



Indurent Management Ltd

**Heywood Distribution Park – Primary
Substation**

Phase I Geo-environmental Desk Study

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I Introduction

I.1 General

PJA has been instructed by Indurent Management Ltd (Indurent) to prepare a Phase 1 geo-environmental desk study to support a planning application for the proposed development of a primary substation, located within Heywood Distribution Park, Pilsworth Road, Heywood. The proposed location of the primary substation is herein referred to as 'the site'. A site location plan is presented in Appendix A.

I.2 Development Proposals

It is understood that the development comprises the construction and operation of a primary substation.

A proposed site layout is shown on SmOp Clean Tech drawing (250031_HYD-SMP-ZZ-00-DR-ME-CCP-003 revision P01, dated 13th May 2025) in Appendix A.

I.3 Scope of Works

The preparation of the Phase 1 geo-environmental desk study includes:

- A description of the current use and condition of the site and uses of the surrounding area;
- A summary of the geo-environmental setting of the site with regards to the recorded geology, topography, hydrogeology, hydrology and regulatory records based on information obtained via a Groundsure report;
- An overview of the historical development of the site and surrounding area using historical maps obtained via Groundsure;
- Identification of minerals safeguarding areas, if relevant;
- Review and summary of coal mining information presented in a Consultants Coal Mining Report.
- Identification of sources, pathways and receptors and preparation of an initial Conceptual Site Model (CSM) to establish potential contaminant linkages;
- Completion of a Tier 1 preliminary qualitative risk assessment for potential contaminant linkages in the initial CSM;
- A summary of key ground engineering constraints which may affect the proposed development;
- An appraisal of potential unexploded ordnance risk based on information provided by Zetica; and
- Recommendations for further work to investigate potential contaminant linkages and ground engineering constraints.



I.4 Limitations

Where information and data has been used in preparation of this report and has been either provided to PJA or prepared by third parties, PJA accepts no responsibility for the accuracy or completeness of that information.

Further details of the report limitations are presented in Appendix G.



2 Sources of Information

Table 2-1: Sources of Information

Description	Author	Date	Reference
Groundsure Report	Groundsure Ltd	June 2025	GS-JDM-QFF-LAZ-DON
Historical Maps	Obtained via Groundsure	June 2025	GS-4DW-65N-ORQ-CC2_largeScale GS-4DW-65N-ORQ-CC2_smallScale
Geoindex	British Geological Survey	Accessed June 2025	https://mapapps2.bgs.ac.uk/geoindex/home.html
Published Geological Records	British Geological Survey	Published 2011	British Geological Survey Map Sheet 85, Manchester, Solid and Drift Edition 1:50,000
Published Geological Records	British Geological Survey	Published 1973 – 1975	SD80NW 1:10,560
Safeguarded Mineral Resources	Rochdale Borough Council	Accessed June 2025	https://www.greatermanchester-ca.gov.uk/media/8354/map24.pdf
Topographic information	Topographic-map	Accessed June 2025	https://en-gb.topographic-map.com/map-lp7cz/Heywood/?center=53.58281%2C-2.24721&zoom=15&popup=53.58064%2C-2.24225
UXO Risk Maps	Zetica	Accessed March 2025	https://zeticauxo.com/guidance/risk-maps/
UXO Desk Study & Risk Assessment - Heywood Distribution Centre	Zetica	May 2022	P11833-22-R1



3 Site Location and Description

3.1 Site Location

The site is square in shape with an adjoining rectangular section outlining the proposed access road to the substation and covers an area of approximately 0.09 hectares. The site is located within Heywood Distribution Park between units P4 to the northeast, P1 to the southeast, M1 to the southwest and P2 to the northwest approximately 90m to the north of Pilsworth Road.

The red line boundary drawing for the site supplied SmOp Clean Tech (250031_HYD-SMP-ZZ-00-DR-ME-CCP-003 revision P01, dated 13th May 2025) is presented in Appendix A. The Ordnance Survey grid reference for the approximate centre of the site is 384047.57, 409372.49.

3.2 Site Description

3.2.1 Current Site Use

The site comprises an area of soft landscaping surfaced with grass.

3.2.2 Topography

Topographic levels indicate the site is flat, with available information showing the site to be at 117m above Ordnance Datum (AOD).

3.2.3 Surrounding Area

Light industrial/logistics units incorporating external yards and car parking are located to the northwest and southwest of the site, with an associated access road and vehicle parking present to the east of the site. Soft landscaping, trees and a balancing pond are situated to the south of the site.

The wider surrounding area to the north, east, west and southeast comprises light industrial/logistics units and associated infrastructure within Heywood Distribution Park. An area of hardstanding located approximately 120m to the northwest of the site is used for heavy goods vehicle (HGV) cab and trailer parking.

Mulberry Way and Pilsworth Road are located approximately 70m and 90m to the south of the site, respectively.



4 Historical Review

4.1 Historical Mapping

Historical maps included in Appendix C and aerial imagery provided in the Groundsure report included in Appendix B have been reviewed to establish the historical development of the site and surrounding area. A summary is provided in Table 4-1.

Table 4-1: Historical Development of the Site and Surrounding Area

Date (Scale)	On-site	Off-site
1851 (1:10,560)	Brightley Brook flows from the northwest to the southeast through the west of the site. The remainder of the site is undeveloped.	The site is generally surrounded by fields. Brightley Brook extends north and south from the site. It flows south, culverted beneath Pilsworth Road and then flows in a southwest direction. A possible second watercourse is present approximately 20m north of the site where it flows into Brightley Brook. Unspecified buildings are recorded approximately 50m east, 110m southeast, 45m southeast and 80m south. A pump is related to the building located approximately 80m to the south. A track is recorded approximately 80m to the east, associated with the building approximately 50m to the east of the site. A track is recorded approximately 110m west. Pilsworth Road is in its current day location approximately 90m to the south of the site. Land to the south of the site is recorded as 'Pilsworth Moor'.
1890 (1:2,500) 1890-1891 (1:2,500)	No significant changes recorded on-site.	The possible second watercourse is no longer recorded. The general area surrounding the site is recorded as Pilsworth Moor.
1908-1909 (1:10,560) 1910 (1:2,500)	No significant changes recorded on-site.	An additional building, assumed residential, is located approximately 100m to the south. A building previously recorded approximately 110m southeast of the site is no longer recorded.
1928 (1:10,560) 1930 (1:2,500)	No significant changes recorded on-site.	An additional building is recorded approximately 105m to the south of the site.
1937-1939 (1:2,500) 1938 (1:10,560)	No significant changes recorded on-site.	No significant changes recorded within the area surrounding the site.
1955-1956 (1:10,560) 1957-1958 (1:2,500)	The map is devoid of information.	The map is devoid of information with the exception of Pilsworth Road and Brightley Brook to the south of the site.
1965-1968 (1:10,560) 1966 (1:1,250) 1968-1969 (1:2,500)	The channel in which Brightley Brook flows appears to have been artificially deepened and is shown in cut. Hardstanding is present along the western edge of the site.	Buildings previously recorded within 250m of the site are no longer present and have been replaced by developments and infrastructure associated with Heywood Distribution Park, which occupies the area to the north, east, west and southeast of the site. Numerous developments, the majority assumed to be industrial units, are located within 250m of the



Date (Scale)	On-site	Off-site
		site, with the closest situated approximately 15m to the west. A depot is recorded approximately 160m to the north of the site. Railway sidings are present across Heywood Distribution Park, the closest of which is positioned approximately 15m to the east of the site. Brightley Brook flows beneath a railway siding approximately 60m to the northeast and approximately 30m to the south of the site before emerging approximately 85m south of the site, north of Pilsworth Road. The watercourse is then culverted under Pilsworth Road, flowing to the southwest on the southern side of Pilsworth Road. Three tanks are recorded approximately 165m to the northeast and 180m and 245m to the west. Two residential properties are located approximately 215m and 225m to the east of the site. Various earthworks are evident around individual development plateaus.
1974-1975 (1:10,000) 1974-1978 (1:1,250)	No significant changes recorded on-site.	Tanks are located approximately 120m to the west and approximately 215m to the northwest of the site. An electricity substation is recorded approximately 200m to the west. Railway sidings are no longer recorded.
1981 -1983 (1:10,000)	Hardstanding is no longer recorded along the western edge of the site.	The surrounding area has undergone some redevelopment and larger units are recorded approximately 25m to the west and 100m to the northwest. An unspecified structure is located approximately 8m to the west of the site. Warehouses are recorded approximately 95m to the southeast of the site off Pilsworth Road.
1984 (1:1,250) 1992 (1:1,250)	No significant changes recorded on site.	No significant changes recorded within the area surrounding the site.
2000 (Aerial photograph) 2001 (1:10,000)	Possible earthworks are evident in the northeast and east of the site.	A large unit has been constructed approximately 50m to the north of the site with a tank on its northern side. Associated parking is located approximately 5m to the north of the site and the access road positioned immediately east of the site. Fields to the south of the site appear to be in use for arable farming.
2003 (1:1,250)	Brightley Brook is no longer recorded on site.	Two ponds are present approximately 20m east and south of the site. A tank is recorded approximately 165m to the southwest of the site. Significant redevelopment has taken place approximately 70m to the northeast as units previously recorded in this area have been replaced by a single larger unit and associated car parking and yards.



Date (Scale)	On-site	Off-site
2010 (1:10,000) 2011 (Aerial photograph)	The site is covered with grass.	No significant changes recorded within the area surrounding the site.
2019 (Aerial photograph)	No significant changes recorded on site.	No significant changes recorded within the area surrounding the site.
2023 (Aerial photograph) 2025 (1:10,000)	No significant changes recorded on site.	The unit formerly located approximately 100m to the northwest of the site has been demolished to ground level and the area is in use for HGV cab/trailer parking.

4.2 Unexploded Ordnance

Risk maps published online by Zetica show the site is in a low unexploded ordnance (UXO) risk area based on World War II bombing densities.

A UXO desk study and risk assessment was prepared by Zetica in 2022 for a nearby development plot in Heywood Distribution Centre, located approximately 100m to the northwest of the site at its closest point. Although the document was not prepared for the site itself, much of the information presented by Zetica is considered pertinent. The UXO desk study and risk assessment provides the following relevant information:

- Former ranges at RAF Heywood were located over 500m to the east of the site and are not considered to provide a source of UXO hazard to the site.
- Former defences at RAF Heywood were removed post-WWII and are not considered to provide a significant source of UXO hazard.
- Former military training is not considered to be a source of UXO hazard to the site.
- Former munitions stores at RAF Heywood were located approximately 500m from the site or more, and are not considered to provide a significant source of UXO hazard to the site.
- No records of bombing or military activity on the Site during World War One (WWI) were found.
- A number of HAA gun batteries were located within 10km of the site during WWII, the closest of which was approximately 4km from the site. The potential for a UXAA shell to have fallen on the site unnoticed, whilst unlikely, cannot be totally discounted.
- The possibility of items of UXO associated with historical Home Guard activities can never be totally discounted.
- Military airfields are not considered to provide a source of UXO hazard.
- No records have been found indicating that the site was bombed during WWI or WWII.
- An explosive Incendiary Bomb (EIB) fell on the No. 7 site at RAF Heywood, approximately 0.2km east of the site.



- Several HE bombs fell on a garage at RAF Heywood, more than 500m to the northeast of the site.
- No records have been found indicating that the site was bombed and no bomb damage has been identified on the Site on historical aerial photography. WWII bombing is not considered to provide a source of UXO hazard to the site.

The UXO desk study and risk assessment is presented in Appendix I.

4.3 Historical Military Use

Information provided by Zetica in the UXO desk study and risk assessment for an area to the northwest of the site indicates that the site, and the wider Heywood Distribution Park, formed part of RAF Heywood from 1939 to 1965. It is understood that RAF Heywood served as a Universal Equipment Depot (UED) and the Zetica desk study indicates that the UED was used for *'storing a wide range of RAF equipment including spares for aircraft, airframes, and engines, as well as, photographic stores, barrage balloons, propellor blades, gun turrets, dinghies, and oil'*.



5 Geo-environmental Setting

5.1 Published Geology

5.1.1 Made Ground

Published British Geological Survey (BGS) records suggest that Made Ground is absent from within the site boundary. However, 'landscaped ground' is present immediately west of the site associated with developed areas of Heywood Distribution Park.

Historical maps indicate that Brightley Brook flowed through the site until the 1990s/early 2000s at which point the channel was diverted and culverted around the site. Consequently, the former channel may have been infilled and Made Ground may therefore be present in this location.

5.1.2 Superficial Deposits

Published BGS records indicate the site to be underlain by Glacial Till (diamicton). The BGS indicates that Glacial Till typically comprises '*heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape*'.

5.1.3 Bedrock

Published BGS records included in the Groundsure report indicate that the site is underlain by the Pennine Lower Coal Measures Formation. The BGS describe the Pennine Lower Coal Measures Formation as '*Interbedded grey mudstone, siltstone and pale grey sandstone, commonly with mudstones containing marine fossils in the lower part, and more numerous and thicker coal seams in the upper part.*'

5.1.4 Geological Faults and Linear Features

A marine band fossil horizon trends northwest - southeast in the east of the site. In addition, an inferred coal seam is present 10m to the northeast of the site, also trending northwest – southeast. The inferred coal seam is not recorded on the 1:10,000 or 1:50,000 map sheets. Based on the recorded geology in the surrounding area, the inferred coal seam is interpreted to dip to the west/southwest.

Two inferred normal geological faults are recorded 173m southwest and 229m northeast, both trending northwest – southeast.

5.1.5 BGS Borehole Records

There is one BGS borehole record located on-site and a further sixteen exploratory hole records located within 250m of the site boundary. Ground conditions encountered within the on-site borehole comprised Made Ground (topsoil and clay fill) from ground level to 0.70m below ground



level (bgl), underlain by firm to stiff, brown and grey mottled sandy clay with occasional gravel and decomposed roots to 3.70mbgl, assumed to be Glacial Till. From 3.70mbgl soft grey brown sandy clay with occasional gravel and coal fragments were noted (assumed to be possible Glacial Till and weathered bedrock), with hard dark grey shale recorded from 7.00mbgl extending beyond the termination depth of the borehole of 9.00mbgl. Groundwater was encountered at 6.80mbgl, rising to 3.5mbgl on completion of drilling.

The borehole log is presented in Appendix D.

5.2 Mining

5.2.1 Coal Mining

Data provided by the Mining Remediation Authority contained in the Groundsure report indicates that the site is located within a coal mining reporting area. A Consultants Coal Mining Report has been obtained as part of this assessment and the findings are summarised below. A copy of the report is presented in Appendix E.

The Consultants Coal Mining Report indicates the following with regards to mining activity and geology:

- No past mining is associated with the site.
- No probable unrecorded shallow workings are associated with the site.
- No spine roadways are recorded at shallow depths beneath the site.
- There are no recorded mine entries within 100m of the site boundary.
- An abandoned mine catalogue plan (16820) intersects with some or all of the site boundary.
- No outcrops are recorded, and there are no faults, fissures or breaklines recorded.
- There are no opencast mines within 500m of the site boundary.
- There are no Mining Remediation Authority managed tips within 500m of the site boundary.

The report provides the following information related to investigative and remedial activity associated with the site:

- No site investigations are recorded within 50m of the site boundary.
- No remediated sites are recorded within 50m of the site boundary.
- The Mining Remediation Authority has not received a damaged notice or claim related to the site or any property within 50m of the site boundary since 31st October 1994.
- There is no current Stop Notice delaying the start of remedial works or repairs to the property.



- The Mining Remediation Authority is not aware of any requests having been made to carry out preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.
- No mine gas has been recorded within 500m of the site boundary.
- No mine water treatment schemes have been recorded within 500m of the site boundary.

With regards to licensing and future mining activity the report provides the following information:

- There are no records indicating future underground mining at the site.
- No coal mining licences have been issued within 200m of the site boundary.
- No court orders are associated with the site.
- No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.
- The site is not in an area where a notice to withdraw support has been given and the site 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.
- The site is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

The report states that *'if development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority'*.

5.2.2 Non-Coal Mining

In relation to non-coal mining, the Groundsure Report indicates that there are no formal records of mining or mineral extraction for the site or within 250m of the site. The Groundsure report indicates that an area 185m southwest of the site is a region of sporadic underground mining where *'Underground mine workings are uncommon, although the geology is similar to that worked elsewhere. Potential for difficult ground conditions are unlikely and are at a level where they need not be considered.'* The commodity is stated to be a *'vein mineral'*.

5.3 Mineral Resources

The Rochdale map of Safeguarded Mineral Sites suggests that the site is not located in a Minerals Safeguarding Area.

5.4 Radon

The Groundsure report indicates that the site lies in an area where less than 1% of properties are estimated to be at or above the Radon Action Level and that no radon protection measures are needed.

5.5 Potential for Geological Hazards

The Groundsure report presents the following geological hazard potential within the site boundary:

- Potential for shrinking or swelling clay ground stability hazards: Very low hazard potential;
- Potential for running sands ground stability hazards: Very low hazard potential;
- Potential for compressible ground stability hazards: Negligible hazard potential;
- Potential for landslide ground stability hazards: Very low hazard potential;
- Potential for collapsible ground stability hazards: Very low hazard potential; and,
- Potential for dissolution ground stability hazards: Negligible hazard potential.

5.6 Hydrogeology

5.6.1 Superficial Aquifer Classification

The Glacial Till is classified by the Environment Agency as a Secondary (Undifferentiated) Aquifer. The Environment Agency assigns Secondary (Undifferentiated) Aquifer classifications '*where it is not possible to attribute either Category A or Category B to a rock type*'.

5.6.2 Bedrock Aquifer Classification

The Pennine Lower Coal Measures Formation is classified by the Environment Agency as a Secondary A Aquifer, defined by the Environment Agency 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*'.

5.6.3 Groundwater Vulnerability

The Groundsure report indicates that groundwater in the superficial and bedrock aquifers is of low vulnerability.

5.6.4 Source Protection Zones

The site is not indicated to be located within a groundwater Source Protection Zone.



5.6.5 Licensed Groundwater Abstractions

The Groundsure report does not record any active licensed groundwater abstractions on site or within 250m of the boundary.

5.6.6 Groundwater Flooding

The Groundsure report indicates the site to be at a low risk of groundwater flooding.

5.7 Hydrology

5.7.1 Nearest Surface Water Features

There are no recorded on-site surface water features listed in the Groundsure report or indicated on available maps.

Information provided within the Groundsure report highlights Brightley Brook flowing east to west 86m south of the site, to the south of Pilsworth Road. Brightley Brook is understood to be culverted within the wider Heywood Distribution Park, flowing from north to south approximately 20m to the east of the site at its closest point. In addition, there are also two surface water ponds, assumed to be attenuation ponds, located approximately 20m east and south of the site.

5.7.2 Surface Water Abstraction Licences

The Groundsure report indicates that there are no active licensed surface water abstractions on the site or within 250m of the site.

5.7.3 Fluvial and Surface Water Flooding

The Groundsure report indicates that the site is located in a Flood Zone 1.

Information provided within the Groundsure report indicates the surface water flood risk at the site to be negligible.

6 Regulatory Review

6.1 Pollution Incidents

The Groundsure report does not record any pollution incidents on-site or within 250m of the site boundary.

6.2 Licensed Discharge to Controlled Waters

The Groundsure report indicates that there are no active, licensed discharges to controlled waters on-site or within 250m of the site boundary.

6.3 Landfill and Other Waste Sites

The Groundsure report indicates that there are no authorised or recorded historical landfills or other licensed waste facilities on site or within 250m of the site boundary.

6.4 Waste Exemptions

The Groundsure report does not record any waste exemptions on-site, however; there are ten waste exemptions recorded within 250m of the site boundary. All ten exemptions relate to either the treatment or storage of waste. The closest entry, located 75m to the northwest of the site at Unit 1 P1/P2, relates to repair or refurbishment of waste electrical and electronic equipment (WEEE). Other waste exemptions relate to storage of unspecified waste in secure containers, baling, sorting and shredding of unspecified waste, and storage of sludge on a farm.

6.5 Current Land Use

The Groundsure report identifies several potentially contaminative land uses within 250m of the site, as summarised in Table 6-1.

Table 6-1: Summary of Potentially Contaminative Land Uses

Distance and direction from site	Description
67m north	Special purpose machinery and equipment related to Hartmann, Parklands P2, Heywood Distribution Park
96m east	Industrial repairs and servicing related to Breakell Lifts, Parklands P1.16, Heywood Distribution Park
122m west	Tank
128m east	Industrial engineers related to Northern Switchgear Services Ltd, Parklands Unit P1.14, Heywood Distribution Park
196m west	Electricity substation
219m northwest	Former fuel storage within vacant plot.

There are no current potentially contaminative land uses recorded on-site.



6.6 Fuel Stations

The Groundsure report records no current or former fuel stations on the site or within 250m of the site.

6.7 Hazardous Substance Storage/Usage

The Groundsure report indicates that Eddie Stobart Logistics Ltd located 230m to the west of the site holds a consent to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015. No information is provided on the type of substance.

6.8 Designated Environmentally Sensitive Areas

The Groundsure report records the site to be located within a Site of Special Scientific Interest (SSSI) Impact Zone.

The site is not located within a Nitrate Vulnerable Zone.



7 Initial Conceptual Site Model

Based on the information summarised in the preceding sections of this report, this section presents the sources of potential contamination, receptors to potential contamination, and pathways between the two. The initial conceptual site model has been developed using this commonly adopted source-pathway-receptor model, as recommended in Land Contamination Risk Management published by the Environment Agency in 2020, most recently updated in June 2025.

Where contamination sources, pathways, and receptors are present these are referred to as potential contaminant linkages.

A preliminary qualitative assessment of the risk posed to identified receptors from potential on-site and off-site contamination sources has been made for each potential contaminant linkage, based on the information available at the time of writing this report.

7.1 Proposed Development

It is understood that the development comprises the construction and operation of a primary substation.

7.2 Potential Sources of Contamination

7.2.1 On-site

On-site potential sources of contamination are considered to comprise:

- Potential Made Ground of unknown provenance associated with the infilled former Brightley Brook channel and with the area of former hardstanding noted in the west of the site; and
- Potential mine gas associated with the Pennine Lower Coal Measures Formation.

It is possible that a range of contaminants may be present locally in soil and groundwater at the site including metals and other inorganics, asbestos, polycyclic aromatic hydrocarbons (PAH) and total petroleum hydrocarbons (TPH). Gases including hydrogen sulphide, carbon dioxide, and methane may be associated with areas of Made Ground if putrescible materials and/or organic-rich materials are present, and with the Pennine Lower Coal Measures Formation.

The site was historically located within RAF Heywood which comprised an UED where RAF equipment was stored, however no specific buildings or structures related to the UED are indicated to have been located within the site boundary and this land use has therefore been discounted as a potential on-site source of contamination.



7.2.2 Off-site

The key off-site potential sources of contamination are considered to comprise:

- Made Ground of unknown provenance associated with various cycles of development across the wider area.
- Current and historical light industrial and logistics facilities including storage tanks;
- HGV cab and trailer parking;
- Former RAF Heywood UED and associated railway sidings.
- Electricity substation.
- Surface runoff from surrounding road network.

Potential contaminants could include metals, nitrates, phosphates, chloride and other inorganics, PAH, TPH, asbestos, VOC, polychlorinated biphenyls (PCB). The generation of hydrogen sulphide, carbon dioxide and methane may be occurring if putrescible materials are present in areas of Made Ground.

7.3 Potential Pathways

7.3.1 Human Health

Regarding the assessment of risks to human health, the following pathways are considered potential exposure routes:

- Ingestion of contaminants in soil and soil-derived dusts where soils (and contaminants) are exposed at the surface;
- Dermal contact with contaminants in soils and soil-derived dusts where soils (and contaminants) are exposed at the surface;
- Inhalation of contaminants in soil-derived dusts from areas where soils (and contaminants) are exposed at the surface; and
- Inhalation of soil-derived and groundwater-derived vapours and/or ground gas.

7.3.2 Controlled Waters

The following pathways for the migration of contamination to controlled waters are considered applicable:

- Leaching and migration of contaminants from soils in the unsaturated zone to groundwater;
- Migration of contaminants via preferential pathways to groundwater;



- Lateral migration of contaminants in groundwater through soils and bedrock with discharge to surface water as base flow;
- Migration of contaminants along preferential pathways such as installed services followed by discharge to surface watercourses; and
- Surface runoff.

7.3.3 Property

The following pathways are considered applicable for property receptors:

- Direct contact of future on site property with contaminants in soils, perched water, and/or groundwater;
- Direct contact of off-site property with contaminants in migrating groundwater; and
- Lateral/vertical migration of gases through soils followed by accumulation in enclosed spaces and potentially explosive conditions.

7.4 Potential Receptors

Potential receptors to contamination are presented in Table 7-1.

Table 7-1: Potential Receptors

Receptor	Description
Human Health	Current site users.
	Occupants/users of off-site industrial properties.
	Construction and maintenance workers associated with the proposed development.
Controlled Waters	Groundwater in Secondary A Aquifer and Secondary (Undifferentiated) Aquifer.
	Surface water in off-site ponds and Brightley Brook.
Property	Future on-site structures/buildings, foundations and services.
	Current and future off-site structures/buildings, foundations and services.

It is understood that none of the proposed structures will be occupiable and only periodic maintenance visits will be carried out by operatives. Whilst construction and maintenance workers are considered to be potential receptors to contamination, their exposure is considered to be acute based on the generally short duration of their work. It is reasonably assumed that in accordance with the Control of Substances Hazardous to Health (COSHH) Regulations 2002, construction and maintenance workers will be provided with the necessary personal protective equipment for their work, taking into account the potential presence of harmful substances/contaminants.

Land contamination risk assessment is based on chronic risks associated with exposure to contamination over a longer period of time, therefore risks to construction and maintenance workers are not considered in the conceptual site model.

7.5 Initial Conceptual Site Model and Risk Assessment

Based on the information currently available, potential contaminant linkages have been identified and a preliminary risk assessment has been undertaken for the site. The estimation of the potential significance of each linkage is based on the nature of the proposed development, the presence and mobility of potential contaminants and the plausibility of the identified migration/exposure pathways.

The preliminary risk assessment was undertaken in accordance with the risk matrix set out in CIRIA C552 and is presented in Table 7-2. Risk Classification used to inform the preliminary risk assessment is presented in Appendix H.

**Table 7-2: Preliminary Assessment of Risks Associated with the Site Under Present Site Conditions**

	Potential Source	Key Contaminants	Pathway	Receptor	Probability	Consequence	Risk	Comment
1	<u>On site:</u> Made Ground of unknown provenance associated with the infilled former Brighley Brook channel and with the area of former hardstanding noted in the west of the site.	Metals and other inorganics, asbestos, PAH, TPH	Dermal contact with and/or ingestion of contamination in soil and soil-derived dust. Inhalation of contaminants in soil-derived dust. Inhalation of soil-derived and groundwater-derived vapours.	Human – Current site users	Unlikely	Medium	Low	Widespread contamination is not anticipated but may be present locally associated with anticipated areas of Made Ground of unknown provenance. It is considered unlikely that contamination is present at levels sufficient to pose unacceptable risks to users of the site.
2			Dermal contact with and/or ingestion of contaminants in windblown soil-derived dust. Inhalation of contaminants in windblown soil-derived dust. Inhalation of migrating soil-derived and groundwater-derived vapours.	Human – Occupants of off-site commercial properties	Unlikely	Medium	Low	Widespread contamination is not anticipated across the site but may be present locally associated with anticipated areas of Made Ground of unknown provenance. It is considered unlikely that contamination is present at levels sufficient to pose unacceptable risks to off-site receptors.
3			Leaching and migration of contaminants from	Controlled waters - Groundwater in Secondary A	Low likelihood	Medium	Moderate/Low	Widespread contamination is not anticipated across the site but may be present locally associated with anticipated



	Potential Source	Key Contaminants	Pathway	Receptor	Probability	Consequence	Risk	Comment
4			soils in the unsaturated zone into groundwater. Migration of contaminants via preferential pathways to groundwater.	Aquifer and Secondary (Undifferentiated) Aquifer	Low likelihood	Medium	Moderate/low	areas of Made Ground of unknown provenance. The site comprises soft landscaping. Shallow soils at the site associated with the Glacial Till are principally cohesive in nature based on BGS records related to the on-site borehole. Leaching of contamination to groundwater through cohesive soils is therefore anticipated to be limited. The vulnerability of the aquifers is recorded as low. It is considered unlikely that contamination is present at the site at levels sufficient to pose unacceptable risks to groundwater.
			Lateral migration of contaminants in groundwater through soils and bedrock with discharge to surface water as base flow. Migration of contaminants along preferential pathways such as installed services followed by discharge to surface watercourses. Surface runoff	Controlled waters – Off-site ponds and Brightley Brook				Widespread contamination is not anticipated across the site but may be present locally associated with anticipated areas of Made Ground of unknown provenance. The site comprises soft landscaping. Shallow soils at the site associated with the Glacial Till are principally cohesive in nature based on BGS records related to the on-site borehole. Leaching of contamination to groundwater through cohesive soils is therefore anticipated to be limited.



	Potential Source	Key Contaminants	Pathway	Receptor	Probability	Consequence	Risk	Comment
								There is anticipated to be a low likelihood that contamination is migrating from the site to surface water at levels sufficient to pose unacceptable risks.
5			Direct contact with contaminants in soils, perched water and/or groundwater.	Future on-site structures, foundations and services.	Unlikely	Minor	Very low	The site is not recorded to be underlain by sulphate-bearing bedrock and therefore aggressive ground conditions are considered unlikely to pose a risk to property at the site. Contaminants are considered to be unlikely to be present at concentrations which could present a risk to new buried services.
6			Direct contact with contaminants in migrating groundwater.	Current and future off-site buildings, foundations and services.	Unlikely	Minor	Very low	Contaminants are considered unlikely to be present at concentrations sufficient to pose unacceptable risks to off-site property receptors.
7		Methane, carbon dioxide, and hydrogen sulphide	Lateral/vertical migration through soils followed by accumulation in enclosed spaces and potentially explosive conditions.	Property – Current and future on-site and off-site buildings/structures, foundations and services.	Unlikely	Severe	Moderate/low	There is the potential for ongoing generation of ground gas associated with Made Ground of unknown provenance if putrescible materials and/or organic-rich materials are present, and associated with Pennine Lower Coal Measures Formation.
8	<u>Off-site:</u> Made Ground of unknown provenance associated with	Metals, nitrates, phosphates, chloride and other inorganics,	Dermal contact with and/or ingestion of contaminants in windblown soil-derived dust.	Humans – Current site users	Unlikely	Medium	Low	Whilst potentially contaminative land uses have been identified in the surrounding area, it is considered unlikely that contaminants would migrate on to the site to a significant degree as windblown soil-derived dust, in groundwater and as



	Potential Source	Key Contaminants	Pathway	Receptor	Probability	Consequence	Risk	Comment
	various cycles of development across the wider area. Current and historical light industrial and logistics facilities including storage tanks.	PAH, TPH, asbestos, VOC, PCB.	Inhalation of contaminants in windblown soil-derived dust. Inhalation of migrating soil-derived and groundwater-derived vapours.					vapours which site users may then come into contact with.
9	HGV cab and trailer parking. Former RAF Heywood UED and associated railway sidings.	Methane, carbon dioxide, and hydrogen sulphide	Lateral migration of contaminants through permeable soils in migrating groundwater.	Controlled waters – Groundwater in Secondary A Aquifer and Secondary (Undifferentiated) Aquifer	Low likelihood	Medium	Moderate/ Low	Shallow soils in the general area are anticipated to be generally cohesive in nature and there is considered to be a low likelihood that contamination has leached from off-site soils and has migrated or is migrating onto the site in groundwater.
10	Electricity substation. Surface runoff from surrounding road network.		Direct contact with contaminants in migrating groundwater.	Property –future on-site structures, foundations and services.	Unlikely	Minor	Very low	Shallow soils in the general area are generally cohesive in nature and it is considered unlikely that contamination has leached from off-site soils and has migrated or is migrating onto the site in groundwater.
11			Lateral/vertical migration through soils followed by accumulation in enclosed spaces and potentially explosive conditions	Property –Future on-site structures, foundations and services.	Unlikely	Severe	Moderate/low	Potential off-site Made Ground may be a source of gas if putrescible materials are present. However, it is considered unlikely that there is ongoing generation of gases at sufficient levels to pose an unacceptable risk.



8 Engineering Considerations

The following potential engineering constraints have been identified within the site using the information available. This list should not be considered exhaustive.

8.1 Made Ground

It is anticipated that Made Ground may be present locally at the site associated with an infilled watercourse through the site and former hardstanding present in the west of the site, the provenance, depth, and composition of which may vary. Due to the inherent variability of Made Ground and the frequently uncontrolled nature of its deposition, it is not recommended to found any structure within Made Ground.

8.2 Shrink-Swell Potential and Deterioration of Clay Soils

The site is recorded to be underlain by Glacial Till, which is anticipated to include cohesive soils. The potential volume change of any encountered clay soils should be established to inform foundation design. Clay soils are prone to deterioration in wet weather and with changes in moisture content. The management of water will be essential during any proposed earthworks and areas of excavation to reduce the potential for deterioration of clay soils.

8.3 Possible Shallow Groundwater

Given the limited groundwater information available for the site, relating to one borehole drilled in 1972, any proposed ground investigation should be designed to confirm groundwater levels by installation of monitoring standpipes and implementation of a groundwater monitoring regime. If present, shallow groundwater and seepages may require consideration if areas of excavation are proposed.

8.4 Settlement Characteristics

The potential for differential settlement may need to be considered, should foundations span cohesive and granular material and/or the potentially infilled ground which may include soft, compressible materials.

8.5 Coal Mining

The Groundsure report indicates an inferred coal seam 10m to the north east of the site. Based on published geological records for the surrounding area, the inferred coal seam is interpreted to dip to the west/south west. The Consultants Coal Mining Report indicates that no past mining is associated with the site, no probable unrecorded shallow workings are associated with the site, and there are no recorded mine entries within 100m of the site boundary. However, there is the potential for the inferred coal seam and possible unrecorded workings to be present beneath the site.



9 Conclusions and Recommendations

9.1 Conclusions

The site is recorded to have been historically undeveloped with Brightley Brook flowing from north to south through the centre of the site from the date of the earliest available map (1851). It is understood that the site and surrounding area formed part of RAF Heywood which was used as a Universal Equipment Depot between 1939 and 1965. No buildings or structures associated with RAF Heywood appear to have been located on the site itself. Heywood Distribution Park is first recorded in 1966 and Brightley Brook appeared to have been engineered into a deepened channel by this time. Historical maps indicate that Brightley Brook was culverted beyond the site between circa 1992 and 2000 and it is assumed that the former on-site channel was infilled.

Possible Made Ground of unknown provenance, the infilled former channel of Brightley Brook, and potential mine gas associated with the Pennine Lower Coal Measures Formation represent potential on-site sources of contamination. Potential contamination sources identified in the surrounding area include current and historical light industrial and logistics facilities, areas of HGV cab and trailer parking, and the former RAF Heywood UED and associated railway sidings.

Identified risks to receptors from potential contamination have been assessed as moderate/low to very low risk, as summarised in Table 9-1.

Table 9-1: Initial Potential Risks to Identified Receptors

Receptor	Description	Potential Risk
Human Health	Current site users.	Low
	Occupants/users of off-site industrial properties.	Low
Controlled Waters	Groundwater in Secondary A Aquifer and Secondary (Undifferentiated) Aquifer.	Moderate/Low
	Surface water in off-site ponds and Brightley Brook.	Moderate/Low
Property	Future on-site structures, foundations and services.	Very Low to Moderate/Low
	Current and future off-site buildings, foundations and services.	Very Low to Moderate/Low

9.2 Recommendations

Prior to any future development, a ground investigation should be designed and undertaken to establish existing ground conditions including the composition, extent, thickness and the engineering properties of underlying soils to inform the design of proposed infrastructure at the site.



The ground investigation should include coverage of both the assumed infilled former Brightley Brook channel and the areas of the site beyond the extent of this feature.

Environmental sampling is also recommended with associated laboratory analysis to inform an assessment of the presence/absence of contamination and provide the empirical data required for generic quantitative risk assessment for human health and controlled waters. Gas monitoring may be required depending on the recorded geology.

No detailed UXO risk assessment is considered necessary for the site given the available information for the wider RAF Heywood.

Appendix A Drawings

P2

01- GENERAL NOTES

SITE:
ADDRESS:
CONNECTION:
DNO: ENW
DNO: VNL

SUBSTATION BUILDINGS SHALL BE FULLY WEATHERPROOF, PAYING PARTICULAR ATTENTION TO DESIGN AND CONSTRUCTION DETAILS WITH RESPECT TO WIND DRIVEN RAIN AND STORM WATER RUN-OFF.
SUBSTATION BUILDINGS SHALL BE DESIGNED AND DETAILED SUCH THAT THE POTENTIAL FOR VANDALISM AND THEFT IS MINIMISED.

WHERE EXPOSED METALWORK WITHIN IS ACCEPTABLE IN PRINCIPLE TO ENERGENETWORKS THIS SHALL BE BONDED TO THE SUBSTATION EARTH SYSTEM WITH ADEQUATELY SIZED INSULATED CONDUCTOR.

SUFFICIENT SPACE SHALL BE PROVIDED WITHIN BUILDINGS TO FACILITATE ACCESS FOR ALL NECESSARY CONSTRUCTION, TESTING AND COMMISSIONING, INSPECTION, MAINTENANCE AND REMOVAL ACTIVITIES. THE ARRANGEMENT SHALL MAKE ALLOWANCE FOR FUTURE BAYS WHERE REQUIRED.

A CLEAR PASSAGE OF NOT LESS THAN 700MM WIDE SHALL BE PROVIDED BEHIND AND AROUND FLOOR MOUNTED EQUIPMENT WHERE ACCESS FOR OPERATION, MAINTENANCE OR REPLACEMENT OF EQUIPMENT IS REQUIRED. DISTANCE BETWEEN FRONT FACES SHALL NOT BE LESS THAN 1.8M INCREASED AS NECESSARY TO FACILITATE ACCESS FOR TEST GEAR AND FOR REMOVAL FOR REPLACEMENT OF EQUIPMENT.

WHERE TWO ROWS OF EQUIPMENT FACE EACH OTHER (CONTROL PANELS AND/OR SWITCHGEAR) THE CLEAR DISTANCE BETWEEN FRONT FACES SHALL NOT BE LESS THAN 1.8M INCREASED AS NECESSARY TO FACILITATE ACCESS FOR TEST GEAR AND FOR REMOVAL FOR REPLACEMENT OF EQUIPMENT.

THE CLEAR DISTANCE IN FRONT OF EQUIPMENT SHALL PROVIDE OPERATORS WITH A FULL VIEW OF INSTRUMENTS AND INDICATORS TO THE UNIT UNDER CONSIDERATION AND TO THE UNITS IMMEDIATELY TO EITHER SIDE AND SHALL NOT BE LESS THAN 1.2M.

REQUIREMENTS FOR CLEAR PASSAGE AND OPERATING DISTANCE SHALL BE CLEAR OF OBSTRUCTIONS SUCH AS WALKMOUNTED EQUIPMENT OR TOOLS, RADIATORS, SERVICES, STRUCTURAL PROJECTIONS AND THE LIKE AS WELL AS EQUIPMENT DOOR OPENINGS UNLESS THESE ARE EITHER REMOVABLE OR WILL OPEN THROUGH APPROXIMATELY 180°.

03- SUBSTRUCTURE
DAMP PROOF MEMBRANE SYSTEMS INCORPORATING MEMBRANE PROTECTION SHALL BE PROVIDED TO FULLY ENCLOSE BELOWGROUND MASONRY SUBSTRUCTURE. CONSTRUCTION TO OPERATIONAL ROOMS WITH BELOW FLOOR CABLE ACCESS.

THIS DAMP PROOF SYSTEM MAY BE OMITTED TO REINFORCED CONCRETE SUBSTRUCTURE CONSTRUCTION IN APPROPRIATE SITE SPECIFIC SITUATIONS.

SUB-FLOOR INFILL SHALL BE WEAK MIX CAST IN SITU CONCRETE.

CABLE TRENCHES FORMED WITHIN SOLID FLOOR CONSTRUCTION SHALL HAVE REINFORCED CONCRETE BOTTOMS AND SIDES OR MAY HAVE MASONRY SIDES WHERE THESE ARE ABOVE STRUCTURAL REINFORCED CONCRETE RAFTS.

05- FLOOR
TRENCH WORK WITHIN SOLID CONCRETE CONSTRUCTION SHALL INCORPORATE GALVANISED STEEL OR GRP KERB REBATES CAST WITHIN FLOORS TO RECEIVE TRENCH COVERS.

REINFORCEMENT WITHIN THE TOP SURFACE OF FLOOR SLABS WITHIN GIS SUBSTATION SWITCH ROOMS SHALL BE BONDED TO THE SUBSTATION EARTH SYSTEM IN ACCORDANCE WITH THE REQUIREMENTS OF THIS SPECIFICATION.

STRUCTURAL FLOOR SLABS SHALL BE CONTINUOUS AT DOORWAYS, INCLUDING SUSPENDED SLAB CONSTRUCTION OVER TRENCHES WHERE APPLICABLE.

SAND FILL WITH SCREED TOPPING OR SUSPENDED TRENCH COVER SYSTEMS SHALL NOT BE ACCEPTABLE TO TRENCHES AT THESE LOCATIONS.

CONCRETE FLOORS SHALL BE PREPARED AND PAINTED WITH 2ND COATS OF A PROPRIETARY ANTI-SLIP FLOOR PAINT SYSTEM STRICTLY IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS ONCE FLOORS ARE CURED. SLIP-RESISTANT FLOOR PAINT SYSTEMS TO BATTERY ROOMS WITH SEALED BATTERIES (VALVE) SHALL ADDITIONALLY BE ACID RESISTANT.

06- MASONRY
MATERIALS SHALL BE SELECTED TO MAXIMISE DURABILITY CONSISTENT WITH THE ARCHITECTURAL OR PLANNING REQUIREMENTS FOR THE SUBSTATION.

THE MINIMUM ACCEPTABLE STANDARD FOR BELOWGROUND MASONRY SHALL BE HIGH DENSITY (HD) CATEGORY I CLAY BRICKWORK OF MINIMUM 75MM/2 MEAN COMPRESSIVE STRENGTH, 7.0% MAXIMUM MOISTURE ABSORPTION AND DURABILITY DESIGNATION F2 (i.e., ENGINEERING CLASS B, QUALITY DESIGNATION OR EQUIVALENT).

EXTERNAL MASONRY SHALL BE HD CLAY-FACING BRICKWORK OF MINIMUM 30MM/2 MEAN COMPRESSIVE STRENGTH, MAXIMUM 12% MOISTURE ABSORPTION AND DURABILITY DESIGNATION F2 (i.e., ENGINEERING CLASS B, QUALITY DESIGNATION OR EQUIVALENT).

WHERE IT IS ESSENTIAL TO PROPOSE THE USE OF LOWER QUALITY EXTERNAL MASONRY TO MEET PLANNING AUTHORITY OR OTHER AESTHETIC REQUIREMENTS, IN SUCH CIRCUMSTANCES IT MAY BE NECESSARY TO APPLY AN APPROPRIATE COATING SYSTEM SUCH AS A CALULKANE HYDROPHOBIC IMPREGNATION TO ENSURE THAT UNDE MOISTURE PENETRATION IS PREVENTED.

WALLS SHALL INCORPORATE AS NECESSARY ANY COMBINATION OF STRUCTURAL FRAMING, ENHANCED CAVITY TIES, BED-JOINT REINFORCEMENT, WIND POSTS OR ENHANCED LATERAL RESTRAINT (INCLUDING THAT FROM ROOFS) TO MITIGATE THE IMPACT OF DISRUPTIVE FAILURE.

INTERNAL MASONRY ENCLISING ROOMS THAT HOUSE HIGH VOLTAGE SWITCHGEAR SHALL BE LIGHT COLOURED SOLID SMOOTH FAIR-FACED CLAY OR CONCRETE FACING BRICKWORK OF MINIMUM 30MM/2 MEAN COMPRESSIVE STRENGTH AND MAXIMUM 12% MOISTURE ABSORPTION.

INTERNAL MASONRY WALLS AND THE INNER LEAVES OF CAVITY MASONRY WALLS TO TRADITIONALLY BUILT ENCLOSURES THAT HOUSE HIGH VOLTAGE SWITCHGEAR OR TRANSFORMERS SHALL BE SOLID BRICKWORK CONSTRUCTION MINIMUM 210MM OVERALL THICKNESS UTILISING CLAY OR CONCRETE BRICKS.

INTERNAL MASONRY GENERALLY SHALL OTHERWISE BE THE CONSTRUCTORS DESIGN RESPONSIBILITY. HOWEVER, MODULAR, CELLULAR, HOLLOW AND SOME FORMS OF PERFORATED MASONRY UNITS WOULD NOT BE ACCEPTABLE. IT IS ESSENTIAL THAT WALLS TO SUPPORT EQUIPMENT PRESENT A SMOOTH PLUMB EVEN SURFACE.

MORTAR GRADE SHALL BE APPROPRIATE FOR THE MASONRY TYPE, INCLUDING THE USE OF SULPHATE RESISTING CEMENT WHERE NECESSARY (E.G. IN CERTAIN BELOWGROUND CONDITIONS). IN PARTICULAR, MORTAR TO INTERNAL CONCRETE BRICKWORK SHALL BE CLASS II.

BRICKWORK TIES TO CAVITY WALLS SHALL BE STAINLESS STEEL TYPE 1 OR TYPE 2 CONSTRUCTION EVENLY SPACED AT MAXIMUM 450MM CENTRES VERTICALLY AND 900MM CENTRES HORIZONTALLY, STAGGERED IN ALTERNATE COURSES.

WHERE UTILISED, MASONRY BED-JOINT REINFORCEMENT SHALL BE STAINLESS STEEL CONSTRUCTION. WHERE UTILISED, BUILT-UP WIND POSTS SHALL BE GALVANISED OR STAINLESS STEEL CONSTRUCTION.

DAMP-PROOF COURSES SHALL BE INCORPORATED AND SHALL BE EITHER HIGH DENSITY (HD) CATEGORY I CLAY BRICKWORK OF MINIMUM 125MM/2 MEAN COMPRESSIVE STRENGTH, 4.0% MAXIMUM MOISTURE ABSORPTION AND DURABILITY DESIGNATION F2 (i.e., ENGINEERING CLASS A, QUALITY DESIGNATION OR EQUIVALENT) OR PROPRIETARY HIGH PERFORMANCE (HIGH LOAD) STRENGTH, HIGH BOND) PITCH-POLYMER SYSTEMS.

ROOF
ROOFS SHALL PROVIDE A MAXIMUM OVERALL THERMAL TRANSMITTANCE U-VALUE NOT EXCEEDING 0.25W/M2K.

ROOFS SHALL BE DESIGNED SUCH THAT THEY ELIMINATE OR PROTECT AGAINST THE RISK OF FAILURE DUE TO VANDALISM OR THEFT. IN PARTICULAR IN RELATION TO TRADITIONAL CONSTRUCTION PITCHED ROOFS WHERE THIS COULD LEAD TO DISRUPTIVE FAILURE.

FOR THIS REASON OR IN RELATION TO THE POTENTIAL FOR DISRUPTIVE FAILURE OF PLANT AND PROVISION OF ADEQUATE LATERAL RESTRAINT TO WALLS, TRADITIONAL CONSTRUCTION PITCHED ROOFS MAY REQUIRE INCORPORATION OF A WATERPROOFED STRUCTURAL REINFORCED CONCRETE SLAB OR OTHER EQUAL APPROVED ROBUST SUB-ROOF CONSTRUCTION BENEATH (NOT APPLICABLE TO STEEL-FRAMED CLAD BUILDING CONSTRUCTION).

