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2 INCHFIELD CLOSE, ROCHDALE

PHASE I DESK STUDY
FOR
CUBIC SURVEYING

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Prepared for:
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This report has been prepared in accordance with GRM's Accredited Quality Procedures.

If you have any queries regarding this report please contact the project manager in the first instance.

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1 INTRODUCTION

1.1 PREAMBLE

GRM Development Solutions Limited (GRM) has been appointed by Cubic Surveying (Client) to undertake a Phase I Desk Study. The desk study and site inspection form Phase I of the assessment and allow the geotechnical and geo-environmental setting of the site to be determined and the identification of areas of particular concern that require targeted investigation.

This site appraisal is intended to provide information that will assist decision making by identifying potential ground engineering and contamination issues.

GRM Standard Limitations of Reporting are provided in Appendix A of this report.

The Client proposes to develop the site with a single storey residential building to be built over the footprint of a previous dwelling which was destroyed by a fire. The proposed end use includes a garden area and off road parking. The Proposed Development Plan is presented in Appendix B.

1.2 OBJECTIVES OF THE SITE APPRAISAL

The principal aims of the Phase I Desk Study are as follows:

- a) Obtain information, from easily accessible sources, about the soil and groundwater conditions within the area of the site.
- b) Determine the possible ground related geotechnical and contamination hazards within the site boundaries that may affect the proposed development.
- c) Provide preliminary development recommendations.
- d) Provide advice on further works required for the cost-effective reduction of risks to the development and procedures likely to satisfy regulators.

Whilst every effort has been made to pre-empt the likely requirements of the Local Authority and the Environment Agency, they are likely to have specific requirements that will need to be discussed and addressed at a later date.

2 PHASE I DESK STUDY AND SITE OBSERVATIONS

2.1 INFORMATION SOURCES

In addition to the general sources of information listed in Appendix A (i) the Client has supplied the following information that has been used in the assessment of the site:

- The location of the site.
- The past site usage.

2.2 SITE DESCRIPTION

Geographical Setting

The site is located approximately 4km north west of Rochdale town centre. The National Grid Reference (NGR) for the approximate centre of the site is SD862139. A Site Location and Boundary Plan is presented in Appendix C.

The northern, eastern and southern boundaries are formed by the fences of the adjoining residential properties and the western boundary by Inchfield Close.

The topography of the area gently slopes down to the west (approximately 1:10).

Site Inspection Observations

The General Site Photographs presented in Appendix D illustrate the salient observations made during a site inspection on 21st February 2018.

The site was until recently a residential bungalow, however due to structural damage obtained during a fire the house has now been demolished to ground level, remnant foundations are understood to remain. The site area is approximately 0.03 hectares.

The site is currently an undeveloped plot of land within a residential setting. The ground surface is a combination of concrete (beneath the footprint of previous building) and grass (front and rear garden areas), no evidence of the recorded fire was observed. Although not observed, it is assumed that live services will be present below the concrete slab. Vegetation observed includes small shrub plants within garden areas. The plot is level and the front garden slopes down gently to Inchfield Close.

Significant Features identified during site inspection:
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Made Ground – Source of contamination and deeper foundations.

Concrete slabs – investigation constraint.
--

Live services – require removal/re-connection and pose investigation constraints
--

2.3 HISTORICAL DEVELOPMENT OF THE SITE

A review of the available historical Ordnance Survey (OS) maps gives an insight into the development of the site and can highlight potential hazards. Extracts of the maps reviewed are provided in Appendix E.

The significant features identified on the historical mapping data considered likely to have the potential to affect the site are presented in Table 1 below.

Table 1: Significant Historical Features

Date from and to	Identified On-site Hazard	Identified Off-site Hazard
1851	No hazards observed – site recorded to be located on a field boundary.	Coal pit recorded approximately 100m to the south.
1890	Pond observed within the eastern boundary of the site, with a footpath crossing the site.	Reservoir recorded approximately 75m to the west. Coal pit is no longer recorded.
1930	Pond no longer recorded, potentially infilled.	No change.
1959	Footpath no longer crosses the site.	No change.
1968	Site developed into residential property, as it was until recently demolished.	Local area developed into residential housing.
1992 - 2002	No change.	Reservoir re-developed into residential housing.

Anecdotal evidence obtained from a local resident during the walkover indicated the former property was subject of an arson attack circa March 2016, subsequent to which the property was demolished due to structural damage.

