfan (1% SOM)	7	190 (0.00007)	1.1	6300 (0.00007)	1200	2400
Beta-Endosulfan (2.5% SOM)	17	320 (0.0002)	2.7	7800 (0.0002)	1200	2400
Beta-Endosulfan (6% SOM)	39	440 (0.0004)	6.4	8700	1200	2500
Alpha-Hexachlorocyclohexanes (	0.23	6.9	0.035	170	24	47
Alpha-Hexachlorocyclohexanes (	0.55	9.2	0.087	180	24	48
Alpha-Hexachlorocyclohexanes (	1.2	11	0.21	180	24	48
Beta-Hexachlorocyclohexanes (1	0.085	3.7	0.013	65	8.1	15
Beta-Hexachlorocyclohexanes (2	0.2	3.8	0.032	65	8.1	15
Beta-Hexachlorocyclohexanes (6	0.46	3.8	0.077	65	8.1	16
Gamma-Hexachlorocyclohexane	0.06	2.9	0.0092	67	8.2	14
Gamma-Hexachlorocyclohexane	0.14	3.3	0.023	69	8.2	15
Gamma-Hexachlorocyclohexane	0.33	3.5	0.054	70	8.2	15

CHLOROBENZENES & METHYLBENZENES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Chlorobenzene (1% SOM)	0.46	0.46	5.9	56	11000	1300 (675)				
Chlorobenzene (2.5% SOM)	1.0	1.0	14	130	13000	2000 (1520)				
Chlorobenzene (6% SOM)	2.4	2.4	32	290	14000	2900				
1,2-Dichlorobenzene (1% SOM)	23	24	94	2000 (571)	90000	24000 (571)				
1,2-Dichlorobenzene (2.5% SOM	55	57	230	4800 (1370)	95000	36000 (1370)				
1,2-Dichlorobenzene (6% SOM)	130	130	540	11000 (3240)	98000	51000 (3270)				
1,3-Dichlorobenzene (1% SOM)	0.40	0.44	0.25	30	300	390				
1,3-Dichlorobenzene (2.5% SOM	1.0	1.1	0.6	73	300	440				
1,3-Dichlorobenzene (6% SOM)	2.3	2.5	1.5	170	300	470				
1,4-Dichlorobenzene (1% SOM)	61	61	15	4400 (224)	17000	36000 (224)				
1,4-Dichlorobenzene (2.5% SOM	150	150	37	10000 (540)	17000	36000 (540)				
1,4-Dichlorobenzene (6% SOM)	350	350	88	25000 (1280)	17000	36000 (1280)				
1,2,3-Trichlorobenzene (1% SOI	1.5	1.5	4.7	102	1800	770 (134)				
1,2,3-Trichlorobenzene (2.5% S(	3.6	3.7	12	250	1800	110 (330)				
1,2,3-Trichlorobenzene (6% SOI	8.6	8.8	28	590	1800	1600 (789)				
1,2,4-Trichlorobenzene (1% SOI	2.6	2.6	55	220	15000	1700 (318)				
1,2,4-Trichlorobenzene (2.5% S(	6.4	6.4	140	530	17000	2600 (786)				
1,2,4-Trichlorobenzene (6% SOI	15	15	320	1300	19000	400 (1880)				
1,3,5-Trichlorobenzene (1% SOI	0.33	0.33	4.7	23	1700	380 (36.7)				
1,3,5-Trichlorobenzene (2.5% S(	0.81	0.81	12	55	1700	580 (90.8)				
1,3,5-Trichlorobenzene (6% SOI	1.9	1.9	28	130	1800	860 (217)				
1,2,3,4-Tetrachlorobenzene (1%	15	24	4.4	1700 (122)	830	1500 (122)				
1,2,3,4-Tetrachlorobenzene (2.5	36	56	11	3080 (304)	830	1600				
1,2,3,4-Tetrachlorobenzene (6%	78	120	26	4400 (728)	830	1600				
1,2,3,5-Tetrachlorobenzene (1%	0.66	0.75	0.38	49 (39.4)	78	110 (39)				
1,2,3,5-Tetrachlorobenzene (2.5	1.6	1.9	0.90	120 (98.1)	79	120				
1,2,3,5-Tetrachlorobenzene (6%	3.7	4.3	2.2	240 (235)	79	130				
1,2,4,5-Tetrachlorobenzene (1%	0.33	0.73	0.06	42 (19.7)	13	25				
1,2,4,5-Tetrachlorobenzene (2.5	0.77	1.7	0.16	72 (49.1)	13	26				
1,2,4,5-Tetrachlorobenzene (6%	1.6	3.5	0.37	96	13	26				
Pentachlorobenzene (1% SOM)	5.8	19	1.2	640 (43.0)	100	190				
Pentachlorobenzene (2.5% SOM	12	30	3.1	770 (107)	100	190				
Pentachlorobenzene (6% SOM)	22	38	7.0	830	100	190				
Hexachlorobenzene (1% SOM)	1.8 (0.20)	4.1 (0.20)	0.47	110 (0.20)	16	30				
Hexachlorobenzene (2.5% SOM)	3.3 (0.50)	5.7 (0.50)	1.1	120	16	30				
Hexachlorobenzene (6% SOM)	4.9	6.7 (1.2)	2.5	120	16	30				
1,2,4-Trimethylbenzene (1% SOM)							0.35	0.41	0.38	42
1,2,4-Trimethylbenzene (2.5% SOM)							0.85	0.99	0.93	99
1,2,4-Trimethylbenzene (6% SOM)							2	2.3	2.2	220
Isopropyl benzene (1% SOM)							11	12	32	1400
Isopropyl benzene (2.5% SOM)							27	28	79	3300
Isopropyl benzene (6% SOM)							64	67	190	7700
Propylbenzene (1% SOM)							34	40	34	4100
Propylbenzene (2.5% SOM)							82	97	83	9700
Propylbenzene (6% SOM)							190	230	200	21000
Styrene (1% SOM)							8.1	35	1.6	3300
Styrene (2.5% SOM)							19	78	3.7	6500
Styrene (6% SOM)							43	170	8.7	11000