THE USE OF LEAD AS PART OF WATERPROOFING SYSTEMS SHOULD BE AVOIDED UNLESS ESSENTIAL FOR PLANNING PURPOSES, IN ORDER TO LIMIT THE POTENTIAL FOR VANDALISM AND THEFT AND THEREBY MITIGATE AGAINST THE RISK OF DISRUPTIVE FAILURE.

ROOFS ENCLISING SWITCHGEAR OR TRANSFORMERS - DISRUPTIVE FAILURE
ROOFS THAT ENCLOSE HIGH VOLTAGE SWITCHGEAR SHALL BE ADEQUATELY ROBUST AND/OR INCORPORATE DESIGNED PRESSURE RELIEF SUCH THAT PROGRESSIVE COLLAPSE DOES NOT ENSUE IN THE EVENT OF DISRUPTIVE FAILURE, INCLUDING PROVIDING ADEQUATE LATERAL RESTRAINT TO WALLS WHERE NECESSARY.

ROOFS THAT ENCLOSE HIGH VOLTAGE SWITCHGEAR SHALL BE ADEQUATELY ROBUST AND/OR INCORPORATE PRESSURE RELIEF PANELS SUCH THAT POTENTIALLY HAZARDOUS ROOFING MATERIAL IS NOT DISCHARGED TO ADJACENT PUBLIC AREAS IN THE EVENT OF DISRUPTIVE FAILURE.

CONCRETE ROOFS
CONCRETE ROOF SYSTEMS SHALL PROVIDE A FAIR-FACE SOFFIT FINISH AND SHALL INCORPORATE SLIP JOINTS AT WALL BEARINGS. WHERE APPLICABLE POLYURETHANE SEALED EXTERNALLY.

CONCRETE ROOFS SHALL BE CAST IN SITU REINFORCED CONCRETE CONSTRUCTION OR ALTERNATIVE PREFORMED SYSTEMS.

WATERPROOF COVERINGS TO FLAT ROOFS
PROPRIETARY SYNTHETIC COVER FLASHINGS SHALL BE PROVIDED TO UPSTANDS TO HIGHER LEVEL ELEVATIONS OF BUILDINGS AND BOTH UPSTANDS AND COVER FLASHINGS SHALL BE CHASED INTO JOINTS AND APPROPRIATELY POINTED.

MASTIC ASPHALT WATERPROOFING SYSTEMS
MASTIC ASPHALT WATERPROOFING SYSTEMS TO CONCRETE ROOFS SHALL COMPRISE PREPARATION AND TWO-COAT ROOFING GRADE MASTIC ASPHALT NOT LESS THAN 20MM THICK OVERALL, Laid TO BREAK JOINT AND INCORPORATING SHEATHING FELT UNDERLAY BENEATH.

UPSTANDS AND APRON DOWNSTANDS SHALL NOT BE LESS THAN 12MM THICK OVERALL, INCORPORATING FILLETS AND GALVANISED OR STAINLESS STEEL METAL BACKING MECHANICALLY FIXED TO THE SUBSTRATE.

ASPHALT SYSTEMS SHALL RECEIVE TWO COATS OF SOLAR REFLECTIVE PAINT FINISH.

DOORS
EXTERNAL METAL SECURITY DOORS SHALL BE PROPRIETARY CORROSION RESISTANT STEEL OR ALUMINIUM UNITS, PROPOSED DETAILS OF WHICH SHALL BE SUBMITTED TO ENERGENETWORKS FOR COMMENT AND ACCEPTANCE PRIOR TO PROCEEDMENT.

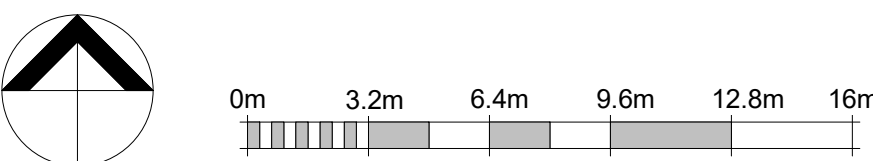
METAL SECURITY DOORS SHALL BE BONDED TO THE SUBSTATION EARTH SYSTEM IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL SPECIFICATION FOR THE CIVIL ENGINEERING AND BUILDING DESIGN AND CONSTRUCTION OF PRIMARY SUBSTATIONS. SUB-03-005 ISSUE 01.

DOORS SHALL BE OF ROBUST CONSTRUCTION THAT OFFERS A HIGH DEGREE OF SECURITY AGAINST UNAUTHORISED ENTRY.

DOORS SHALL INCORPORATE PROTECTIVE SURFACE FINISHES THAT ARE DURABLE AND MAXIMISE PERIODS BETWEEN MAINTENANCE.

ALL DOORS SHALL BE EMERGENCY ESCAPE DOORS, INCLUDING DOORS PROVIDING ACCESS INTO BUILDINGS. THE NUMBER OF DOORS HAVING EXTERNAL LOCKING TO ACCESS BUILDINGS SHALL BE KEPT TO A MINIMUM CONSISTENT WITH ADEQUATE SAFE OPERATIONAL USE, (TO LIMIT OPPORTUNITIES FOR UNAUTHORISED ENTRY).

EMERGENCY ESCAPE DOORS SHALL OPEN OUTWARDS.



Appendix B Groundsure Report

Heywood Distribution Park - Substation

Order Details

Date: 09/06/2025
Your ref: PO25319
Our Ref: GS-JDM-QFF-LAZ-DON

Site Details

Location: 384041 409375
Area: 0.09 ha
Authority: [Rochdale Metropolitan Borough Council](#) ↗

[Summary of findings](#)[p. 2 >](#)[Aerial image](#)[p. 9 >](#)[OS MasterMap site plan](#)[p.13 >](#)[Insight User Guide](#) ↗

Contact us with any questions at:

info@groundsure.com ↗

01273 257 755

Summary of findings

Page	Section	Past land use >	On site	0-50m	50-250m	250-500m	500-2000m
14 >	1.1 >	Historical industrial land uses >	1	0	4	22	-
16 >	1.2 >	Historical tanks >	0	0	7	7	-
16 >	1.3 >	Historical energy features >	0	0	1	7	-
17	1.4	Historical petrol stations	0	0	0	0	-
17	1.5	Historical garages	0	0	0	0	-
18	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
19 >	2.1 >	Historical industrial land uses >	1	0	6	39	-
21 >	2.2 >	Historical tanks >	0	0	13	11	-
22 >	2.3 >	Historical energy features >	0	0	2	13	-
23	2.4	Historical petrol stations	0	0	0	0	-
23	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill >	On site	0-50m	50-250m	250-500m	500-2000m
24	3.1	Active or recent landfill	0	0	0	0	-
24	3.2	Historical landfill (BGS records)	0	0	0	0	-
25	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
25	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
25	3.5	Historical waste sites	0	0	0	0	-
25	3.6	Licensed waste sites	0	0	0	0	-
25 >	3.7 >	Waste exemptions >	0	0	10	11	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
28 >	4.1 >	Recent industrial land uses >	0	0	6	-	-
29	4.2	Current or recent petrol stations	0	0	0	0	-
29	4.3	Electricity cables	0	0	0	0	-
29	4.4	Gas pipelines	0	0	0	0	-
29	4.5	Sites determined as Contaminated Land	0	0	0	0	-



30 >	4.6 >	Control of Major Accident Hazards (COMAH) >	0	0	1	1	-
30	4.7	Regulated explosive sites	0	0	0	0	-
30 >	4.8 >	Hazardous substance storage/usage >	0	0	1	0	-
31	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
31	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
31 >	4.11 >	Licensed pollutant release (Part A(2)/B) >	0	0	0	1	-
31	4.12	Radioactive Substance Authorisations	0	0	0	0	-
32	4.13	Licensed Discharges to controlled waters	0	0	0	0	-
32	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
32	4.15	Pollutant release to public sewer	0	0	0	0	-
32	4.16	List 1 Dangerous Substances	0	0	0	0	-
32	4.17	List 2 Dangerous Substances	0	0	0	0	-
33	4.18	Pollution Incidents (EA/NRW)	0	0	0	0	-
33	4.19	Pollution inventory substances	0	0	0	0	-
33	4.20	Pollution inventory waste transfers	0	0	0	0	-
33	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology >	On site	0-50m	50-250m	250-500m	500-2000m
34 >	5.1 >	Superficial aquifer >	Identified (within 500m)				
36 >	5.2 >	Bedrock aquifer >	Identified (within 500m)				
37 >	5.3 >	Groundwater vulnerability >	Identified (within 50m)				
38	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
38	5.5	Groundwater vulnerability- local information	None (within 0m)				
39 >	5.6 >	Groundwater abstractions >	0	0	0	0	5
41 >	5.7 >	Surface water abstractions >	0	0	0	0	7
43	5.8	Potable abstractions	0	0	0	0	0
43	5.9	Source Protection Zones	0	0	0	0	-
43	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology >	On site	0-50m	50-250m	250-500m	500-2000m
44 >	6.1 >	Water Network (OS MasterMap) >	0	0	8	-	-



45 >	6.2 >	Surface water features >	0	2	2	-	-
45 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
46 >	6.4 >	WFD Surface water bodies >	0	0	0	-	-
46 >	6.5 >	WFD Groundwater bodies >	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
47	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
47	7.2	Historical Flood Events	0	0	0	-	-
47	7.3	Flood Defences	0	0	0	-	-
48	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
48	7.5	Flood Storage Areas	0	0	0	-	-
49	7.6	Flood Zone 2	None (within 50m)				
49	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
50	8.1	Surface water flooding	Negligible (within 50m)				
Page	Section	Groundwater flooding >					
51 >	9.1 >	Groundwater flooding >	Low (within 50m)				
Page	Section	Environmental designations >	On site	0-50m	50-250m	250-500m	500-2000m
52	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
53	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
53	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
53	10.4	Special Protection Areas (SPA)	0	0	0	0	0
53	10.5	National Nature Reserves (NNR)	0	0	0	0	0
54	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
54	10.7	Designated Ancient Woodland	0	0	0	0	0
54	10.8	Biosphere Reserves	0	0	0	0	0
54	10.9	Forest Parks	0	0	0	0	0
55	10.10	Marine Conservation Zones	0	0	0	0	0
55 >	10.11 >	Green Belt >	0	0	0	0	3
55	10.12	Proposed Ramsar sites	0	0	0	0	0



55	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
56	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
56	10.15	Nitrate Sensitive Areas	0	0	0	0	0
56	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
57 >	10.17 >	SSSI Impact Risk Zones >	1	-	-	-	-
58	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
59	11.1	World Heritage Sites	0	0	0	-	-
59	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
59	11.3	National Parks	0	0	0	-	-
59	11.4	Listed Buildings	0	0	0	-	-
60	11.5	Conservation Areas	0	0	0	-	-
60	11.6	Scheduled Ancient Monuments	0	0	0	-	-
60	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations >	On site	0-50m	50-250m	250-500m	500-2000m
61 >	12.1 >	Agricultural Land Classification >	Grade 3 (within 250m)				
62	12.2	Open Access Land	0	0	0	-	-
62	12.3	Tree Felling Licences	0	0	0	-	-
62	12.4	Environmental Stewardship Schemes	0	0	0	-	-
62	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations >	On site	0-50m	50-250m	250-500m	500-2000m
63	13.1	Priority Habitat Inventory	0	0	0	-	-
63 >	13.2 >	Habitat Networks >	0	0	1	-	-
64	13.3	Open Mosaic Habitat	0	0	0	-	-
64	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
65 >	14.1 >	10k Availability >	Identified (within 500m)				
66 >	14.2 >	Artificial and made ground (10k) >	0	1	0	3	-
68 >	14.3 >	Superficial geology (10k) >	1	0	1	2	-

69	14.4	Landslip (10k)	0	0	0	0	-
70 >	14.5 >	Bedrock geology (10k) >	1	0	4	14	-
71 >	14.6 >	Bedrock faults and other linear features (10k) >	1	1	2	14	-
Page	Section	Geology 1:50,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
73 >	15.1 >	50k Availability >	Identified (within 500m)				
74	15.2	Artificial and made ground (50k)	0	0	0	0	-
74	15.3	Artificial ground permeability (50k)	0	0	-	-	-
75 >	15.4 >	Superficial geology (50k) >	1	0	1	2	-
76 >	15.5 >	Superficial permeability (50k) >	Identified (within 50m)				
76	15.6	Landslip (50k)	0	0	0	0	-
76	15.7	Landslip permeability (50k)	None (within 50m)				
77 >	15.8 >	Bedrock geology (50k) >	1	0	4	14	-
78 >	15.9 >	Bedrock permeability (50k) >	Identified (within 50m)				
79 >	15.10 >	Bedrock faults and other linear features (50k) >	1	0	2	11	-
Page	Section	Boreholes >	On site	0-50m	50-250m	250-500m	500-2000m
80 >	16.1 >	BGS Boreholes >	1	0	16	-	-
Page	Section	Natural ground subsidence >					
82 >	17.1 >	Shrink swell clays >	Very low (within 50m)				
83 >	17.2 >	Running sands >	Very low (within 50m)				
84 >	17.3 >	Compressible deposits >	Negligible (within 50m)				
85 >	17.4 >	Collapsible deposits >	Very low (within 50m)				
86 >	17.5 >	Landslides >	Very low (within 50m)				
87 >	17.6 >	Ground dissolution of soluble rocks >	Negligible (within 50m)				
Page	Section	Mining and ground workings >	On site	0-50m	50-250m	250-500m	500-2000m
89 >	18.1 >	BritPits >	0	0	0	1	-
90	18.2	Surface ground workings	0	0	0	-	-
90 >	18.3 >	Underground workings >	0	0	0	7	0
91	18.4	Underground mining extents	0	0	0	0	-
91	18.5	Historical Mineral Planning Areas	0	0	0	0	-

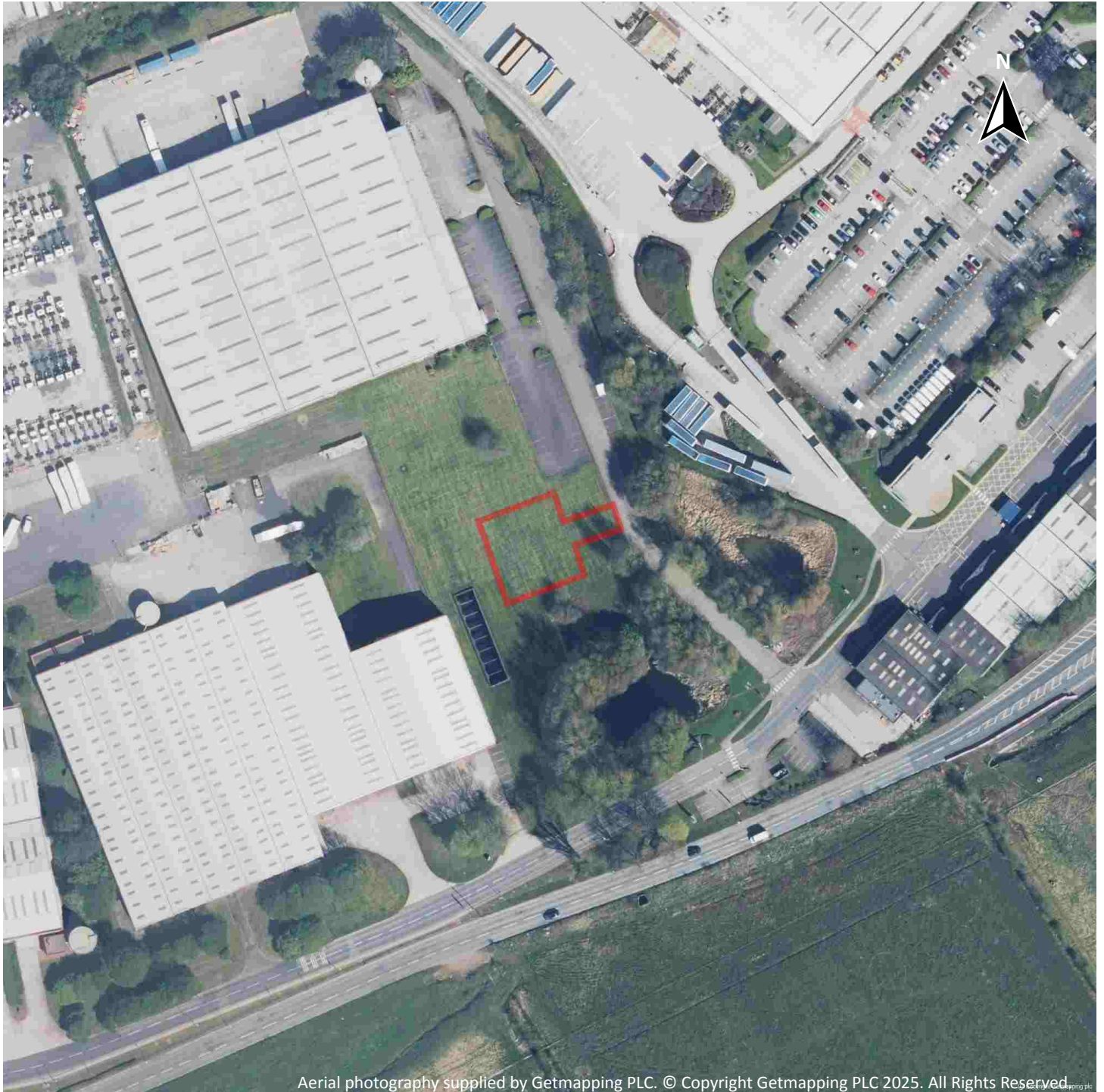


91 >	18.6 >	Non-coal mining >	0	0	1	0	0
91	18.7	JPB mining areas	None (within 0m)				
92	18.8	The Coal Authority non-coal mining	0	0	0	0	-
92	18.9	Researched mining	0	0	0	0	-
92	18.10	Mining record office plans	0	0	0	0	-
92	18.11	BGS mine plans	0	0	0	0	-
93 >	18.12 >	Coal mining >	Identified (within 0m)				
93	18.13	Brine areas	None (within 0m)				
93	18.14	Gypsum areas	None (within 0m)				
93	18.15	Tin mining	None (within 0m)				
93	18.16	Clay mining	None (within 0m)				
Page	Section	Ground cavities and sinkholes >	On site	0-50m	50-250m	250-500m	500-2000m
94	19.1	Natural cavities	0	0	0	0	-
95	19.2	Mining cavities	0	0	0	0	0
95	19.3	Reported recent incidents	0	0	0	0	-
95 >	19.4 >	Historical incidents >	0	0	0	1	-
Page	Section	Radon >					
96 >	20.1 >	Radon >	Less than 1% (within 0m)				
Page	Section	Soil chemistry >	On site	0-50m	50-250m	250-500m	500-2000m
98 >	21.1 >	BGS Estimated Background Soil Chemistry >	1	2	-	-	-
98	21.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
98	21.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects >	On site	0-50m	50-250m	250-500m	500-2000m
99	22.1	Underground railways (London)	0	0	0	-	-
99	22.2	Underground railways (Non-London)	0	0	0	-	-
100	22.3	Railway tunnels	0	0	0	-	-
100 >	22.4 >	Historical railway and tunnel features >	0	1	7	-	-
100	22.5	Royal Mail tunnels	0	0	0	-	-
101	22.6	Historical railways	0	0	0	-	-



101	22.7	Railways	0	0	0	-	-
101	22.8	Crossrail 2	0	0	0	0	-
101	22.9	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 07/04/2023

Site Area: 0.09ha



Recent site history - 2019 aerial photograph



Capture Date: 23/05/2019

Site Area: 0.09ha



Recent site history - 2011 aerial photograph



Capture Date: 02/05/2011

Site Area: 0.09ha



Recent site history - 2000 aerial photograph



Aerial photography supplied by Getmapping PLC. © Copyright Getmapping PLC 2025. All Rights Reserved.

Capture Date: 19/06/2000

Site Area: 0.09ha

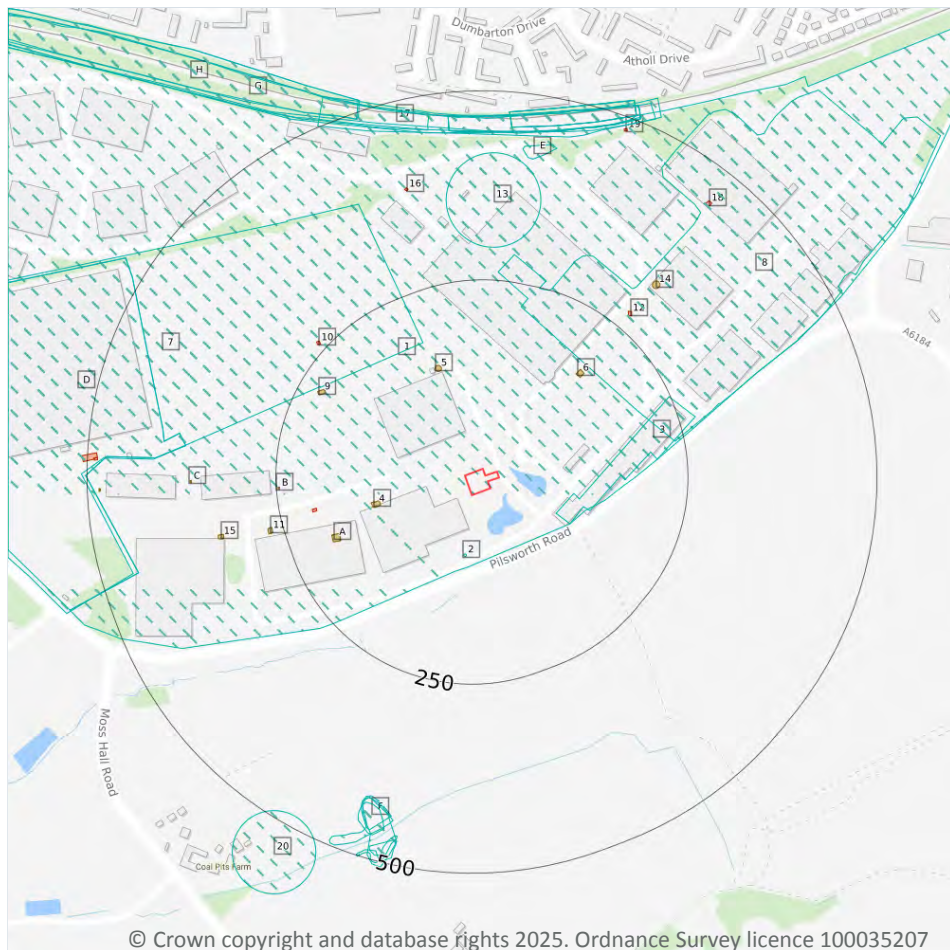


OS MasterMap site plan



Site Area: 0.09ha

1 Past land use



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features

1.1 Historical industrial land uses

Records within 500m

27

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 14 >](#)

ID	Location	Land use	Dates present	Group ID
1	On site	Industrial Estate	1981	684437



ID	Location	Land use	Dates present	Group ID
2	78m S	Pump	1851	682531
3	89m SE	Unspecified Warehouse	1981	692352
7	183m NW	Unspecified Depot	1974 - 1981	793900
8	184m NE	Unspecified Depot	1974 - 1981	735873
13	293m N	Unspecified Hole	1938	664250
D	371m W	Unspecified Depot	1981	782452
E	415m N	Unspecified Heap	1908 - 1938	711271
F	419m S	Unspecified Pit	1955 - 1981	746139
F	422m S	Coal Pits	1891	746898
F	423m S	Coal Pits	1908 - 1938	736715
F	429m S	Old Sandstone Quarry	1851	692073
17	442m N	Cuttings	1851	717967
G	445m N	Cuttings	1891	805452
E	445m N	Cuttings	1908	708648
E	445m N	Cuttings	1928	728069
E	445m N	Cuttings	1938	756905
G	447m N	Cuttings	1955	802278
E	454m N	Cuttings	1981	722765
E	454m N	Cuttings	1965	764450
E	454m N	Cuttings	1974	776673
H	454m N	Cuttings	1908 - 1938	773969
F	462m S	Coal Pits	1908 - 1938	743922
F	468m S	Unspecified Pit	1965 - 1981	712968
20	485m SW	Coal Pits	1955 - 1981	724524
H	492m N	Cuttings	1965	718916
H	492m N	Cuttings	1974 - 1981	723608

This data is sourced from Ordnance Survey / Groundsure.



1.2 Historical tanks

Records within 500m

14

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 ungrouped 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 14 >](#)

ID	Location	Land use	Dates present	Group ID
4	118m W	Unspecified Tank	1978 - 1997	102857
5	141m N	Unspecified Tank	1997	90260
6	166m NE	Unspecified Tank	1966 - 1969	105987
A	182m W	Unspecified Tank	1966 - 1997	92193
9	214m NW	Unspecified Tank	1978 - 1997	94360
B	246m W	Unspecified Tank	1968	99627
B	246m W	Unspecified Tank	1966	97278
11	264m W	Unspecified Tank	1978 - 1997	98393
14	320m NE	Unspecified Tank	1984 - 1998	108276
15	329m W	Unspecified Tank	1978 - 1997	94554
C	362m W	Unspecified Tank	1968	107282
C	362m W	Unspecified Tank	1966	102400
D	482m W	Unspecified Tank	1968	104211
D	483m W	Unspecified Tank	1966	97031

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m

8

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 ungrouped 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 14 >](#)

ID	Location	Land use	Dates present	Group ID
A	201m W	Electricity Substation	1978 - 1997	60873
10	258m NW	Electricity Substation	1978 - 1997	51942
12	270m NE	Electricity Substation	1997 - 1998	58802
16	381m N	Electricity Substation	1997	47907
18	449m NE	Electricity Substation	1984 - 1998	55622
19	481m N	Electricity Substation	1997 - 1998	60597
D	486m W	Electricity Substation	1997	60879
D	487m W	Electricity Substation	1978	54972

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 ungrouped 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

0

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 ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.



1.6 Historical military land

Records within 500m

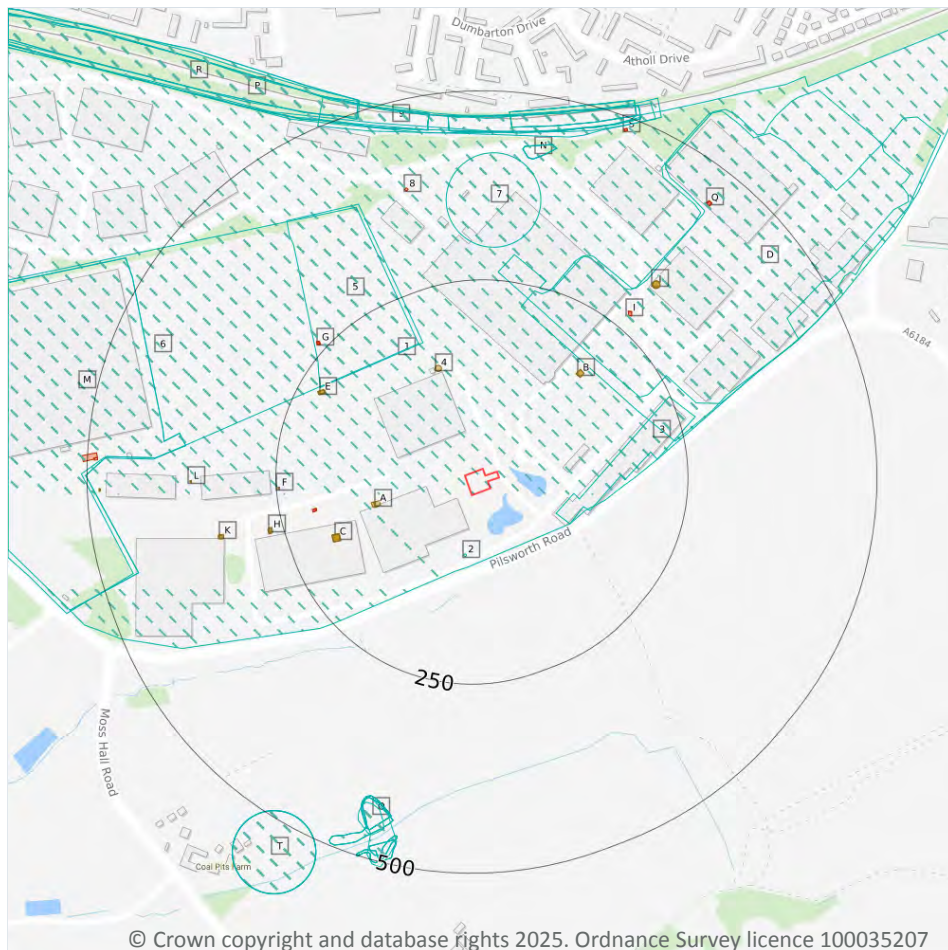
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Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

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



2 Past land use - un-grouped



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features

2.1 Historical industrial land uses

Records within 500m

46

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 19](#) >

ID	Location	Land Use	Date	Group ID
1	On site	Industrial Estate	1981	684437
2	78m S	Pump	1851	682531
3	89m SE	Unspecified Warehouse	1981	692352



ID	Location	Land Use	Date	Group ID
5	183m NW	Unspecified Depot	1981	793900
D	184m NE	Unspecified Depot	1974	735873
6	184m NW	Unspecified Depot	1974	793900
D	198m NE	Unspecified Depot	1981	735873
7	293m N	Unspecified Hole	1938	664250
M	371m W	Unspecified Depot	1981	782452
N	415m N	Unspecified Heap	1938	711271
N	415m N	Unspecified Heap	1928	711271
N	415m N	Unspecified Heap	1908	711271
O	419m S	Unspecified Pit	1981	746139
O	419m S	Unspecified Pit	1974	746139
O	419m S	Unspecified Pit	1965	746139
O	419m S	Unspecified Pit	1955	746139
O	422m S	Coal Pits	1891	746898
O	423m S	Coal Pits	1938	736715
O	423m S	Coal Pits	1928	736715
O	423m S	Coal Pits	1908	736715
O	429m S	Old Sandstone Quarry	1851	692073
9	442m N	Cuttings	1851	717967
P	445m N	Cuttings	1891	805452
N	445m N	Cuttings	1938	756905
N	445m N	Cuttings	1928	728069
N	445m N	Cuttings	1908	708648
P	447m N	Cuttings	1955	802278
N	454m N	Cuttings	1981	722765
N	454m N	Cuttings	1974	776673
N	454m N	Cuttings	1965	764450
R	454m N	Cuttings	1938	773969



ID	Location	Land Use	Date	Group ID
R	454m N	Cuttings	1928	773969
R	454m N	Cuttings	1908	773969
O	462m S	Coal Pits	1938	743922
O	462m S	Coal Pits	1928	743922
O	462m S	Coal Pits	1908	743922
O	468m S	Unspecified Pit	1981	712968
O	468m S	Unspecified Pit	1974	712968
O	468m S	Unspecified Pit	1965	712968
T	485m SW	Coal Pits	1981	724524
T	485m SW	Coal Pits	1974	724524
T	485m SW	Coal Pits	1965	724524
T	485m SW	Coal Pits	1955	724524
R	492m N	Cuttings	1974	723608
R	492m N	Cuttings	1965	718916
R	493m N	Cuttings	1981	723608

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m

24

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 19 >](#)

ID	Location	Land Use	Date	Group ID
A	118m W	Unspecified Tank	1997	102857
A	125m W	Unspecified Tank	1978	102857
4	141m N	Unspecified Tank	1997	90260
B	166m NE	Unspecified Tank	1966	105987
B	166m NE	Unspecified Tank	1969	105987



ID	Location	Land Use	Date	Group ID
C	182m W	Unspecified Tank	1978	92193
C	183m W	Unspecified Tank	1968	92193
C	183m W	Unspecified Tank	1966	92193
C	183m W	Unspecified Tank	1997	92193
E	214m NW	Unspecified Tank	1978	94360
E	215m NW	Unspecified Tank	1997	94360
F	246m W	Unspecified Tank	1968	99627
F	246m W	Unspecified Tank	1966	97278
H	264m W	Unspecified Tank	1978	98393
H	266m W	Unspecified Tank	1997	98393
J	320m NE	Unspecified Tank	1984	108276
J	320m NE	Unspecified Tank	1997	108276
J	320m NE	Unspecified Tank	1998	108276
K	329m W	Unspecified Tank	1978	94554
K	331m W	Unspecified Tank	1997	94554
L	362m W	Unspecified Tank	1968	107282
L	362m W	Unspecified Tank	1966	102400
M	482m W	Unspecified Tank	1968	104211
M	483m W	Unspecified Tank	1966	97031

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m

15

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 19](#) >

ID	Location	Land Use	Date	Group ID
C	201m W	Electricity Substation	1978	60873



ID	Location	Land Use	Date	Group ID
C	203m W	Electricity Substation	1997	60873
G	258m NW	Electricity Substation	1978	51942
G	260m NW	Electricity Substation	1997	51942
G	260m NW	Electricity Substation	1996	51942
I	270m NE	Electricity Substation	1997	58802
I	270m NE	Electricity Substation	1998	58802
8	381m N	Electricity Substation	1997	47907
Q	449m NE	Electricity Substation	1984	55622
Q	449m NE	Electricity Substation	1997	55622
Q	449m NE	Electricity Substation	1998	55622
S	481m N	Electricity Substation	1997	60597
S	481m N	Electricity Substation	1998	60597
M	486m W	Electricity Substation	1997	60879
M	487m W	Electricity Substation	1978	54972

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

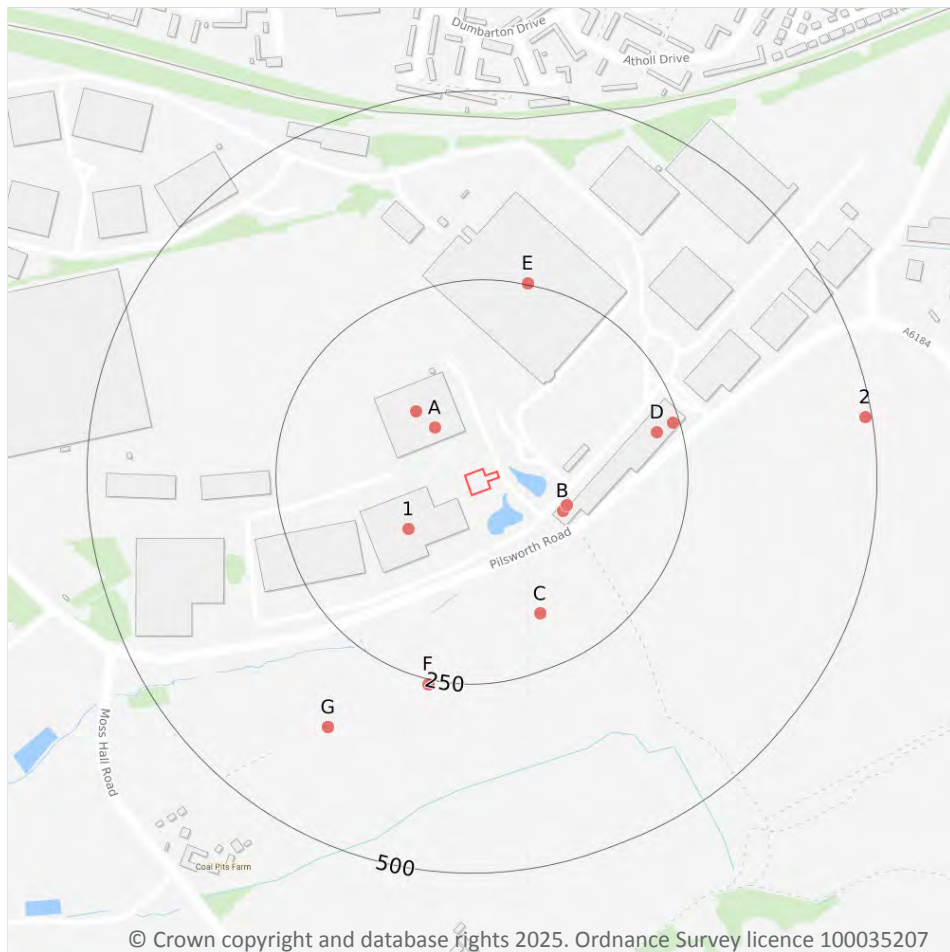
0

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'.

This data is sourced from Ordnance Survey / Groundsure.



3 Waste and landfill



— Site Outline
Search buffers in metres (m)
● Waste exemptions

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

0

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.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m**0**

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

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

3.4 Historical landfill (EA/NRW records)

Records within 500m**0**

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.

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

3.5 Historical waste sites

Records within 500m**0**

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

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

3.6 Licensed waste sites

Records within 500m**0**

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

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

3.7 Waste exemptions

Records within 500m**21**

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 24 >](#)

ID	Location	Site	Reference	Category	Sub-Category	Description
A	75m NW	Unit 1 P1/p2, Heywood Distribution Park, Heywood, OL10 2tt	EXP/GP3146Y U	Treating waste exemption	Not on a farm	Repair or refurbishment of WEEE



ID	Location	Site	Reference	Category	Sub-Category	Description
B	95m SE	P16, Heywood Distribution Park, Heywood, OL10 2tt	EXP/BP3341YA	Treating waste exemption	Not on a farm	Repair or refurbishment of WEEE
B	96m SE	P1.16, Parklands, Heywood Distribution Park, Heywood, OL10 2tt	WEX284167	Storing waste exemption	Not on a farm	Storage of waste in secure containers
B	96m SE	P1.16, Parklands, Heywood Distribution Park, Heywood, OL10 2tt	WEX413552	Storing waste exemption	Not on a farm	Storage of waste in secure containers
1	96m SW	Fowler Welch Limited, Moss Hall Road, Heywood, OL10 2tr	WEX241678	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)
A	106m NW	Unit P1 And P2, Heywood Distribution Park, Heywood, OL10 2tt	EA/EPR/VP388 8HB/A001	Treating waste exemption	Not on a farm	Repair or refurbishment of WEEE
C	179m S	-	WEX227641	Storing waste exemption	On a farm	Storage of sludge
C	179m S	-	WEX151550	Storing waste exemption	On a farm	Storage of sludge
D	217m E	Iron Mountain, P17 Parklands, Heywood Distribution Park, Heywood, OL10 2tt	WEX076404	Storing waste exemption	Not on a farm	Storage of waste in a secure place
D	240m E	Argos Distribution Centre Door 31 Heywood Distribution Park Heywood OL10 2tt	EPR/BF0934DE /A001	Treating waste exemption	Non-agricultural waste only	Crushing waste fluorescent tubes
E	252m N	-	WEX419203	Storing waste exemption	Not on a farm	Storage of waste in a secure place
E	252m N	Iron Mountain, Unit H2, Heywood Distribution Park, Pilsworth Road, Heywood, OL10 2tt	WEX281845	Storing waste exemption	Not on a farm	Storage of waste in a secure place
E	252m N	Unit B2, Heywood Distribution Park, Pilsworth Road, Heywood, OL10 2tt	WEX287577	Storing waste exemption	Not on a farm	Storage of waste in a secure place
E	252m N	Iron Mountain, Unit H2, Heywood Distribution Park, Pilsworth Road, Heywood, OL10 2tt	WEX411671	Storing waste exemption	Not on a farm	Storage of waste in a secure place
F	257m S	-	WEX274438	Using waste exemption	Not on a farm	Use of waste in construction

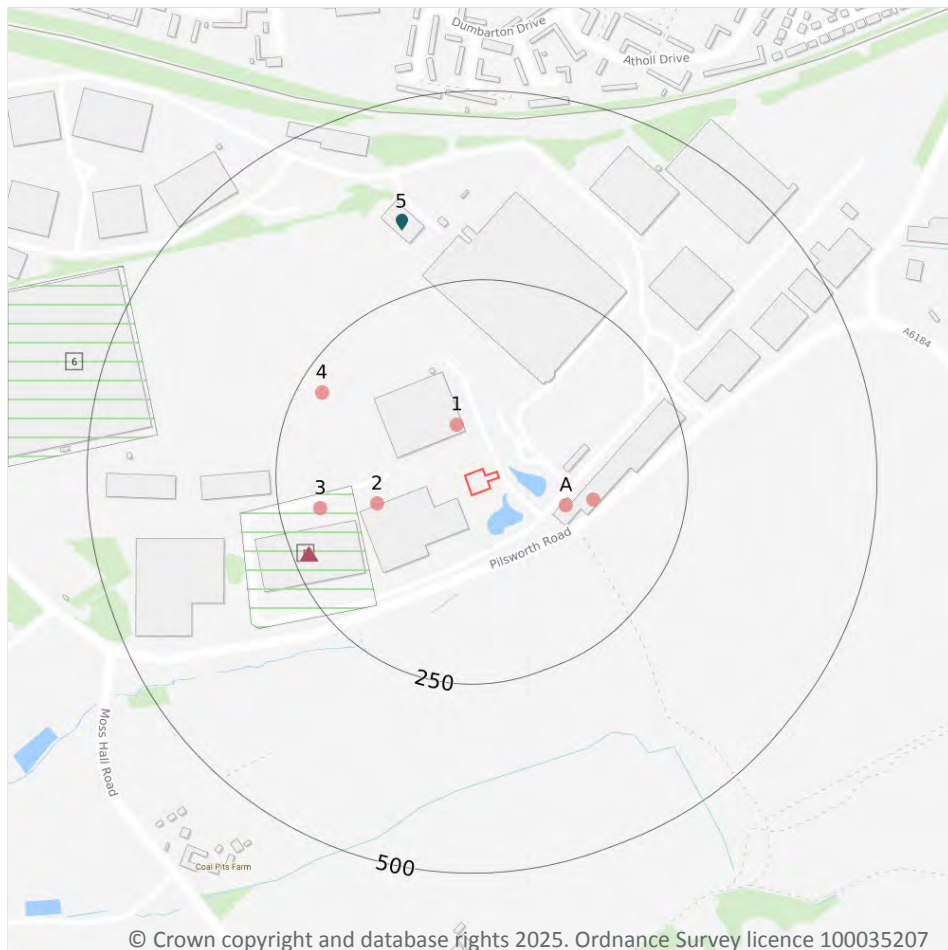


ID	Location	Site	Reference	Category	Sub-Category	Description
F	257m S	-	WEX274438	Treating waste exemption	Not on a farm	Screening and blending of waste
G	362m SW	-	WEX227718	Storing waste exemption	On a farm	Storage of sludge
G	362m SW	-	WEX151544	Storing waste exemption	On a farm	Storage of sludge
G	362m SW	-	WEX112722	Storing waste exemption	On a farm	Storage of sludge
G	362m SW	-	WEX292470	Storing waste exemption	On a farm	Storage of sludge
2	490m E	Hareshill Farm Hareshill Road Lancashire OL12 2tb	EPR/SE5345XJ /A001	Storing waste exemption	Non-agricultural waste only	Storage of sludge

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



4 Current industrial land use



- Site Outline
- Search buffers in metres (m)
- Recent industrial land uses
- Control of Major Accident Hazards
- ▲ Hazardous substance storage/usage
- Licensed pollutant release (Part A(2)/B)

4.1 Recent industrial land uses

Records within 250m

6

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on [page 28](#) >

ID	Location	Company	Address	Activity	Category
1	67m N	Hartmann	Parklands P2 Heywood Distribution Park, Pilsworth Road, Heywood, Greater Manchester, OL10 2TT	Special Purpose Machinery and Equipment	Industrial Products
A	96m E	Breakell Lifts	Parklands P1.16 Heywood Distribution Park, Pilsworth Road, Heywood, Greater Manchester, OL10 2TT	Industrial Repairs and Servicing	Repair and Servicing



ID	Location	Company	Address	Activity	Category
2	122m W	Tank	Greater Manchester, OL10	Tanks (Generic)	Industrial Features
A	128m E	Northern Switchgear Services Ltd	Parklands Unit P1.14 Heywood Distribution Park, Pilsworth Road, Heywood, Greater Manchester, OL10 2TT	Industrial Engineers	Engineering Services
3	196m W	Electricity Sub Station	Greater Manchester, OL10	Electrical Features	Infrastructure and Facilities
4	219m NW	Tank	Greater Manchester, OL10	Tanks (Generic)	Industrial Features

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m

0

Open, closed, under development and obsolete petrol stations.

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

2

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.

Features are displayed on the Current industrial land use map on [page 28 >](#)

ID	Location	Company	Address	Operational status	Tier
B	150m W	Eddie Stobart Logistics Limited	Eddie Stobart Logistics Limited, Heywood, Unit M2 Heywood Distribution Park, Pilsworth Road, Heywood, Greater Manchester, OL10 2TR	Historical COMAH Site	COMAH Upper Tier Operator
6	410m W	Beck & Pollitzer Ltd	Beck & Pollitzer Ltd, Mosshall Road, Bury	Historical NIHHS Site	-

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

1

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.

Features are displayed on the Current industrial land use map on [page 28 >](#)

ID	Location	Details	
B	230m W	Application reference number: No Details Application status: Approved Application date: No Details Address: Eddie Stobart Logistics Ltd, Heywood Distribution Park, Unit M2, Pilsworth Road, Heywood, Greater Manchester, England, OL10 2TR	Details: No Details Enforcement: No Details Date of enforcement: No Details Comment: No Details

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 28 >](#)

ID	Location	Address	Details	
5	344m N	UK Accident Assistance Repair Centre, P5, Parklands, Heywood Distribution Park, Heywood, Lancashire, OL10 2TT	Process: Respraying of Road Vehicles 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**0**

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

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**0**

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.

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

4.18 Pollution Incidents (EA/NRW)

Records within 500m**0**

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

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.