Although a small pond was observed on the eastern boundary which was infilled approximately 100 years ago, as the site and local area has been developed for 50 years it is considered that the resultant risks posed to the site from the infilled pond are very low.

Significant Features identified:
Former Coal pit – potential local shallow coal reserves and potential shallow workings.
Former residential property – buried foundations.
Potential asbestos – from previous residential structure.
Made ground in pond backfill – source of contamination

2.4 ANTICIPATED GEOLOGY

The BGS Geological Sheet for this area shows:

- Superficial Glacial Till deposits likely to comprise cohesive strata.
- Solid geology of Great Arc Sandstone with Pennine Lower Coal Measures close to the north western boundary.
- Lower Mountain Coal seam is recorded 23m to the north west, dipping to the south below the site.
- The closest fault is recorded to be approximately 100m to the south west.

- BGS boreholes recoded approximately 70m to the west of the site boundary record made ground over sandy gravelly clay overlying mudstone. Depths of the strata from ground level are unavailable as the borehole has been undertaken on the banks and base of a historic reservoir.

The BGS borehole record is presented in Appendix F.

As the site has been previously developed there is made ground in the form of remnant foundations.

Significant Features identified from geological data:
--

Potential shallow coal workings – Coal Mining Risk Assessment (CMRA) required. Made Ground – source of potential contamination / geotechnical hazard (remnant foundations).
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2.5 HYDROGEOLOGICAL INFORMATION

Within a borehole located approximately 70m to the west of the site, groundwater was not recorded, the borehole was terminated in mudstone. Additionally the groundwater level is likely to be subject to seasonal variations.

The Environment Agency has classified the underlying Superficial strata (Glacial Till) as a Secondary (Undifferentiated) Aquifer and the bedrock (Great Arc Sandstone and Lower Pennine Coal Measures) as a Secondary A Aquifer.

There are no recorded groundwater abstraction licenses within 500m of the site.

The site is not recorded to be within a Groundwater Source Protection Zone.

Due to the overlying cohesive ground conditions which are unlikely to hold groundwater it is considered that only a potential limited pathway exists to the underlying Secondary A Aquifer which is also unlikely to hold much groundwater. Therefore at this time given lack of sensitive receptors, abstractions or significant contamination sources the risk is considered to be very low.

Significant Features identified from hydrogeological data:

Secondary A Aquifer – potential receptor (very low risk).

2.6 HYDROLOGICAL INFORMATION

There are no recorded river networks with 500m of the site.

There are no recorded surface water abstraction licenses within 500m of the site.

Significant Features identified from hydrological data:
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None.

2.7 FLOOD RISK

The BGS suggests the site is within an area of potential groundwater flooding related to Clearwater Flooding with limited potential (unconfined aquifer) and that the confidence level is low. A Phase II ground investigation would provide information on the local groundwater regime so that the risk can be assessed by the projects infrastructure engineer. Any risk associated with the groundwater regime should be catered for within the development infrastructure design.

The site is not within 250m of an indicative fluvial floodplain, and the Environment Agency's Internet based flood risk maps suggest there is no risk from river flooding.

Significant Flood Risk Features identified:
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Potential for groundwater flooding (limited potential).

2.8 MINING

The site is recorded to be within a development high risk area and to require a Coal Mining Risk Assessment (CMRA). GRM have carried out a CMRA, which is presented in Appendix G.

In summary the site is at risk of ground movement from shallow (less than 7m depth) recorded and unrecorded mine workings in the Lower Mountain Coal. Part of the site is also at risk from a mine entry which is recorded to be present 2m off site to the south. Mitigation measures are required to reduce the risks posed to acceptable levels, and these are detailed in GRM's CMRA.

Significant Mining Risks:

Recorded mine entry and shallow workings, and possible unrecorded workings and entries – risk of ground movement, mitigation measures required.

2.9 QUARRYING

There is no evidence of any non-coal mineral extraction having taken place within, or close to, the site area.

Significant Quarrying Risks:

None.

2.10 ENVIRONMENTAL INFORMATION

An Environmental Report has been acquired for the site. The full report is presented in Appendix H. No significant environmental hazards, that are considered likely to pose a potential risk to the site, have been identified from the available information.

Significant Features identified from Environmental data:

None.