PHENOLS AND CHLOROPHENOLS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	LQM/CIEH						EA SGV			EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential**	**Allotment**	**Commercial**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**otm**	**Commercial**
Phenol (1% SOM)	120	440 (460)	23	440 (26000)	440 (10000)	440 (7600)							
Phenol (2.5% SOM)	200	690	42	690 (30000)	690 (10000)	690 (8300)							
Phenol (6% SOM)	380	1200	83	1300 (34000)	1300 (10000)	1300 (9300)	420	280	3200 (38000)				
Chlorophenol (1% SOM)	0.87	94	0.13	3500	620	1100							
Chlorophenol (2.5% SOM)	2.0	150	0.30	4000	620	1100							
Chlorophenol (6% SOM)	4.5	210	0.70	4300	620	1100							
Pentachlorophenol (1% SOM)	0.22	27 (16.7)	0.03	400	60	110							
Pentachlorophenol (2.5% SOM)	0.52	29	0.08	400	60	120							
Pentachlorophenol (6% SOM)	1.2	31	0.19	400	60	120							
2,4-Dimethylphenol (1% SOM)										19	210	3	16000
2,4-Dimethylphenol (2.5% SOM)										43	410	7	24000
2,4-Dimethylphenol (6%SOM)										97	730	17	30000
Total Cresols (2-Methylphenol, 3-methylphenol, 4-methylphenol) (1%SOM)										80	3700	12	160000
Total Cresols (2-Methylphenol, 3-methylphenol, 4-methylphenol) (2.5%SOM)										180	5400	27	180000
Total Cresols (2-Methylphenol, 3-methylphenol, 4-methylphenol) (6%SOM)										400	6900	63	180000

PHTHALATES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	EIC/AGS/CL:AIRE			
Compound	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Bis (2-ethylhexyl) phthalate (1%	280	2700	47	85000
Bis (2-ethylhexyl) phthalate (2.5	610	2800	120	86000
Bis (2-ethylhexyl) phthalate (6%	1100	2800	280	86000
Butyl benzyl phthalate (1% SOM	1400	42000	220	940000
Butyl benzyl phthalate (2.5% SO	3300	44000	550	940000
Butyl benzyl phthalate (6% SOM	7200	44000	1300	950000
Diethyl Phthalate (1% SOM)	120	1800	19	1500000
Diethyl Phthalate (2.5% SOM)	260	3500	41	220000
Diethyl Phthalate (6% SOM)	570	6300	94	290000
Di-*n*-butyl phthalate (1% SOM)	13	450	2	15000
Di-*n*-butyl phthalate (2.5% SOM	31	450	5	15000
Di-*n*-butyl phthalate (6% SOM)	67	450	12	15000
Di-*n*-octyl phthalate (1% SOM)	2300	3400	940	89000
Di-*n*-octyl phthalate (2.5% SOM	2800	3400	2100	89000
Di-*n*-octyl phthalate (6% SOM)	3100	3400	3900	89000