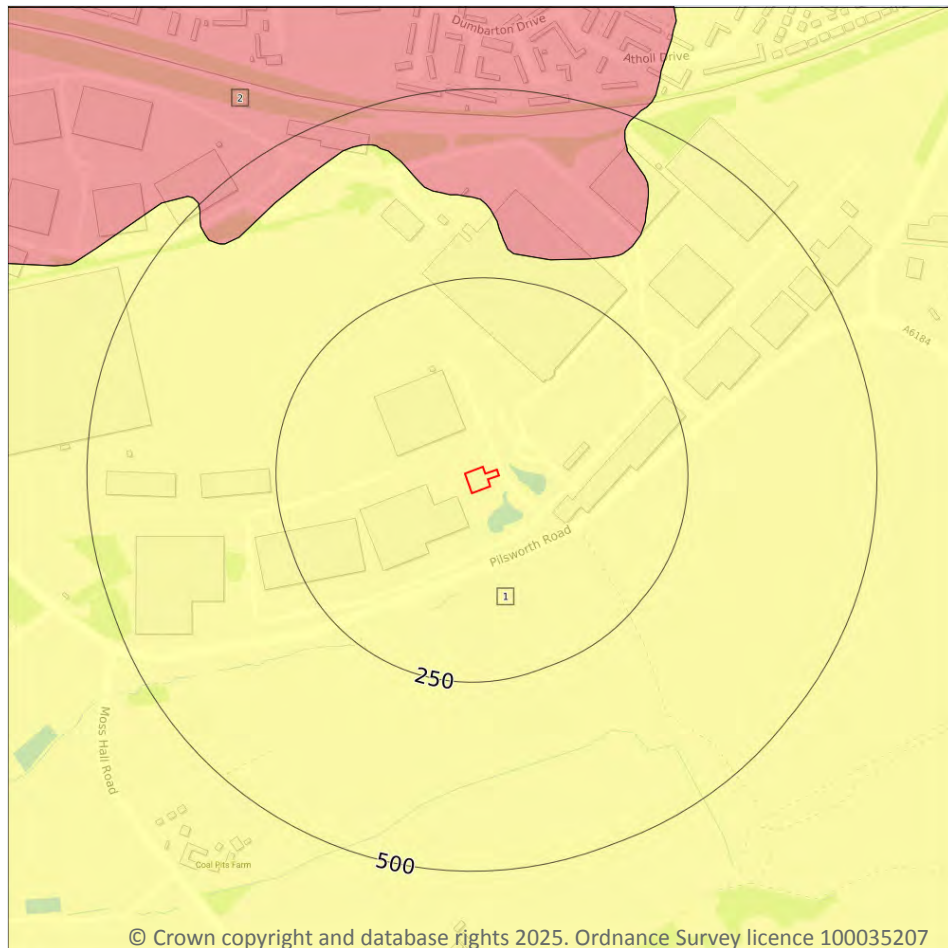
4.21 Pollution inventory radioactive waste

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



- Site Outline
- Search buffers in metres (m)
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive
 - Unknown

5.1 Superficial aquifer

Records within 500m

2

Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on [page 34](#) >

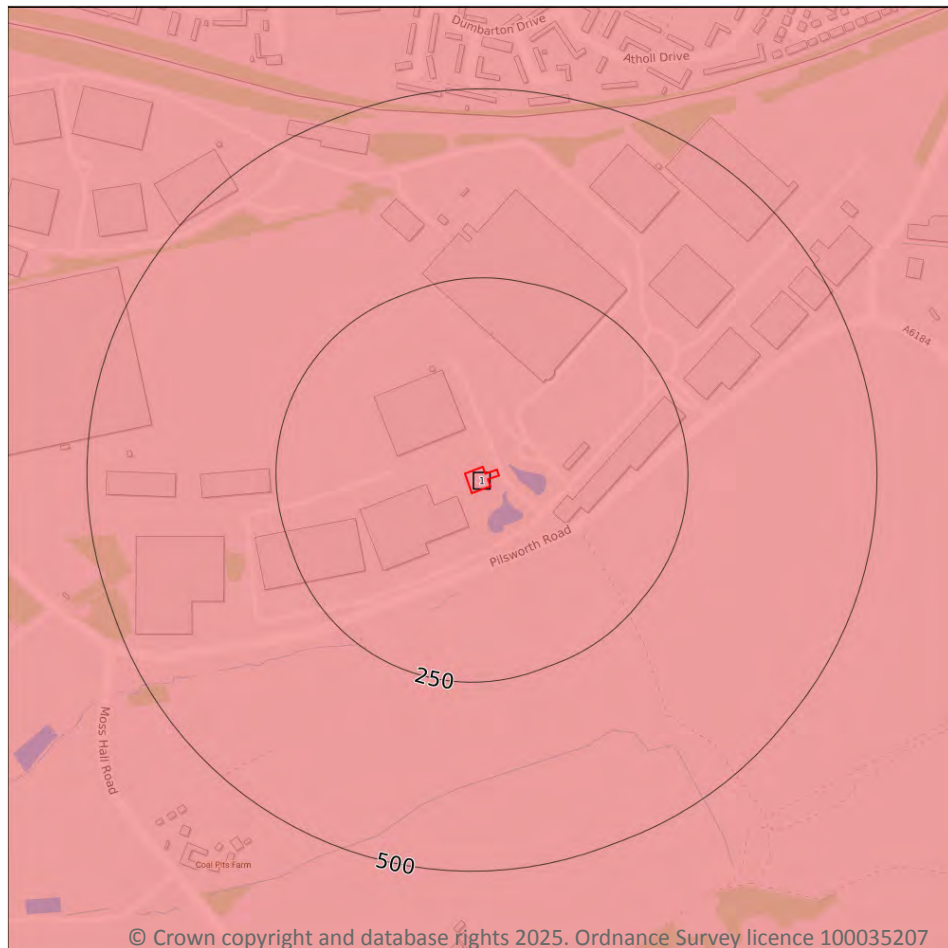
ID	Location	Designation	Description
1	On site	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	285m 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.



Bedrock aquifer



- Site Outline
- Search buffers in metres (m)
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive

5.2 Bedrock aquifer

Records within 500m

1

Aquifer status of groundwater held within bedrock geology.

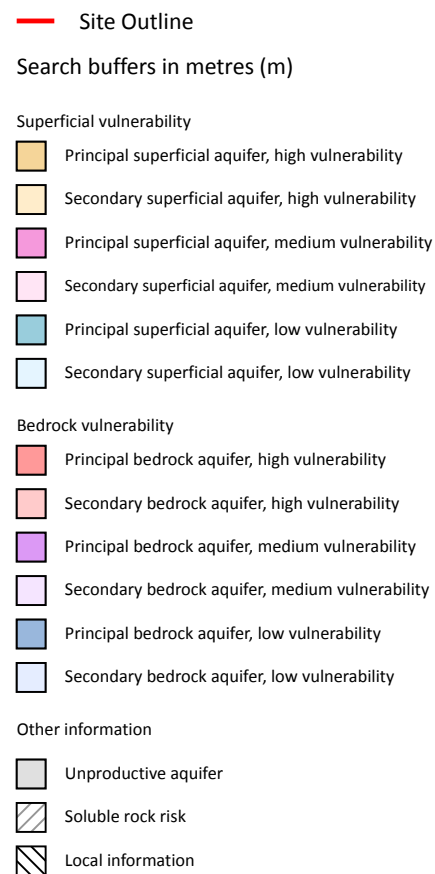
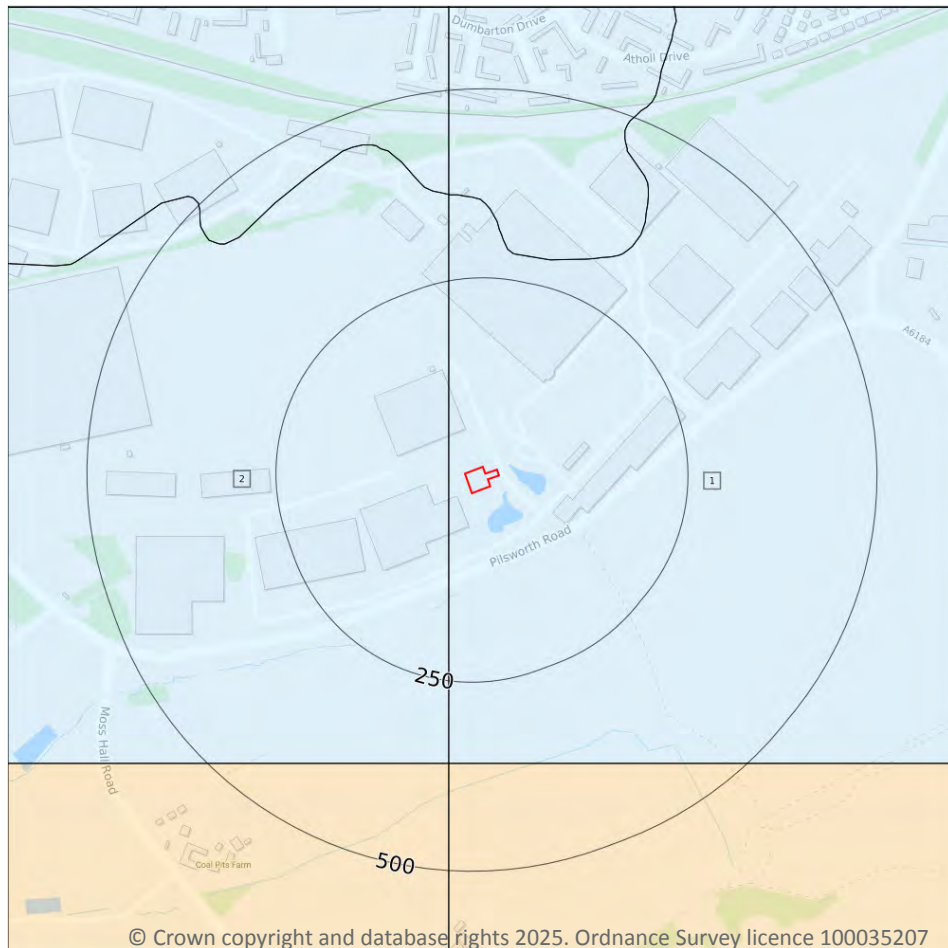
Features are displayed on the Bedrock aquifer map on [page 36](#) >

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

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



Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m

2

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 37](#) >



ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: >550mm/year	Vulnerability: Low Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures
2	22m W	Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: >550mm/year	Vulnerability: Low Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High	Vulnerability: Low 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

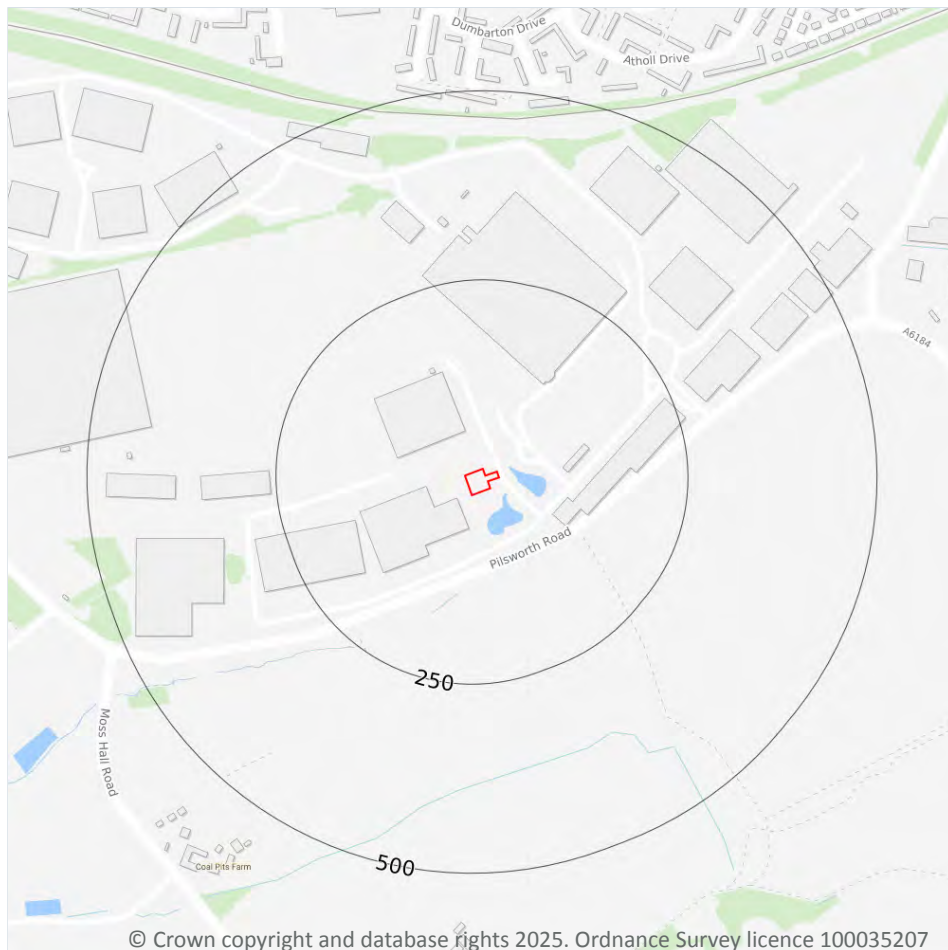
0

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
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

5

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 39](#) >



ID	Location	Details	
-	648m W	Status: Active Licence No: NW/069/0002/013 Details: Dewatering Direct Source: Ground Water - North West Region Point: SUMP 'B' AT PILSWORTH LANDFILL SITE, PILSWORTH ROAD, BURY Data Type: Poly4 Name: Viridor Waste Management Ltd Easting: 383250 Northing: 409380	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: NPS/NA/001648 Original Start Date: 31/03/2021 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 31/03/2021 Version End Date: -
-	1752m W	Status: Active Licence No: NW/069/0002/013 Details: Dewatering Direct Source: Ground Water - North West Region Point: SUMP 'A' AT PILSWORTH LANDFILL SITE, PILSWORTH ROAD, BURY Data Type: Point Name: Viridor Waste Management Ltd Easting: 382340 Northing: 408890	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: NPS/NA/001648 Original Start Date: 31/03/2021 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 31/03/2021 Version End Date: -
-	1806m NW	Status: Active Licence No: NW/069/0002/010 Details: Process Water Direct Source: Ground Water - North West Region Point: BOREHOLE - NORTHERN MANCHESTER CARBONIFEROUS AQUIFERS Data Type: Point Name: Access Utilities Limited Easting: 382983 Northing: 410861	Annual Volume (m ³): 62400 Max Daily Volume (m ³): 200 Original Application No: - Original Start Date: 19/09/2018 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 01/04/2024 Version End Date: -
-	1905m NW	Status: Historical Licence No: 2569002059 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: "WELL AT SPOUT BANK FARM, HEAP BRIDGEBURY, LANCASHIRE" Data Type: Point Name: FISH Easting: 382300 Northing: 410200	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 15/02/1966 Version End Date: -



ID	Location	Details	
-	1905m NW	Status: Historical Licence No: 2569002059 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: WELL AT SPOUT BANK FARM, HEAP BRIDGEBURY, LANCASHIRE Data Type: Point Name: FISH Easting: 382300 Northing: 410200	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 15/02/1966 Version End Date: -

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

5.7 Surface water abstractions

Records within 2000m

7

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 39 >](#)

ID	Location	Details	
-	1860m SW	Status: Historical Licence No: 2569002088 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: "Surface, Non-Tidal - North West Region" Point: "BRIGHTLEY& WHITTLE BRKS @ THEIR CONFLUENCE, ABOVE WEIR, BURY" Data Type: Point Name: BORDEN CHEMICAL U K LTD Easting: 382500 Northing: 408300	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 16/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 16/05/1996 Version End Date: -
-	1860m SW	Status: Historical Licence No: 2569002088 Details: General Washing/Process Washing Direct Source: "Surface, Non-Tidal - North West Region" Point: "BRIGHTLEY& WHITTLE BRKS @ THEIR CONFLUENCE, ABOVE WEIR, BURY" Data Type: Point Name: BORDEN CHEMICAL U K LTD Easting: 382500 Northing: 408300	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 16/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 16/05/1996 Version End Date: -



ID	Location	Details	
-	1860m SW	Status: Historical Licence No: 2569002088 Details: Process water Direct Source: "Surface, Non-Tidal - North West Region" Point: "BRIGHTLEY& WHITTLE BRKS @ THEIR CONFLUENCE, ABOVE WEIR, BURY" Data Type: Point Name: BORDEN CHEMICAL U K LTD Easting: 382500 Northing: 408300	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 16/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 16/05/1996 Version End Date: -
-	1860m SW	Status: Historical Licence No: 2569002088 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Surface, Non-Tidal - North West Region Point: BRIGHTLEY& WHITTLE BRKS @ THEIR CONFLUENCE, ABOVE WEIR, BURY Data Type: Point Name: HEXION SPECIALITY CHEMICALS UK TD Easting: 382500 Northing: 408300	Annual Volume (m ³): 118198 Max Daily Volume (m ³): 681.9 Original Application No: - Original Start Date: 16/03/1966 Expiry Date: - Issue No: 101 Version Start Date: 01/07/2005 Version End Date: -
-	1860m SW	Status: Historical Licence No: 2569002088 Details: General Washing/Process Washing Direct Source: Surface, Non-Tidal - North West Region Point: BRIGHTLEY& WHITTLE BRKS @ THEIR CONFLUENCE, ABOVE WEIR, BURY Data Type: Point Name: HEXION SPECIALITY CHEMICALS UK TD Easting: 382500 Northing: 408300	Annual Volume (m ³): 118198 Max Daily Volume (m ³): 681.9 Original Application No: - Original Start Date: 16/03/1966 Expiry Date: - Issue No: 101 Version Start Date: 01/07/2005 Version End Date: -
-	1860m SW	Status: Historical Licence No: 2569002088 Details: Process Water Direct Source: Surface, Non-Tidal - North West Region Point: BRIGHTLEY& WHITTLE BRKS @ THEIR CONFLUENCE, ABOVE WEIR, BURY Data Type: Point Name: HEXION SPECIALITY CHEMICALS UK TD Easting: 382500 Northing: 408300	Annual Volume (m ³): 118198 Max Daily Volume (m ³): 681.9 Original Application No: - Original Start Date: 16/03/1966 Expiry Date: - Issue No: 101 Version Start Date: 01/07/2005 Version End Date: -

ID	Location	Details	
-	1963m NW	Status: Historical Licence No: NW/069/0002/002 Details: Hydroelectric Power Generation Direct Source: Surface, Non-Tidal - North West Region Point: RIVER ROCH AT HEAP BRIDGE WEIR Data Type: Point Name: Brother Investments Ltd Easting: 382536 Northing: 410666	Annual Volume (m ³): 76032000 Max Daily Volume (m ³): 345600 Original Application No: - Original Start Date: 17/09/2010 Expiry Date: 31/03/2026 Issue No: 2 Version Start Date: 18/09/2015 Version End Date: -

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

5.8 Potable abstractions

Records within 2000m	0
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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
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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
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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

8

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 44](#) >

ID	Location	Type of water feature	Ground level	Permanence	Name
A	86m S	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	Brightley Brook



ID	Location	Type of water feature	Ground level	Permanence	Name
A	88m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Brightley Brook
A	91m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Brightley Brook
A	118m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Brightley Brook
A	133m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Brightley Brook
3	164m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Brightley Brook
4	241m SW	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	Brightley Brook
B	245m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Brightley Brook

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m

4

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 44](#) >

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 44 >](#)

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	On site	River	Whittle Brook (Irwell)	GB112069061250	Roch Irk Medlock	Irwell

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

6.4 WFD Surface water bodies

Records identified	1
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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 44 >](#)

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	1815m SW	River	Whittle Brook (Irwell)	GB112069061250 ↗	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 44 >](#)

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
1	On site	Northern Manchester Carboniferous Aquifers	GB41202G101800 ↗	Poor	Poor	Good	2019

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



7 River and coastal flooding

7.1 Risk of flooding from rivers and the sea

Records within 50m**0**

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).

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

7.6 Flood Zone 2

Records within 50m	0
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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.

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

7.7 Flood Zone 3

Records within 50m	0
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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.

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**Negligible****Highest risk within 50m****Negligible**

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.

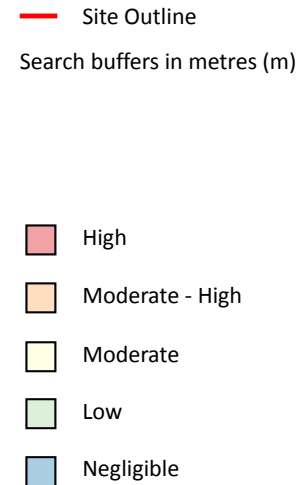
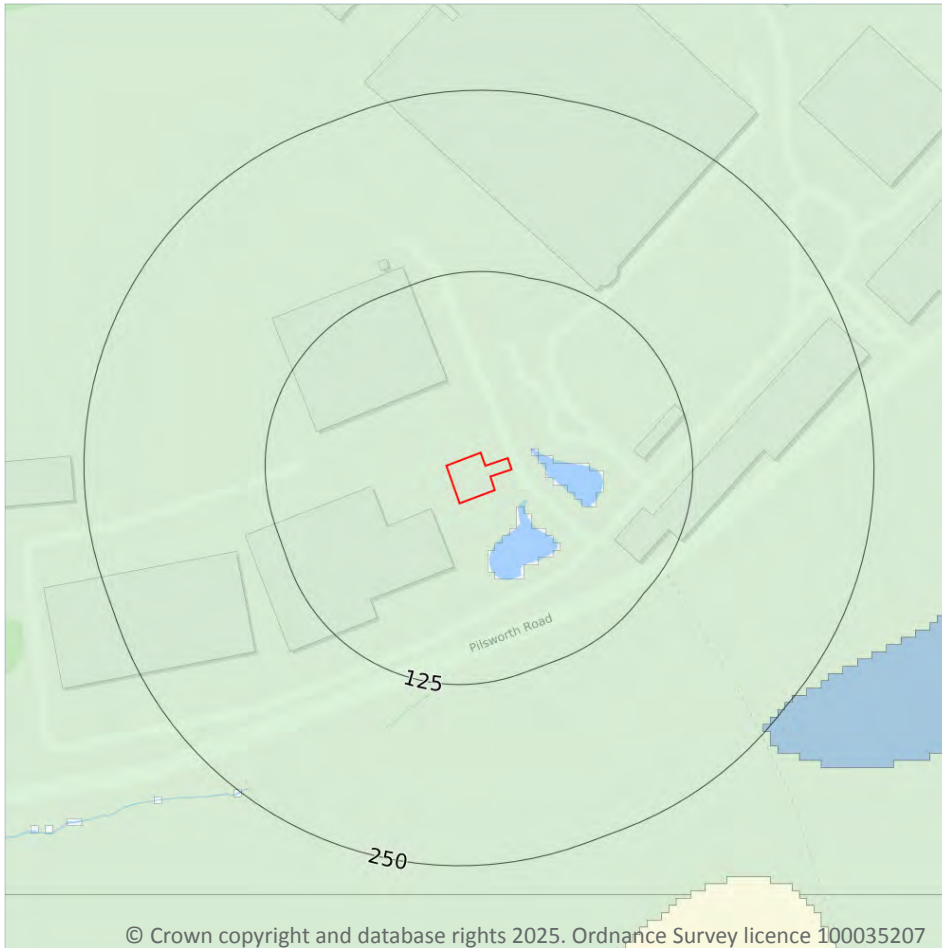
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site. The table below shows the maximum flood depths for a range of return periods for the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

Return period	Maximum modelled depth
1 in 1000 year	Negligible
1 in 250 year	Negligible
1 in 100 year	Negligible
1 in 30 year	Negligible

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 51](#) >

This data is sourced from Ambiantal Risk Analytics.

10 Environmental designations



- Site Outline
- Search buffers in metres (m)
- Green Belt

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**0**

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.

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

3

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

Features are displayed on the Environmental designations map on [page 52 >](#)

ID	Location	Name	Local Authority name
1	528m SW	Merseyside and Greater Manchester Green Belt	Rochdale
2	582m SW	Merseyside and Greater Manchester Green Belt	Bury
-	1927m NW	Merseyside and Greater Manchester Green Belt	Bury

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

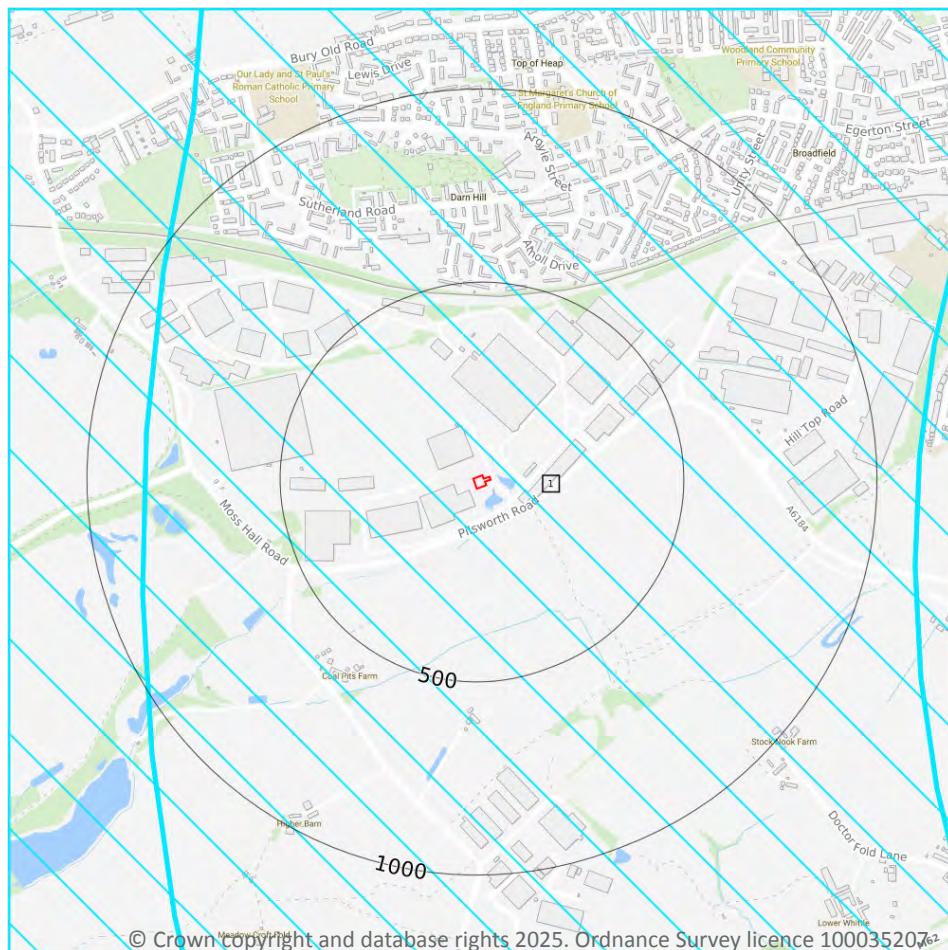
Records within 2000m

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 57](#) >

ID	Location	Type of developments requiring consultation
1	On site	https://irz.geodata.org.uk/IRZ/step2.html?irzcode=0300000430000&notes=&location=387670,439176%20(IRZ%20polygon%20centre)

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

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**0**

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.



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

11.5 Conservation Areas

Records within 250m

0

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.

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

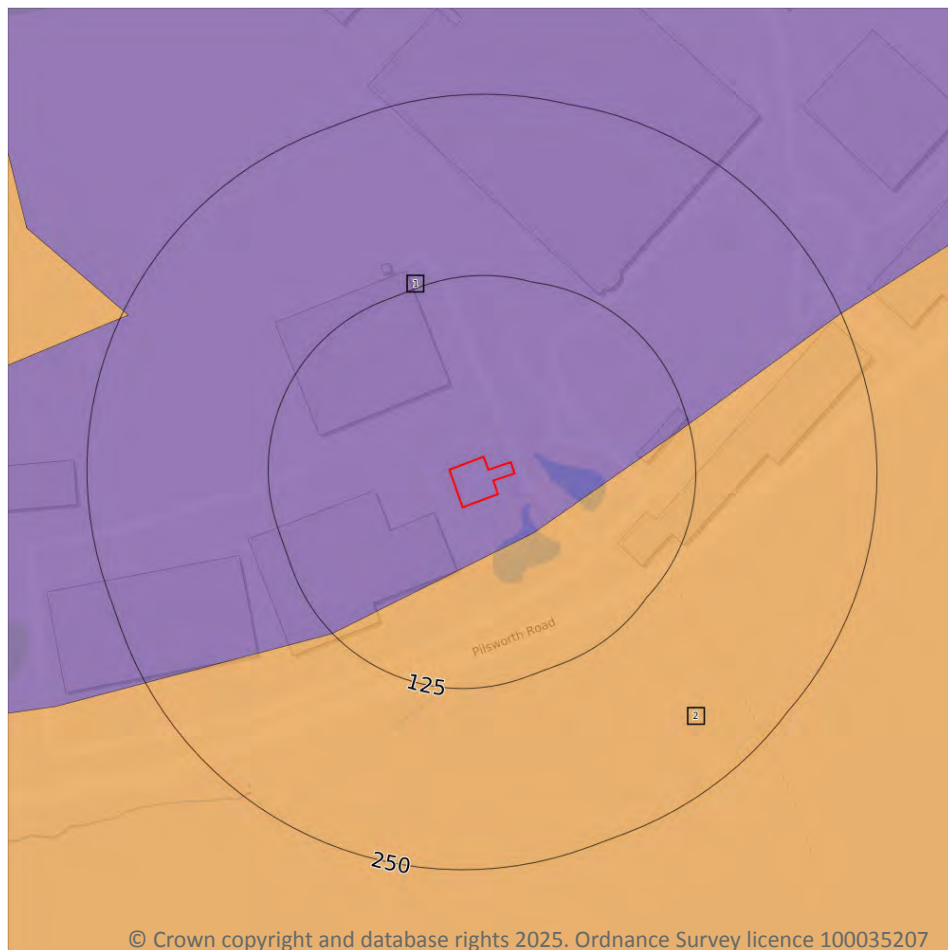
0

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

2

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 61](#) >

ID	Location	Classification	Description
1	On site	Urban	Non-agricultural/no quality assigned
2	35m SE	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

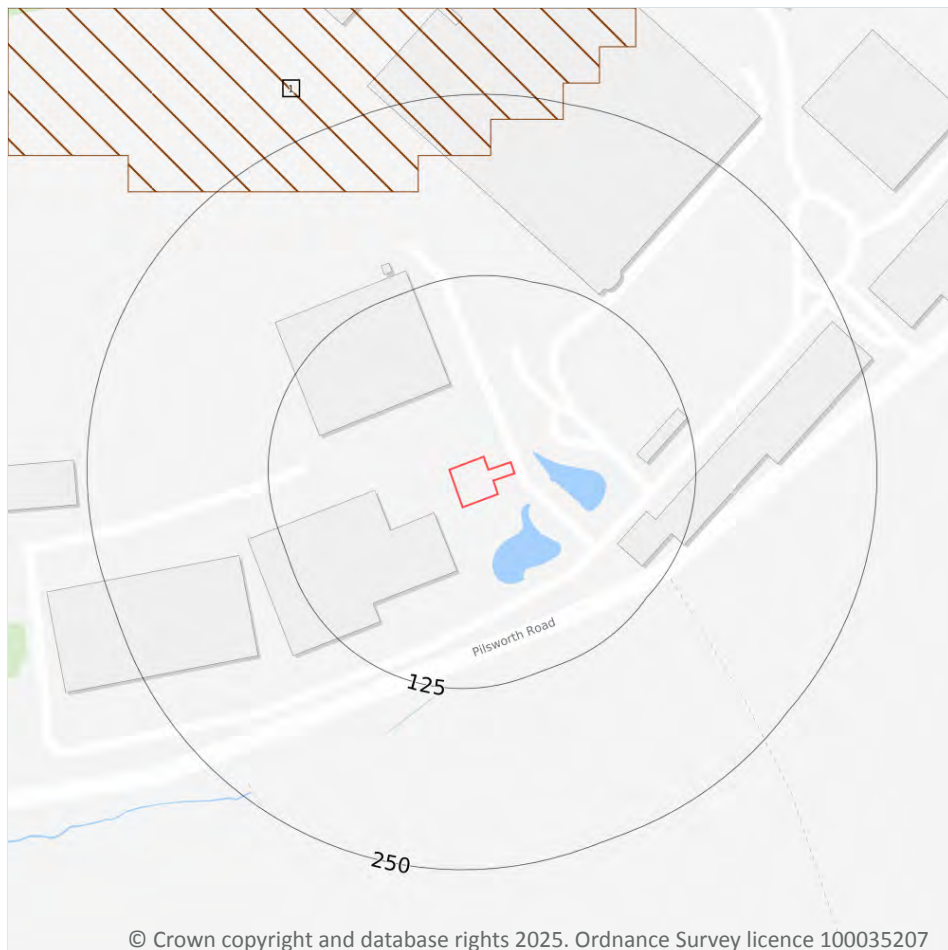
0

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



- Site Outline
- Search buffers in metres (m)
- Priority Habitat Inventory
- Open Mosaic Habitat
- Limestone Pavement Orders
- Habitat Networks
- Primary Habitat
- Restorable Habitat
- Associated Habitats
- Habitat Restoration-Creation
- Network Enhancement Zone 1
- Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m

0

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

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m

1

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.

Features are displayed on the Habitat designations map on [page 63](#) >

ID	Location	Type	Habitat
1	188m N	Network Enhancement Zone 2	Not specified

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0
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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



— Site Outline
Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m

1

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 65](#) >

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	Full	SD80NW

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

4

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 66](#) >

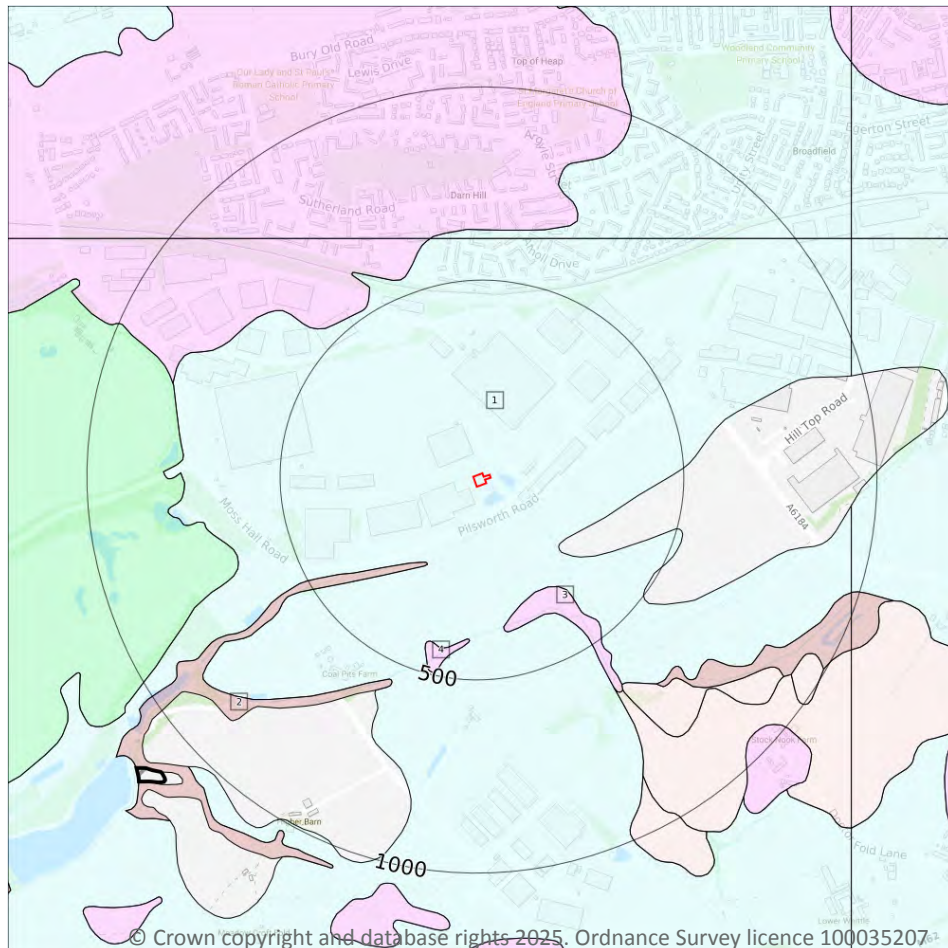
ID	Location	LEX Code	Description	Rock description
1	9m W	LSGR-ARTDP	Landscaped Ground (Undivided)	Artificial Deposit
A	392m SW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
2	456m N	WGR-VOID	Worked Ground (Undivided)	Void
A	499m SW	WGR-VOID	Worked Ground (Undivided)	Void



This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Superficial



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

4

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 68](#) >

ID	Location	LEX Code	Description	Rock description
1	On site	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
2	236m SW	HEAD-XCZSV	Head - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel
3	309m SE	GFSDD-XSV	Glaciofluvial Sheet Deposits, Devensian - Sand And Gravel	Sand And Gravel



ID	Location	LEX Code	Description	Rock description
4	395m S	GFSDD-XSV	Glaciofluvial Sheet Deposits, Devensian - Sand And Gravel	Sand And Gravel

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

Records within 500m

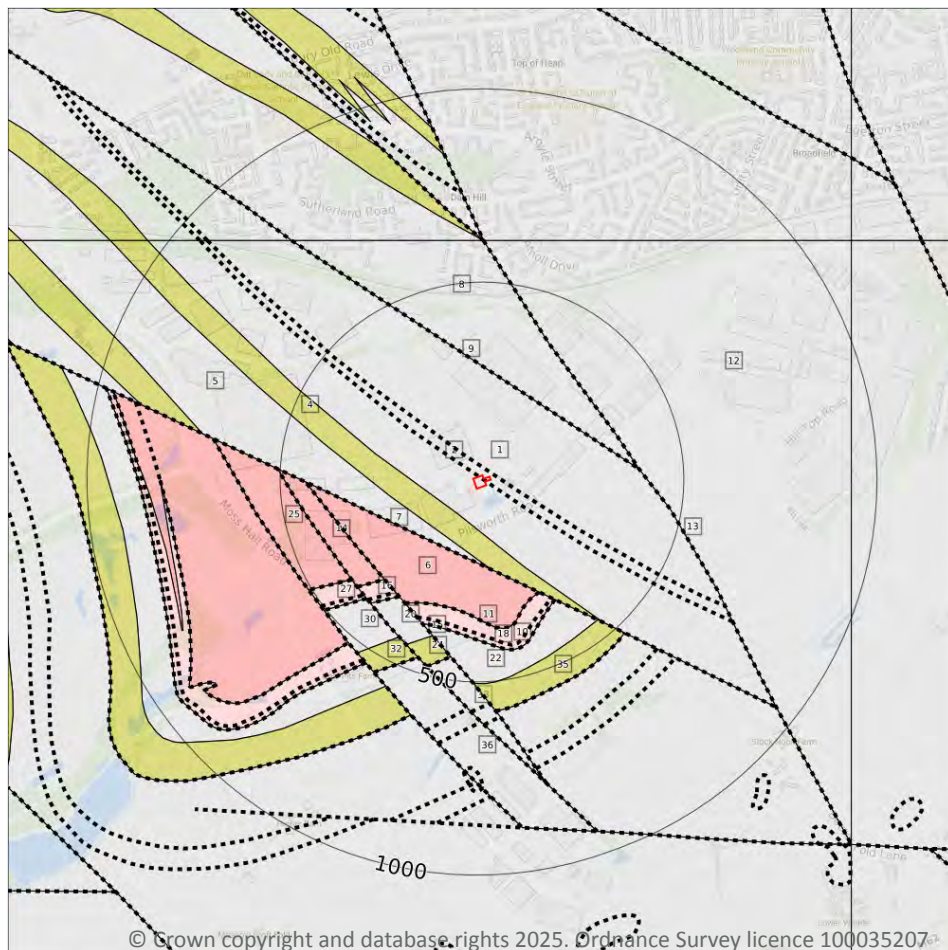
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Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

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

19

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 70 >](#)

ID	Location	LEX Code	Description	Rock age
1	On site	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
4	82m SW	HER-SDST	Helpet Edge Rock - Sandstone	Langsettian Sub-age
5	147m SW	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age



ID	Location	LEX Code	Description	Rock age
6	173m SW	RR-SDST	Rough Rock - Sandstone	Yeadonian Sub-age
8	229m NE	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
10	309m SE	ROSSE-MDSI	Rossendale Formation - Mudstone And Siltstone	Yeadonian Sub-age
12	328m NE	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
14	334m SW	RR-SDST	Rough Rock - Sandstone	Yeadonian Sub-age
16	335m SW	ROSSE-MDSI	Rossendale Formation - Mudstone And Siltstone	Yeadonian Sub-age
20	344m SW	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
22	345m SE	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
24	397m S	WH-SDST	Woodhead Hill Rock - Sandstone	Langsettian Sub-age
25	400m SW	RR-SDST	Rough Rock - Sandstone	Yeadonian Sub-age
27	400m SW	ROSSE-MDSI	Rossendale Formation - Mudstone And Siltstone	Yeadonian Sub-age
30	403m SW	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
32	433m SW	WH-SDST	Woodhead Hill Rock - Sandstone	Langsettian Sub-age
33	440m S	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
35	452m SE	WH-SDST	Woodhead Hill Rock - Sandstone	Langsettian Sub-age
36	462m S	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

18

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 70 >](#)

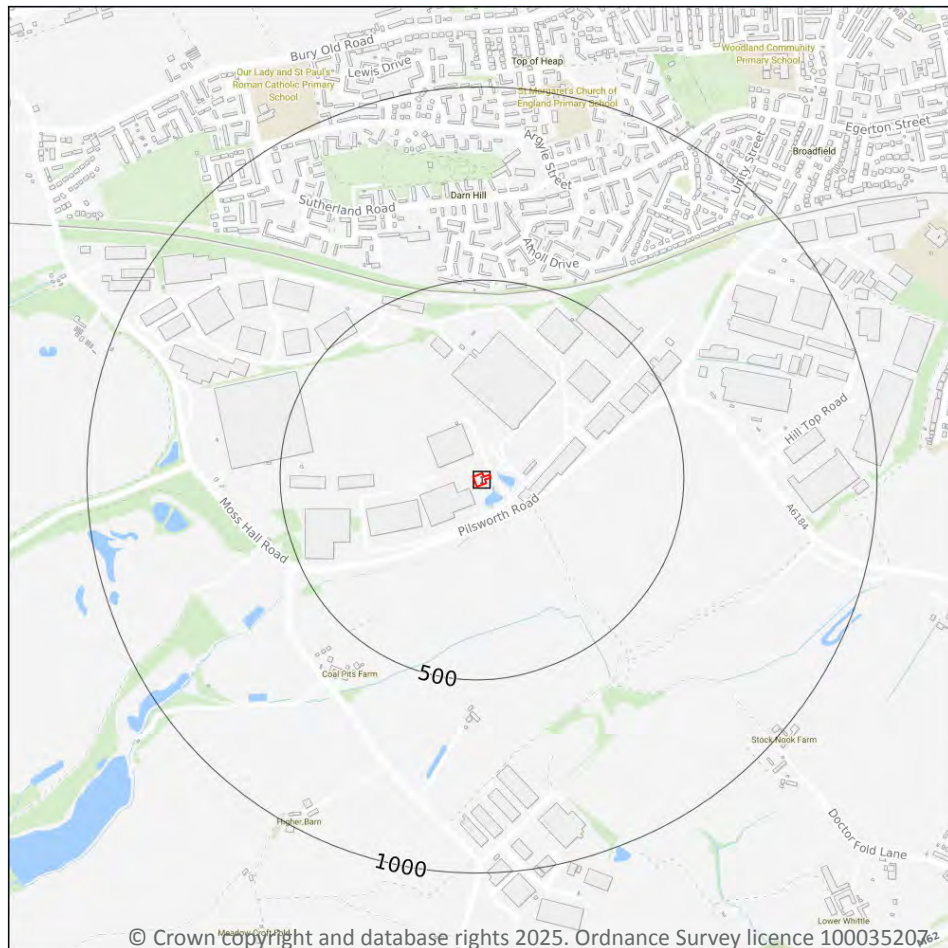


ID	Location	Category	Description
2	On site	FOSSIL_HORIZON	Fossil horizon, marine band
3	10m NE	ROCK	Coal seam, inferred
7	173m SW	FAULT	Normal fault, inferred; crossmarks on downthrow side
9	229m NE	FAULT	Normal fault, inferred; crossmarks on downthrow side
11	309m SE	ROCK	Coal seam, inferred coincident with bedrock geology boundary
13	328m NE	FAULT	Normal fault, inferred; crossmarks on downthrow side
15	334m SW	FAULT	Normal fault, inferred; crossmarks on downthrow side
17	335m SW	ROCK	Coal seam, inferred coincident with bedrock geology boundary
18	337m SE	ROCK	Coal seam, inferred
19	341m SW	ROCK	Coal seam, inferred
21	344m SW	FOSSIL_HORIZON	Fossil horizon, marine band coincident with bedrock geology boundary
23	345m SE	FOSSIL_HORIZON	Fossil horizon, marine band coincident with bedrock geology boundary
26	400m SW	FAULT	Normal fault, inferred; crossmarks on downthrow side
28	400m SW	ROCK	Coal seam, inferred coincident with bedrock geology boundary
29	402m SW	ROCK	Coal seam, inferred
31	403m SW	FOSSIL_HORIZON	Fossil horizon, marine band coincident with bedrock geology boundary
34	440m S	ROCK	Coal seam, inferred coincident with bedrock geology boundary
37	462m S	ROCK	Coal seam, inferred coincident with bedrock geology boundary

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 73](#) >

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	Full	Full	No coverage	EW085_manchester_v4

This data is sourced from the British Geological Survey.



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

15.2 Artificial and made ground (50k)

Records within 500m

0

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.

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

Records within 50m

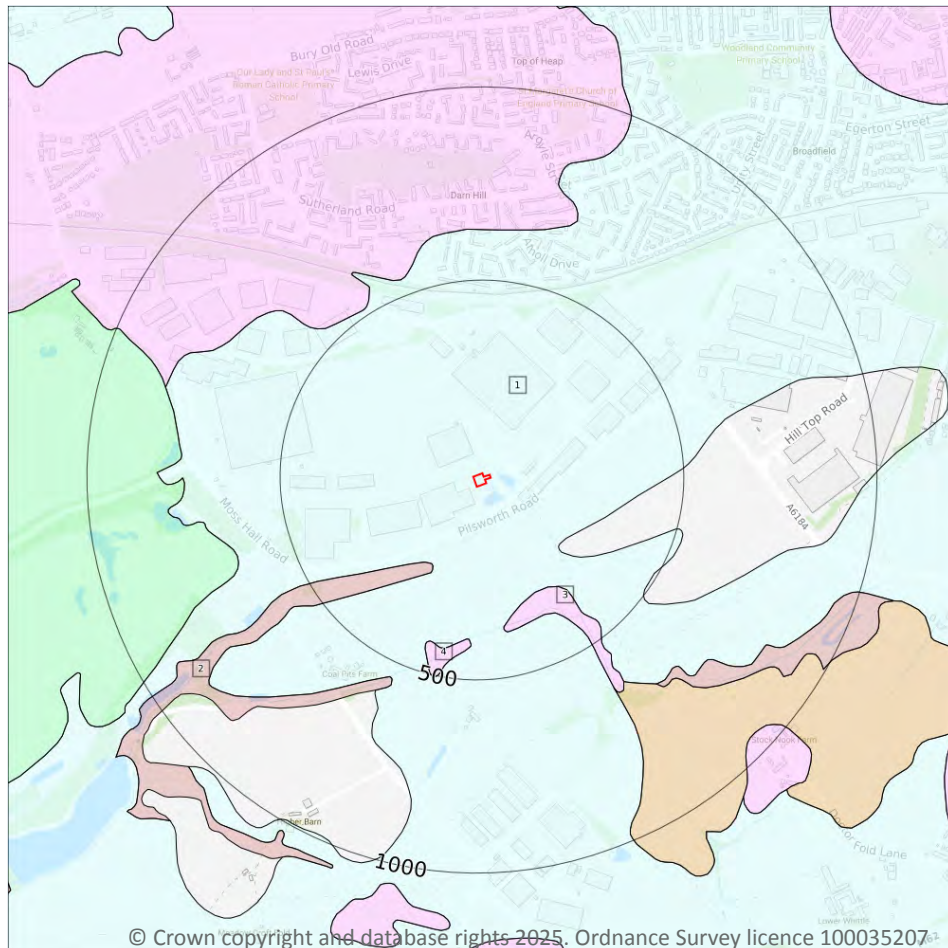
0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial 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 - 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

4

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 75 >](#)

ID	Location	LEX Code	Description	Rock description
1	On site	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
2	231m SW	HEAD-XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL
3	309m SE	GFSDD-XSV	GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN	SAND AND GRAVEL



ID	Location	LEX Code	Description	Rock description
4	395m S	GFSDD-XSV	GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN	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	Mixed	High	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.