2.11 ARCHAEOLOGY

Archaeological information has not been sought as part of this desk study and has not been identified as an issue by the Client. Some Local Authorities require at least an initial archaeological appraisal for development sites. GRM can undertake such appraisals if required. Archaeological investigations occasionally reveal ground-related problems from ancient times (prior to the 1st Edition OS maps) and can occasionally cause foundation and contamination development hazards.

Archaeological Hazards:
Not researched.

2.12 INVASIVE PLANT SPECIES/ECOLOGY

GRM is not a specialist in this topic and has not conducted such a survey; however, we will endeavour to report easily recognisable issues such as Japanese Knotweed, Giant Hogweed, badger sets etc, when seen on site. No such issues were observed during the walkover.

Invasive Plant Species/Ecological Hazards:
Not observed.

2.13 RADON ASSESSMENT

The site has been assessed following the guidelines in 'Radon: guidance on protective measures for new dwellings' (BR211 2015). The site is not within an area recorded to require radon protection measures.

Radon Hazard:
None.

2.14 SUMMARY OF POTENTIAL GEOTECHNICAL/GENERAL HAZARDS

Potential geotechnical/general hazards have been identified in earlier sections and are summarised below.

Potential Hazard	Potential Consequence	Action
Live services	Danger to personnel	Inform relevant parties for disconnection / diversion
Previous building floorslab and foundations	Deepened foundations/buried structures	Ground investigation
Recorded and potentially unrecorded shallow coal workings and mine shafts	Potential ground movement	Ground investigation and remedial action

Potential sources, pathways and receptors are summarised in the Phase I Conceptual Model in Section 3, which is based on current relevant guidance, the principles of which are set out in Appendix A (iii).

2.15 CONTAMINANTS OF CONCERN

In addition to the general contaminants listed in Appendix A (ii), no additional site specific contaminants have been identified.



3 PHASE I CONCEPTUAL SITE MODEL

HUMAN HEALTH			
Source	Pathway	Receptor	Level of Risk
Potential made ground including in the area of the infilled pond.	Indoor and outdoor inhalation of soil dust, the ingestion of, and dermal contact with, contaminated soil and soil dust, ingestion of vegetables that have taken up contamination and contaminated soil attached to vegetables.	End users.	Very low to negligible.
		Construction and Maintenance Workers.	
Made ground.	Inhalation of ground gas.	End users.	Moderate (Based on BS8576 for Bulk Gases).
Mine gas from shallow workings/shafts.			
Asbestos containing materials associated with the the previous building.	Inhalation of asbestos fibres.	Construction and Maintenance Workers.	Very Low.
Made ground.	Water pipes.	End users.	Very Low to negligible.

CONTROLLED WATERS			
Made ground.	Leaching of contaminants and vertical migration to the groundwater (limited potential due to cohesive strata).	Secondary A Aquifer.	Very Low.

4 CONTAMINATION / REMEDIATION RECOMMENDATIONS

The risk from ground contamination is considered very low to negligible.

The risk from ground gas is considered to be moderate (mine gas / made ground).

Prior to development a ground investigation will be required, the scope of which is outlined in Section 6. At this stage, based on the desk study information available, it is considered that allowance be made for the gas protection measures comprising either under floor venting (i.e. beam and block floor), or a well reinforced concrete slab with minimal penetrations.

5 PRELIMINARY GEOTECHNICAL ASSESSMENT

It should be noted that the following comments and recommendations are based on the findings of this desk study which may not give a true indication of a soils actual engineering properties (i.e. stability, mass structure etc). Prior to development a ground investigation will be required to confirm the initial recommendations outlined below, the scope of which is outlined in Section 6. However, at this stage based on the desk based information available it is considered the ground conditions are likely to comprise limited made ground over cohesive Glacial Till. Rock is not expected to be present at shallow depth.

The most appropriate foundation solution will depend on the results of the further investigation and mitigation measures needed for the coal mining legacy issues and the proposed development layout.

At this stage we recommend allowing for the use of either bored piled foundations progressed through the workings of the Lower Mountain coal seam or the use of a heavily reinforced raft that can cater for any ground movements post ground treatment.

An allowance should be made for the use of protection measures for gardens and infrastructure. See the GRM CMRA for further details.