OTHER ORGANICS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Carbon disulphide (1% SOM)	0.14	0.14	4.8	11	11000	1300				
Carbon disulphide (2.5% SOM)	0.29	0.29	10	22	11000	1900				
Carbon disulphide (6% SOM)	0.62	0.62	23	47	12000	2700				
Hexachloro-1,3-butadiene (1% S	0.29	0.32	0.25	31	25	48				
Hexachloro-1,3-butadiene (2.5%	0.70	0.78	0.61	66	25	50				
Hexachloro-1,3-butadiene (6% S	1.6	1.8	1.4	120	25	51				
Tributyl tin oxide (1% SOM)							0.25	1.4	0.042	130
Tributyl tin oxide (2.5% SOM)							0.59	3.1	0.1	180
Tributyl tin oxide (6% SOM)							1.3	5.7	0.24	200
Biphenyl (1% SOM)							66	220	14	18000
Biphenyl (2.5% SOM)							160	500	35	33000
Biphenyl (6% SOM)							360	980	83	48000
2,4-Dinitrotoluene (1% SOM)							1.5	170	0.22	3700
2,4-Dinitrotoluene (2.5% SOM)							3.2	170	0.49	3700
2,4-Dinitrotoluene (6% SOM)							7.2	170	1.1	3800
2,6-Dintrotoluene (1% SOM)							0.78	78	0.12	1900
2,6-Dintrotoluene (2.5% SOM)							1.7	84	0.27	1900
2,6-Dintrotoluene (6% SOM)							3.9	87	0.61	1900
Bromoform (1% SOM)							2.8	5.2	0.95	760
Bromoform (2.5% SOM)							5.9	11	2.1	1500
Bromoform (6% SOM)							13	23	4.6	3100

6. GEOENVIRONMENTAL RISK ASSESSMENT

6.1 **Potential Hazard Sources.** Ground contamination can occur through several causes, particularly from historical use of the site and is often linked to the processes of waste disposal, underground storage, open storage, process pipework, leaks, spillages, tanks, site filling and various other reasons. The contamination can either arise from site sources or be the result of migration from other sources off site.

6.2 **Potential Migratory Pathways.** The primary pathways are considered to be laterally or vertically downward through underlying strata or upward to the ground surface. Such pathways also provide the potential for contaminants to migrate towards local watercourses and groundwater.

6.3 **Potential Targets At Risk.** Potential environmental liabilities related to current legislation associated with contaminated land with regard to existing ownership and redevelopment are summarised.

The probability of a hazard, linked with its consequences, can be used to assess risk in accordance with the tables below for use in decision making.

Consequence of Pollution Linkage

Severe	Damage to human health. Substantial pollution of controlled waters. Significant change in ecosystem population. Irreparable damage to property.
Moderate	Non-permanent damage to human health. Minor pollution of controlled waters. Change in ecosystem. Damage to property.
Mild	Short term health effects. Slight pollution of controlled waters. Slight effect on ecosystem. Minor repairable damage to property.
Near Zero	No noticeable effect on human health. No significant pollution to controlled waters. No measurable effect on ecosystem densities. Non-structural cosmetic damage to property.

Decision Making

Probability of a hazard and an associated linkage	**Consequences of a pollution linkage (hazard-pathway-target)**			
	Severe	Moderate	Mild	Near Zero
High	High	High	Medium/low	Negligible
Medium	High	Medium	Low	Negligible
Low	High/medium	Medium/low	Low	Negligible
Unlikely	High/medium/low	Medium/low	Low	Negligible

Final overall risk is based on an assessment of probability of a hazard and its consequences. Risk categories are shown shaded in the table above and defined below.

Risk	**Description**
High	Site probably or certainly unsuitable for present use or environmental setting. Contamination probably or certainly present and likely to have an unacceptable impact on key targets. Urgent action needed.
Medium/ Moderate	Site may not be suitable for present use or environmental setting. Contamination may be present, and likely to have unacceptable impact on key targets. Action may be needed on the medium term.
Low	Site considered suitable for present use and environmental setting. Contamination may be present but unlikely to have unacceptable impacts on key targets. Action unlikely to be needed in present use.
Negligible	Site considered suitable for present use and environmental setting. Contamination may be present but unlikely to have unacceptable impacts on key targets. No action needed while site remains in present use.

The review of the information from the exploratory investigation may be such that a decision is made that there is no need for further investigation. Alternatively, it may be necessary to carry out a further main investigation.

The Environment Agency has set out guidance as to the classification of waste arising from construction sites in its document "The Definition of Waste" dated April 2006. This document outlines how waste is to be handled

The following activities are not regarded as a waste management activity requiring licencing.

1) Construction activities carried out for the purpose of producing a suitably engineered soil e.g. lime stabilisation, vibro-replacement and piling.

2) Uncontaminated materials produced on site (including excavated soils and materials from demolition) which can be reused without further treatment. Examples include site regrading and footing excavations.

   These must be done in accordance with the Planning Permission. Demolition material must be used in accordance with the quality protocols for the production of aggregates from inert waste, subject to appropriate testing and the lack of any harmful constituents. Uses include pipe bedding, backfill and sub-base.

3) Contaminated soils can be moved on-site providing they do not require treatment or containment. There should be no risk to the environment i.e. non-leachable and in accordance with Planning Permission. Relevant activities can include site regarding and use of materials below clean cover systems, capping, buildings and hardstanding.