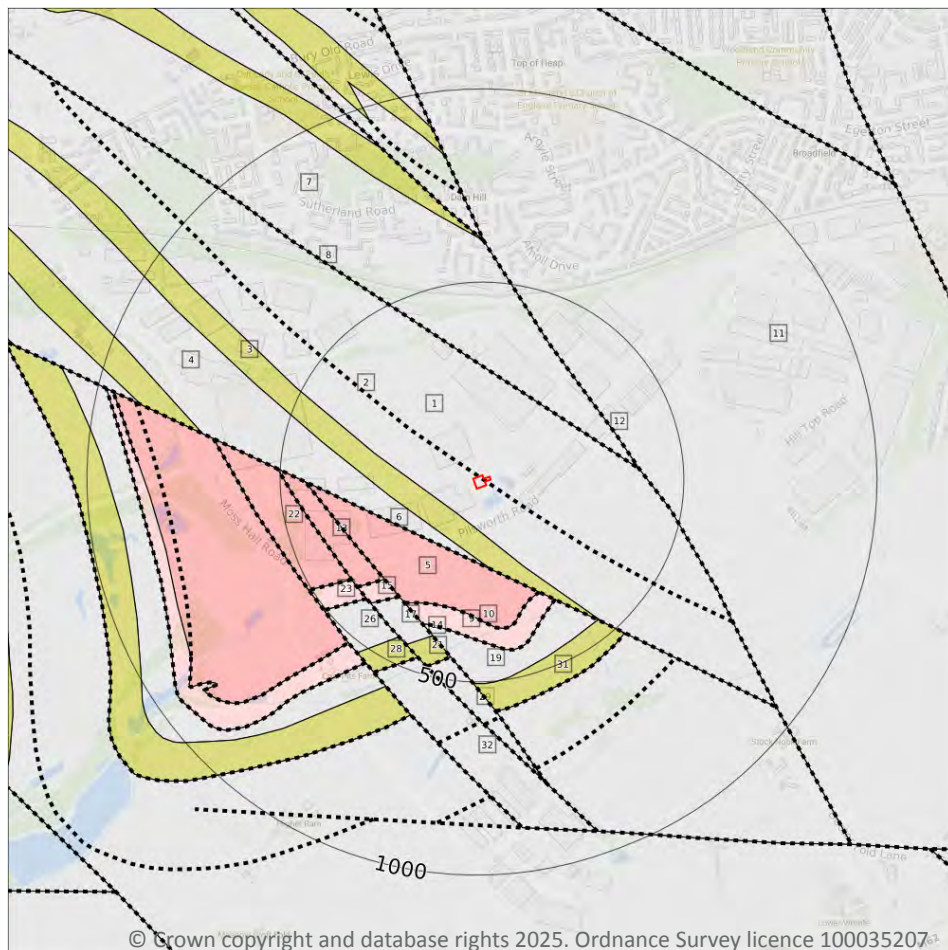
15.7 Landslip permeability (50k)

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



- Site Outline
- Search buffers in metres (m)
- Bedrock faults and other linear features (50k)
- Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m

19

Bedrock geology at 1:50,000 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 1:50,000 scale - Bedrock map on [page 77](#) >

ID	Location	LEX Code	Description	Rock age
1	On site	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
3	82m SW	HER-SDST	HELPE EDGE ROCK - SANDSTONE	WESTPHALIAN
4	147m SW	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN



ID	Location	LEX Code	Description	Rock age
5	173m SW	RR-SDST	ROUGH ROCK - SANDSTONE	NAMURIAN
7	229m NE	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
9	309m SE	ROSSE-MDSI	ROSSENDALE FORMATION - MUDSTONE AND SILTSTONE	NAMURIAN
11	328m NE	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
13	334m SW	RR-SDST	ROUGH ROCK - SANDSTONE	NAMURIAN
15	335m SW	ROSSE-MDSI	ROSSENDALE FORMATION - MUDSTONE AND SILTSTONE	NAMURIAN
17	344m SW	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
19	345m SE	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
21	397m S	WH-SDST	WOODHEAD HILL ROCK - SANDSTONE	WESTPHALIAN
22	400m SW	RR-SDST	ROUGH ROCK - SANDSTONE	NAMURIAN
23	400m SW	ROSSE-MDSI	ROSSENDALE FORMATION - MUDSTONE AND SILTSTONE	NAMURIAN
26	403m SW	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
28	433m SW	WH-SDST	WOODHEAD HILL ROCK - SANDSTONE	WESTPHALIAN
29	441m S	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
31	453m SE	WH-SDST	WOODHEAD HILL ROCK - SANDSTONE	WESTPHALIAN
32	462m S	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

1

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	Moderate	Low



This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m

14

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.

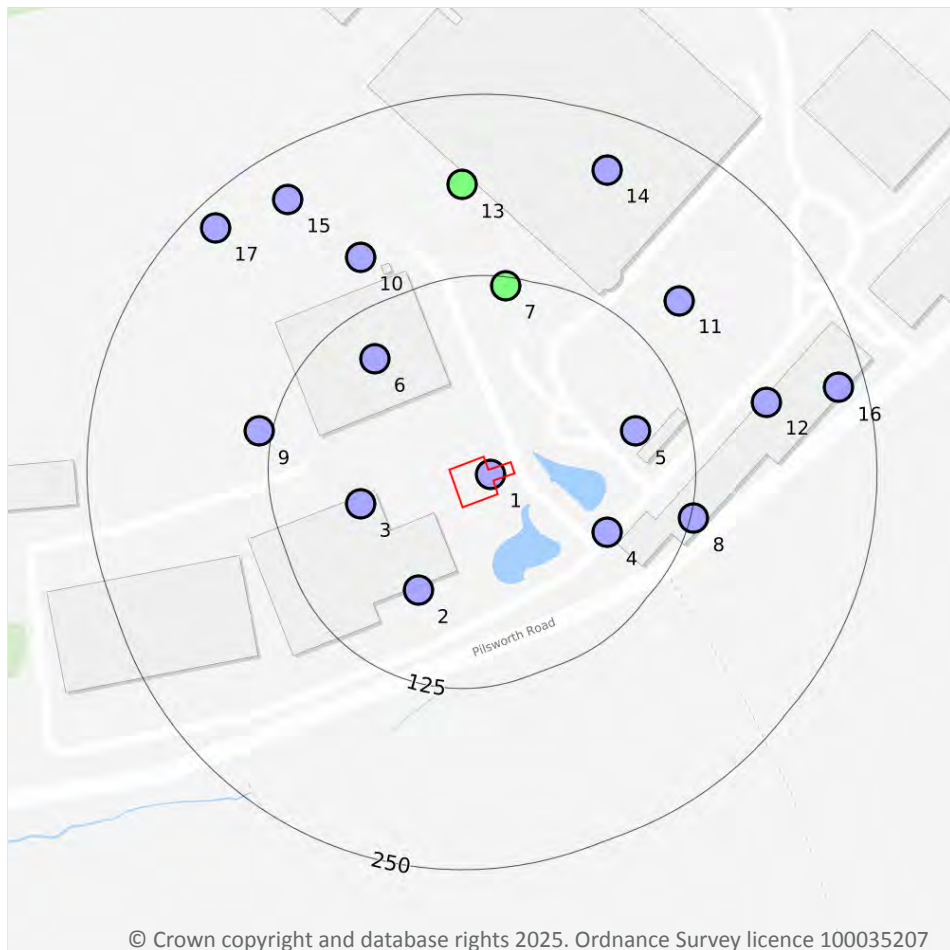
Features are displayed on the Geology 1:50,000 scale - Bedrock map on [page 77 >](#)

ID	Location	Category	Description
2	On site	FOSSIL_HORIZON	Marine band
6	173m SW	FAULT	Fault, inferred
8	229m NE	FAULT	Fault, inferred
10	309m SE	ROCK	Coal seam, inferred
12	328m NE	FAULT	Fault, inferred
14	334m SW	FAULT	Fault, inferred
16	335m SW	ROCK	Coal seam, inferred
18	344m SW	FOSSIL_HORIZON	Marine band
20	345m SE	FOSSIL_HORIZON	Marine band
24	400m SW	ROCK	Coal seam, inferred
25	400m SW	FAULT	Fault, inferred
27	403m SW	FOSSIL_HORIZON	Marine band
30	441m S	ROCK	Coal seam, inferred
33	462m S	ROCK	Coal seam, inferred

This data is sourced from the British Geological Survey.



16 Boreholes



- Site Outline**
- Search buffers in metres (m)**
- Confidential
 - 0 - 10m
 - 10 - 30m
 - 30m+
 - Unknown

16.1 BGS Boreholes

Records within 250m

17

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 80](#) >

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	On site	384050 409380	HEYWOOD 11	9.0	N	13952705 ↗
2	65m SW	384000 409300	HEYWOOD 9	9.0	N	13952703 ↗

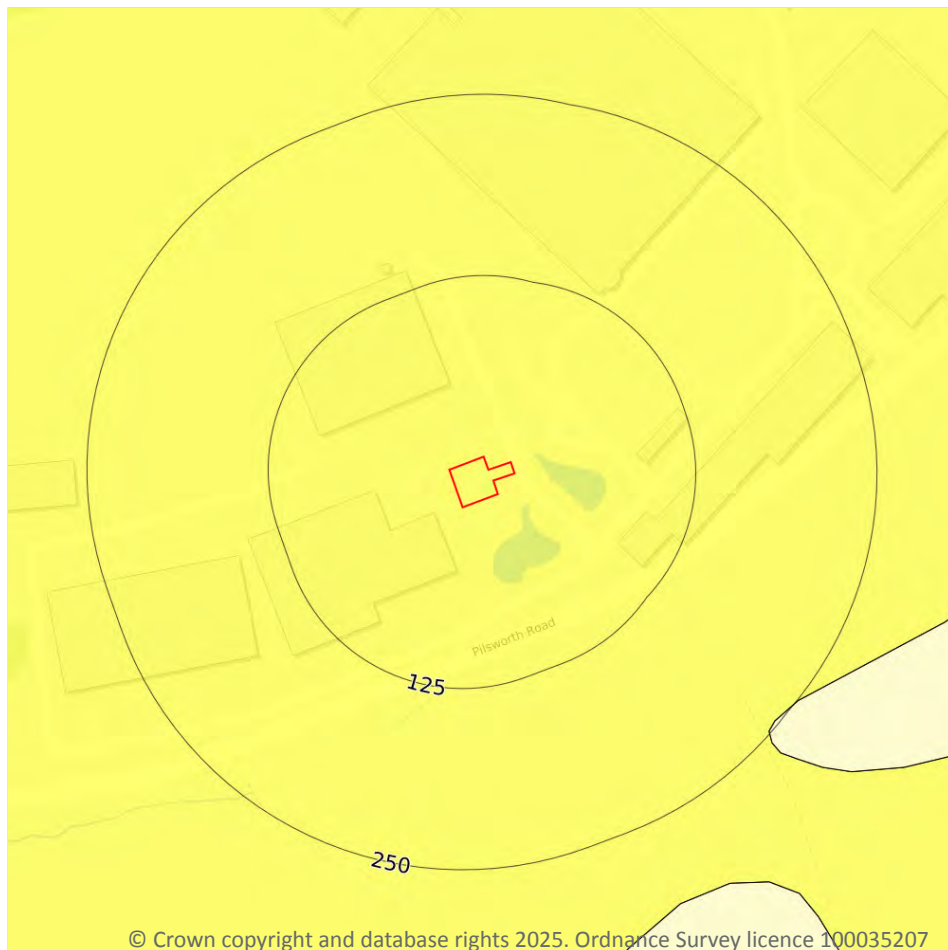


ID	Location	Grid reference	Name	Length	Confidential	Web link
3	66m W	383960 409360	HEYWOOD 10	9.0	N	13952704 ↗
4	76m SE	384130 409340	HEYWOOD INDUSTRIAL ESTATE 1	9.3	N	15046247 ↗
5	89m E	384150 409410	HEYWOOD 12	10.0	N	13952706 ↗
6	92m NW	383970 409460	HEYWOOD 16	10.0	N	13952710 ↗
7	119m N	384060 409510	HEYWOOD 19	11.0	N	13952713 ↗
8	127m E	384190 409350	HEYWOOD INDUSTRIAL ESTATE 2	6.1	N	15046251 ↗
9	134m W	383890 409410	HEYWOOD 18	9.0	N	13952712 ↗
10	159m NW	383960 409530	HEYWOOD 15	7.0	N	13952709 ↗
11	161m NE	384180 409500	HEYWOOD 13	9.0	N	13952707 ↗
12	180m E	384240 409430	HEYWOOD INDUSTRIAL ESTATE 3	8.0	N	15046252 ↗
13	188m N	384030 409580	HEYWOOD 14	11.0	N	13952708 ↗
14	212m N	384130 409590	HAYWOOD DISTRICT PARK UNIT4 TP8	2.7	N	27494 ↗
15	218m NW	383910 409570	MOSSHILL RD HEYWOOD P	6.4	N	27401 ↗
16	231m E	384290 409440	HEYWOOD INDUSTRIAL ESTATE 4	9.1	N	15046254 ↗
17	232m NW	383860 409550	MOSSHILL RD HEYWOOD 3	8.84	N	27404 ↗

This data is sourced from the British Geological Survey.



17 Natural ground subsidence - Shrink swell clays



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☒ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.1 Shrink swell clays

Records within 50m

1

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 82 >](#)

Location	Hazard rating	Details
On site	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

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17.2 Running sands

Records within 50m

1

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 83](#) >

Location	Hazard rating	Details
On site	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

1

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 84](#) >

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.

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

1

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 85 >](#)

Location	Hazard rating	Details
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



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☒ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

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17.5 Landslides

Records within 50m

1

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 86](#) >

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.

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

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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 87](#) >

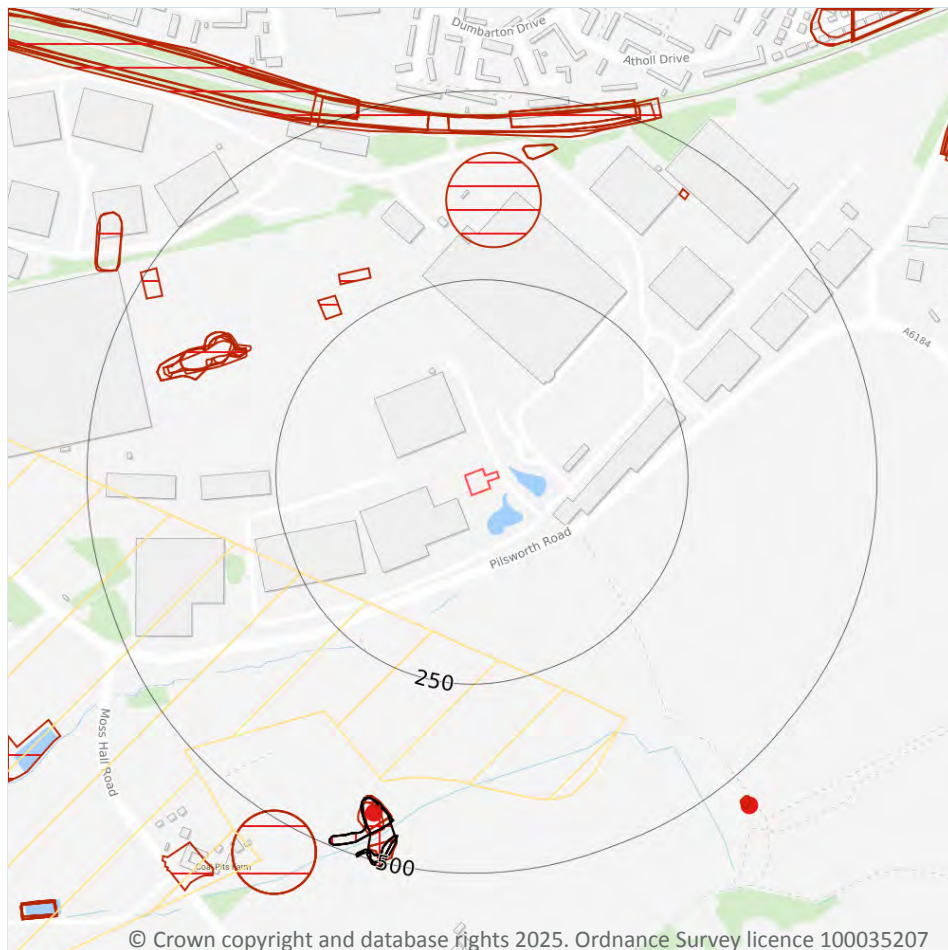
Location	Hazard rating	Details
On site	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.



This data is sourced from the British Geological Survey.



18 Mining and ground workings



- Site Outline
- Search buffers in metres (m)
- BritPits
- ▤ Surface ground workings
- ▥ Underground workings
- ▦ Underground mining extents
- ▧ Historical mineral planning areas
- ▨ TCA non-coal mining
- Non Coal Mining
- ▩ Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- ▬ Underground mining known or likely within or in close proximity
- ▭ Underground mining known within or in very close proximity

18.1 BritPits

Records within 500m

1

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 and ground workings map on [page 89](#) >

ID	Location	Details	Description
C	439m S	Name: Three Land Ends Address: Darn Hill, HEYWOOD, Lancashire Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Delf, Delph, Gravel Pit, Sand Pit, Sand and Gravel Pit, Clay Pit, Pit, Opencast Coal Site or Surface Mine. It may be mapped as Worked Ground or Worked and Made Ground on BGS mapping. Status description: Site which has ceased to extract minerals. May be considered as 'Closed' by operator. May be considered to have 'Active', 'Dormant' or 'Expired' planning permissions by the Mineral Planning Authority.

This data is sourced from the British Geological Survey.

18.2 Surface ground workings

Records within 250m	0
----------------------------	----------

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.

This is data is sourced from Ordnance Survey/Groundsure.

18.3 Underground workings

Records within 1000m	7
-----------------------------	----------

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 and ground workings map on [page 89 >](#)

ID	Location	Land Use	Year of mapping	Mapping scale
C	422m S	Coal Pits	1891	1:10560
C	423m S	Coal Pits	1938	1:10560
C	423m S	Coal Pits	1928	1:10560
C	423m S	Coal Pits	1908	1:10560
C	462m S	Coal Pits	1938	1:10560
C	462m S	Coal Pits	1928	1:10560
C	462m S	Coal Pits	1908	1:10560

This is data is sourced from Ordnance Survey/Groundsure.



18.4 Underground mining extents

Records within 500m

0

This data identifies underground mine workings that could present a potential risk, including adits and seam workings. These features have been identified from BGS Geological mapping and mine plans sourced from the BGS and various collections and sources.

This data is sourced from 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

1

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).

Features are displayed on the Mining and ground workings map on [page 89](#) >

ID	Location	Name	Commodity	Class	Likelihood
1	185m SW	Not available	Vein Mineral	A	Underground mine workings are uncommon, although the geology is similar to that worked elsewhere. Potential for difficult ground conditions are unlikely and are at a level where they need not be considered.

This data is sourced from the British Geological Survey.

18.7 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.



18.8 The Coal Authority non-coal mining

Records within 500m**0**

This data provides an indication of the potential zone of influence of recorded underground non-coal mining workings. Any and all analysis and interpretation of Coal Authority Data in this report is made by Groundsure, and is in no way supported, endorsed or authorised by the Coal Authority. The use of the data is restricted to the terms and provisions contained in this report. Data reproduced in this report may be the copyright of the Coal Authority and permission should be sought from Groundsure prior to any re-use.

This data is sourced from The Coal Authority.

18.9 Researched mining

Records within 500m**0**

This data indicates areas of potential mining identified from alternative or archival sources, including; BGS Geological paper maps, Lidar data, aerial photographs (from World War II onwards), archaeological data services, websites, Tithe maps, and various text/plans from collected books and reports. Some of this data is approximate and Groundsure have interpreted the resultant risk area and, where possible, specific areas of risk have been captured.

This data is sourced from Groundsure.

18.10 Mining record office plans

Records within 500m**0**

This dataset is representative of Mining Record Office and/or plan extents held by Groundsure and should be considered approximate. Where possible, plans have been located and any specific areas of risk they depict have been captured.

This data is sourced from Groundsure.

18.11 BGS mine plans

Records within 500m**0**

This dataset is representative of BGS mine plans held by Groundsure and should be considered approximate. Where possible, plans have been located and any specific areas of risk they depict have been captured.

This data is sourced from Groundsure.



18.12 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.

18.13 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.

18.14 Gypsum areas

Records on site	0
-----------------	---

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.15 Tin mining

Records on site	0
-----------------	---

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

18.16 Clay mining

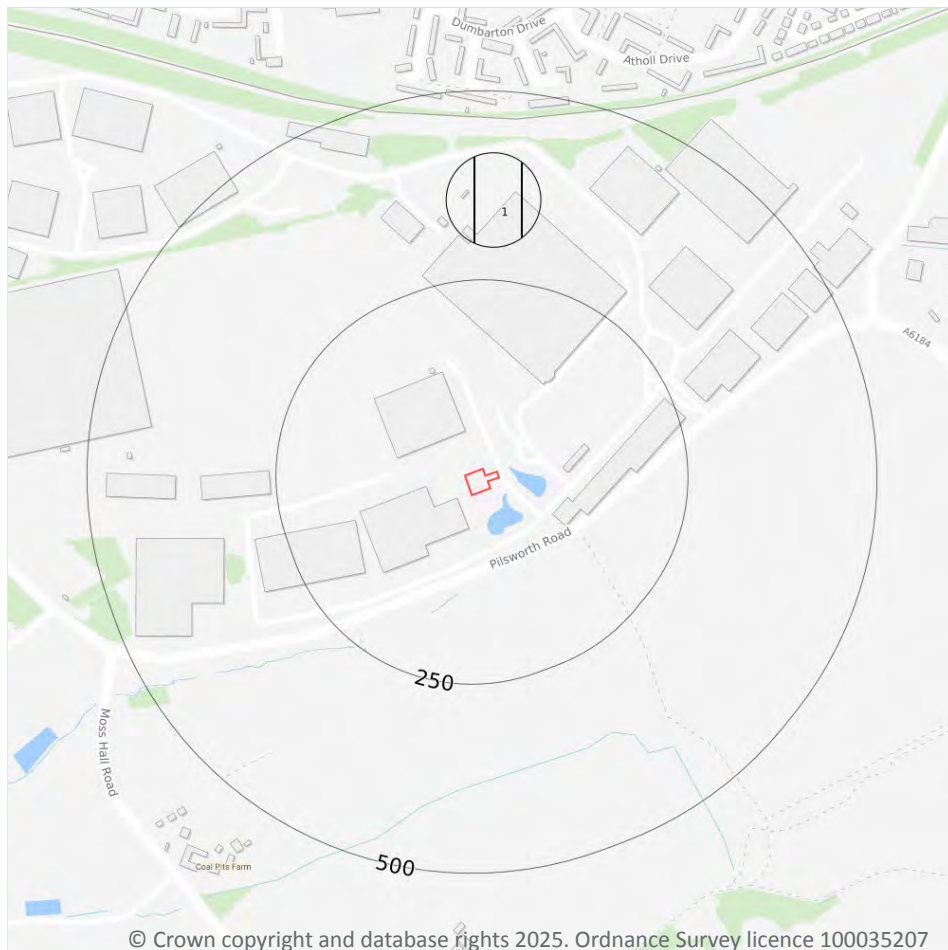
Records on site	0
-----------------	---

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 Ground cavities and sinkholes



- Site Outline
- Search buffers in metres (m)
- Natural cavities (Area)
- Natural cavities (Point)
- Mining cavities
- Reported recent incidents
- Historical incidents

19.1 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.

19.2 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.

19.3 Reported recent incidents

Records within 500m

0

This data identifies sinkhole information gathered from media reports and Groundsure's own records. This data goes back to 2014 and includes relative accuracy ratings for each event and links to the original data sources. The data is updated on a regular basis and should not be considered a comprehensive catalogue of all sinkhole events. The absence of data in this database does not mean a sinkhole definitely has not occurred during this time.

This data is sourced from Groundsure.

19.4 Historical incidents

Records within 500m

1

This dataset comprises an extract of 1:10,560, 1:10,000, 1:2,500 and 1:1,250 scale historical Ordnance Survey maps held by Groundsure, dating back to the 1840s. It shows shakeholes, deneholes and other 'holes' as noted on these maps. Dene holes are medieval chalk extraction pits, usually comprising a narrow shaft with a number of chambers at the base of the shaft. Shakeholes are an alternative name for suffusion sinkholes, most commonly found in the limestone landscapes of North Yorkshire but also extensively noted around the Brecon Beacons National Park.

Not all 'holes' noted on Ordnance Survey mapping will necessarily be present within this dataset.

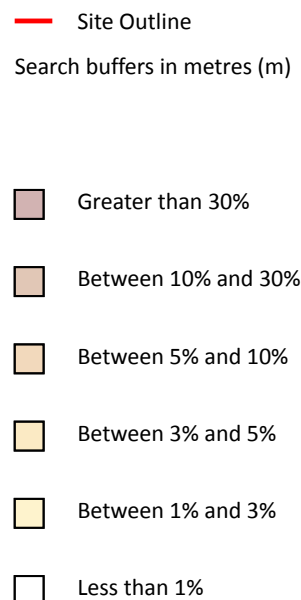
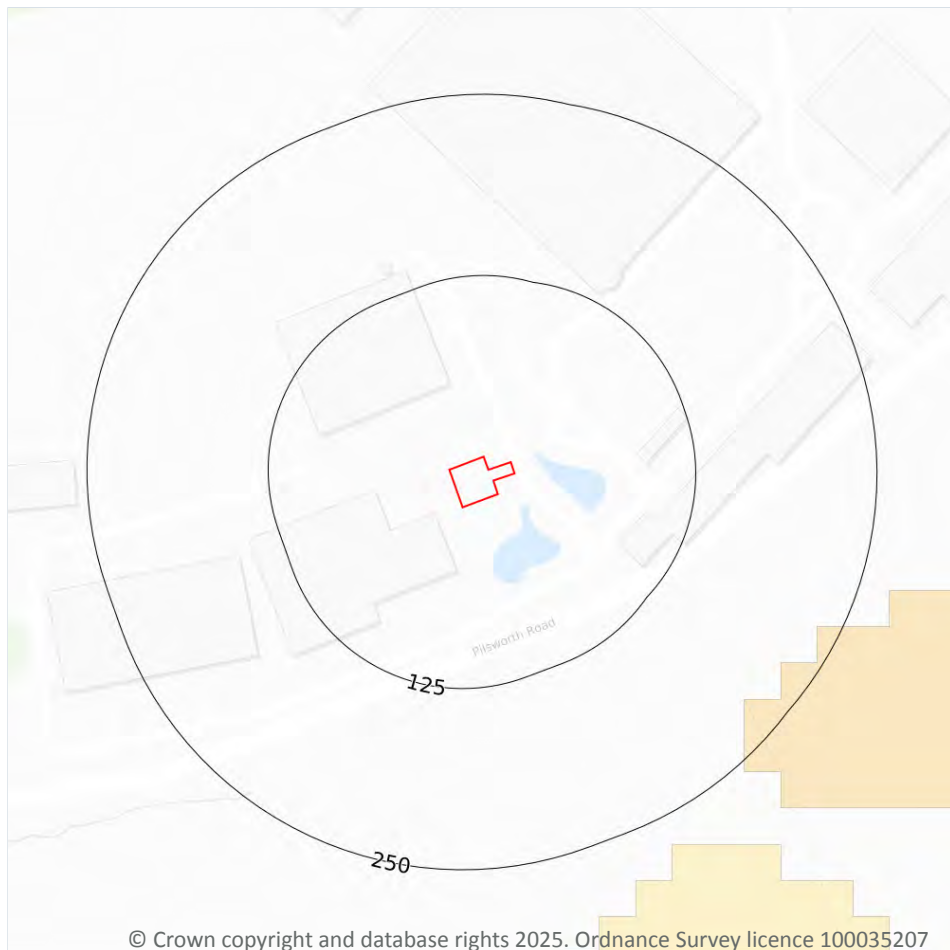
Features are displayed on the Ground cavities and sinkholes map on [page 94](#) >

ID	Location	Type	Date of mapping
1	293m N	Unspecified Hole	1938

This data is sourced from Groundsure.



20 Radon



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20.1 Radon

Records on site

1

The Radon Potential data classifies areas based on their likelihood of a property having a radon level at or above the Action Level in Great Britain. The dataset is intended for use at 1:50,000 scale and was derived from both geological assessments and indoor radon measurements (more than 560,000 records). A minimum 50m buffer should be considered when searching the maps, as the smallest detectable feature at this scale is 50m. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain (1:100,000 scale).

Features are displayed on the Radon map on [page 96 >](#)

Location	Estimated properties affected	Radon Protection Measures required
On site	Less than 1%	None



This data is sourced from the British Geological Survey and UK Health Security Agency.



21 Soil chemistry

21.1 BGS Estimated Background Soil Chemistry

Records within 50m

3

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 km². 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 km²; 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 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
21m W	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
21m W	15 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.

21.2 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 km²).

This data is sourced from the British Geological Survey.

21.3 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 km².

This data is sourced from the British Geological Survey.



22 Railway infrastructure and projects



- Site Outline
- Search buffers in metres (m)
- C2 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

22.1 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.

22.2 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.

22.3 Railway tunnels

Records within 250m

0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

22.4 Historical railway and tunnel features

Records within 250m

8

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 99 >](#)

Location	Land Use	Year of mapping	Mapping scale
10m E	Railway Sidings	1969	2500
51m NW	Railway Sidings	1968	2500
52m NW	Railway Sidings	1966	1250
66m SW	Railway Sidings	1968	2500
68m SW	Railway Sidings	1966	1250
78m SW	Railway Sidings	1968	2500
174m N	Railway Sidings	1968	2500
210m NE	Railway Sidings	1966	1250

This data is sourced from Ordnance Survey/Groundsure.

22.5 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.



22.6 Historical railways

Records within 250m**0**

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

This data is sourced from OpenStreetMap.

22.7 Railways

Records within 250m**0**

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

This data is sourced from Ordnance Survey and OpenStreetMap.

22.8 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.

22.9 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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Groundsure's Terms and Conditions can be accessed at this link: www.groundsure.com/terms-and-conditions-april-2023/ ↗.



Appendix C Historical Maps

Site Details:

Heywood Distribution Park -
Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: County Series

Map date: 1851

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1847
Revised N/A
Edition 1851
Copyright N/A
Levelled N/A

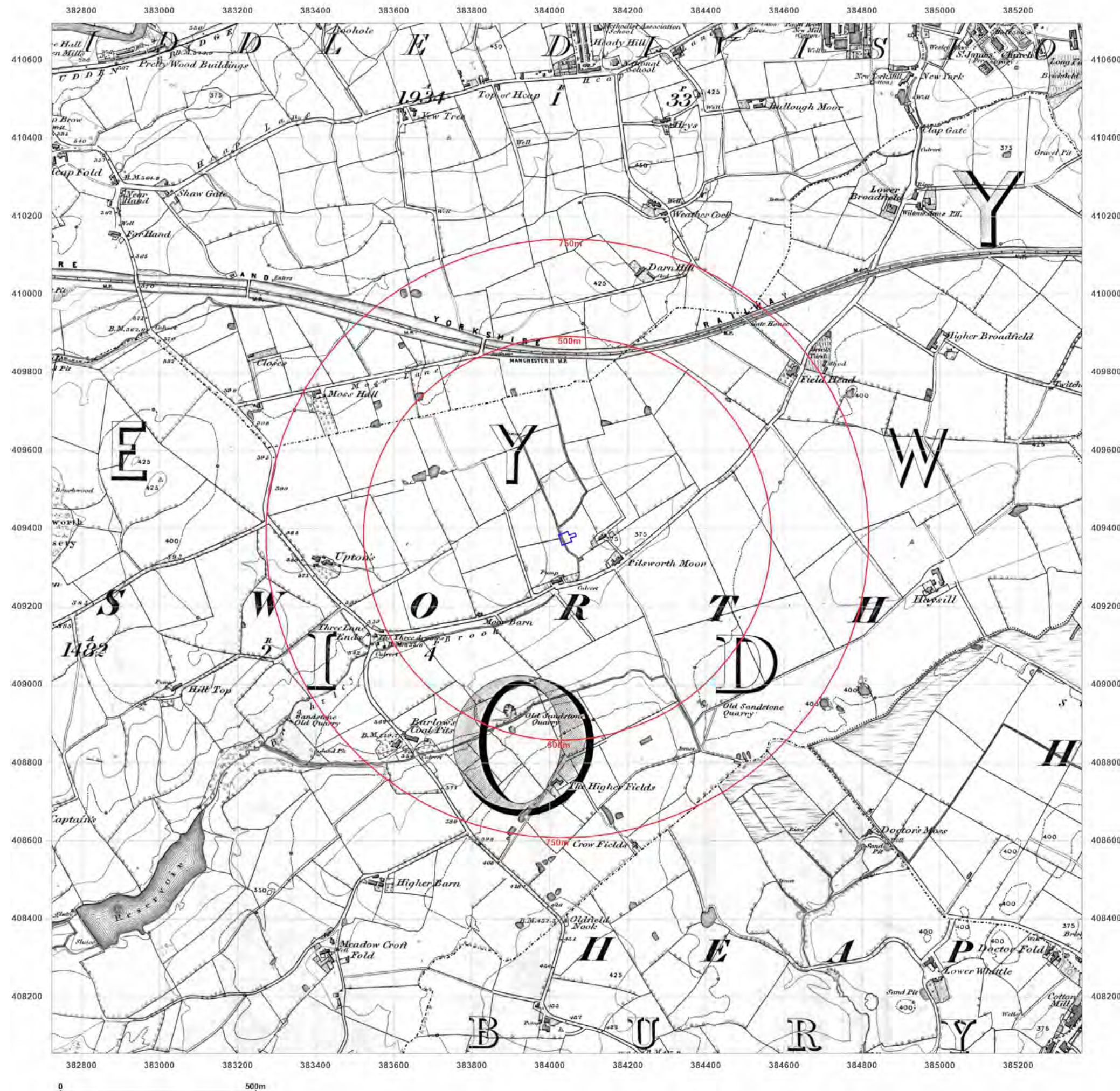


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Site Details:

Heywood Distribution Park -
Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: County Series

Map date: 1890-1891

Scale: 1:10,560

Printed at: 1:10,560



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Edition N/A
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Surveyed 1890
Revised 1890
Edition N/A
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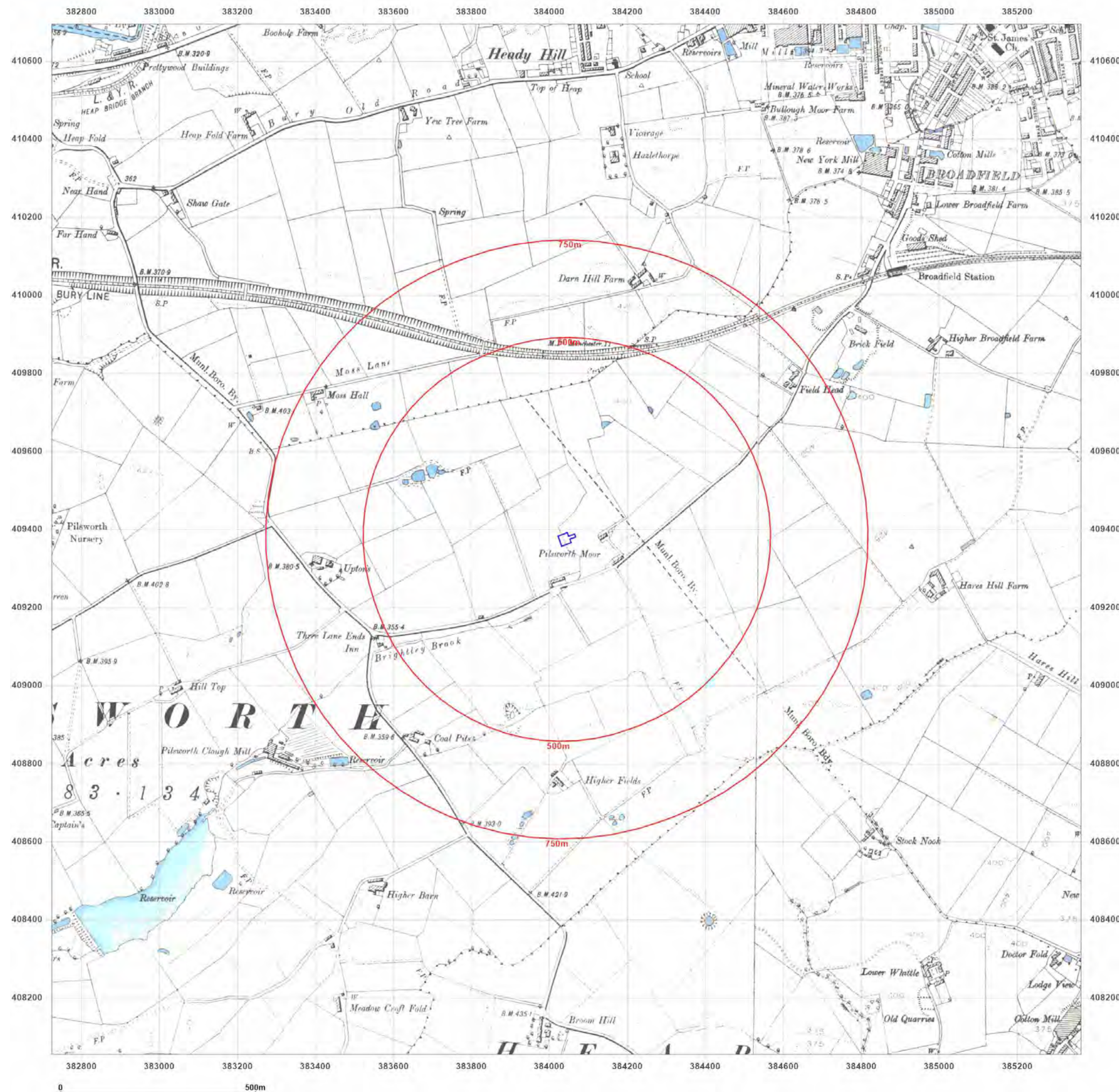


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Site Details:

Heywood Distribution Park -
Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: County Series

Map date: 1908-1909

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1844
Revised 1908
Edition N/A
Copyright N/A
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Surveyed 1848
Revised 1909
Edition N/A
Copyright N/A
Levelled N/A

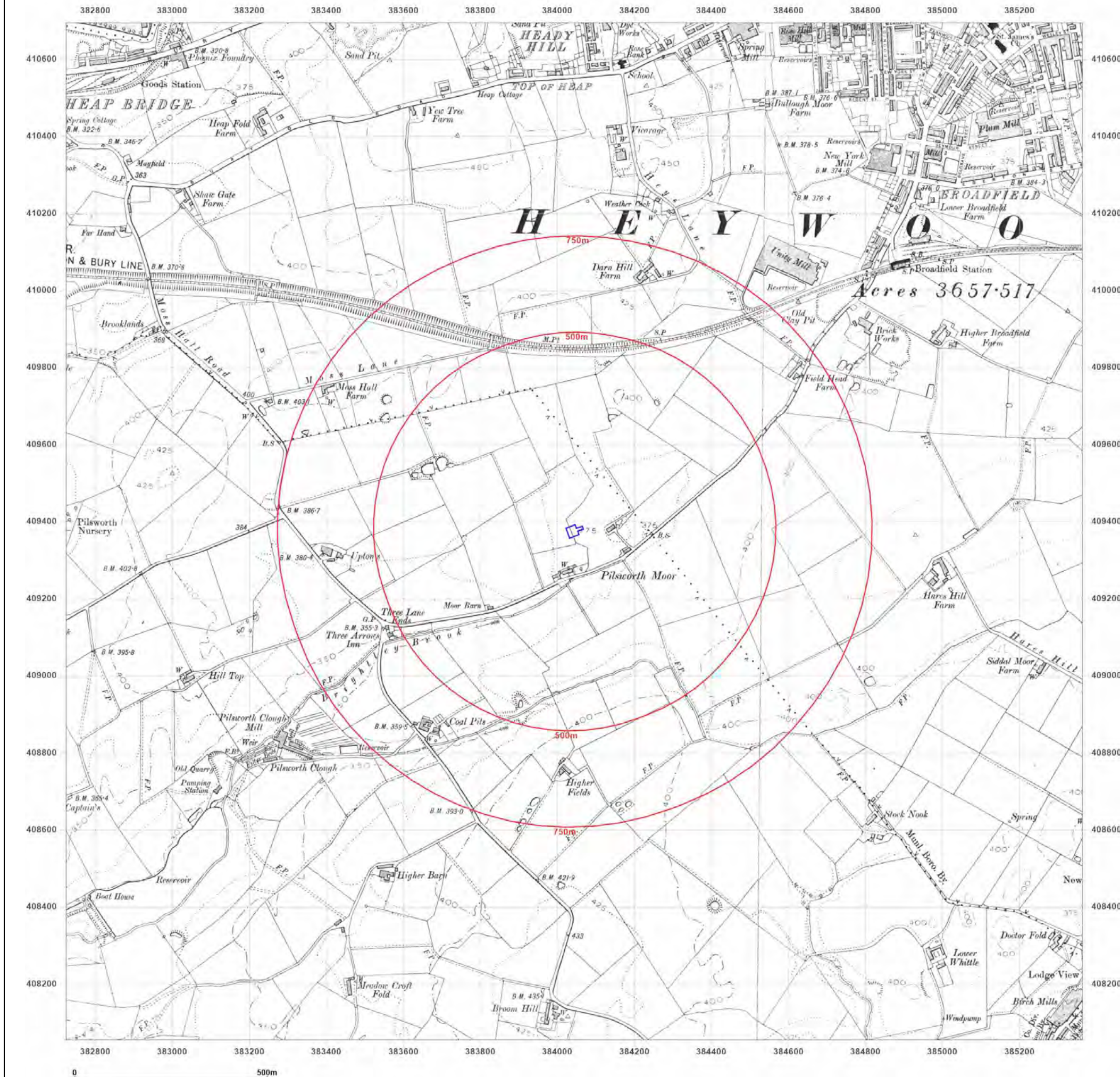


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Site Details:

Heywood Distribution Park - Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: County Series

Map date: 1928

Scale: 1:10,560

Printed at: 1:10,560



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 Edition N/A
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Surveyed 1848
 Revised 1928
 Edition N/A
 Copyright N/A
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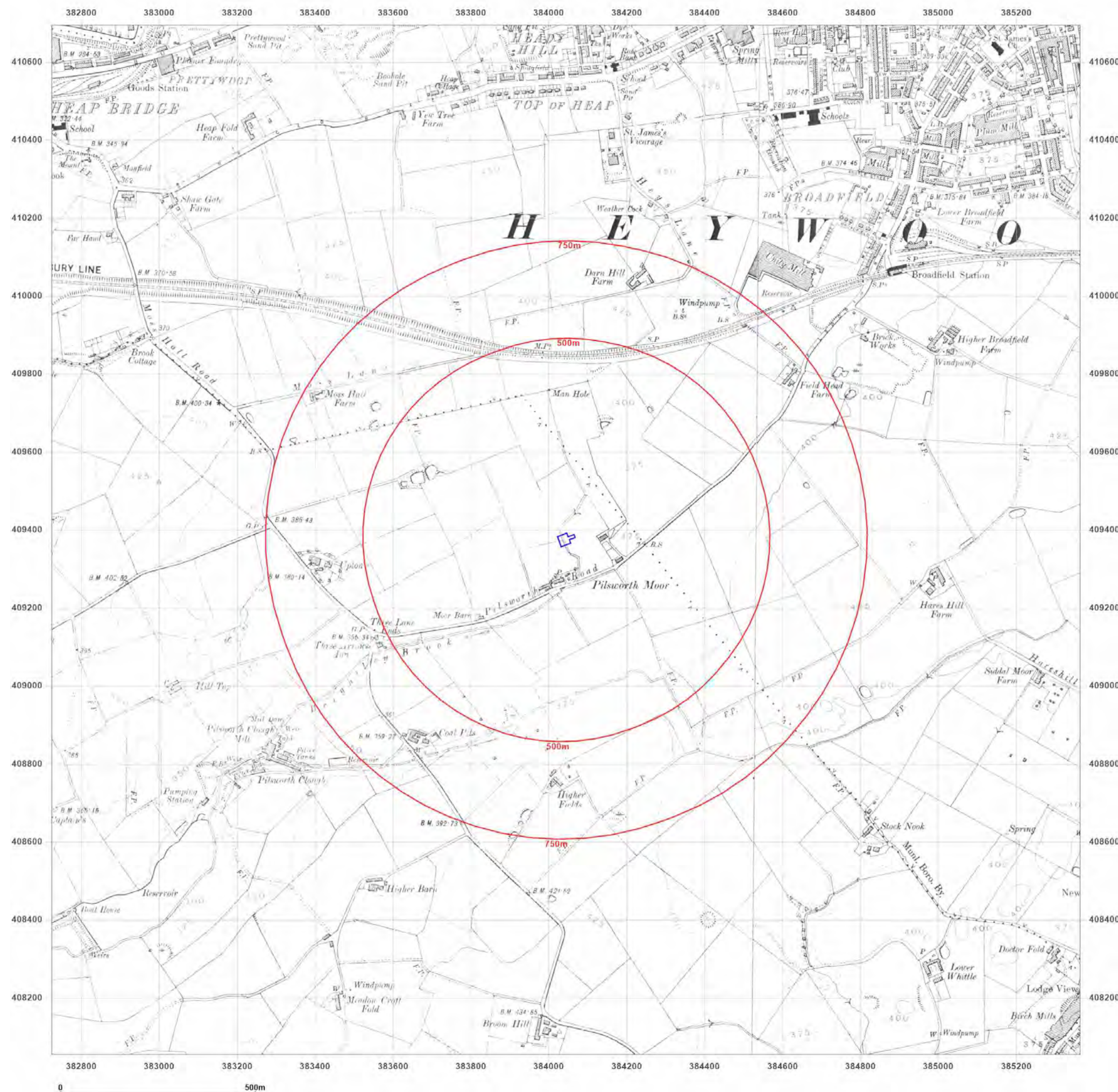


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Site Details:

Heywood Distribution Park -
Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



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Surveyed 1848
Revised 1938
Edition N/A
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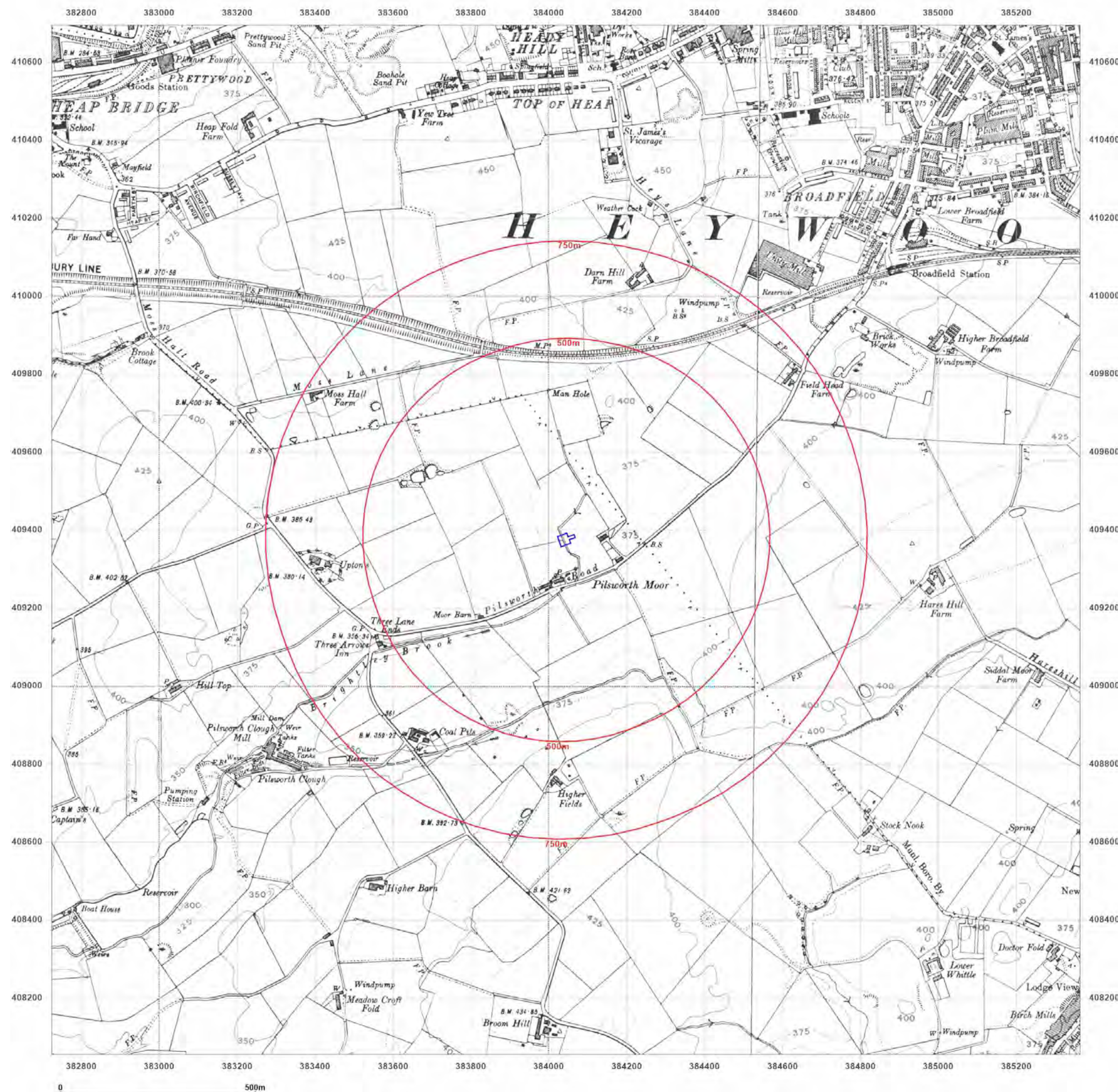


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Site Details:

Heywood Distribution Park -
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Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: Provisional

Map date: 1955-1956

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1949
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Revised 1955
Edition 1956
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Surveyed 1949
Revised 1955
Edition 1955
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Revised 1955
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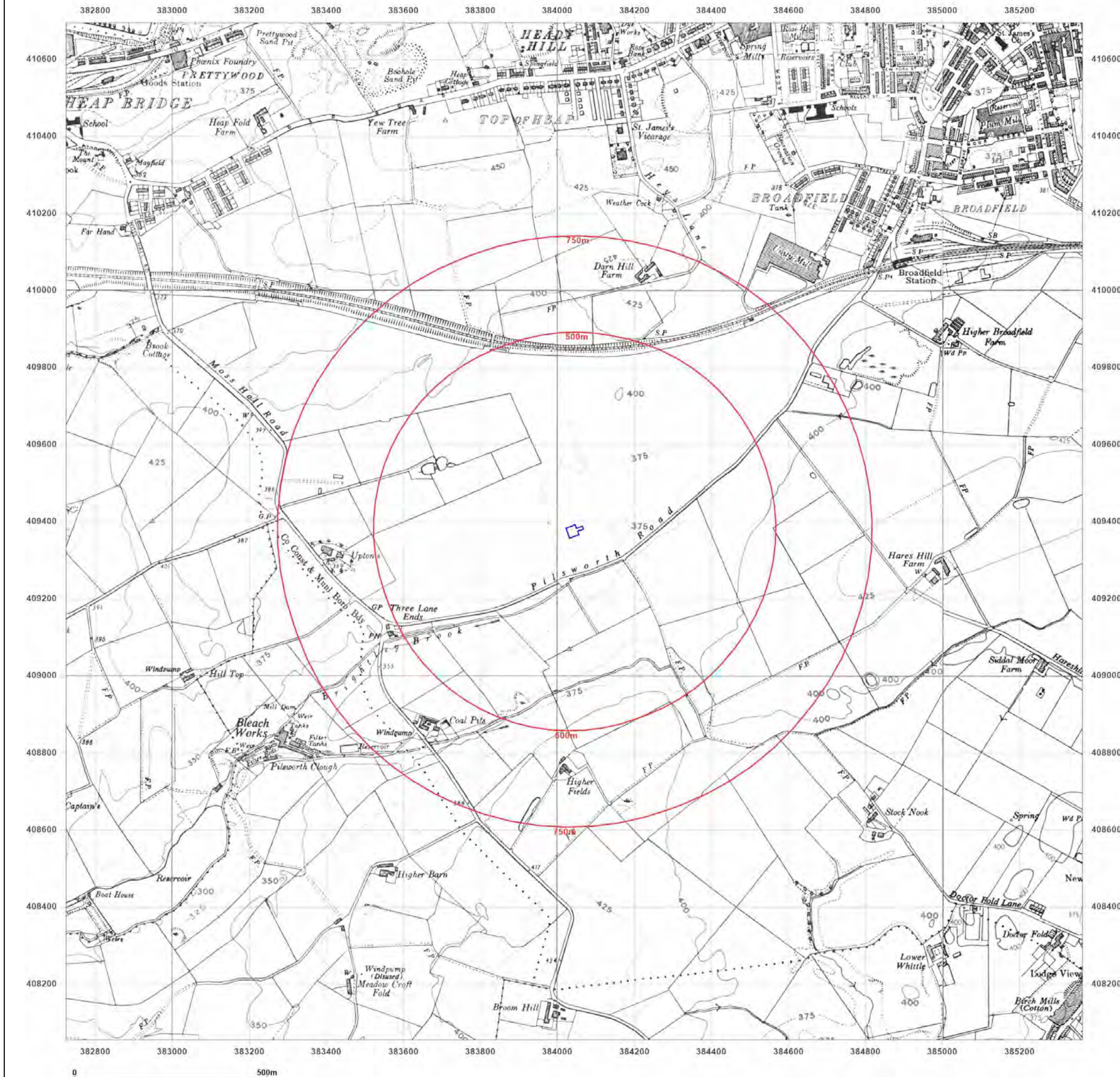


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Site Details:

Heywood Distribution Park -
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Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: Provisional

Map date: 1965-1968

Scale: 1:10,560

Printed at: 1:10,560



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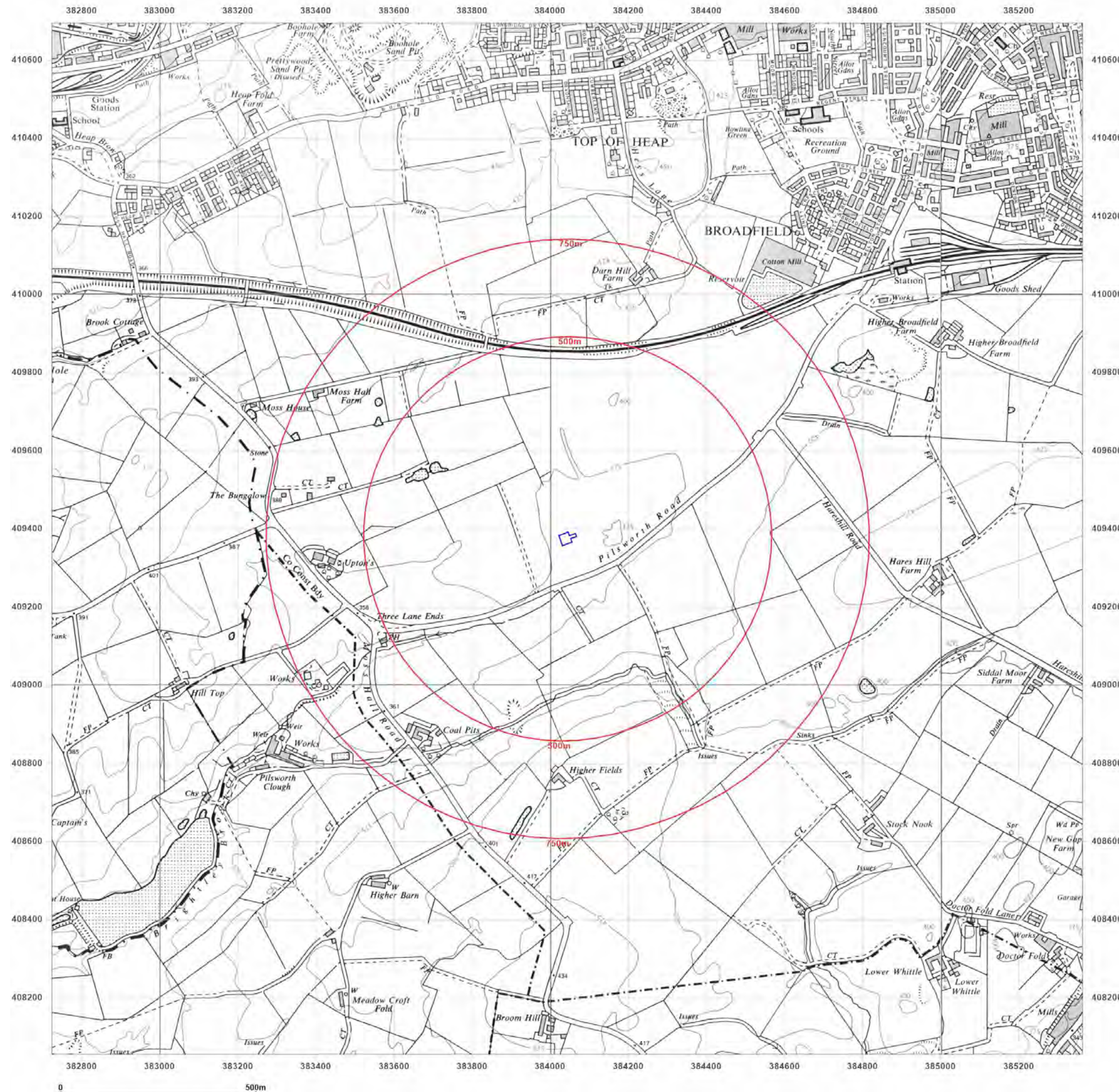


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Heywood Distribution Park -
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Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: National Grid

Map date: 1974-1975

Scale: 1:10,000

Printed at: 1:10,000



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Revised 1975
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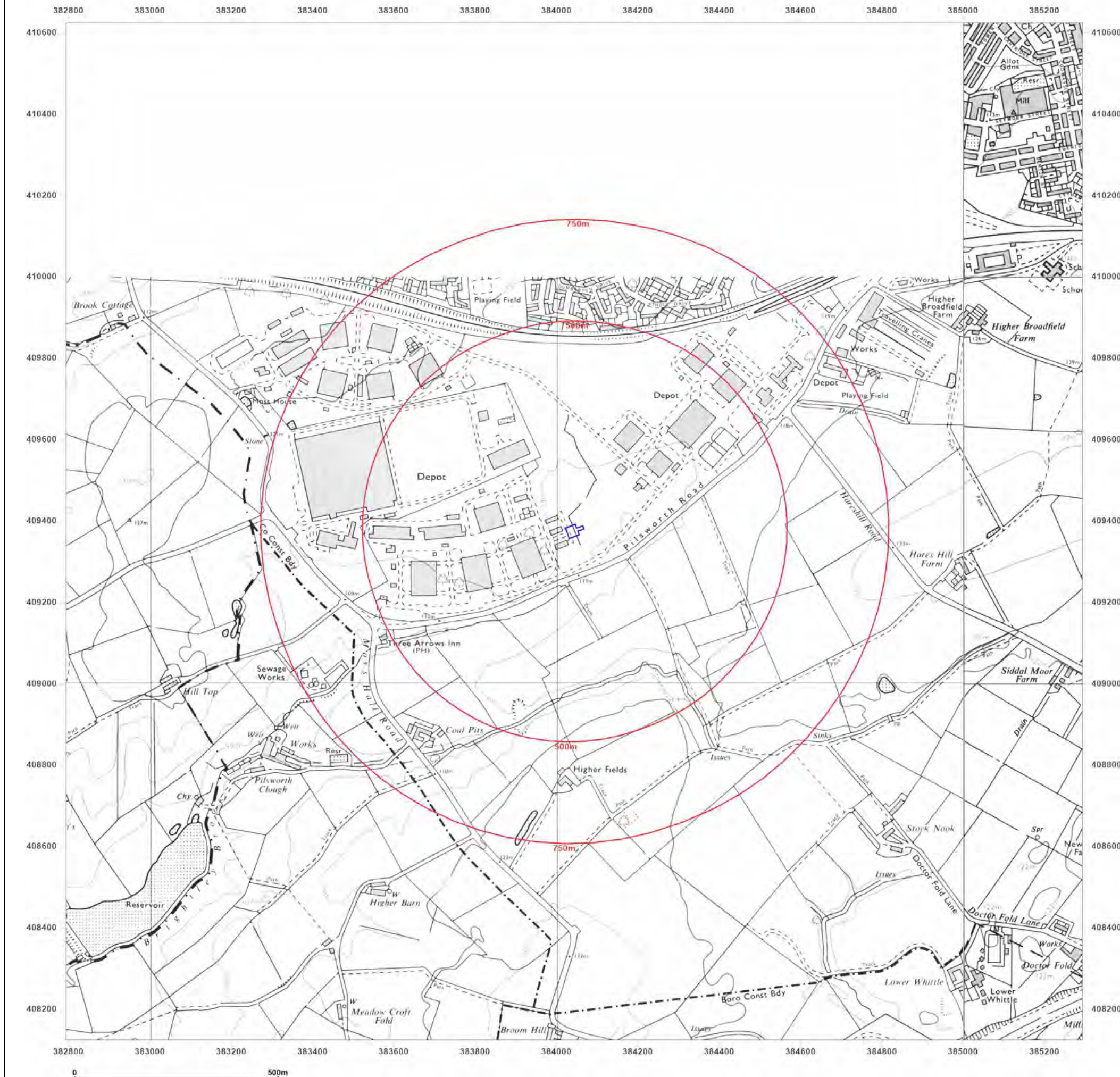


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Site Details:

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Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: National Grid

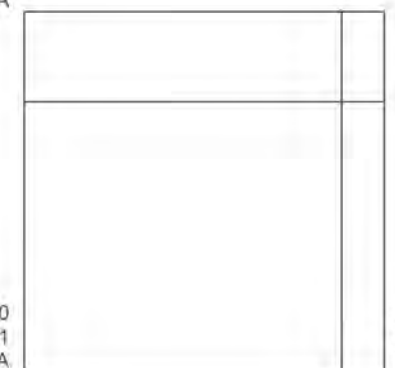
Map date: 1981-1983

Scale: 1:10,000

Printed at: 1:10,000



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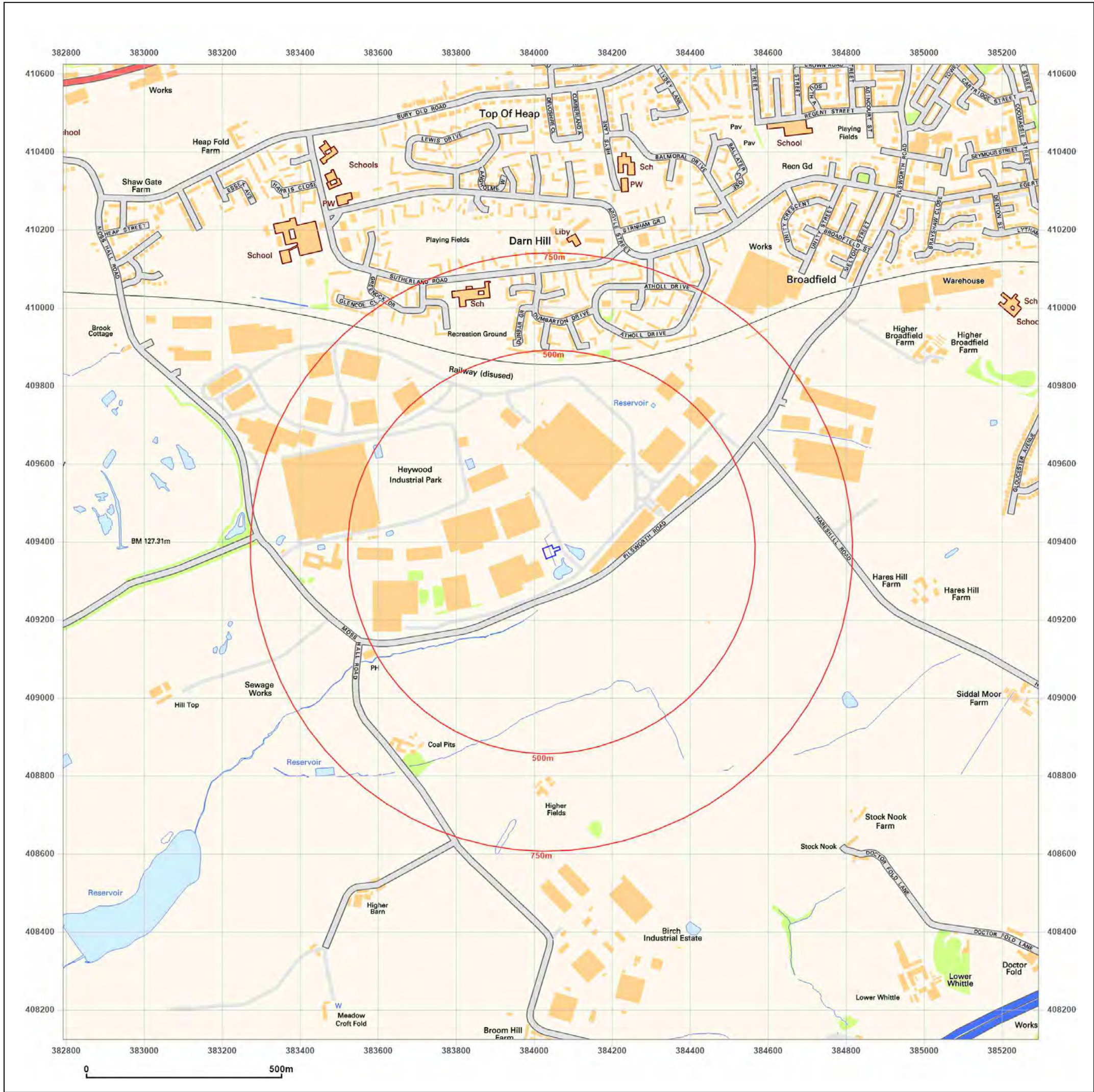


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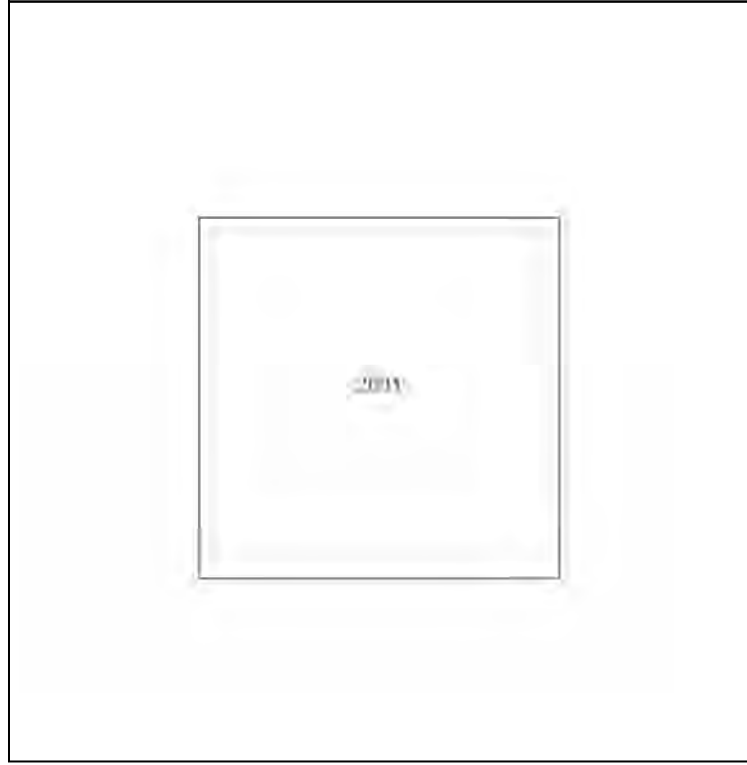


Site Details:

Heywood Distribution Park - Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: National Grid
Map date: 2001
Scale: 1:10,000
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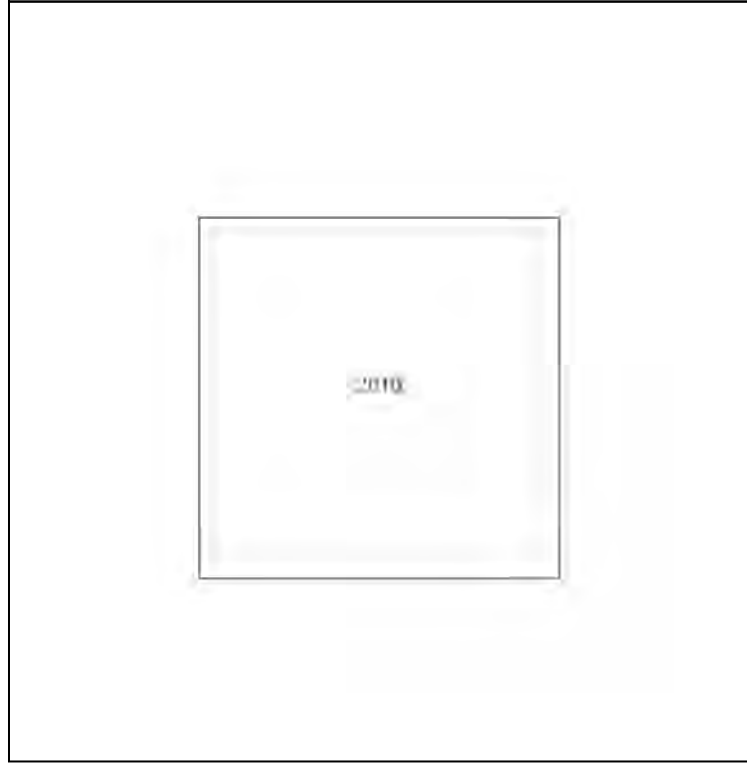
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Heywood Distribution Park - Substation

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Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: National Grid
Map date: 2010
Scale: 1:10,000
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Grid Ref: 384043, 409374

Map Name: National Grid

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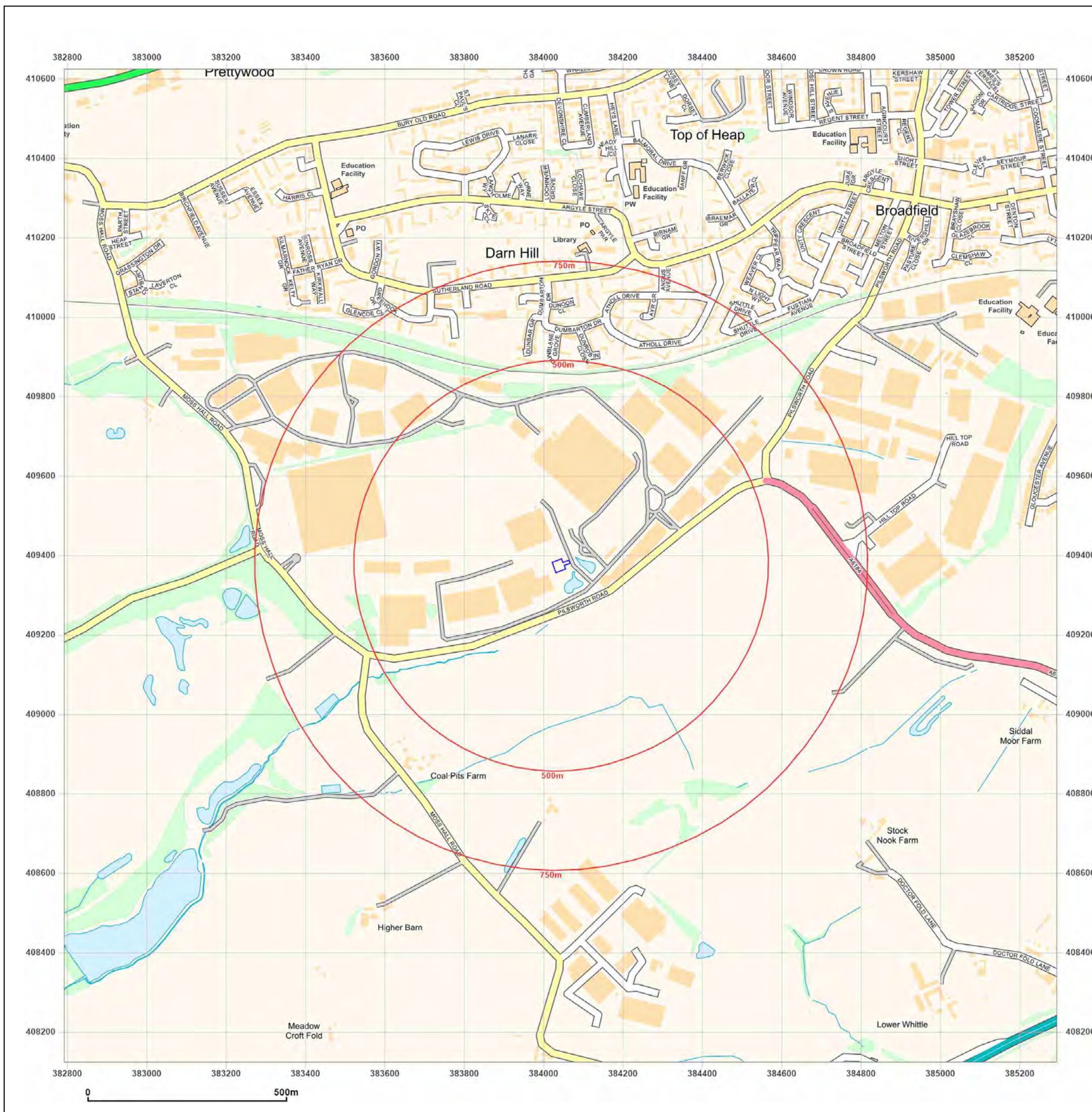


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Site Details:

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Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: County Series

Map date: 1890

Scale: 1:2,500

Printed at: 1:2,500



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Edition N/A
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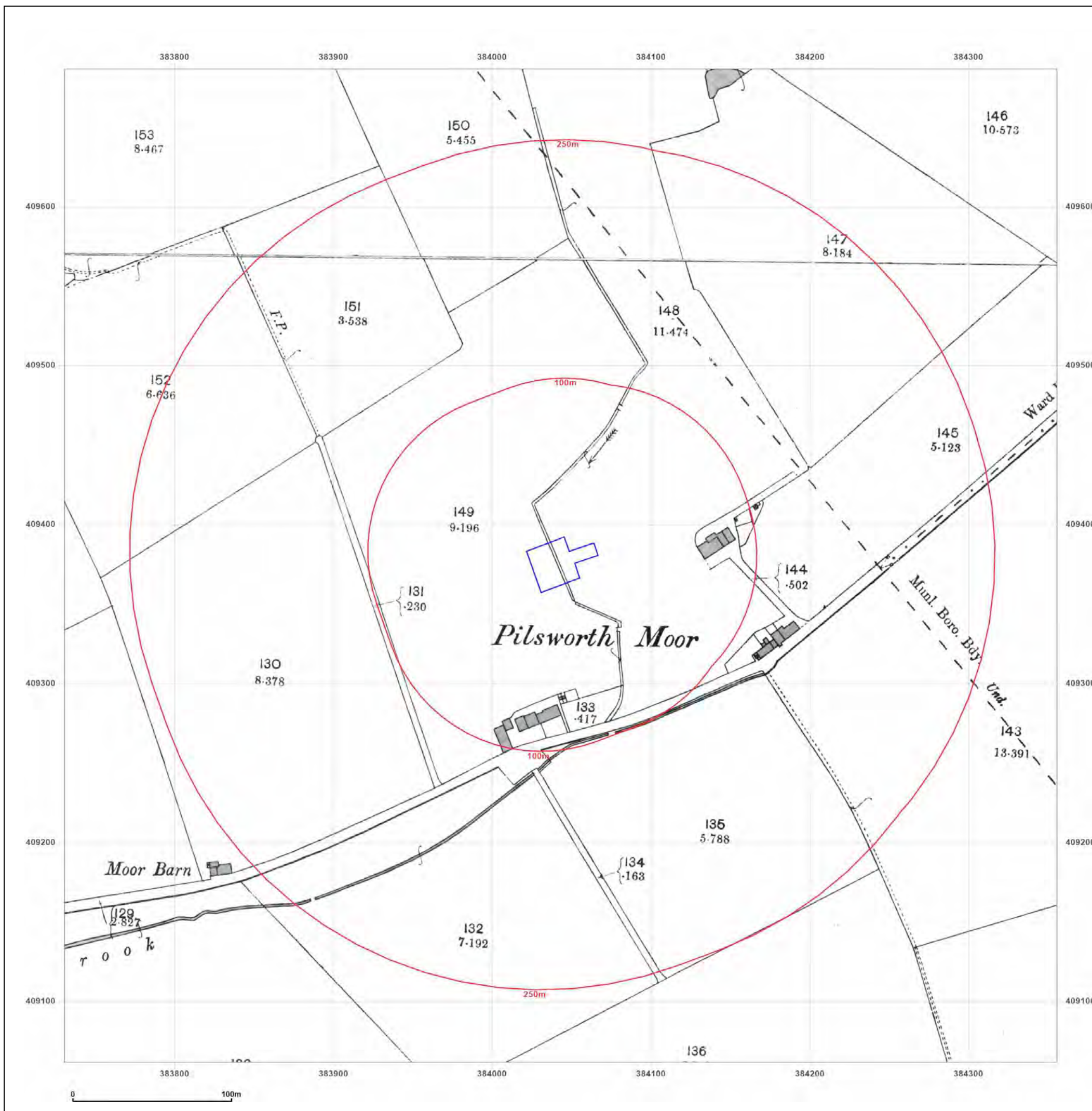


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Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: County Series

Map date: 1910

Scale: 1:2,500

Printed at: 1:2,500



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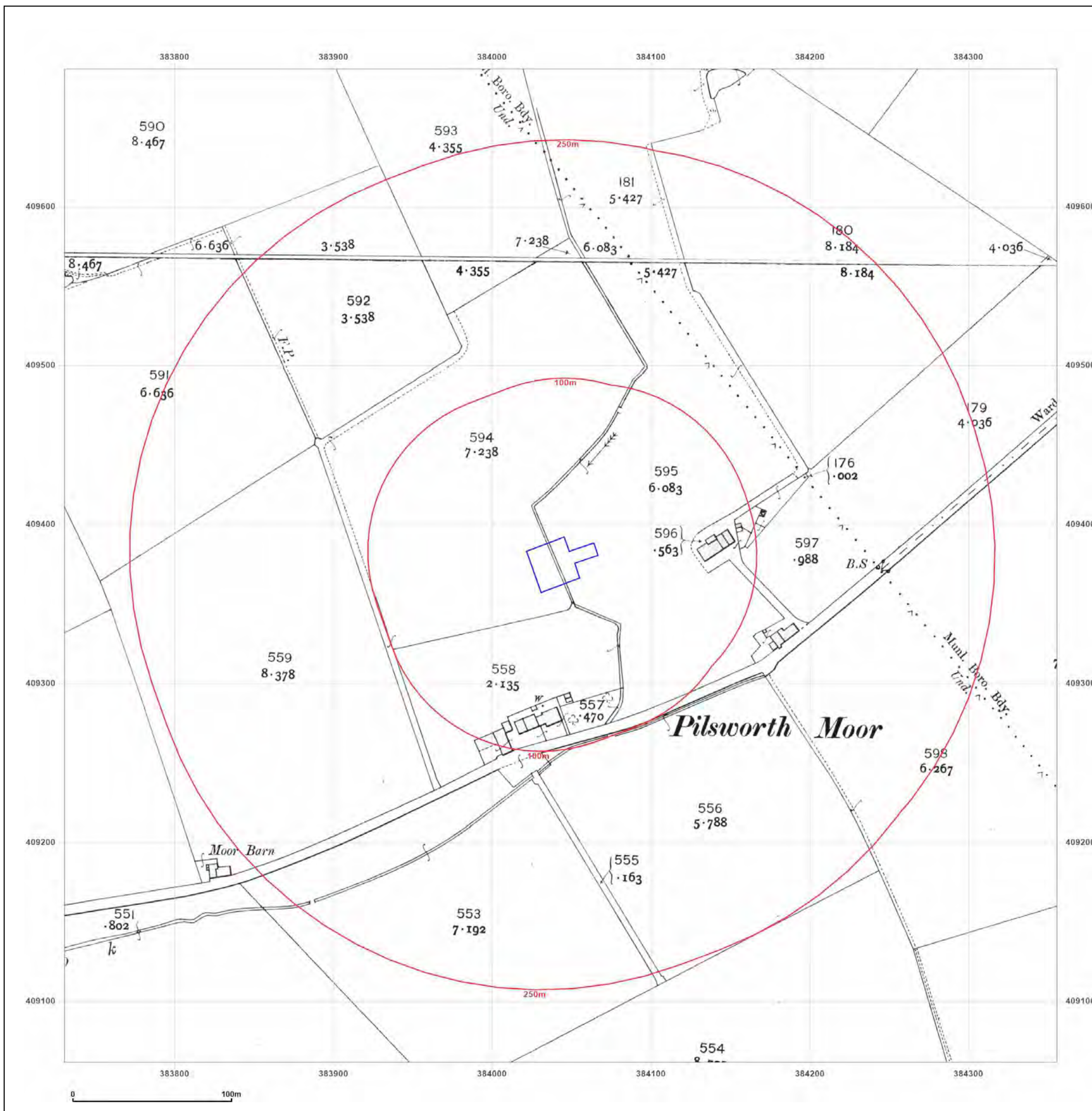


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Site Details:

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Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: County Series

Map date: 1930

Scale: 1:2,500

Printed at: 1:2,500



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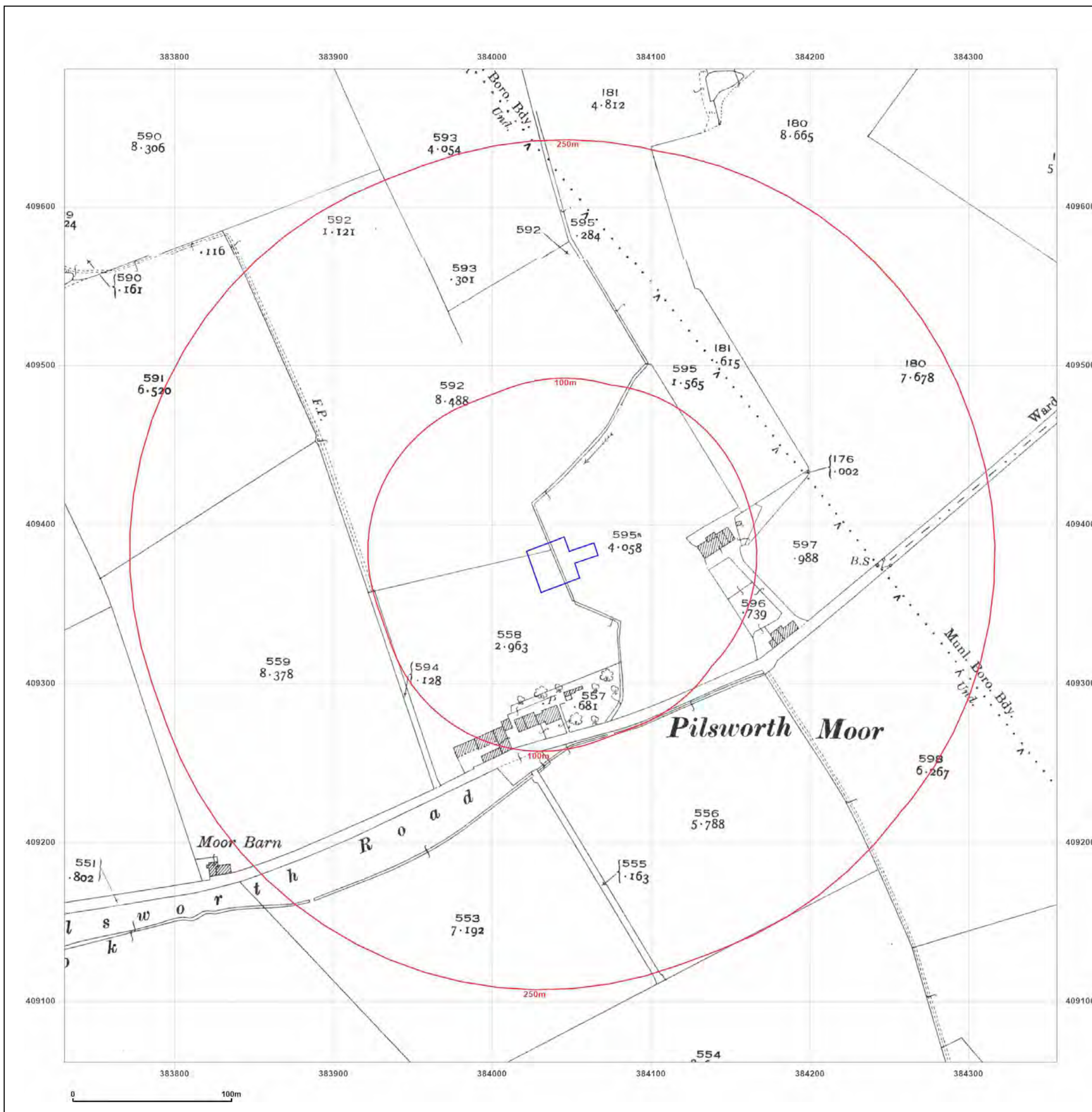


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Site Details:

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Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: County Series

Map date: 1937-1939

Scale: 1:2,500

Printed at: 1:2,500



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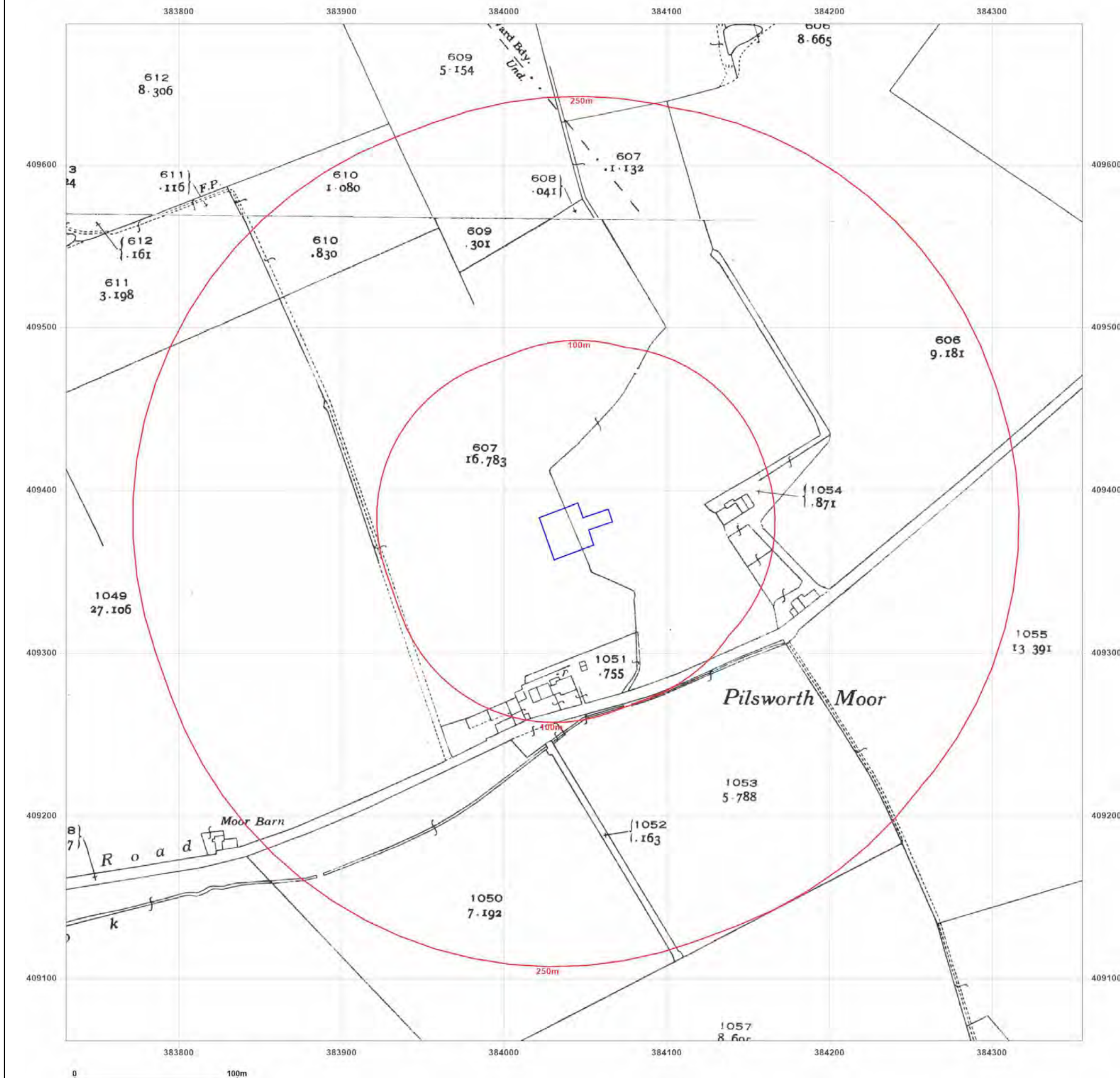


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Site Details:

Heywood Distribution Park -
Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: National Grid

Map date: 1956-1957

Scale: 1:1,250

Printed at: 1:2,000



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Surveyed 1956
Revised 1956
Edition N/A
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Levelled 1928

Surveyed 1957
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Edition N/A
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Levelled 1928

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Revised 1956
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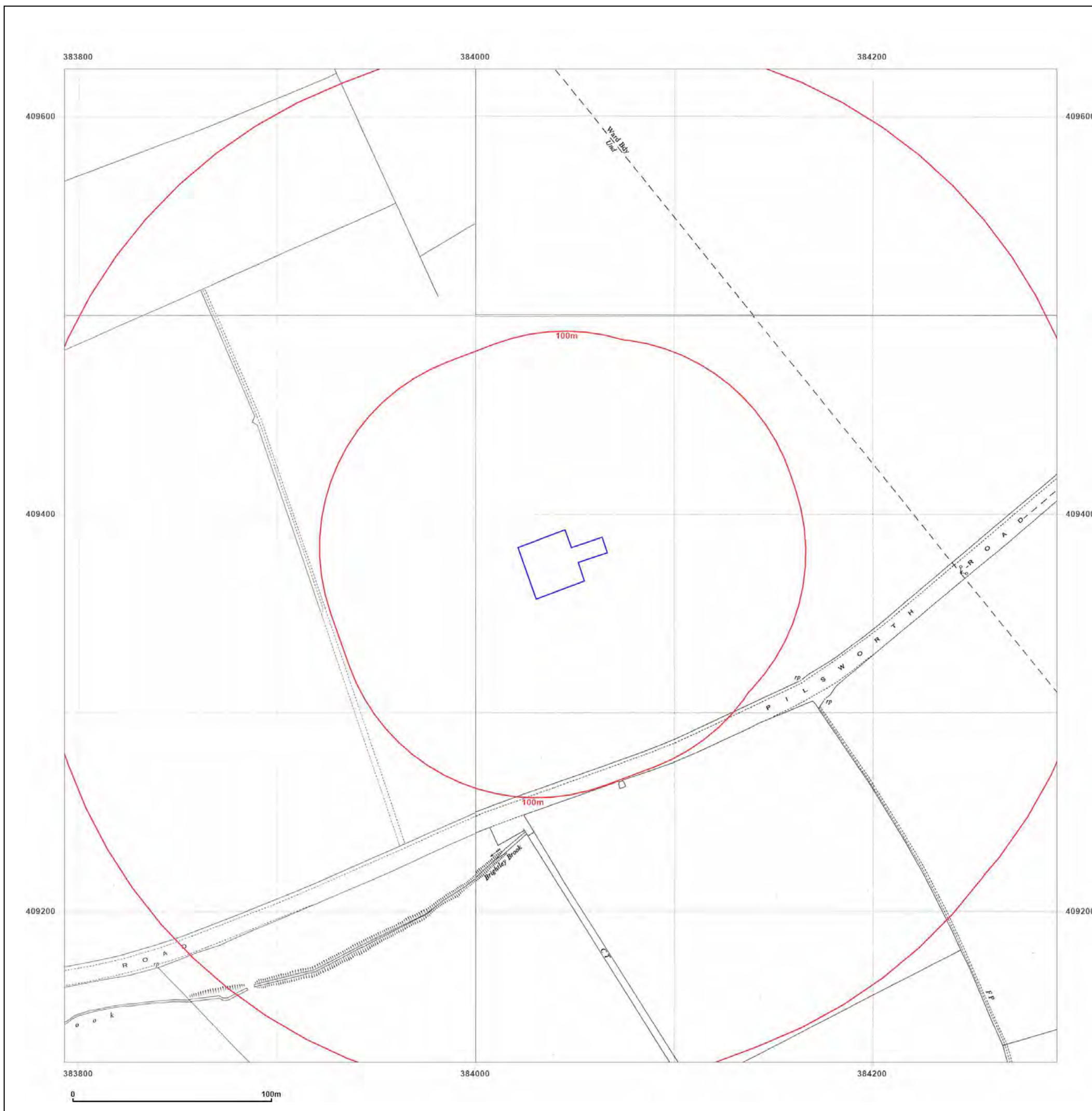


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Site Details:

Heywood Distribution Park -
Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: National Grid

Map date: 1958

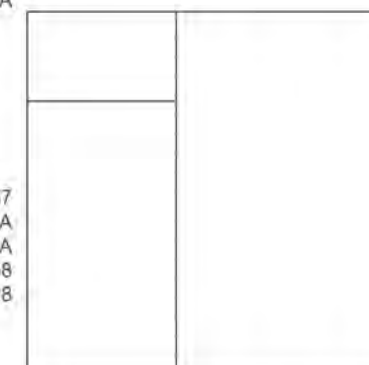
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Printed at: 1:2,000



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Edition N/A
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Surveyed 1957
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Edition N/A
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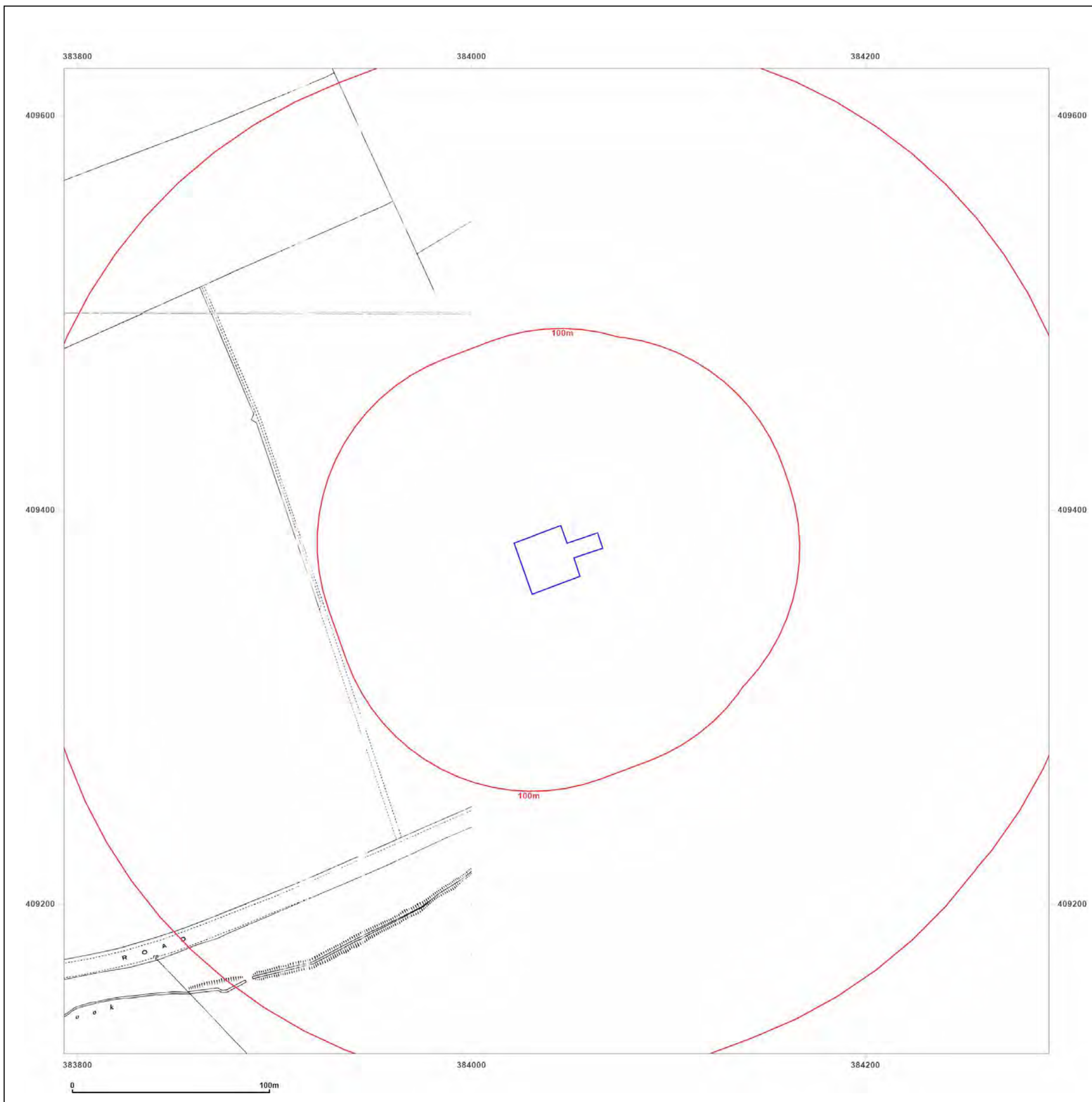