Where contaminated materials have to be placed in an engineered cell to prevent pollution, then this would be classed as landfilling and require PPC permits. Any material taken off site is considered to be waste. However, this is under review. If material is waste, then there is a duty of care including ensuring material is transported by a registered carrier. The destination of material leaving the site should be regularly checked and Waste Transfer Notes kept.

Clean Cover Systems

According to the Environment Agency's Remediation Position Statements of May 2006, the placement of a cover system using "clean" material is not treatment of waste. Consequently, no licensing/permitting position statements are applicable to this type of remediation. If the cover system uses 'waste materials' in its construction, waste management licensing exemption paragraph 9A may be applicable to its installation. If the installation of the proposed cover system does not meet the criteria for registration of this exemption, the activity may be regulated through a waste management site license.

7. WASTE ACCEPTANCE CRITERIA (WAC)

The main objective of the Landfill Directive is to prevent or reduce as far as possible the negative effects of landfilling waste on the environment and on human health. It is intended to reduce the disposal of waste materials to landfills and to encourage more sustainable approaches to dealing with wastes. It bans the landfill of liquids and certain solid wastes, introduces requirements for the treatment of wastes prior to landfill and provides for the classification of landfills as sites for inert, hazardous or non-hazardous waste and prohibits co-disposal.

It sets out procedures for waste acceptance at landfills and the types of waste for each class of landfill as specified by Waste Acceptance Criteria (WAC). The WAC are predominantly lists of "limit values" for certain parameters obtained from standard leaching tests of wastes going to landfills. WAC are set out in the Landfill Directive itself. Full details can be found in the Environment Agency document "Waste Classification – Guidance on the classification and Assessment of Waste " Technical Guidance WM3 - 2015

8. MAIN REFERENCES

British Standards	BS3882: 2015 British Standard Specification for Topsoil BS5930: 2015+A1:2020 British Standard Code of Practice for Site Investigations BS8485: 2015 British Standard Code of Practice for the design and protective measures from methane and carbon dioxide ground gases for new buildings BS10175: 2011+A2:2017 British Standard Code of Practice for the Investigation of Potentially Contaminated Sites
BRE	Radon: Guidance on protective measures for new dwellings, BR211, 2015 Protective measures for housing on gas-contaminated land, BR414, 2015 Cover systems for land regeneration, 2004 Concrete in aggressive ground. Special Digest SD1, 3rd Edition, 2005 Soakaway Design (DG365)
CIEH	The LQM / CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd Edition)
CIRIA	Assessing risks posed by hazardous ground gases to buildings, CIRIA C665 Asbestos in Soil and Made Ground: a guide to understanding and managing risks, CIRIAC733, 2014 Good Practice on the testing and verification of protection systems for buildings against hazardous ground gases. C735:2014
CL:AIRE	Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, SP1010, 2013
DEFRA	Contaminated Land Report CLR 11, 2002 (7-10 withdrawn) R & D Publications TOX 1 – 12, 14, 16 – 25 R & D Publications SGV 1, 3, 4, 5, 7, 8, 9, 10, 15 and 16 (withdrawn) Improvements to Contaminated Land Guidance - "Outcome of the "Way Forward", 2008 Exercise on Soil Guideline Values. July 2008 Guidance on the Legal Definition of Contaminated Land. July 2008 Simplification of the Contaminated Land Regime Impact Assessment No: Defra 1133
DETR	Circular 02/2000. Contaminated Land, 2000 Guidelines for Environmental Risk Assessment and Management, 2000
Environment Agency	Guidance for the Safe Development of Housing on Land Affected by Contamination, 2000 Protective measures for housing on gas-contaminated land Remediation Position Statements, May 2006 Guidance and monitoring of landfill leachate, groundwater and surface water Human health toxicological assessment of contaminants in soil (Science Report SC050021/SR2) 2008 Updated technical background in the CLEA model (Science Report SC0520021/SR3) Waste Classification – Guidance on the classification and Assessment of Waste - Technical Guidance WM3 (2015) Contaminated Land Risk Management (2021)
HMSO	Part 2A of the Environmental Protection Act Part 2A Statutory Guidance – April 2012 Contaminated Land (England) Regulations 2006 The Contaminated Land (England) (Amendment) Regulations 2012 The Water Act 2003 (Commencement No. 11) Order 2012
Institution of Civil Engineers	Contaminated Land: Investigation, Assessment and Remediation, 2nd Edition
NHBC	Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present, 2007

This list is not intended to be exhaustive.



Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Charnock Court 6 South Parade Wakefield West Yorkshire WF1 1LR

Tel: 01924 360458

Web: www.geoenvironmental.co.uk Email: mdja@geoenvironmental.co.uk