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Site Details:

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Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: National Grid

Map date: 1957-1958

Scale: 1:2,500

Printed at: 1:2,500



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Edition 1958
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Surveyed 1956
Revised 1956
Edition 1957
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Levelled 1928

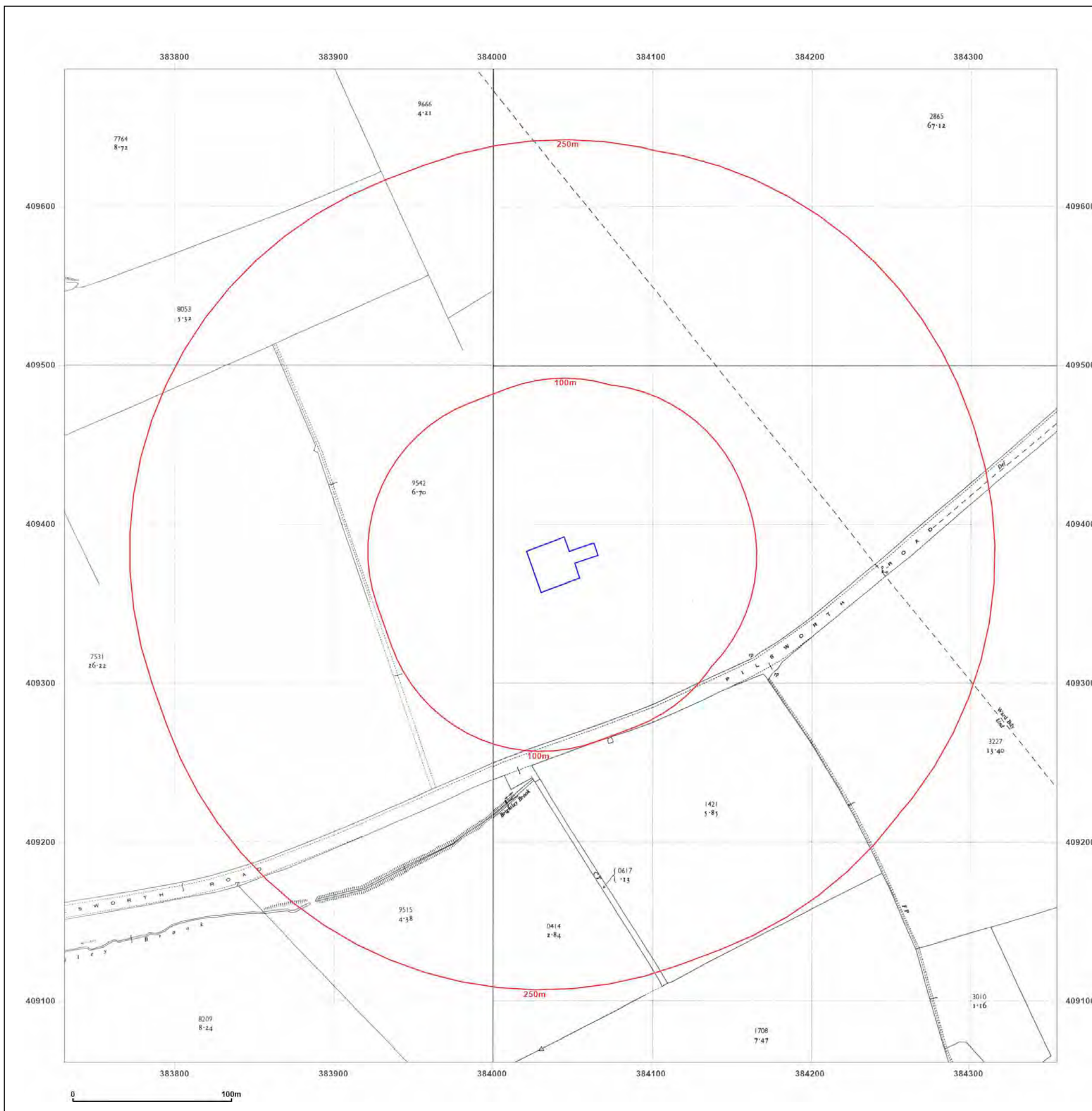


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Site Details:

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Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: National Grid

Map date: 1966

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1957
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Edition N/A
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Levelled 1962

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Revised 1966
Edition N/A
Copyright 1966
Levelled 1958

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Revised 1966
Edition N/A
Copyright 1966
Levelled 1962

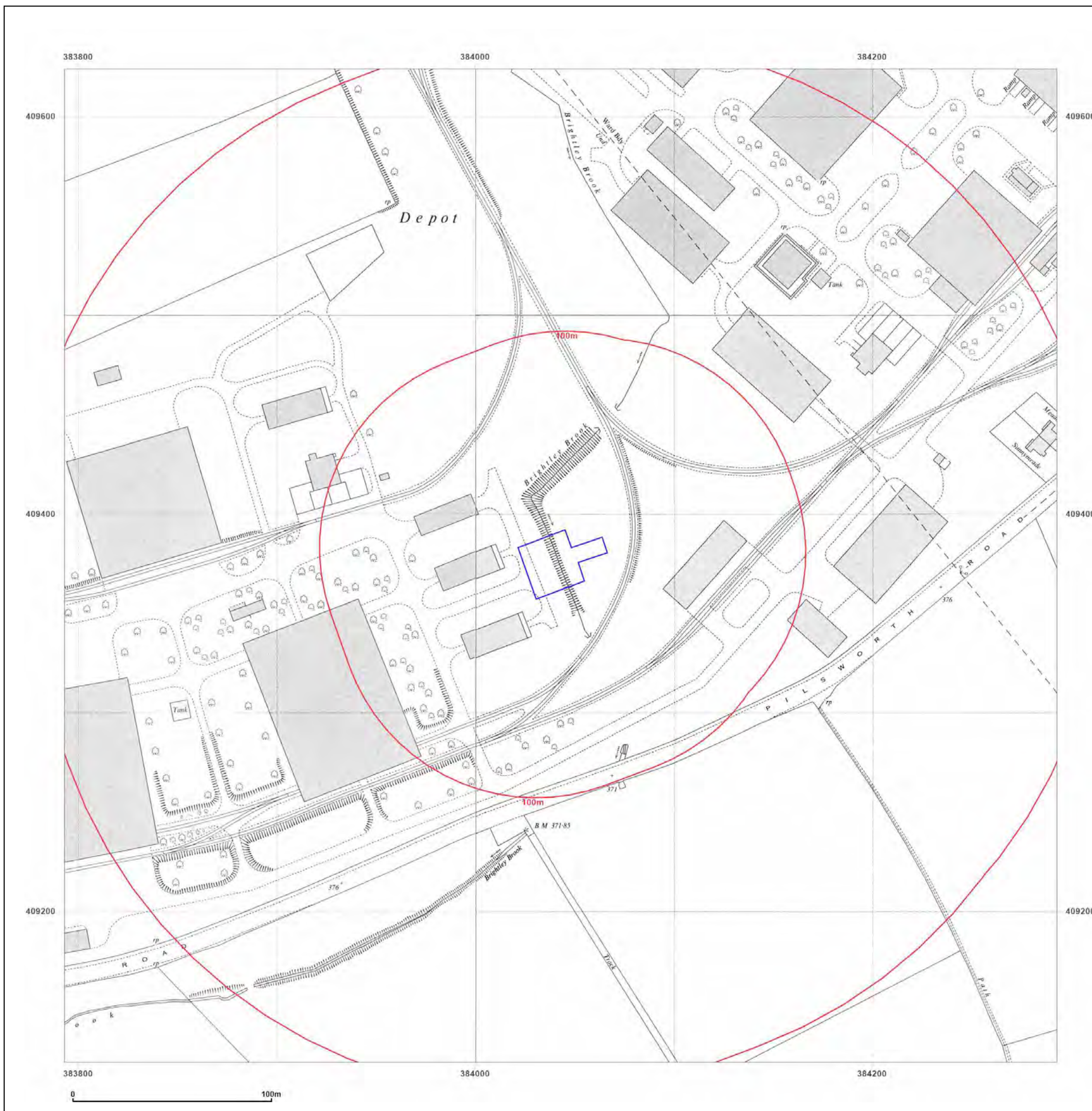


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Site Details:

Heywood Distribution Park -
Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: National Grid

Map date: 1968-1969

Scale: 1:2,500

Printed at: 1:2,500



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Surveyed 1968
Revised 1968
Edition N/A
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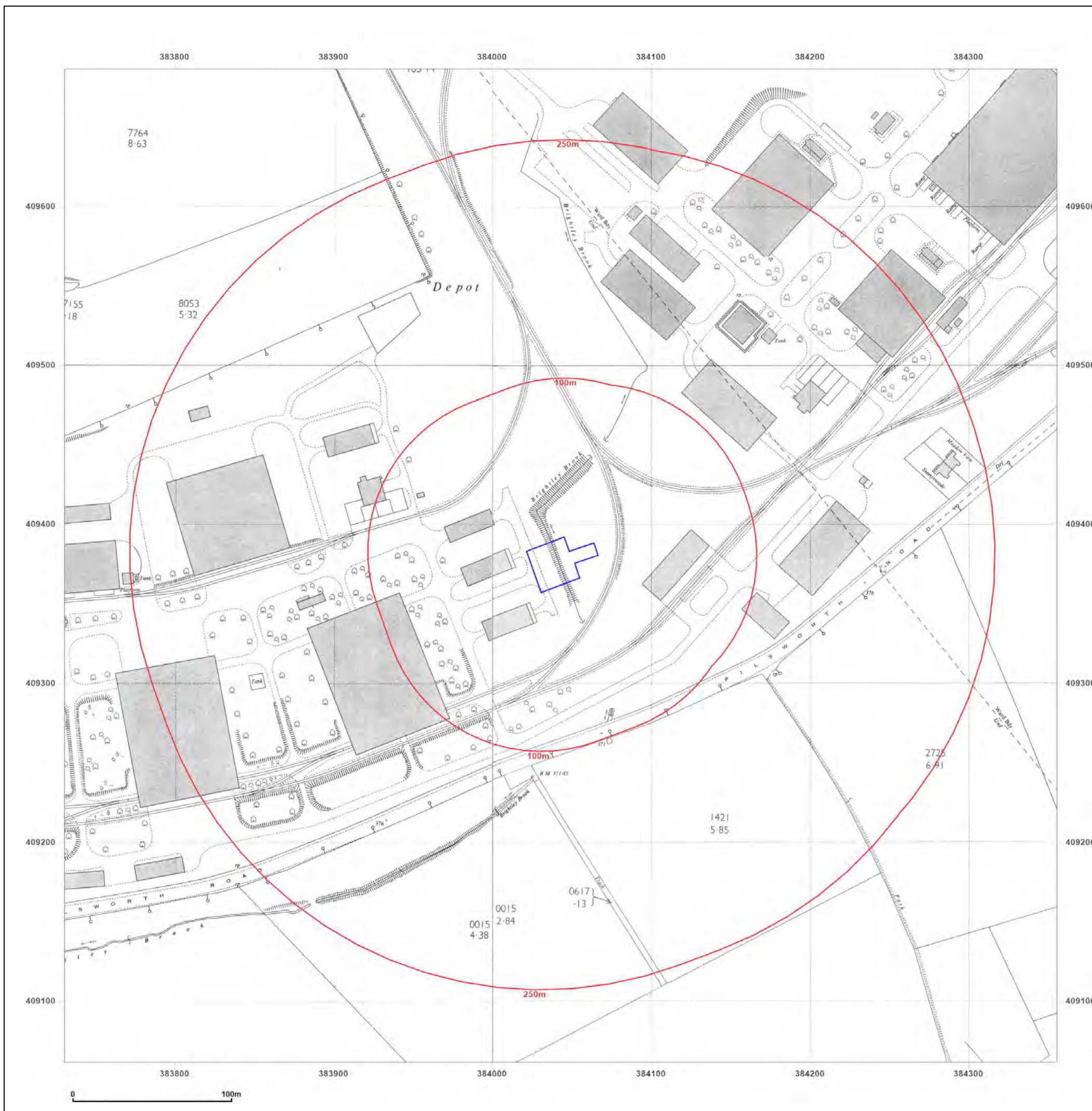


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Production date: 09 June 2025

Map legend available at:
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Site Details:

Heywood Distribution Park -
Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: National Grid

Map date: 1974-1978

Scale: 1:1,250

Printed at: 1:2,000



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Revised N/A
Edition N/A
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Revised N/A
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Levelled N/A

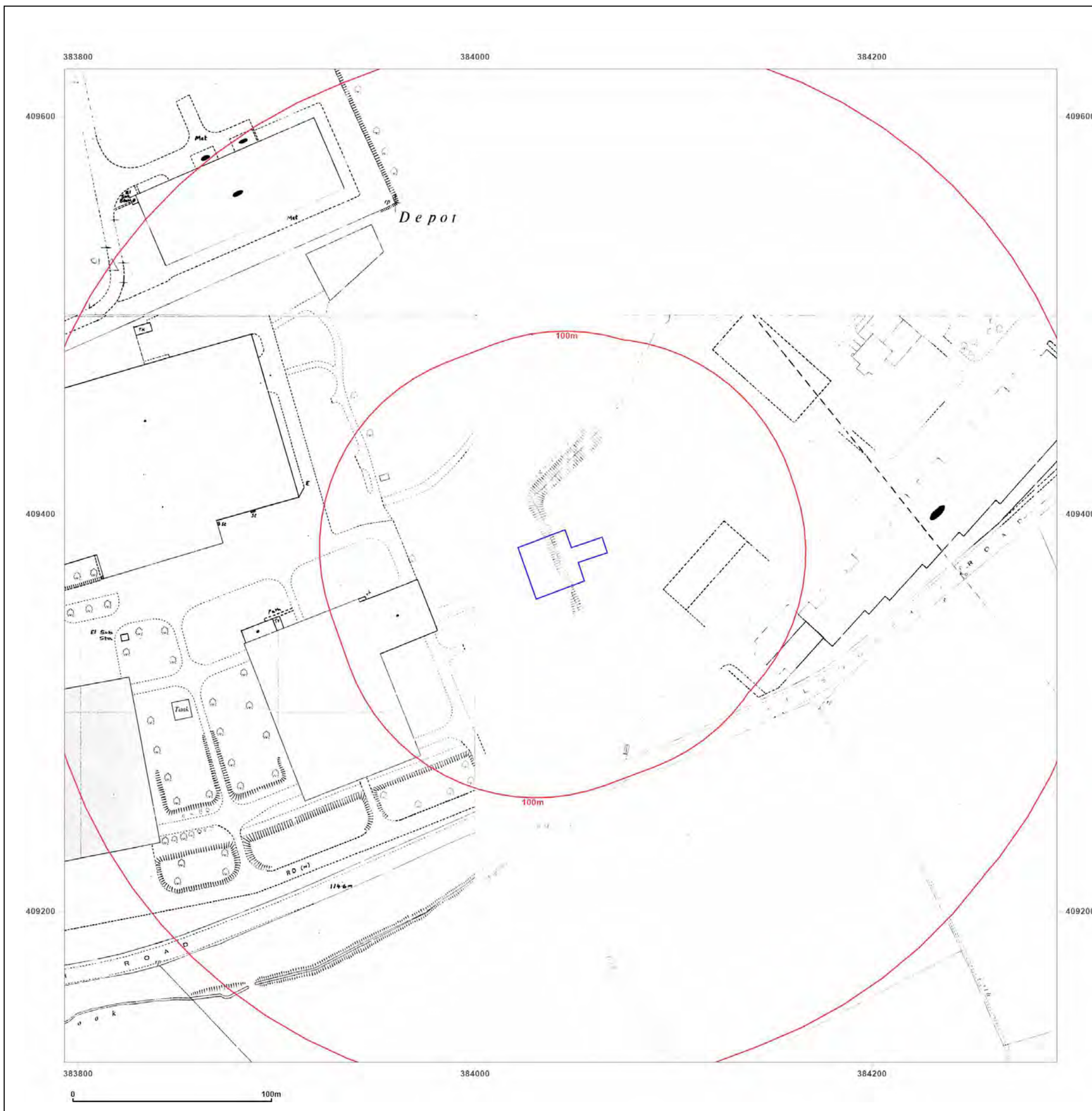


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Site Details:

Heywood Distribution Park -
Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: National Grid

Map date: 1974-1980

Scale: 1:1,250

Printed at: 1:2,000



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Revised N/A
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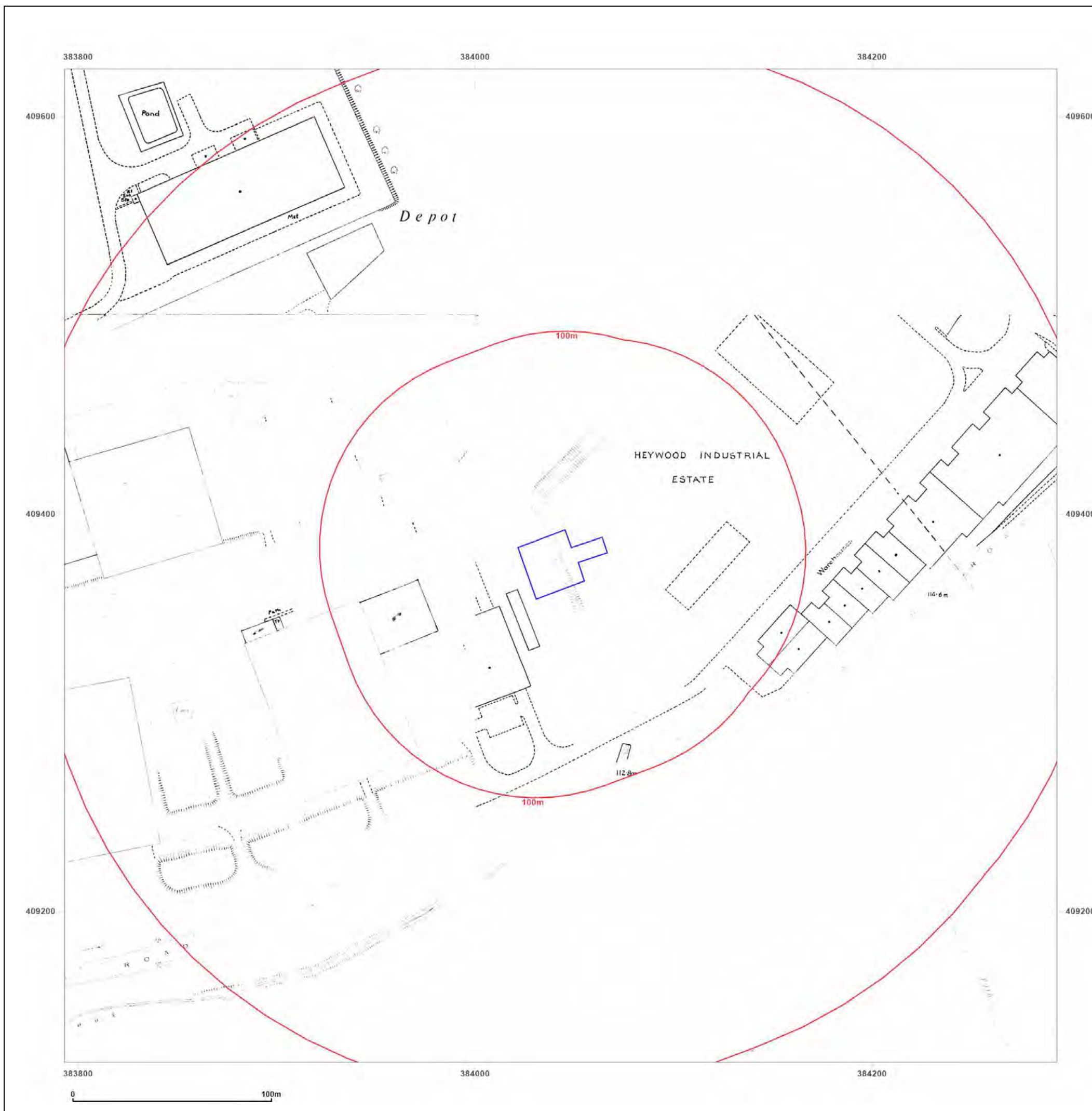


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Production date: 09 June 2025

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Site Details:

Heywood Distribution Park -
Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: National Grid

Map date: 1992

Scale: 1:1,250

Printed at: 1:2,000



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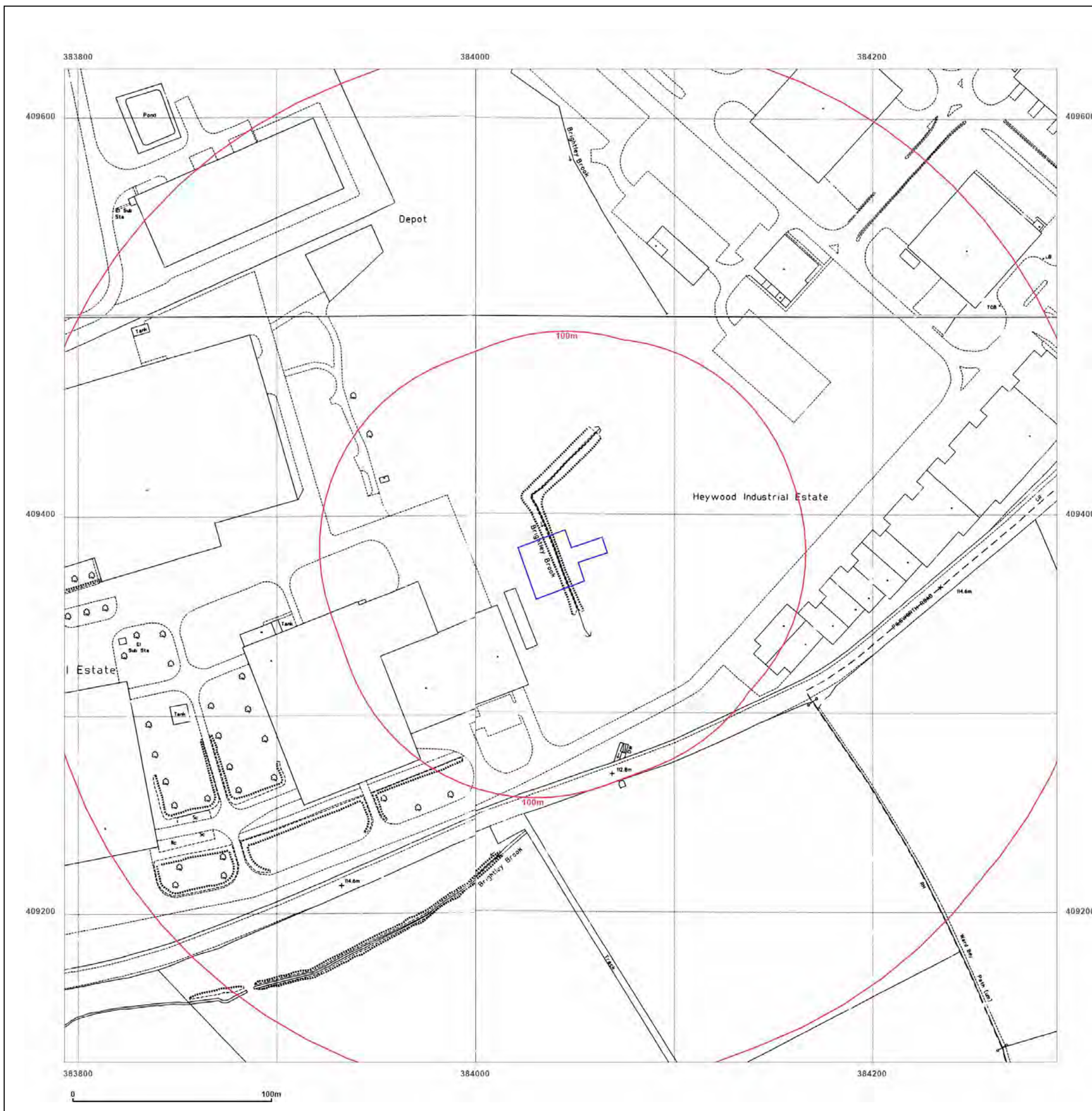


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Site Details:

Heywood Distribution Park -
Substation

Client Ref: PO25319
Report Ref: GS-4DW-65N-ORQ-CC2
Grid Ref: 384043, 409374

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

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Appendix D BGS Borehole Record

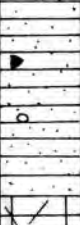
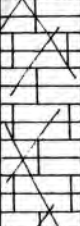
RECORD OF BOREHOLE 11 HEYWOOD

GROUND LEVEL 114.6 m O.D. approx.

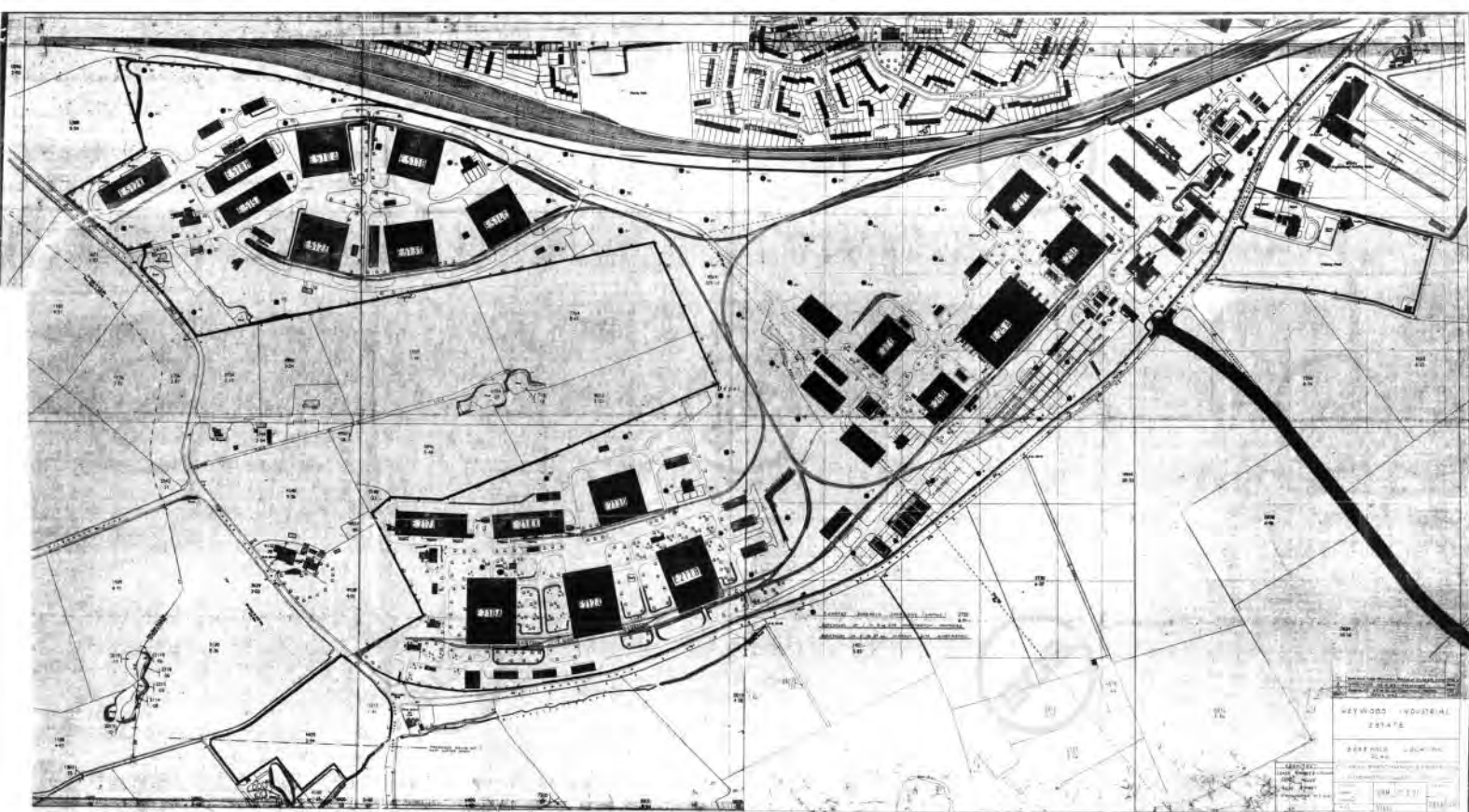
BORING: STARTED 23.4.72.

BORING: FINISHED 23.4.72.

HOLE SIZE 0.15 m dia. to 9.0 m depth.

SAMPLE OR TEST		CHANGE OF STRATA			
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
			0.70	113.90	Topsoil and clay fill (MADE GROUND).
1.0 1.0 - 1.5	D1 U(4)1				Firm to stiff brown and grey mottled sandy CLAY with occasional gravel and decomposed roots.
2.5 2.5 - 3.0	D2 U(4)2		3.70	110.90	
4.0 4.0 - 4.5	D3 U(4)3				Soft grey brown sandy CLAY with occasional gravel and coal fragments.
5.5 5.5 - 6.0	D4 U(4)4				
7.0	D5		7.00	107.60	
					Hard dark grey SHALE.
9.0	D6		9.00	105.60	
REMARKS Groundwater encountered at a depth of 6.8 m. Standing water level on completion of boring 3.5 m.					
KEY: D — DISTURBED SAMPLE S { } STANDARD PENETRATION TEST B — BULK DISTURBED SAMPLE C { } CONE PENETRATION TEST W — WATER SAMPLE NO. OF BLOWS FOR 300 mm U — UNDISTURBED SAMPLE PENETRATION IN BRACKETS					





Appendix E Consultants Coal Mining Report



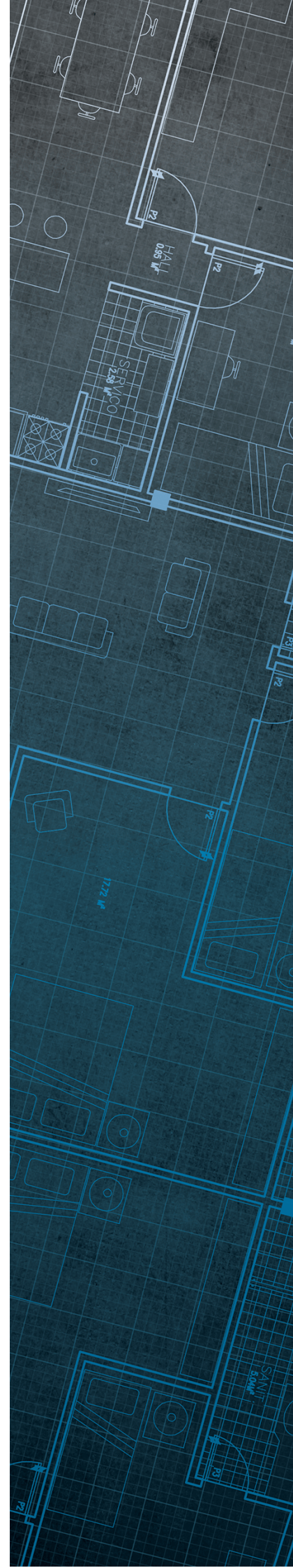
The Coal
Authority

Consultants Coal Mining Report

Heywood Distribution Park -
Substation
Greater Manchester
OL10 2TR

Date of enquiry: 12 June 2025
Date enquiry received: 12 June 2025
Issue date: 12 June 2025

Our reference: 51003504903001
Your reference: GS-ZDQ-O8F-UWX-5ZT



Consultants

Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

GROUNDSURE LIMITED

Enquiry address

Heywood Distribution Park - Substation
Greater Manchester
OL10 2TR

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

No past mining recorded.

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

16820		
-------	--	--

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 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.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices

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.

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.

Section 4 – Further information

Based on the responses in this report, no further information has been highlighted.

Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority.

MINE GAS: Please note, if there are no recorded instances of mine gas within 500m of the enquiry boundary, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed. In these instances, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk**.

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded.

Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land

Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

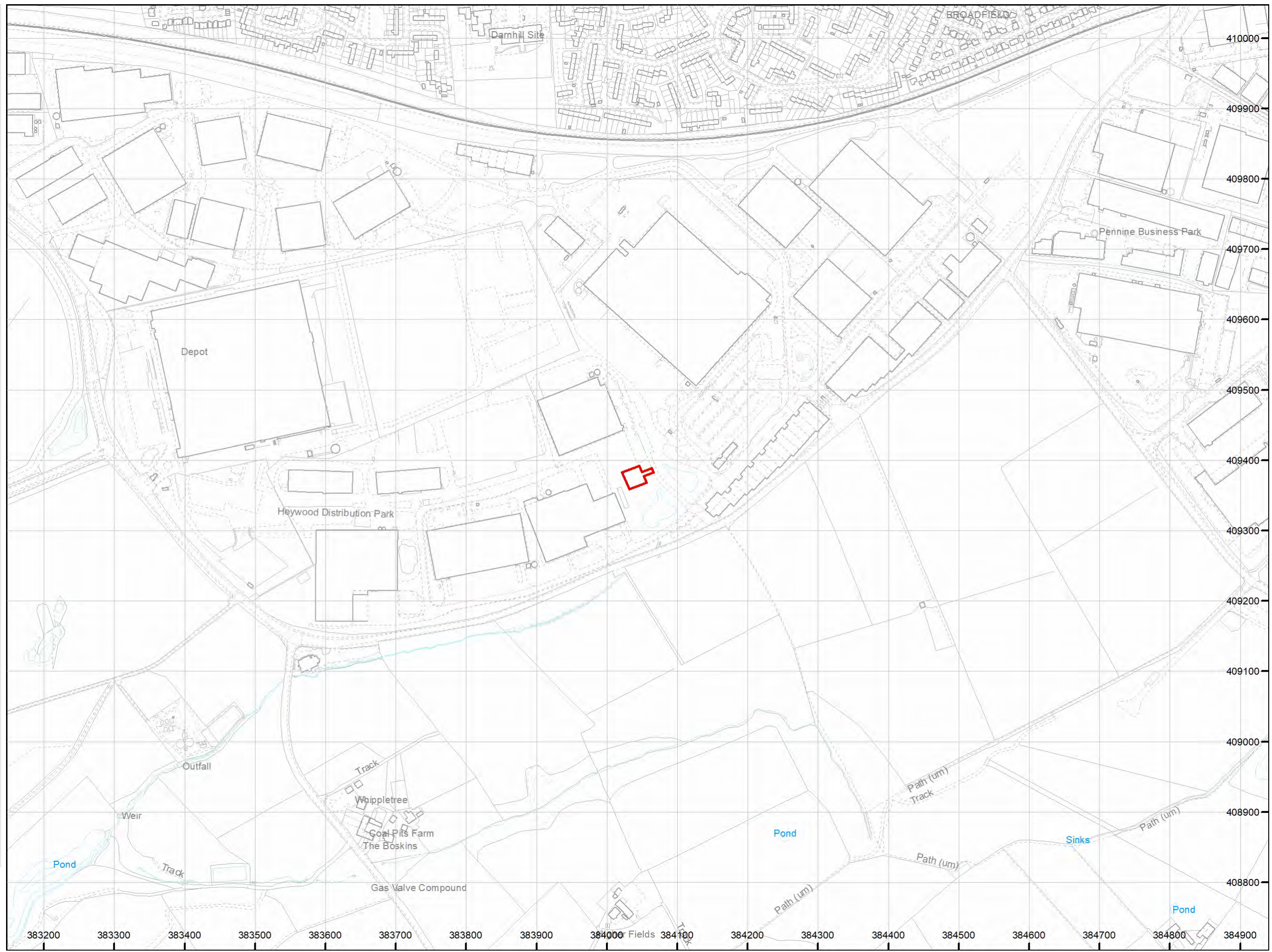
The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

Approximate position of the enquiry boundary shown 

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com





Appendix F Preliminary Geotechnical Risk Register

The preliminary Geotechnical Risk Register is presented in Table F-1. The risk register identifies potential geotechnical hazards / risks associated with proposed development based on available information reviewed as part of this desk study. The risk register should be updated as the project progresses, and more is known about the ground conditions and any design works that are proposed.

Table F-1: Preliminary Geotechnical Risk Register

Item	Hazard	Consequence	Qualitative Risk Level (High/Medium/ Low)	Possible Mitigation
1	Made Ground of unknown composition and thickness	Inappropriate foundation design	Medium	Undertake ground investigation and appropriate laboratory testing to determine thickness and properties of Made Ground prior to undertaking geotechnical design.
2	Shrink-swell potential and deterioration of clay soils	Inappropriate foundation design	Medium	Undertake ground investigation and appropriate laboratory testing to determine properties of soils prior to undertaking geotechnical design.
3	Possible shallow groundwater	Inappropriate foundation design Instability of excavations	Medium	Undertake ground investigation to determine shallow groundwater conditions prior to undertaking geotechnical design.
4	Settlement characteristics	Inappropriate foundation design	Medium	Undertake ground investigation and appropriate laboratory testing to identify the composition and engineering properties of materials underlying the site prior to undertaking geotechnical design.
5	Coal Mining	Inappropriate foundation design	Medium	Undertake ground investigation to identify the composition of materials (including presence/absence of inferred coal seam) underlying the site prior to undertaking geotechnical design.

Appendix G Report Limitations

All conclusions and recommendations made within this report are based upon and limited to the factual information obtained as part of this study. PJA will state where it has utilised and relied upon information obtained by others. It has been assumed that all third-party information provided is true and accurate. No responsibility is accepted by PJA for the accuracy or completeness of such information.

There is a possibility that there may exist on site, conditions that could not be identified within the scope of the assessment or which were not reasonably identifiable from the available information. The conclusions drawn in the report are considered correct, although any subsequent additional information may allow refinement of the conclusions.

The findings of this report represent the professional opinion of experienced environmental scientists and contaminated land specialists. All advice, opinions, assessments and views set out in this Phase 1 report are based on relevant UK standards, codes, construction practices and legislation understood to be current and applicable at the date of this report. Further assessment and a revision of the report may be required should new information come to light or legislation/changes to best practice be introduced after the date of issue of the report.

PJA confirms it offers no duty to update the report in the light of any such information or changes to regulation and / or guidance. PJA does not provide legal advice and the advice of solicitors may also be required.

PJA has prepared the report for the sole use and reliance of the Client. The report may not be used or relied upon by any unauthorised third party without the explicit written agreement of PJA.

The interpretative work undertaken within this report remains the intellectual property of PJA. This information must not be divulged to any other commercial third party without prior written agreement from PJA.

Appendix H Risk Assessment Matrix

The approach to risk evaluation is a qualitative method in general accordance with the CIRIA C552 2001 document. It involves the classification of the potential consequence of risk occurring and the probability of the risk occurring.

Classification of Consequence

The terms and definitions relating to the classification of consequence are summarised in Table H1:

Table H1: Classification of Consequence

Classification	Definition	Example
Severe	Short term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA. Short term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem (note: the definitions of ecological systems within the Circular on Contaminated Land, DETR, 2000).	- High concentrations of cyanide on the surface of an informal recreation area. - Major spillage of contaminants from site into controlled water. - Explosion, causing building collapse (can also equate to a short term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health ("significant harm" as defined in the DETR, 2000). Pollution of sensitive water resources (note: Water Resources Act contains no scope for considering significance of pollution). A significant change in a particular ecosystem, or organism forming part of such ecosystem. (note: the definitions of ecological systems within Circular on Contaminated Land, DETR, 2000).	- Concentrations of a contaminant from site exceed the generic, or site-specific assessment criteria. - Leaching of contaminants from a site to a major or minor aquifer (renamed principal, secondary and significant drift under the Water Framework Directive). - Death of a species within a designated nature reserve.
Mild	Pollution of non-sensitive water resources. Significant damage to buildings/structures and crops ("significant harm" as defined in the Circular on Contaminated Land, DETR, 2000). Damage to sensitive buildings/structures or the environment.	- Pollution of non-classified groundwater. - Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as Personal Protective Clothing, etc.). Easily repairable effects of damage to buildings/structures.	- The presence of contaminants at such concentrations that protective equipment is required during site works. - The loss of plants in a landscaping scheme. - Discolouration of concrete.

Classification of Probability

Probability is classified based on the following terms and definitions:



Table H2: Classification of Probability

Classification	Definition
High Likelihood	There is a pollution linkage and an event which would either appear very likely in the short term and almost inevitable over the long term, or, there is evidence at the receptor of harm or pollution.
Moderate Likelihood	There is a pollution linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the shorter term.
Unlikely	There is a pollution linkage, but circumstances are such that it is improbable that an event would occur even in the very long term.

Risk Matrix

The risk matrix based on probability and consequence is presented in Table H3:

Table H3: Risk Matrix

		Consequences			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very high	High	Moderate	Moderate / Low
	Moderate Likelihood	High	Moderate	Moderate / Low	Low
	Low likelihood	Moderate	Moderate / Low	Low	Very Low
	Unlikely	Moderate / Low	Low	Very Low	Very Low

Risk Descriptions

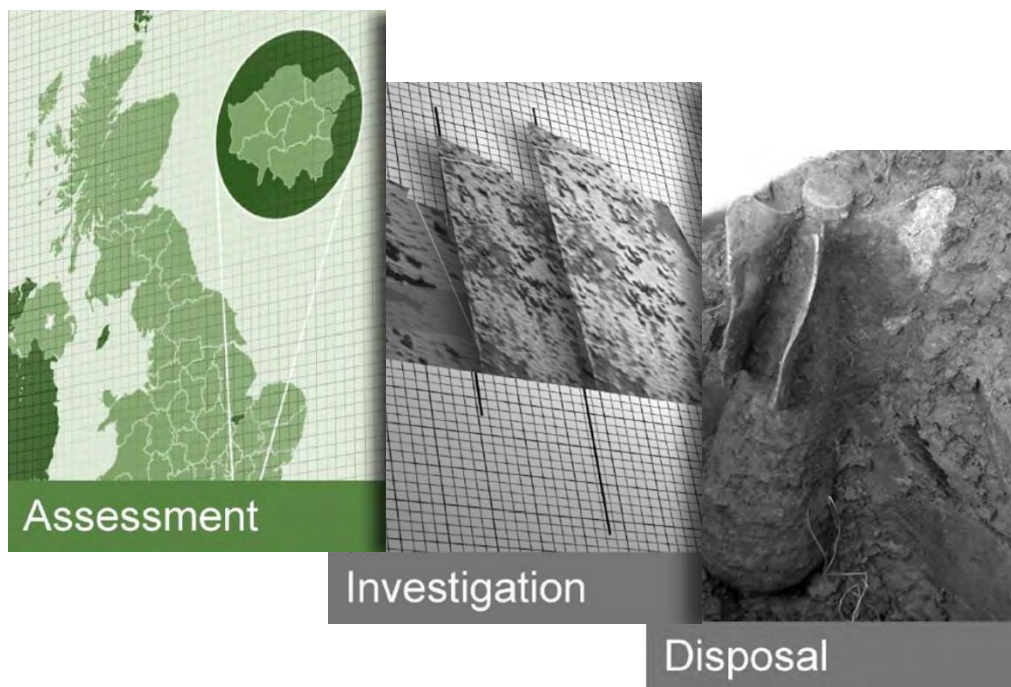
Definitions of the risk categories are presented in Table H4:

Table H4: Description of the classified risks and likely action required

Classification	Definition
Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, or there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High Risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term.
Moderate Risk	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very Low Risk	There is a low probability that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.



Appendix I Heywood Distribution Centre - UXO Desk Study and Risk Assessment



Heywood Distribution Centre - UXO Desk Study & Risk Assessment

Drafted by William Holford
Checked by Joe Lingard
Authorised by Stefan Lang

Document Title UXO Desk Study & Risk Assessment
Document Ref. P11833-22-R1
Revision A
Project Location Heywood Distribution Centre
Client Black Cat Building Consultancy Ltd
Date 24th May 2022

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UXO DESK STUDY & RISK ASSESSMENT

EXECUTIVE SUMMARY

Key findings: No significant sources of Unexploded Ordnance (UXO) hazard have been identified.

Key actions: UXO awareness briefing for staff involved in excavations.

UXO Hazard Assessment

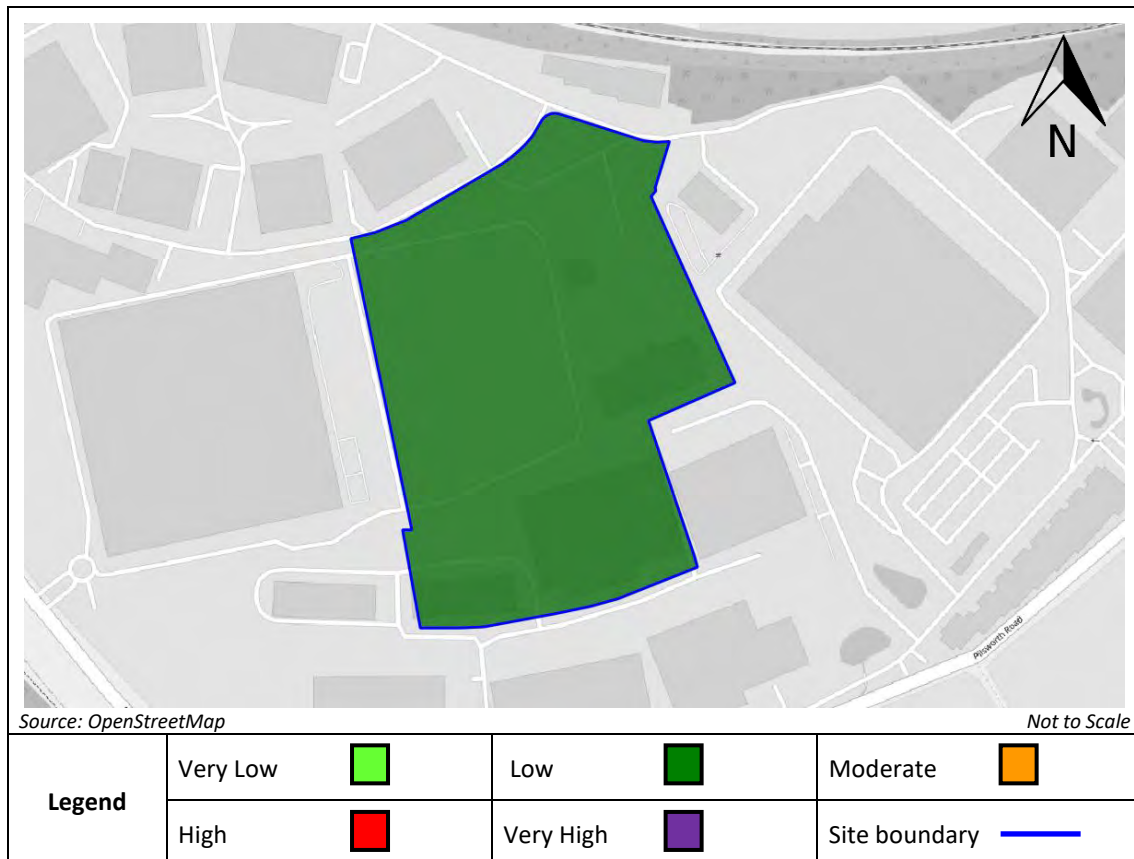
Between 1939 and 1965 the Site comprised part of Royal Air Force (RAF) Heywood, a Universal Equipment Depot (UED).

No records have been found indicating that the Site was bombed and no other significant sources of UXO hazard have been identified on the Site.

Given this, it is considered that the Site has a low UXO hazard level, as shown in the following Figure, reproduced as Figure 4 in the main report.

The UXO hazard zone plan of the Site is also given in the accompanying P11833-22-R1-MAP01-A.

UXO hazard zone plan of the Site



The main findings of the report are summarised below.

- No records of bombing or military activity on the Site during World War One (WWI) have been found.
- In June 1939, RAF Heywood, a UED was established on land encompassing the Site.
- During WWII the main strategic targets in the vicinity of the Site included RAF Heywood, No. 10 Barrage Balloon Centre, and industries engaged in the war effort.

- No records have been found indicating that the Site was bombed during WWII. Records indicate the nearest High Explosive (HE) bombs fell on a garage at RAF Heywood, approximately 0.5km northeast of the Site, on the 1st June 1941.
- Post WWII RAF Heywood remained in use until its closure in 1965. It has since been partially redeveloped.

Data Confidence Level

The findings of this report were based on good corroborative evidence of the military activity and bombing on the Site.

Proposed Works

It is understood that the Site will be developed as a distribution centre.

For the purpose of this risk assessment, it is assumed that works on the Site may include intrusive ground investigations, excavations and piling.

Risk Assessment

The Table below, reproduced as Table 4 in the main report, provides a UXO risk assessment for the proposed works on the Site.

Further details on the methodology for the risk assessment are provided in Section 7.2 of the main report.

UXO risk assessment for the Site

Potential UXO Hazard	Anticipated Works	PE	PD	P = PE x PD	Likelihood	Severity	Risk Rating	UXO Risk
UXB	Shallow Excavations	1	1	1	1	5	5	Low
	Deep Excavations	1	1	1	1	5	5	Low
	Boreholes/Piling	1	1	1	1	4	4	Low
Other UXO	Shallow Excavations	1	1	1	1	4	4	Low
	Deep Excavations	1	1	1	1	4	4	Low
	Boreholes/Piling	1	1	1	1	3	3	Low
PE (Probability of Encounter), PD (Probability of Detonation), P (Overall Probability)								
Shallow Excavations defined as <1.0m below ground level (bgl.)								

Risk Mitigation Plan

The Table below, reproduced as Table 5 in the main report, summarises the UXO risk for proposed works on the Site and recommended actions.

Summary of UXO risk and mitigation recommendations

Proposed Works	UXO Risk	Recommended Mitigation
Excavations		Awareness briefing – Given the Site's military history it is recommended that a formal UXO awareness briefing is provided to staff involved in excavation.
Boreholes/Piling		Proceed with works

In summary, it is recommended that staff involved in excavations are provided with a formal awareness briefing so that they take appropriate action in the event of a suspect find.

What Do I Do Next?

If you require a quote for an awareness briefing, or have any questions, contact us via phone (01993 886682) or email (uxo@zetica.com) and we can help.

If you have requirements to identify other buried hazards (such as mapping utilities or obstructions) we can provide these surveys.

If proposed works on the Site change, or additional works are planned, contact Zetica for a re-assessment of the UXO risk and the risk mitigation requirements.

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Accompanying GIS Data

P11833-22-R1-A (UXO Desk Study)

ABBREVIATIONS

AA	Anti-Aircraft
ALARP	As Low As Reasonably Practicable
ARP	Air Raid Precaution
AXO	Abandoned Explosive Ordnance
BD	Bomb Disposal
BDO	Bomb Disposal Officer
BDU	Bomb Disposal Unit
CMD	Conventional Munitions Disposal
DCLG	Department of Communities and Local Government
EIB	Explosive Incendiary Bomb
EO	Explosive Ordnance
EOC	Explosive Ordnance Clearance
EOR	Explosive Ordnance Reconnaissance
ERW	Explosive Remnants of War
ESA	Explosive Substances and Articles
FFE	Free From Explosives
HAA	Heavy Anti-Aircraft
HE	High Explosive
HQ	Headquarters
HSE	Health and Safety Executive
IB	Incendiary Bomb
IED	Improvised Explosive Device
IEDD	Improvised Explosive Device Disposal
JSEODOC	Joint Services EOD Operations Centre
LAA	Light Anti-Aircraft
LMSR	London, Midland and Scottish Railway
MG	Machine Gun
MoD	Ministry of Defence
NDC	National Defence Company
OB	Oil Bomb
PM	Parachute Mine
PoW	Prisoner of War
PUCA	Pick Up and Carry Away
RAF	Royal Air Force
SAA	Small Arms Ammunition
TA	Territorial Army
TEP	Time Expired Pyrotechnics
UED	Universal Equipment Depot
UXAA	Unexploded Anti-Aircraft
UXB	Unexploded Bomb
UXO	Unexploded Ordnance
WWI	World War One
WWII	World War Two

UXO DESK STUDY & RISK ASSESSMENT

Please read: Zetica has colour coded each paragraph. Paragraphs with black text on a white background are paragraphs that provide site-specific information or information specifically researched as part of this project.

Boxed paragraphs in a dark green text with a green background are paragraphs providing general information and, where appropriate, links to online resources giving further detail. These are all available at www.zeticauxo.com. If you cannot gain access to these resources, Zetica can forward them on request.

1 INTRODUCTION

1.1 Project Outline

Zetica Ltd was commissioned by Black Cat Building Consultancy Ltd to carry out a detailed Unexploded Ordnance (UXO) Desk Study and Risk Assessment for an area of approximately 9.7 hectares (ha) at Heywood Distribution Centre in Rochdale, Greater Manchester (the 'Site').

The aim of this report is to gain a fair and representative view of the UXO hazard for the Site and its immediate surrounding area in accordance with the Construction Industry Research and Information Association (CIRIA) C681 'Unexploded Ordnance (UXO), a Guide for the Construction Industry'.

Where appropriate, this hazard assessment includes:

- Likelihood of ordnance being present.
- Type of ordnance (size, filling, fuze mechanisms).
- Quantity of ordnance.
- Potential for live ordnance.
- Probable location.
- Ordnance condition.

It should be noted that some military activity providing a source of UXO hazard may not be recorded and therefore there cannot be any guarantee that all UXO hazards affecting the Site have been identified in this report.

1.2 Sources of Information

Zetica Ltd researched the military history of the Site and its surrounding area using a range of information sources. The main sources of information are detailed in the following sections and referenced at the end of this report.

1.2.1 Zetica Ltd Defence Related Site Records

Zetica Ltd's in-house records were consulted, including reference books and archived materials from past work in the region. Relevant documents have been cited within the bibliography of this report.

1.2.2 Zetica Ltd Bombing Density Records and Maps

Reference has been made to the Zetica Ltd bomb risk maps located on Zetica's website (<http://zeticauxo.com/downloads-and-resources/risk-maps/>)

1.2.3 Ministry of Defence and Government Records

Government departments and units within the Ministry of Defence (MoD) were approached for information of past and present military activity in the area. These included the Department of Communities and Local Government (DCLG) records of abandoned bombs.

1.2.4 Other Historical Records, Maps and Drawings

Numerous reference documents including historical maps, aerial photographs and drawings have been consulted from sources such as the National Archives, the US National Archives & Records Administration (NARA), the Imperial War Museum (IWM), the Royal Air Force (RAF) Museum, Historic England and the Defence of Britain Project.

The British Geological Survey (BGS) was consulted for borehole information.

1.2.5 Local Authority Records

Information was obtained from Manchester City Council and Rochdale Borough Council.

1.2.6 Local Record Offices and Libraries

The Lancashire Record Office, Greater Manchester County Record Office, Manchester Central Library, and Rochdale Local Studies and Archive were consulted for records.

1.2.7 Local Historical and Other Groups

Local history groups and archaeological bodies were consulted, including the Greater Manchester Historic Environment Record (HER).

1.3 Data Confidence Level

In general, there is a high level of confidence in the researched information sources used for this report. Exceptions to this are specifically detailed in the text of the report.

2 THE SITE

2.1 Site Location

The Site is centred on Ordnance Survey National Grid Reference (OSNGR) SD 838095. It is located approximately 11.4km north of central Manchester.

The Site comprises hardstanding, open ground, and 1No. industrial structure. It is bounded on all sides by the Heywood Distribution Park.

Figure 1 is a Site location map and Plate 1 is a recent aerial photograph of the Site.

Figure 1 Site location map

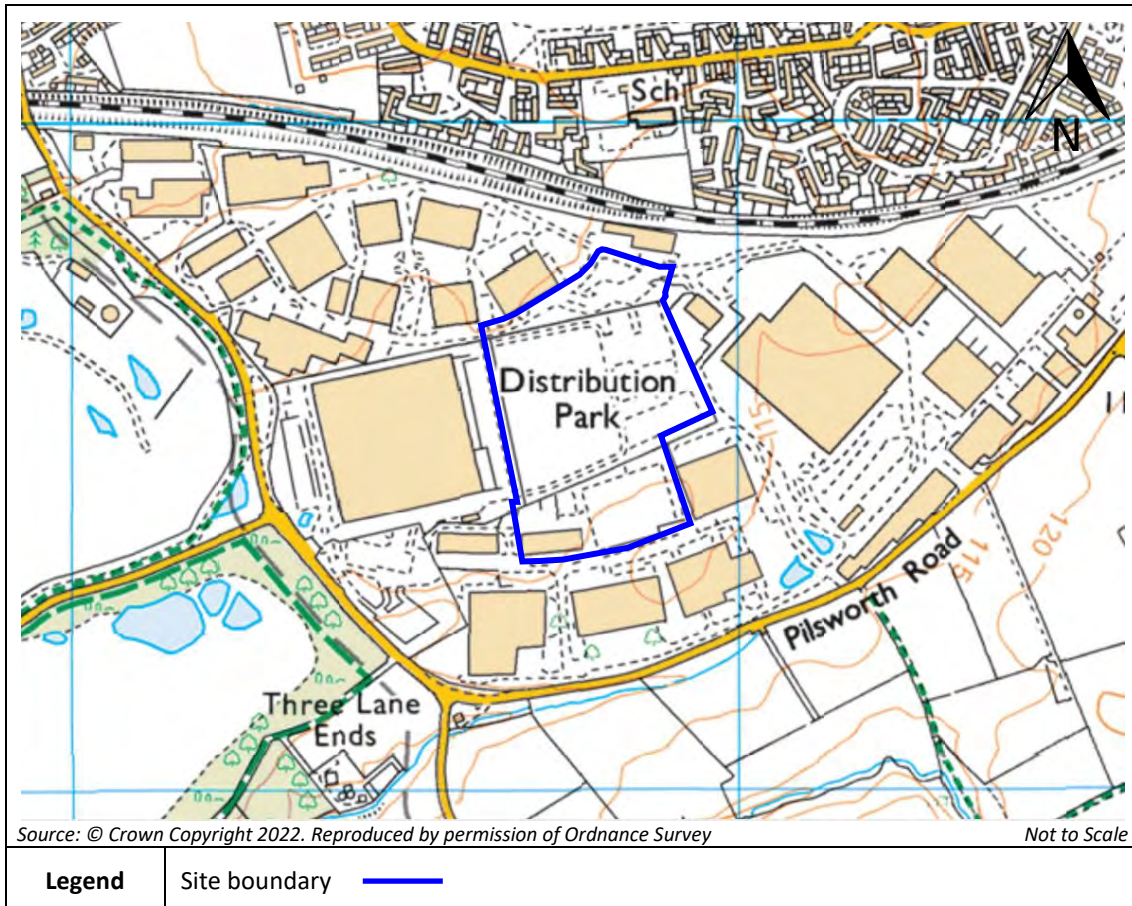


Plate 1 Recent aerial photograph of the Site



Source: Google Earth

Not to Scale

Legend

Site boundary —

3 MILITARY ACTIVITY

The following sections outline the recorded military activity in the vicinity of the Site. The potential UXO hazard from WWI and WWII bombing is detailed in Section 4.

Each sub-section provides hyperlinks to further information on potential sources of UXO hazard. These are also available at www.zeticauxo.com. If you cannot gain access to these resources, Zetica can forward them on request.

3.1 RAF Heywood

From 1939 the Site comprised part of RAF Heywood. A brief history is provided below.

3.1.1 RAF Heywood

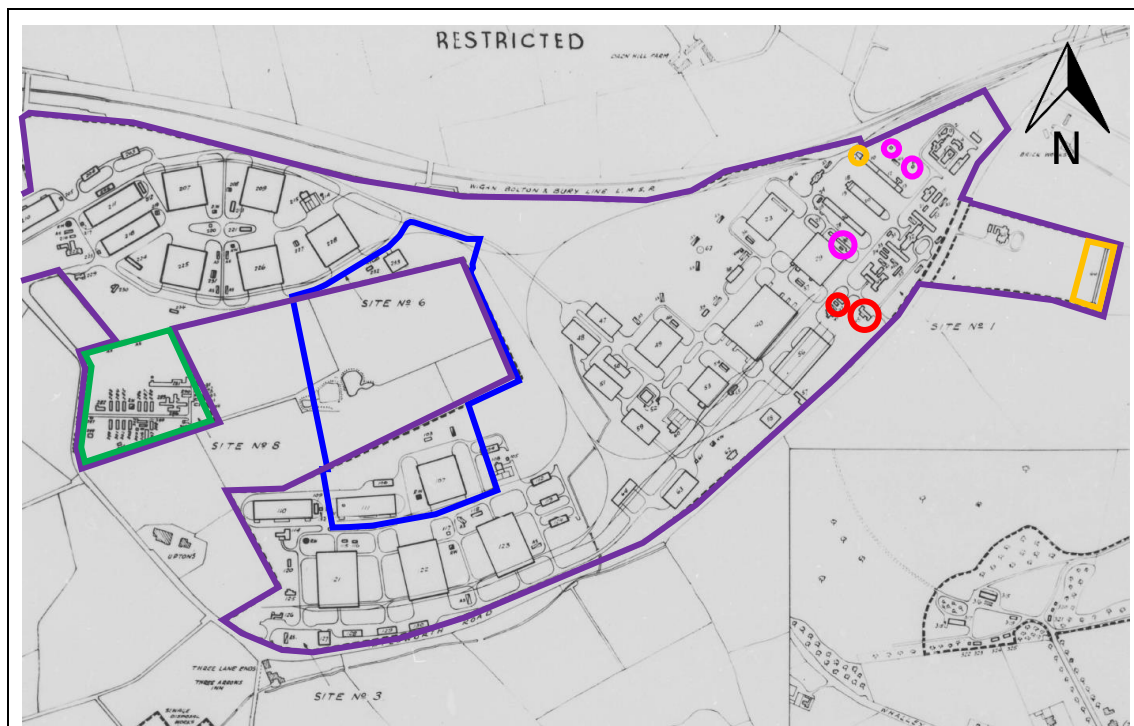
RAF Heywood was established in June 1939 as a Universal Equipment Depot (UED) under No. 35 Maintenance Unit (MU). RAF Heywood was spread over several dispersed sites (see Plate 2). It was responsible for storing a wide range of RAF equipment, including spares for aircraft, airframes, and engines, as well as, photographic stores, barrage balloons, propellor blades, gun turrets, dinghies, and oil.

RAF Heywood also maintained stocks for American aircraft and for Free French forces.

At peak activity 2,250 No. staff were employed as part of No. 35 MU, of which the majority were civilians. Later in the war a Prisoner of War (PoW) camp was established on Moss Hall Road (SD 833095), approximately 0.2km west of the Site. It held Italian PoWs working at RAF Heywood.

Figure 2 is a plan of RAF Heywood, dating from 1944. Several features are identified, including the Machine Gun (MG) & cannon range, pistol range, munitions stores, Home Guard armoury & stores, and the Italian PoW camp.

Figure 2 Plan of RAF Heywood, 1944



Source: RAF Museum

Not to Scale

Legend	Site boundary	—	RAF Heywood	—	Italian PoW camp	—
	Ranges	—	Munitions stores	—	Home Guard stores	—

The Italian PoW camp was closed in April 1946.

RAF Heywood continued in use as a UED until 1965 when No. 35 MU was disbanded. RAF Heywood has since been partially redeveloped for industrial purposes.

Details of activities at RAF Heywood that may provide a source of UXO hazard are given in the Sections below.

3.1.2 Military Activities at RAF Heywood

Ranges

2No. Ranges were established at RAF Heywood during WWII to provide facilities for the testing of armaments and the training of Home Guard forces (see section 3.2.2).

A pistol range was established near the London, Midland and Scottish Railway (LMSR) line (SD 845098), approximately 0.7km northeast of the Site.

A machine-gun (MG) and cannon range was established near the Officers' Mess (SD 848097), approximately 0.9km northeast of the Site.

These were removed after the closure of RAF Heywood.

Ranges at RAF Heywood are not considered to provide a source of UXO hazard to the Site.

Defences

During WWII a number of defences were established around the perimeter of RAF Heywood, including machine gun posts, redoubts, and barbed wire entanglements. These were manned by soldiers of the Territorial Army (TA), including the 2/6th Lancashire Fusiliers, 11th Manchester Regiment, and No. 101 National Defence Company.

RAF Heywood also had its own Home Guard unit, comprising approximately 600No. men (see Section 3.2.2). These men were trained at the depot's ranges.

Defences at RAF Heywood were removed post-WWII and are not considered to provide a significant source of UXO hazard to the Site.

Military Training

During WWII at least 3No. training exercises were carried out at RAF Heywood to test the readiness of the defences. Anti-invasion training exercises involved both regular army and local Home Guard forces, with a particular focus on defence against airborne attack.

No records have been found to indicate that these exercises at RAF Heywood involved the use of live ammunition.

Potential UXO Hazard

Records have been found to indicate that at least 3No. training exercises took place at RAF Heywood during WWII.

Given that the Site comprised and was in the immediate vicinity of several large storage areas, it is unlikely that any Small Arms Ammunition (SAA) or close combat munitions would have been spilled or discarded on the Site during these exercises.

Military training is not considered to provide a source of UXO hazard to the Site.

Munitions Storage

Munitions were kept at RAF Heywood for the testing of armaments and for the use of defending forces.

Munitions stores were established in 2No. buildings by the Pilsworth Road (SD 845096), approximately 0.6km northeast of the Site.

The Home Guard also had an armoury which was located by the Fabric Repair Block (SD 844097), approximately 0.6km northeast of the Site.

The Home Guard grenade stores were located by the LMSR line (SD 845098), approximately 0.7km northeast of the Site.

These stores were removed after the closure of RAF Heywood.

Munitions stores at RAF Heywood are not considered to provide a significant source of UXO hazard to the Site.

3.2 Defences

For further information on military defences, and the potential UXO hazards associated with them, follow the links below:

- [Anti-Aircraft Guns](#)
- [Anti-Invasion Defences](#)
- [Barrage Balloons](#)
- [Bombing Decoys](#)
- [Home Guard](#)
- [Mined Locations](#)
- [Mortar & Gun Emplacements](#)
- [Pillboxes](#)

Other than those identified in Section 3.1, no military defences have been identified on the Site. The nearest are described below.

3.2.1 Anti-Aircraft Guns

During WWI there were 5No. Anti-Aircraft (AA) batteries within 10km of the Site. The nearest was located at Rhodes (SD 850053), approximately 4.1km southeast of the Site. It was armed with 1No. 18-pounder (-pdr) gun.

During WWII there were 13No. Heavy AA (HAA) and ZAA batteries within 10km of the Site. The nearest was located at Middleton (SD 859055), approximately 4.2km southeast of the Site. Its armament is unknown.

The nearest recorded WWII AA shell incident to the Site is described below.

10th October 1941

1No. AA shell fell on a field at Barn Hill Farm, Heywood, approximately 0.3km northeast of the Site. This was recorded as an Unexploded AA (UXAA) shell.

Potential UXO Hazard

Given the number of HAA gun batteries in the surrounding area during WWII, the potential for a UXAA shell to have fallen on the Site unnoticed, whilst unlikely, cannot be totally discounted.

3.2.2 Home Guard

Units from the 60th (Heywood & Radcliffe) Battalion of the Lancashire Home Guard were active in the vicinity of the Site and responsible for patrolling local transport hubs and strategic targets such as depots.

Home Guard troops were involved in the preparation, testing, and maintenance of defences at RAF Heywood, which had its own Home Guard unit (see Section 3.1.2).

Potential UXO Hazard

It should be noted that records of Home Guard activities were rarely kept. Storage and disposal of munitions by the Home Guard was poorly documented and surplus supplies were often buried or dumped in lakes and ponds.

Given the irregular nature of this activity, the possibility of items of UXO being discovered at any locations occupied by the Home Guard can never be totally discounted.

3.3 Military Airfields

For further information on military airfields, and the potential UXO hazards associated with them, follow the link below:

- [Military Airfields](#)

No records of any military airfields on or in close proximity to the Site have been found.

During WWI, the nearest recorded military airfield was at Royal Air Force (RAF) Alexandra Park (SJ 833933), approximately 5km south of the Site. It opened in May 1918 and was used for the assembly, test flying, and acceptance of aircraft delivered from nearby aircraft factories. RAF Alexandra Park was turned over to civil use in May 1919 and closed in August 1924.

During WWII, the nearest military airfield was RAF Barton (SJ 742972), approximately 10.6km west of the Site. It was used primarily for the repair of damaged aircraft and by the Fleet Air Arm (FAA). RAF Barton continued in use after WWII as a Reserve Flying School (RFS), before being turned over to civil control. It remains operational.

Military airfields are not considered to provide a source of UXO hazard to the Site.

3.4 Aircraft Crashes

For further information on military aircraft crashes, and the potential UXO hazards associated with them, follow the link below:

- [Aircraft Crashes](#)

No records of any aircraft crashes on or in close proximity to the Site have been found.

3.5 Explosives Factories, Munitions Depots and Disposal Areas

For further information on explosives factories, munitions depots and disposal areas, and the potential UXO hazards associated with them, follow the links below:

- [Explosives Factories](#)
- [Munitions Depots](#)
- [Munitions Disposal Areas](#)

Other than those identified in Section 3.1, no records of any explosives factories, munitions depots or munitions disposal areas on or in close proximity to the Sites have been found.

3.6 Firing Ranges and Military Training Areas

For further information on firing ranges and military training areas, and the potential UXO hazards associated with them, follow the links below:

- [Artillery Ranges](#)
- [Bombing Ranges](#)
- [Military Training Areas](#)
- [Small Arms Ranges](#)

Other than those identified in Section 3.1, no records of any firing ranges or military training areas on or in close proximity to the Site have been found.

4 BOMBING

4.1 WWI Bombing

For further information on WWI bombing in the UK, and the potential UXO hazard associated with it, see Appendix 2.1. Alternatively, use the following link.

- [WWI Bombing](#)

No records have been found indicating that the Site was bombed during WWI.

4.2 WWII Bombing

For further information on WWII bombing in the UK, and the potential UXO hazard associated with it, see Appendix 2.2. Alternatively, use the following link.

- [WWII Bombing](#)

No records have been found indicating that the Site was bombed during WWII. Details of WWII bombing in the vicinity of the Site are provided in the following sections.

4.2.1 Bombing in Lancashire

From prior to the declaration of war in 1939, Britain was subject to reconnaissance flights by the Luftwaffe which was building up a photographic record of potential targets.

As early as 1937, German airships and aircraft were flying over the northwest of England to photograph defences, docks and factories. Military establishments in the region such as airfields and radar stations were specifically targeted. Records for heavy raids on many of the regions' airfields were suppressed until after WWII.

Bombing raids in the region began in the summer of 1940 and continued until 1944. Most of the bombing raids in Lancashire were aimed at the large industrial centres of Liverpool and Manchester and their surrounding towns.

Bombing densities in the Rochdale region were low and raids were typically carried out by single aircraft. These included some 'tip and run' bombing raids in which aircraft jettisoned bombs, either before reaching or on their return flights from strategically important targets in the region such as the city of Liverpool.

4.2.2 Strategic Targets

The Site was located in an area which contained numerous potential strategic targets, including RAF Heywood, No. 10 Barrage Balloon Centre, and industries engaged in the war effort.

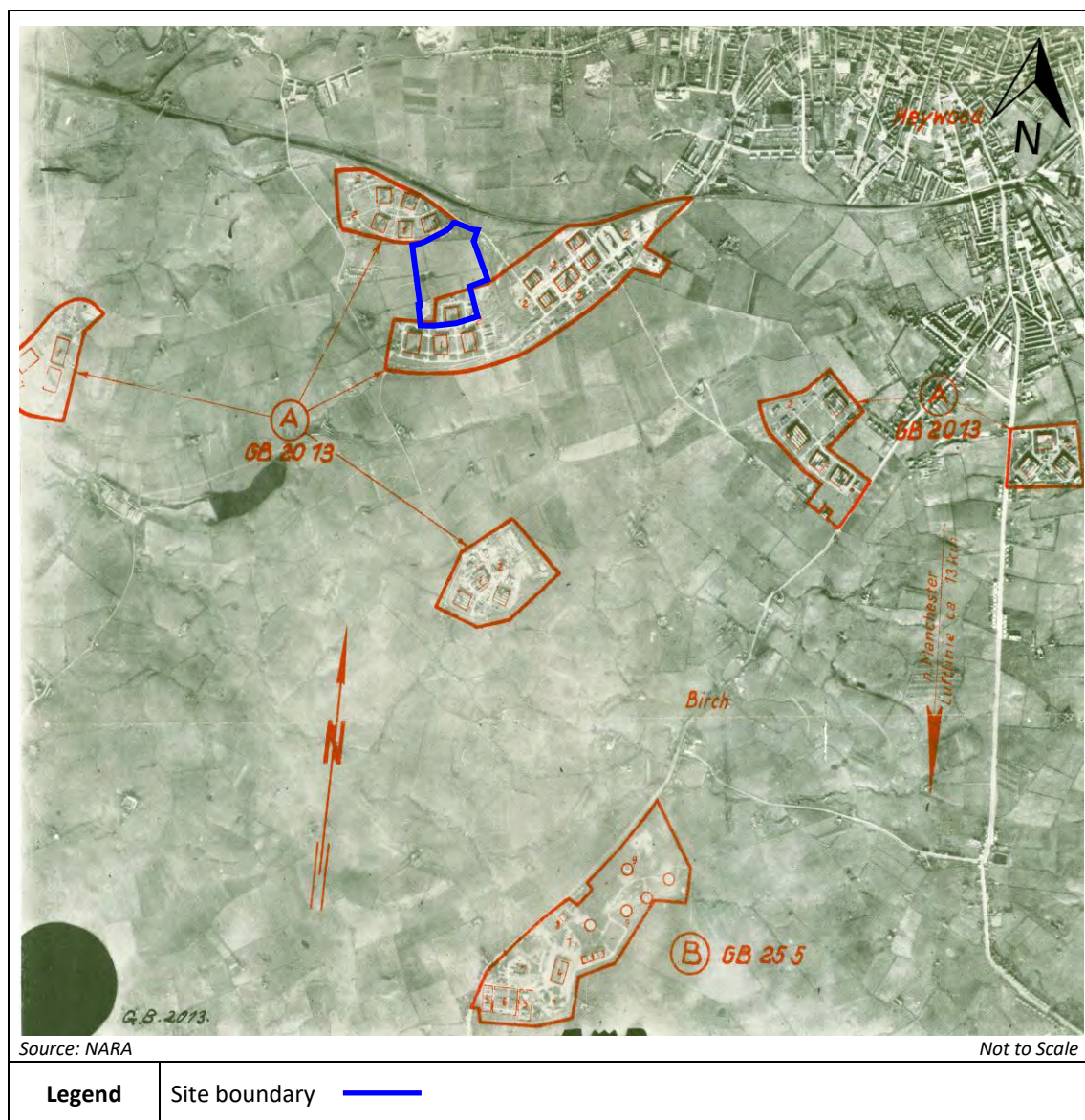
Plate 2 is a Luftwaffe target photograph of RAF Heywood, dating from December 1940.

Several targets are identified, as summarised in Table 1.

Table 1 Luftwaffe targets in the vicinity of the Site

Target No.	Target
A (GB 20 13)	Replenishment store (RAF Heywood)
1	Warehouses
2	Accommodation and outbuildings
B (GB 25 5)	Barrage balloon and special troop camp (No. 10 Barrage Balloon Centre)
3	Barrage balloon hangars
4	Barrage balloon winch vehicle hangar
5	Accommodation buildings
6	Barracks
7	Depots and workshops
8	Machine shops
9	Balloon positions

Plate 2 Luftwaffe target photograph of RAF Heywood, December 1940



4.2.3 Bombing Densities and Incidents

Table 2 gives details of the overall bombing statistics recorded for the Local Authority Districts of the Site (highlighted by bold text) and surrounding districts. These were categorised as Rural Districts (RD), Urban Districts (UD), Municipal or Metropolitan Boroughs (MB) and County Boroughs (CB). WWII bomb density levels are defined below:

<5 bombs per 405ha is a Very Low regional bombing density.

5-15 bombs per 405ha is Low.

15-50 bombs per 405ha is Moderate.

50-250 bombs per 405ha is High.

>250 bombs per 405ha is Very High.

Table 2 Bombing statistics

Area	Bombs Recorded				Bombs per 405ha (1000 acres)
	High Explosive	Parachute Mines	Other	Total	
Heywood MB	4	0	0	4	0.5
Middleton MB	37	0	0	37	7.2
Whitfield UD	15	0	0	15	4.4
Bury CB	22	0	5	27	3.6
Whitworth UD	7	0	0	7	1.6
Rawenstall MB	10	0	0	10	1.0
Rochdale CB	4	0	0	4	0.4
Baccup MB	2	0	0	2	0.3
Ramsbottom UD	0	2	0	2	0.2

Note that Table 2 excludes the figures for Incendiary Bombs (IBs). Discrepancies between this list and other records, such as bomb clearance records, demonstrate that this data is likely to under-represent actual bombing.

Details of the nearest recorded bombing incidents to the Site are given in the following section.

15th December 1940

1No. Explosive Incendiary Bomb (EIB) fell on the No. 7 site at RAF Heywood, approximately 0.2km east of the Site.

1st June 1941

Several HE bombs fell on a garage at RAF Heywood, approximately 0.5km northeast of the Site.

It should be noted that during WWII, many Unexploded Bombs (UXBs) were mapped and subsequently removed as and when conditions and demands on Bomb Disposal teams allowed. Their removal was not always accurately recorded and sometimes records were later destroyed. In practice, most UXB were probably removed and only a much smaller number were actually registered as officially abandoned bombs.

Figure 3 is a map showing the approximate location of recorded bomb impacts in the immediate vicinity of the Site. IBs shown are indicative of larger numbers of similar devices that fell within the given area.

The map has been compiled from a number of different sources, including air raid incident reports, historical aerial photographs and bomb census maps.

The bomb map is also given in the accompanying P11833-22-R1-MAP01-A.

Figure 3 Compiled bomb impact map for the vicinity of the Site

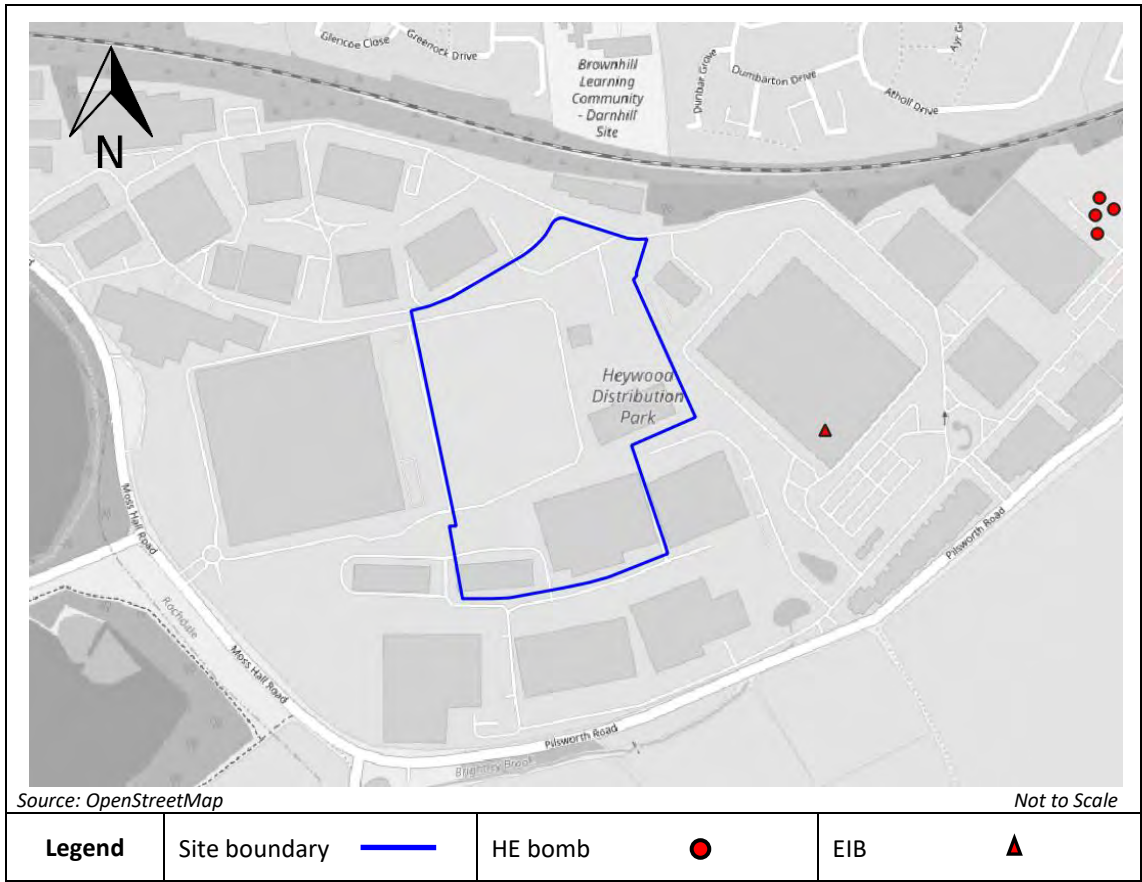
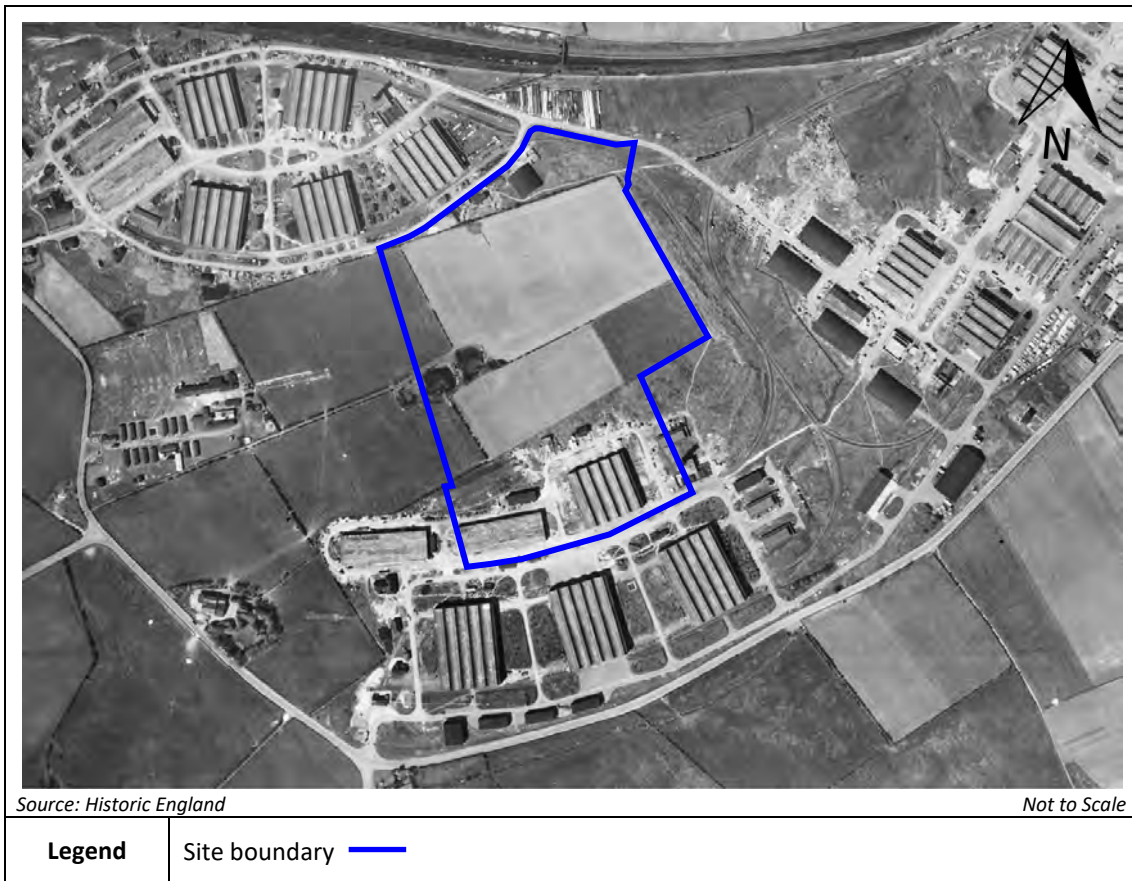


Plate 3 is an aerial photograph dated the 9th May 1946. No bomb damage or cratering has been identified on the Site.

Plate 3 Aerial photograph, 9th May 1946

Potential UXO Hazard

No records have been found indicating that the Site was bombed and no bomb damage has been identified on the Site on historical aerial photography.

WWII bombing is not considered to provide a source of UXO hazard to the Site.

4.2.4 Geology and Bomb Penetration Depths

It is important to consider the geological materials present at the time that a bomb was dropped in order to establish its maximum penetration depth.

British Geological Survey (BGS) 1:50,000 Sheet 85 Manchester (Bedrock & Superficial) and BGS borehole records from nearby investigations have been consulted to get an indicative overview of the Site geology.

The geology of the Site is understood to consist of top soil, over clay of Devensian Till, overlying sandstone of the Pennine Lower Coal Measures Formation.

Table 3 provides an estimate of average maximum bomb penetration depths for the Site assuming WWII ground conditions of 1.5m of 4.5m of stiff clay, overlying more than 20m of weak rock.

Table 3 Estimated average maximum bomb penetration depths

Estimated average bomb penetration depths for anticipated geology		
Bomb Weight	50kg	5.5m
	250kg	7.0m
	500kg	9.5m

These calculations can be refined on receipt of further Site-specific information.

The estimated bomb penetration depths given in Table 3 are from the WWII ground level and are based on the following assumptions:

- a) High level release of the bomb resulting in an impact velocity of 260m/s (>5,000m altitude).
- b) A strike angle of 10 to 15 degrees to the vertical.
- c) That the bomb is stable, both in flight and on penetration.
- d) That no retarding units are fitted to the bomb.
- e) That the soil type is homogenous.

A high altitude release of a bomb will result in ground entry at between 10° and 15° to the vertical with the bomb travelling on this trajectory until momentum is nearly lost. The bomb will then turn abruptly to the horizontal before coming to rest. The distance between the centre of the entry hole and the centre of the bomb at rest is known as the 'offset'. A marked lateral movement from the original line of entry is common.

Low-level attacks may have an impact angle of 45° or more, which will frequently lead to a much greater amount of offset movement during soil penetration.

The average offset is one third of the penetration depth, i.e. an offset of 2m may be expected for a 50kg bomb in dry silts and clays. If hard standings or Made Ground were present during WWII, bomb penetration depths would have been significantly reduced but offset distances may have been up to four times greater.

5 EXPLOSIVE ORDNANCE CLEARANCE ACTIVITIES

Official UK bombing statistics have been compiled from both British and German sources. There were differences in the way the figures were originally reported and collated which has led to discrepancies in the summary data.

Based on data from 1939 to 1945, War Office statistics indicate that 200,195No. HE bombs exploded within Great Britain. Additionally, 25,195No. HE bombs (representing 11%) were recorded as UXBs. However, records from the Royal Engineers who were responsible for bomb disposal at the time indicate that as of 27th February 1946 upwards of 45,000No. UXBs were disposed of.

On average 8.5% of UXBs later self-exploded. In some cases the bombs had delayed action fuzes or were never intended to explode, their purpose being to cause inconvenience and fear. Given the discrepancy in records and the fact that UXBs are still being found unexpectedly, it is clear that the original figures are understated and provide only an approximation of the number of potential UXBs in the UK.

War Office statistics also show that between October 1940 and May 1941 most of the UXBs (93%) were either 50kg or 250kg. It should be noted that details of the recovery and the size of the UXB were not always accurately reported.

The larger WWII UXBs are often difficult to recover due to both penetration depths and the presence of two or more fuzes, combined with more sensitive fillings of explosive mixtures including Amatol and Trialen.

5.1 Abandoned Bombs

For further information on abandoned bombs, and the potential UXO hazard associated with them, follow the link below:

- [Abandoned Bombs](#)

No records have been found indicating that any officially abandoned bombs are located on the Site.

5.2 EOC Tasks

Records held by Zetica Ltd show that the following post-WWII EOC tasks have taken place in the vicinity of the Site.

9th January 2022

1No. grenade was discovered in a house on Glamis Avenue, Heywood, approximately 2.5km east of the Site. It was made safe and removed.

6 UXO HAZARD ASSESSMENT

6.1 UXO Hazard Level

The definitions for the levels of UXO hazard are provided below.

Definitions of UXO Hazard Level for a Site	
Hazard Level	Definition
Very Low	There is positive evidence that UXO is not present, e.g. through physical constraints or removal.
Low	There is no positive evidence that UXO is present, but its occurrence cannot be totally discounted.
Moderate	There is positive evidence that ordnance was present or that other uncharted ordnance may be present as UXO.
High	There is positive evidence that UXO is present.
Very High	As high, but requires immediate or special attention due to the potential hazard.

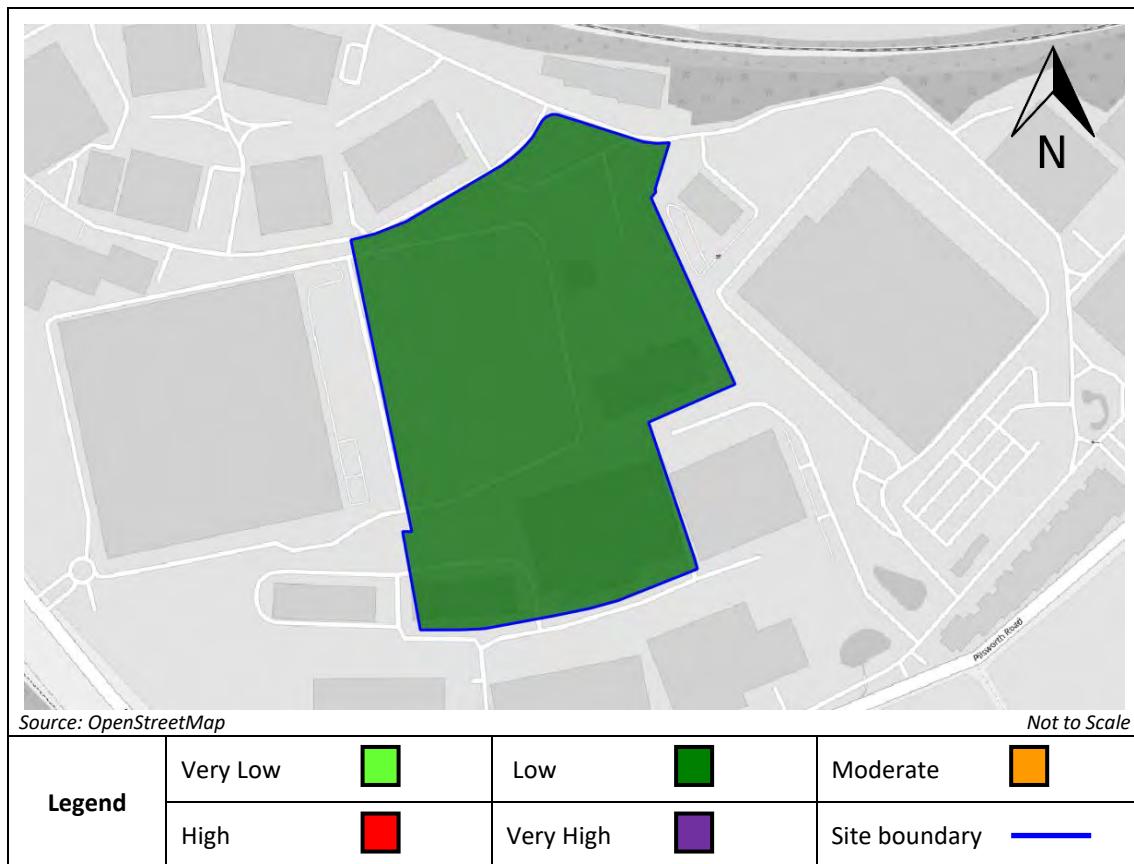
Between 1939 and 1965 the Site comprised part of RAF Heywood, a UED.

No records have been found indicating that the Site was bombed and no other significant sources of UXO hazard have been identified on the Site.

Given this, it is considered that the Site has a low UXO hazard level, as shown in Figure 4.

The UXO hazard zone plan of the Site is also given in the accompanying P11833-22-R1-MAP01-A.

Figure 4 UXO hazard zone plan of the Site



7 UXO RISK ASSESSMENT

7.1 Proposed Works

It is understood that the Site will be developed as a distribution centre.

For the purpose of this risk assessment, it is assumed that works on the Site may include intrusive ground investigations, excavations and piling.

7.2 Risk Assessment Methodology

A UXO risk assessment has been undertaken for the proposed works, taking into consideration the identified UXO hazard.

Firstly, the probability of encountering UXO (PE) has been considered and rated for the different construction techniques, as detailed below.

Probability of Encounter (PE)	Rating
Frequent, highly likely, almost certain.	5
Probable, more likely to happen than not.	4
Occasional, increased chance or probability.	3
Remote, unlikely to happen but could.	2
Improbable, highly unlikely.	1
Impossible	0

Secondly, the probability of detonating a UXO (PD) has been considered and rated for the different construction techniques, as detailed below.

Probability of Detonation (PD)	Rating
Frequent, highly likely, almost certain.	5
Probable, more likely to happen than not.	4
Occasional, increased chance or probability.	3
Remote, unlikely to happen but could.	2
Improbable, highly unlikely.	1
Impossible	0

Next, the probability of encountering and detonating the UXO (PE x PD) have been used to generate an overall likelihood rating (P).

P = PE x PD	LIKELIHOOD of Encounter and Detonation	Rating
21 to 25	Frequent, highly likely, almost certain.	5
16 to 20	Probable, more likely to happen than not.	4
6 to 15	Occasional, increased chance or probability.	3
2 to 5	Remote, unlikely to happen but could.	2
1	Improbable, highly unlikely.	1
0	Impossible	0
P ranges from 25, a certainty of UXO being encountered and detonated on the Site by engineering activity, to 0, a certainty that UXO does not occur on the Site and will not be detonated by engineering activity.		

The likelihood of encountering and detonating UXO during site works is multiplied by the severity of such an event occurring (P x S), in order to provide a risk level using the following matrix.

Severity (S)	Rating
Multiple fatalities	5
Major injury, long term health issues, single fatality.	4
Minor injury, short term health issues, no fatalities.	3
First aid case but no lost time or ill health.	2
Minor injuries, no first aid.	1
No injuries.	0

UXO Risk Matrix							
LIKELIHOOD (P)	SEVERITY (S)						
		5	4	3	2	1	0
	5	25	20	15	10	5	0
	4	20	16	12	8	4	0
	3	15	12	9	6	3	0
	2	10	8	6	4	2	0
	1	5	4	3	2	1	0
	0	0	0	0	0	0	0

7.3 UXO Risk Level

The UXO risk assessment for proposed works on the Site is given in Table 4.

Table 4 UXO risk assessment for the Site

Potential UXO Hazard	Anticipated Works	PE	PD	P = PE x PD	Likelihood	Severity	Risk Rating	UXO Risk
UXB	Shallow Excavations	1	1	1	1	5	5	Low
	Deep Excavations	1	1	1	1	5	5	Low
	Boreholes/Piling	1	1	1	1	4	4	Low
Other UXO	Shallow Excavations	1	1	1	1	4	4	Low
	Deep Excavations	1	1	1	1	4	4	Low
	Boreholes/Piling	1	1	1	1	3	3	Low
PE (Probability of Encounter), PD (Probability of Detonation), P (Overall Probability)								
Shallow Excavations defined as <1.0m below ground level (bgl.)								

8 RISK MITIGATION PLAN

Key findings: No significant sources of UXO hazard have been identified.

Key actions: UXO awareness briefing for staff involved in excavations.

8.1 UXO Risk Summary

Table 4 summarises the UXO risk for proposed works on the Site and recommended actions.

Table 5 Summary of UXO risk and mitigation recommendations

Proposed Works	UXO Risk	Recommended Mitigation
Excavations		Awareness briefing – Given the Site's military history it is recommended that a formal UXO awareness briefing is provided to staff involved in excavation.
Boreholes/Piling		Proceed with works

In summary, it is recommended that staff involved in excavation are provided with a formal awareness briefing so that they take appropriate action in the event of a suspect find.

8.2 Risk Mitigation Techniques

8.2.1 UXO Awareness Briefing

Typically ~1hour in duration, these briefings will be expected to provide site workers with:-

- Background to the potential UXO hazards that could be encountered.
- Awareness of how the UXO hazard could present a risk.
- Knowledge of what to do in the event that a suspect item is encountered.

The briefing is to be provided along with back-up materials such as UXO awareness posters, emergency contact numbers and other background information to assist site workers in becoming familiar with what potential UXO can look like.

The materials can also be used by key staff to pass on the relevant points of the induction to others who visit or work on the Site.

By providing the UXO awareness briefing, it ensures that in the unlikely event that UXO is encountered:-

- All site staff take appropriate action.
- A support mechanism and points of contact are established.
- The likelihood of harm to people or property is reduced.
- Significant delays to site work are prevented.

8.3 What Do I Do Next?

If you require a quote for an awareness briefing, or have any questions, contact us via phone (01993 886682) or email (uxo@zetica.com) and we can help.

If you have requirements to identify other buried hazards (such as mapping utilities or obstructions) we can provide these surveys.

If proposed works on the Site change, or additional works are planned, contact Zetica for a re-assessment of the UXO risk and the risk mitigation requirements.

APPENDICES

Appendix 1 Anticipated Ordnance Types

The probability of encountering UXO on the Site is considered to be low. As with any similar site in the UK, there is always a background risk of finding ordnance and potential types to be encountered are detailed below. For a more comprehensive set of ordnance data sheets, see <http://zeticauxo.com/downloads-and-resources/ordnance-data-sheets/>.

Information Data Sheet

Category Small Arms Ammunition
Type Various



Description: Small Arms Ammunition (SAA) is one of the more recognisable categories of ordnance which is primarily designed for anti-personnel use. SAA include items such as bullets, generally up to a calibre (diameter) of 20mm.

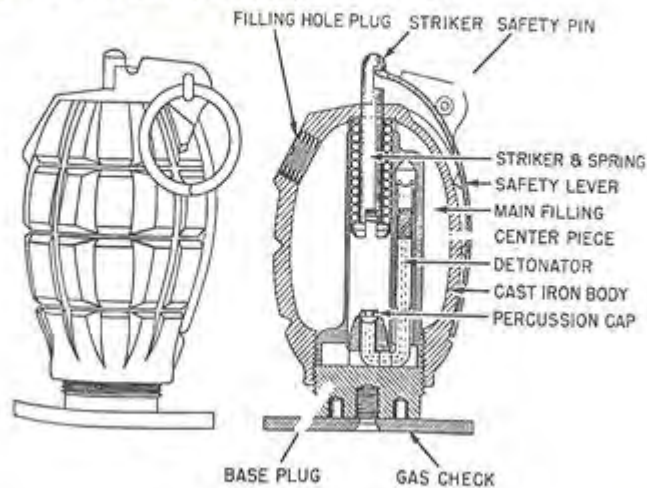
Generally small arms ordnance has a relatively low risk as UXO, although the larger calibre categories may have the same detonation risk as larger high explosive ordnance.

SAA is often associated with discarded ammunition boxes around firing practice ranges and training areas and is often found scattered across former military airfields as a result of aircraft crashes and localised disposal.



Information Data Sheet

Category Grenades (British)
Type No. 36 Hand Grenade ('Mills Bomb')



Variants -

Dimensions 101.6mm x 61mm (4" x 2.4")

Weight 2 lbs

Delay 4 seconds

Filling Baratol

Material Cast Iron

Description Lemon-shaped, cast-iron body filled with high explosive. Three holes in the body; one in the base for priming, one near the top for filling; one on the top holding striker.

Function Used as a defence against enemy personnel.



Information Data Sheet

Category Grenades (British)

Type No. 76 Self-Igniting Phosphorus Grenade

Variants -

Dimensions 152.4mm x 63.5mm (6" x 2.5")

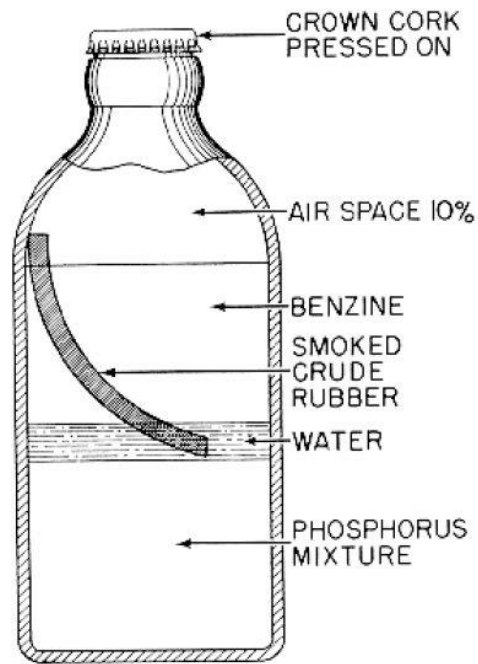
Weight 1lb

Fuze Self-igniting upon breakage

Material Glass

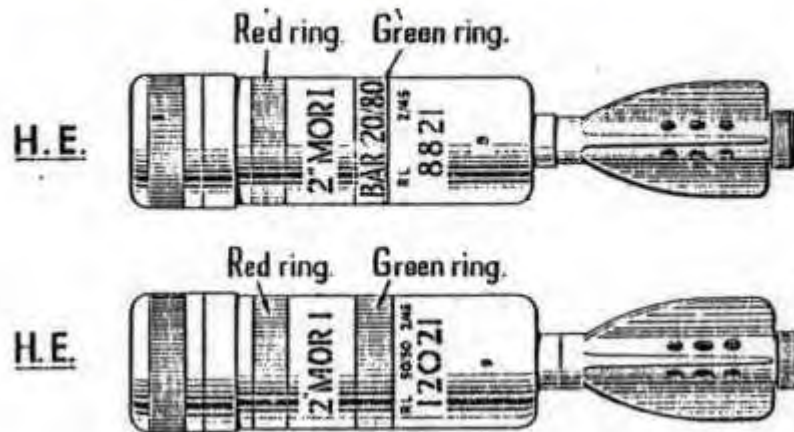
Description Glass bottle filled with white phosphorus, benzene, water and crude rubber.

Function Introduced as an emergency anti-tank measure for the Home Guard early in WWII. Intended to ignite the engine compartment of advancing tanks.



Information Data Sheet

Category Mortar (British)
Type 2-Inch Mortar Bomb



Variants 14

Length 11.4" x 2"

Weight 2.5lbs

Firing Mechanism Trip (small trigger)

Calibre 50.8mm (2.0 inches)

Rate of Fire 8 rounds per minute

Description Pear-shaped steel body with 6 or 8 vanes. Originally painted buff yellow or dark grey. Filled with c. TNT, granular TNT or powdered Amatol. Also smoke, illumination and practice versions.

Function Small enough to be carried by one man, with a range limited to 500 yards, the 2" mortar was used an anti-personnel role.



Information Data Sheet

Category Bomb (Luftwaffe)

Type Sprengbombe-Cylindrisch (SC) 50kg

Variants 8

Body Dimensions 762 x 200mm (30" x 7.9")

Weight 55kg (122lbs)

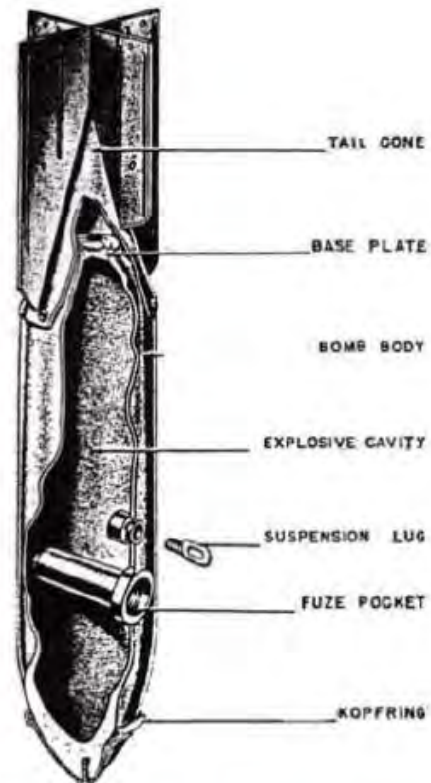
Charge Weight 25kg (54lbs)

Fuze Single electric impact fuze. Some have short time delay

Composition Sheet steel

Description Thick nose welded to a steel body. Nose may be attached to Kopfring (a triangular section steel ring) or spike. Suspension bolt in eye/body and sheet metal tail attached to body with rivets/screws. Originally painted green-grey with a yellow stripe on the tail. Cast TNT, Amatol or Trialen filling.

Function Designed to maximise shock waves through air, water and earth and for general demolition. Used against easily damageable targets, including roads, aircraft hangars, rolling stock and small buildings. Spike bombs/ 'Stabo' (SC 50 with spikes attached to nose) were used against rail lines and country roads, with Kopfring used against naval targets.



Information Data Sheet

Category Bomb (Luftwaffe)

Type Sprengbombe-Cylindrisch (SC) 50kg

Variants 8

Body Dimensions 762 x 200mm (30" x 7.9")

Weight 55kg (122lbs)

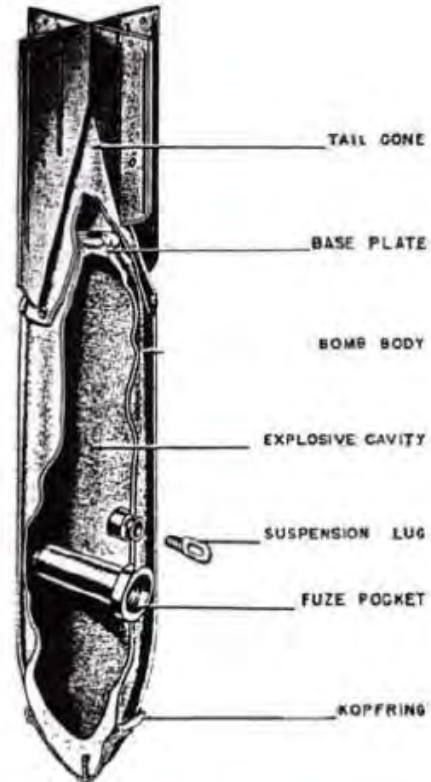
Charge Weight 25kg (54lbs)

Fuze Single electric impact fuze. Some have short time delay

Composition Sheet steel

Description Thick nose welded to a steel body. Nose may be attached to Kopfring (a triangular section steel ring) or spike. Suspension bolt in eye/body and sheet metal tail attached to body with rivets/screws. Originally painted green-grey with a yellow stripe on the tail. Cast TNT, Amatol or Trialen filling.

Function Designed to maximise shock waves through air, water and earth and for general demolition. Used against easily damageable targets, including roads, aircraft hangars, rolling stock and small buildings. Spike bombs/ 'Stabo' (SC 50 with spikes attached to nose) were used against rail lines and country roads, with Kopfring used against naval targets.



Information Data Sheet

Category Bomb
Type Sprengbombe-Cylindrisch (SC) 250kg

Variants 8

Body Dimensions 1194mm x 368mm (47" x 14.5")

Weight 249-264 kg (548-582lbs)

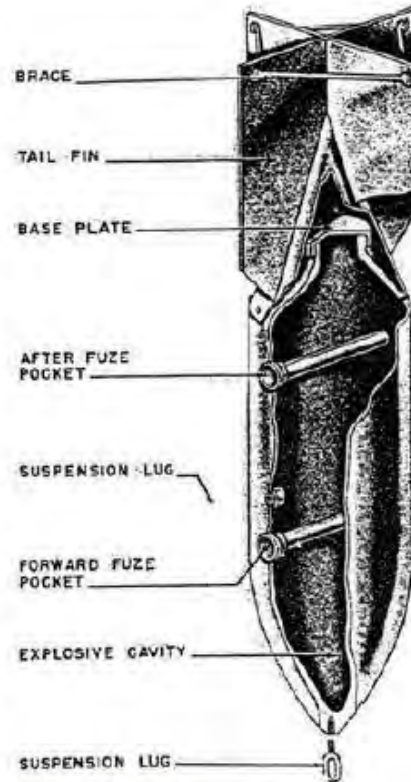
Charge Weight 130-145 kg (287-320lbs)

Fuze Electric impact fuze/electric clockwork time fuse & electric anti-disturbance fuze

Composition Sheet steel with stays

Description Thick nose welded to steel body. Nose may be attached to Kopfring (triangular section steel ring) or spike. Sheet metal tail attached to body with rivets/ screws. Suspension eye bolt in the nose/body. Originally painted green-grey with a yellow stripe on the tail. TNT; amatol; TNT and aluminium powder, naphthalene, ammonium nitrate and wax/ wood meal filling.

Function Designed to maximise shock waves through air, water and earth and general demolition. Used against railway installations, large buildings, ammunition depots and below-ground installations (to 8m). Spike bombs/ 'Stabo' (SC 50 with spikes attached to nose) used against rail lines and country roads.



Information Data Sheet

Category Bomb

Type Sprengbombe-Cylindrisch (SC) 500kg

Variants -

Body Dimensions 1414-1486mm x 470mm (55.7-58.5' x 18.5")

Weight 500kg (1,100lbs)

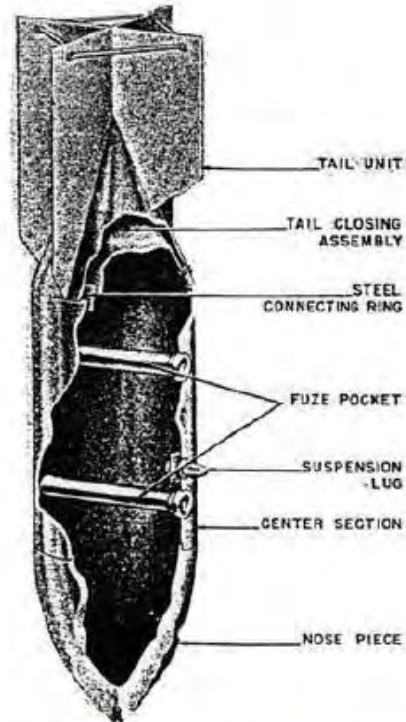
Charge Weight 220kg (484lbs)

Fuze Electric impact fuze/electric clockwork time fuze & electric anti-disturbance fuze.

Composition Sheet steel with stays or drum

Description Thick nose welded to steel body. Nose may be attached to Kopfring (triangular section steel ring). Tail either steel sheet or drum-shaped. Suspension band. Originally painted green-grey/ buff (some later versions sky blue) with yellow stripe on tail. Filled with amatol, TNT or trialen.

Function Designed to maximise shock waves through air, water and earth and for general demolition. Used against railway property, large buildings, shipping and below-ground installations.



Information Data Sheet

Category Bomb

Type Sprengbombe-Cylindrisch (SC) 1,000kg (HERMANN)

Variants 3

Body Dimensions 1742-1905mm x 648-660mm (68.6-75" x 25.5-26")

Weight 1,000-1,088kg (2,204-2,398lbs)

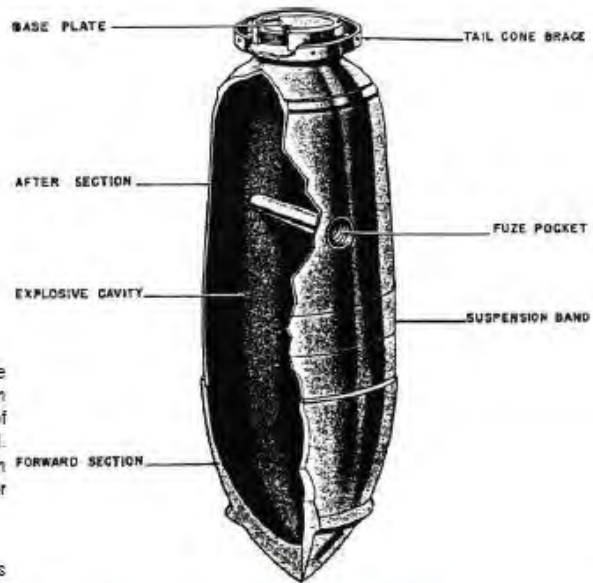
Charge Weight 529-619kg (1,166-1,364lbs)

Fuze Electric impact fuze/ electric clockwork time fuze & electric anti-disturbance fuze

Composition Magnesium alloy with drum

Description Thick nose welded to steel body. Nose attached to Kopfring (triangular section steel ring). Drum-shaped tail made of magnesium alloy. Suspension band. Originally painted sky-blue. Filled with amatol, TNT/aluminium/wood meal or trialen.

Function Designed to maximise shock waves through air, water and earth and for general demolition.



Information Data Sheet

Category Projectile
Type 3.7" Anti-Aircraft Shell

Variants 6

Body Dimensions 94mm x 360mm (3.7 x 14.7")

Weight 12.7kg (28lb)

Fuze Mechanical time fuze

Composition Cast steel

Description Brass cartridge case. Square-based shell with tapered nose, filled with Amatol, TNT or RDX/TNT. MK6 had forward centring bands and a wider driving band.

Function Used as a defence against enemy aircraft, fired from fixed batteries and mobile mountings. Could fire approximately 20 rounds per minute with a maximum ceiling of 41,000ft and horizontal range of 20,600 yards.



Information Data Sheet

Category Projectile

Type 4.5" Shell (Mark II – Anti-Aircraft)

Variants -

Body Dimensions 114mm x 566mm (4.5" x 21.9")

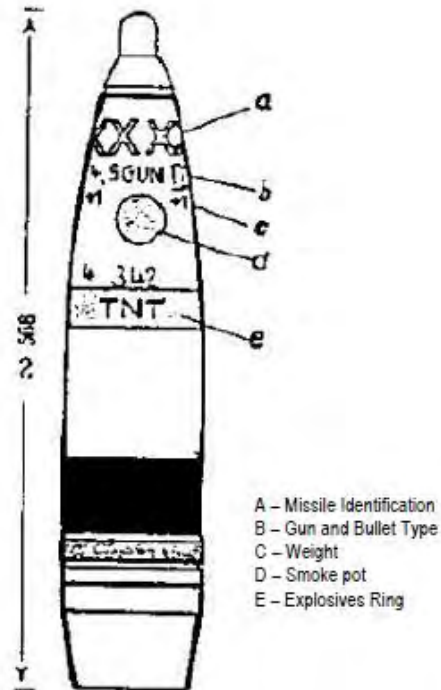
Weight 24.9kg (55lb)

Fuze Mechanical time fuze

Composition Cast steel

Description Square-based, tapered-nosed shell filled with TNT or Amatol. Steel casing, rotating band of either copper or gilding metal located 3.5" in front of the base end with single groove.

Function Used as field artillery and adapted for use in anti-aircraft defence from fixed batteries. Rate of fire of 8 rounds per minute, maximum ceiling of 44,000ft and horizontal range of 22,800 yards.



Appendix 2 Sources of UXO Hazard

The sections below provide background information on the potential sources of UXO hazard (albeit low) affecting the Site. For a more comprehensive set of UXO information sheets, see <http://zeticauxo.com/downloads-and-resources/uxo-information-sheets/>.

Appendix 2.1 WWI Bombing

It is not generally realised that during World War One (WWI) significant bombing took place across some areas of the UK. An estimated 9,000No. German bombs were dropped on Britain during the course of 51No. airship and 52No. aircraft raids. It was the first time that strategic aerial bombardment had been used. More than 1,400No. people were killed during these raids.

Most air raids were carried out on London and Southeast England. Areas along the East Coast were also targeted regularly due to their proximity to the European continent. Bombing raids further inland were rare and West England and Wales were out of reach for German aircraft of the time.

Aerial bombing during WWI initially relied on visual aiming, with bombsights not developed until later in the war. The inaccuracy inherent in this method meant that bombs often fell some way from their intended targets.

The first recorded raid against England occurred on the 21st December 1914 when 2No. high explosive bombs fell near the Admiralty Pier at Dover. Zeppelin raids intensified during 1915 and 1916, with aircraft raids becoming more frequent after 1917. The last raid of WWI took place on the 19th May 1918, when 38 Gotha and 3 Giant aircraft bombed London and surrounding districts, dropping a total of more than 2,500lbs of bombs.



The potential of coming across an Unexploded Bomb (UXB) from WWI is far less likely than a WWII UXB given the lower bombing densities during raids in the Great War.

Some areas which were subjected to sustained bombing raids, such as parts of London and coastal towns, recorded a higher number of UXB. In these areas, where there has been no significant development for the last century, the potential of a UXB remaining from WWI cannot be totally discounted.

Appendix 2.2 WWII Bombing

Bombing raids began in the summer of 1940 and continued until the end of WWII. Bombing densities generally increased towards major cities or strategic targets such as docks, harbours, industrial premises, power stations and airfields. In addition to London, industrial cities and ports, including Birmingham, Coventry, Southampton, Liverpool, Hull and Glasgow, were heavily targeted, as well as seaside towns such as Eastbourne and cathedral cities such as Canterbury.

The German bombing campaign saw the extensive use of both High Explosive (HE) bombs and Incendiary Bombs (IBs). The most common HE bombs were the 50kg and 250kg bombs, although 500kg were also used to a lesser extent. More rarely 1,000kg, 1,400kg and 1,800kg bombs were dropped.

The HE bombs tended to contain about half of their weight in explosives and were fitted with one or sometimes two fuzes. Not all HE bombs were intended to explode on impact. Some contained timing mechanisms where detonation could occur more than 70 hours after impact.

Incendiary devices ranged from small 1kg thermite filled, magnesium bodied Incendiary Bombs (IBs) to a 250kg 'Oil Bomb' (OB) and a 500kg 'C300' IB. In some cases the IBs were fitted with a bursting charge. This exploded after the bomb had been alight for a few minutes causing burning debris to be scattered over a greater area. The C300 bombs were similar in appearance to 500kg HE bombs, although their design was sufficiently different to warrant a specially trained unit of the Royal Engineers to deal with their disposal.



Anti-Personnel (AP) bombs and Parachute Mines (PMs) were also deployed. 2No. types of anti-personnel bombs were in common use, the 2kg and the 12kg bomb. The 2kg bomb could inflict injury across an area up to 150m away from the impact. PMs (which were up to 4m in length) could be detonated either magnetically or by noise/vibration.

Anti-shipping parachute mines were commonly dropped over navigable rivers, dockland areas and coastlines. The Royal Navy was responsible for ensuring that the bombs were made safe. Removal and disposal was still the responsibility of the Bomb Disposal Unit of the Royal Engineers.

In 1944, the Germans introduced new weapons; the V1, a 'flying bomb' and guided missile, and the V2, a ballistic missile rocket that travelled at such speed that no one could see or hear its approach. London was the main target for these attacks.

WWII bomb targeting was inaccurate, especially in the first year of the war. A typical bomb load of 50kg HE bombs mixed with IBs which was aimed at a specific location might not just miss the intended target but fall some considerable distance away.



It is understood that the local Civil Defence authorities in urban areas had a comprehensive system for reporting bomb incidents and dealing with any Unexploded Bombs (UXB) or other UXO. In more rural areas, fewer bombing raids occurred. It is known that Air Raid Precaution (ARP) records under-represent the number and frequency of bombs falling in rural and coastal areas. Bombs were either released over targets or as part of 'tip and run' raids where bomber crews would drop their bombs to avoid anti-aircraft fire or Allied fighter aircraft on the route to and from other strategic targets. Bombs dropped as a result of poor targeting or 'tip and run' raids on rural and coastal areas often went unrecorded or entered as 'fell in open country' or 'fell in the sea'. The Luftwaffe are thought to have dropped approximately 75,000 tons of bombs on Britain throughout the Second World War and an estimated 11% of all bombs dropped during the war failed to detonate.

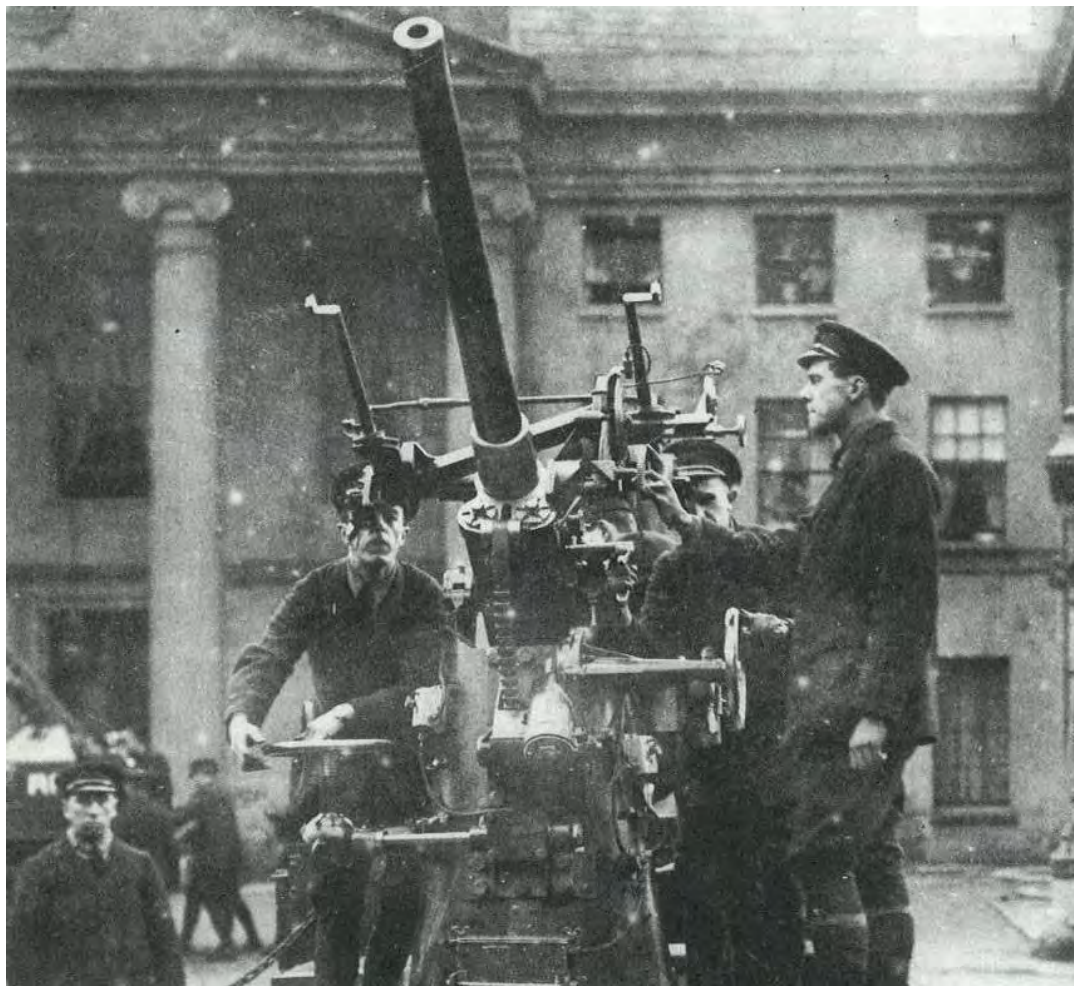
The potential for a UXB hazard to exist on a site depends on a variety of factors. Were there strategic targets in the surrounding area? Was the site bombed? Could a UXB impact have been missed? Even in rural areas, the potential for UXB cannot be totally discounted and therefore it is essential that detailed local bombing records are obtained when assessing the UXB hazard on any site.

Appendix 2.3 Anti-Aircraft Guns

As aerial bombardment first began during WWI, Anti-Aircraft (AA) gun batteries were established and gradually established throughout much of England to counter German bombing raids. By June 1916, there were approximately 271 No. AA guns and 258 No. searchlight installations defending London alone.

Common AA defences during WWI included 3-inch, 75 millimetre, 6-pounder and 1-pounder guns. Many of these guns were mobile, being mounted on lorry chassis. They were driven about following the course of an airship and fired from any area of open land.

During WWI, Unexploded AA (UXAA) shells, could land up to 13km from the firing point, although more typically fell within 10km.



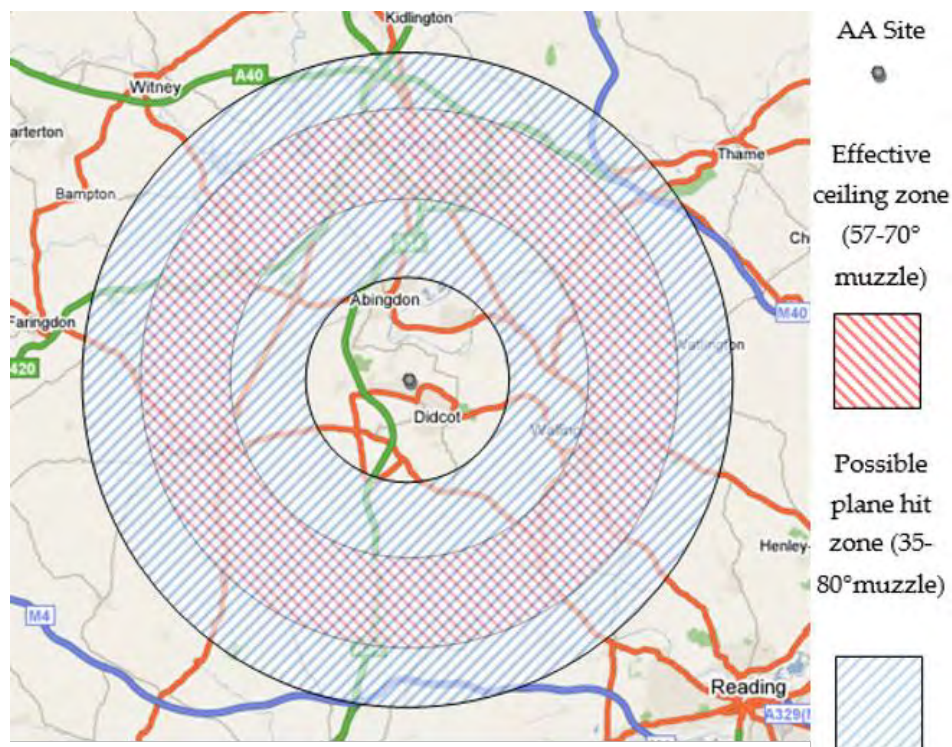
AA gun batteries were used extensively during WWII to counter the threat posed by enemy aircraft. In many instances, AA shells caused damage to Allied territory and in some areas caused significant numbers of civilian fatalities.

During WWII, AA shells could land up to 27km from the firing point, although more typically fell within 15km. These could be distributed over a wide area.

3No. types of AA batteries existed:

- **Heavy Anti-Aircraft (HAA)** batteries of large guns (typically 3.7", 4.5" and 5.25" calibre) designed to engage high flying bomber aircraft. These tended to be relatively permanent gun emplacements.
- **Light Anti-Aircraft (LAA)** weaponry, designed to counter low flying aircraft. These were often mobile and were moved periodically to new locations around strategic targets such as airfields. They typically fired 40mm shells and machine gun ammunition.
- **Rocket batteries (ZAA)** firing 3" or 3.7" AA rockets with a maximum altitude of 5,800m and a ground range of 9km were typically permanent emplacements.

Unexploded AA (UXAA) shells were a common occurrence during WWII. As the figure below demonstrates, shells were unlikely to fall in the immediate vicinity of a gun battery but in the surrounding area. This would be dependent upon the angle of fire and the flight height of the attacking aircraft.



AA batteries were deliberately targeted by the Luftwaffe and therefore areas surrounding a gun battery may have a greater risk of UXB being present.

Munitions stores were also established around AA batteries. These stored the shells for the batteries and small arms ammunition for troops manning the position. Such stores were typically removed at the end of WWII, although some disposal may have occurred in the immediate vicinity of the gun battery.

Appendix 3 Recent UXO Finds

UXO finds in the UK are a regular occurrence, although they almost never result in an accidental detonation.

It is still important to note that explosives rarely lose effectiveness with age. In some instances, mechanisms such as fuzes and gaines can become more sensitive and more prone to detonation, regardless of whether the device has been submersed in water or embedded in silt, clay or similar materials.

The effects of an accidental UXO detonation are usually extremely fast, often catastrophic and invariably traumatic to any personnel involved. Such occurrences are largely restricted to current theatres of war and overseas minefields, with occasional events in mainland Europe.

Zetica, and other commercial EOD companies, uncover and make safe thousands of items of UXO each year, though details are rarely made public knowledge.

Publicly-recorded discoveries do also occur regularly, as demonstrated by the list of recent significant UXO finds in the UK below. To keep up to date with the latest UXO finds, visit <http://zeticauxo.com/news/>.

On the 3rd February 2020, a 500kg German UXB was found on a building site in Soho, London. It was removed by an EOD team.

On the 18th April 2020, a 500lb British UXB was discovered by a farmer near Drayton in Oxfordshire. The area had been used as an RAF practice bombing range during WWII and after an in-situ disposal was completed the item was found to have contained no explosives.

On the 4th May 2020, a UXB was discovered by builders at Kings Hill on the former RAF West Malling airfield, the fourth found since 2017. It was destroyed in a controlled explosion.

On the 1st December 2020, a research vessel discovered an unexploded marine mine containing 350kg of explosives in Wemyss Bay in the Firth of Clyde. RN divers investigated the item and destroyed it.

On the 4th February, 2No. anti-tank mines were discovered on Slapton Sands in Devon. They had been uncovered by recent storms and were destroyed.

On the 26th February 2021, a 1,000kg German “Hermann” UXB was discovered by builders at Exeter University campus (see plate below). It was investigated and detonated in-situ following the evacuation of nearby properties and University halls of residence.



On the 29th March 2021, 1No. 250lb UXB was discovered on the seabed near Hinkley Point C harbour, Bristol. A maritime exclusion was imposed while the item was investigated and then destroyed in a controlled explosion.

On the 10th May 2021, 1No. Anti-Aircraft shell dating from WWII was found by a member of the public in Horsham, Surrey. It was destroyed in-situ by a bomb disposal unit.

On the 17th May 2021, 1No. Sea Wolf missile was brought onboard a fishing vessel near Brixham in Devon. A Royal Navy EOC team destroyed the missile in a controlled explosion.

On the 1st June 2021, a cache of approximately 100No. hand grenades dating from WWII were found in a Nottinghamshire forest, a possible relic from nearby wartime camps. They were destroyed.

On the 23rd July 2021, 1No. 18lb artillery shell dating from WWI was discovered in a private garden in Bloxham, Oxfordshire. It was transported to a nearby field where it was destroyed in a controlled explosion.

On the 24th July 2021, 1No. 500lb British UXB was uncovered during construction works in Goole, East Yorkshire. Reports indicated that the UXB had been jettisoned by a Lancaster bomber aircraft prior to crashing nearby in WWII. The item was investigated and destroyed.

On the 18th August 2021, 1No. UXB was found by construction workers on a Site in Earl Sterndale, Derbyshire. Upon inspection the UXB was deemed to be dangerous and a controlled detonation was undertaken.

On the 10th September 2021, EOD teams destroyed 25No. mortars which had been washed up onto beaches around Nairn and Ardersier in Morayshire. These beaches had been used during WWII for training prior to the D-Day landings in Normandy.

On the 18th October, 1No. 18.5lb artillery shell was discovered during the clearing-out of a farmyard barn near Aberfeldy in Perthshire. The shell dated from WWI and was removed.

On the 12th November 2021, 1No. unexploded artillery shell was found on a housing development site in Wrexham, Wales. It was destroyed in controlled explosion.

On the 15th December 2021, approximately 200No. artillery shells were discovered at a construction site located within the former Royal Ordnance Factory at Swynnerton in Staffordshire. The shells were removed and destroyed.

On the 15th December 2021, 1No. apparent UXB was snagged by a fishing trawler off the Norfolk Coast and then detonated, causing significant damage to the vessel. Upon further investigation, it was concluded that the UXB had been dropped in the water during WWII.

On the 2nd January 2022, 1No. heavily deteriorated 105mm artillery shell was discovered by dogwalkers on a beach in Cumbria. This may have originated on one of the several offshore ranges which have been operational along the nearby coastline since WWII.

Between the 24th and 27th January 2022, 5No. empty artillery shells were uncovered at a construction site in Manchester. These were likely linked to a shell-production factory which had been active on the site during WWII.

On the 17th February 2022, 1No. WWI-era Mk1 Mills hand grenade was found in the River Frome in Dorset by magnet fishermen. This was the third grenade to be pulled from the same stretch of the river over the past year. It was inspected by local police and destroyed.

Appendix 4 Glossary and Definitions

Abandoned Explosive Ordnance (AXO)	Abandoned Explosive Ordnance is explosive ordnance that has not been used during an armed conflict, that has been left behind or disposed of by a party to an armed conflict, and which is no longer under control of that party. Abandoned explosive ordnance may or may not have been primed, fuzed, armed or otherwise prepared for use.
Close Combat Munitions	Items of ordnance thrown, propelled or placed during land warfare, to include grenades, mortars, projectiles, rockets and land mines.
Demil	Derived from the term 'Demilitarisation', it refers to the break down and the recycling or disposal of ordnance components.
Detonation	The high-speed chemical breakdown of an energetic material producing heat, pressure, flame and a shock wave.
Device	This term is used for any component, sub-assembly or completed ordnance, which may or may not have an explosive risk. It can apply to detonators, primers, gaines, fuzes, shells or bombs.
Explosive	The term explosive refers to compounds forming energetic materials that under certain conditions chemically react, rapidly producing gas, heat and pressure. Obviously, these are extremely dangerous and should only be handled by qualified professionals.
Explosive Ordnance (EO)	Explosive Ordnance is all munitions containing explosives, nuclear fission or fusion materials and biological and chemical agents. This includes bombs and warheads, guided and ballistic missiles, artillery, mortar, rocket, small arms ammunition, mines, torpedoes, depth charges, pyrotechnics, cluster bombs & dispensers, cartridge & propellant actuated devices, electro-explosive devices, clandestine & improvised explosive devices, and all similar or related items or components explosive in nature.
Explosive Ordnance Clearance (EOC)	Explosive Ordnance Clearance is a term used to describe the operation of ordnance detection, investigation, identification and removal, with EOD being a separate operation.
Explosive Ordnance Disposal (EOD)	Explosive Ordnance Disposal is the detection, identification, on-site evaluation, rendering safe, recovery and final disposal of unexploded explosive ordnance.
Explosive Ordnance Reconnaissance (EOR)	Explosive Ordnance Reconnaissance is the detection, identification and on-site evaluation of unexploded explosive ordnance before Explosive Ordnance Disposal.
Explosive Remnants of War (ERW)	Explosive Remnants of War are Unexploded Ordnance (UXO) and Abandoned Explosive Ordnance (AXO), excluding landmines.

Explosive Substances and Articles (ESA)	Explosive substances are solid or liquid substances (or a mixture of substances), which are either: • capable by chemical reaction in itself of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. • designed to produce an effect by heat, light, sound, gas or smoke, or a combination of these as a result of a non-detonative, self-sustaining, exothermic reaction. Explosive article is an article containing one or more explosive substances.
Fuze	A fuze is the part of an explosive device that initiates the main explosive charge to function. In common usage, the word fuze is used indiscriminately, but when being specific (and in particular in a military context), fuze is used to mean a more complicated device, such as a device within military ordnance.
Gaine	Small explosive charge that is sometimes placed between the detonator and the main charge to ensure ignition.
Geophysical survey	A geophysical survey is essentially a range of methods that can be used to detect objects or identify ground conditions without the need for intrusive methods (such as excavation or drilling). This is particularly suited to ordnance as disturbance of ordnance items is to be avoided where ever possible.
Gold line	This is the estimated limit of blast damage from an explosive storage magazine. It usually means that development within this zone is restricted.
High Explosive	Secondary explosives (commonly known as High Explosives (HE)) make up the main charge or filling of an ordnance device. They are usually less sensitive than primary explosives. Examples of secondary explosives are: Nitro glycerine (NG), Trinitrotoluene (TNT), AMATOL (Ammonia nitrate + TNT), Gunpowder (GP), and Cyclotrimethylenetrinitramine (RDX).
Munition	Munition is the complete device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological or chemical material for use in military operations, including demolitions. This includes those munitions that have been suitably modified for use in training, ceremonial or non-operational purposes. These fall into three distinct categories:- • inert - contain no explosives whatsoever. • live - contain explosives and have not been fired. • blind - have fired but failed to function as intended.

Primary Explosive	Primary explosives are usually extremely sensitive to friction, heat, and pressure. These are used to initiate less sensitive explosives. Examples of primary explosives are: Lead Azide, Lead Styphnate, and Mercury Fulminate. Primary explosive are commonly found in detonators.
Propellants	Propellants provide ordnance with the ability to travel in a controlled manner and deliver the ordnance to a predetermined target. Propellants burn rapidly producing gas, pressure and flame. Although usually in solid form they can be produced in liquid form. Examples of propellants are: Ballistite often found in a flake form and Cordite used in small arms ammunition.
Pyrotechnic	A pyrotechnic is an explosive article or substance designed to produce an effect by heat, light, sound, gas or smoke, or a combination of any of these, as a result of non-detonative, self-sustaining, exothermic chemical reactions.
Small Arms Ammunition (SAA)	SAA includes projectiles around 12mm or less in calibre and no longer than approximately 100mm. They are fired from a variety of weapons, including rifles, pistols, shotguns and machine guns.
Unexploded Anti-Aircraft (UXAA) Shell	UXAA shells are army ordnance commonly containing HE, though they can also contain pyrotechnic compounds that produce smoke. Most commonly, these were 3.7" and 4.5" HE shells, although they ranged from 2" to 5.25" calibre.
Unexploded Bomb (UXB)	UXB is a common term for unexploded air-dropped munitions.
Unexploded Ordnance (UXO)	UXO is explosive ordnance that has been either primed, fuzed, armed or prepared for use and has been subsequently fired, dropped, launched, projected or placed in such a manner as to present a hazard to operations, persons or objects and remains unexploded either by malfunction or design.
V1	The Vergeltungswaffe-1, V-1, also designated Fieseler Fi 103/FZG-76, known colloquially in English as the Flying Bomb, Buzz Bomb or Doodlebug, was the first guided missile used in WWII and the forerunner of today's cruise missile.
V2	The Vergeltungswaffe 2 (V-2) ('Reprisal Weapon 2') was the first ballistic missile. It was used by the German Army primarily against Belgian and British targets during the later stages of WWII. The V-2 was the first man-made object launched into space, during test flights that reached an altitude of 189km (117 miles) in 1944.

Appendix 5 Bibliography

- Bulloch G, Steeds J E, Green K, Sainsbury M G, Brockwell J S & Slade N J, Land Contamination: Technical Guidance on Special Sites: MoD Land
- Bulloch G, Steeds J E, Green K, Sainsbury M G, Brockwell J S, & Slade N J, R&D Technical Report P5-042/TR/03, Land Contamination: Technical Guidance on Special Sites: Explosives Manufacturing & Processing Sites
- CIRIA, Unexploded Ordnance (UXO), a Guide for the Construction Industry, 2009
- Clarke N J, Luftwaffe Target Reconnaissance, German aerial Photography 1939-1942, 1996
- Clarke N J, Adolf's British Holiday Snaps: Luftwaffe Aerial Reconnaissance Photographs of England, Scotland and Wales, 2012
- Cocroft W D, Dangerous Energy, 2000
- Cocroft W D, Thomas R J, Cold War, 2003
- Department of the Environment, Sampling Strategies for Contaminated Land, Department of the Environment: Contaminated Land Research Report, CLR Report No. 4, 1994.
- Dobinson C S, Twentieth Century Fortifications in England, Volume I 1, Anti-aircraft artillery, England's air defence gun sites. 1914 – 46. Council for British Archaeology, 1996
- Dobinson C S, Twentieth Century Fortifications in England, Volume I 2, Anti-aircraft artillery, Site gazetteer, WWI. Council for British Archaeology, 1996
- Dobinson C S, Twentieth Century Fortifications in England, Volume I. 3. Anti-aircraft artillery, 1914-46, Site gazetteer, WWII HAA & ZAA. Council for British Archaeology, 1996
- Dobinson C S, Twentieth Century Fortifications in England, Volume I 4, Anti-aircraft artillery, Site gazetteer, WWII LAA. Council for British Archaeology, 1996
- Dobinson C S, Twentieth Century Fortifications in England, Volume I 5, Anti-aircraft artillery, Sources. Council for British Archaeology, 1996
- Dobinson C S, Twentieth Century Fortifications in England, Volume II, Anti-invasion defences of WWII. Council for British Archaeology, 1996
- Dobinson C S, Twentieth Century Fortifications in England, Volume III, Bombing decoys of WWII, England's passive air defence 1939-45. Council for British Archaeology, 1996
- Dobinson C S, Twentieth Century Fortifications in England, Volume VIII, Civil defence in WWII, Protecting England's Civil Population. Council for British Archaeology, 1996
- Dobinson C S, Twentieth Century Fortifications in England, Supporting paper AA/1 Searchlight sites in WWII. Council for British Archaeology, 1996
- Dobinson C S, Fields of Deception, Britain's Bombing Decoys of World War II, 2000
- Dobinson C S, AA Command, 2001
- Fegan T, The Baby Killers, 2002
- Morris J, German Air Raids on Britain 1914-1918, 1993
- Price A, Blitz on Britain 1939-45, 2000
- Ramsey W, The Blitz Then and Now, Vol 1, 1987
- Ramsey W, The Blitz Then and Now, Vol 2, 1988
- Ramsey W, The Blitz Then and Now, Vol 3, 1990

Zetica, ZeticaUXO Handbook: a guide to dealing with UXO during construction, 2018

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