6 FURTHER INVESTIGATION

A Phase II ground investigation is recommended to determine more accurately the effect of the identified hazards on the development. Initially, this should include:

- A site strip in the area adjacent to the recorded mineshaft to confirm location on or off site so that appropriate remedial solutions can be designed.
- A drill and grout scheme across the site on a 6 m grid with infill centre holes to treat the recorded, and potential unrecorded mine-workings.
- A ground investigation designed to BS10175:2011 and BS5930:2015 comprising window sampling will be required to confirm ground conditions, collect samples for analysis and install three gas monitoring wells.
- Chemical analysis of soils followed by risk assessment so that the risk to human health and controlled waters can be determined.
- Based on the Phase I Conceptual Model (Section 3) the ground gas risk has been assessed as moderate. A ground gas investigation in line with current guidance such as BS8576:2013 will be required to determine the ground gas regime beneath the site and allow any necessary mitigation measures to be recommended. At this stage allowance for 6 visits over 3 months should be made to assess potential liabilities.
- Geotechnical soils testing of the founding strata to assess its character and suitable grades of buried concrete.

Following your review of this document, a copy of it should be submitted to the Planning Department of the Local Authority for comment and approval prior to any ground investigation works being undertaken, as this is often a condition of planning.

7 CONCLUSIONS

This Phase I Site Appraisal has shown the site is suitable for the proposed development, assuming compliance with all the recommendations contained within this report.



A P P E N D I X A

**GRM Development Solutions provides
multi-disciplinary consultancy services, UK-wide:**

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- Structural Engineering Services
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GENERAL APPRAISAL COMMENTS

i INFORMATION SOURCES

Where available the following sources have been used for the identification and assessment of potential ground hazards:

- Relevant British Standards
- British Geological Survey (BGS) Geology Map Scale 1:10,000 for local area
- British Geological Survey (BGS) Geology Map Scale 1:50,000/1:63,320
- BGS Memoir
- BGS Borehole Records
- Environment Agency Groundwater Vulnerability Maps
- Historical Ordnance Survey (OS) Maps
- Environmental Data Report
- Environment Agency Website: <http://www.environment-agency.gov.uk/>
- Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, UKWIR, 2010.
- Coal Authority Records / Coal Mining Report
- DEFRA/Environment Agency Contaminated Land publications and DoE Industry Profiles
- BRE Guide BR211 (2007), 'Radon: Guidance on protective measures for new buildings'
- HPA-RPD-033 (2007), 'Indicative Atlas of Radon in England and Wales'
- NRPB Publication W26 (2002), 'Radon Atlas of England and Wales'
- CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings'
- BS8485:2015 Code of practice for the design of protective measures from methane and carbon dioxide ground gases for new buildings.
- BS8576:2013 Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds.
- Other technical references used throughout this document are detailed in the text.

ii CONTAMINANTS OF CONCERN

The DoE Industry Profiles are normally used to assess likely contaminants from past land use and potential nearby industrial sources. For land uses where no profile is available, likely contaminants of concern are selected by GRM based on past experience of similar sites, a general screening suite of contaminants covered by CLEA and common contaminants from the Industry Profiles.

- | | | |
|-------------------------|-------------------|--|
| • Arsenic | • Copper | • Water soluble sulphate |
| • Cadmium | • Nickel | • PAH (polycyclic aromatic hydrocarbons) |
| • Chromium (III and IV) | • Zinc | |
| • Lead | • Phenols | |
| • Mercury | • cyanide (total) | |
| • Selenium | • pH | |

Asbestos and PCBs are listed in the vast majority of profiles. PCBs are listed as the profiles expect electricity substations and switch boxes on all industrial sites. There is the potential for asbestos containing material to be mixed up with made ground, following any demolition works.

CONCEPTUAL MODEL METHODOLOGY

The consideration of contamination is based upon the principles of risk assessment, using the 'source-pathway-receptor' model in order to establish the presence, or potential presence, of a pollutant linkage.

To create a risk, contamination must have the potential to cause harm to susceptible targets or receptors such as humans, the water environment or the built environment. The potential for harm to occur requires three conditions to be satisfied to form a pollutant linkage:

- The presence of substances that may cause harm (SOURCE).
- The presence of a target which may be harmed (RECEPTOR).
- The existence of a plausible migration route between the source and the receptor (PATHWAY).

In the absence of a plausible pollutant linkage there is no risk. Where a potential linkage is identified in order for it not to pose a risk to the identified receptor it must be broken.

iv

INTRUSIVE INVESTIGATION SAMPLING METHODOLOGY

The ground investigation (including fieldwork, sampling, monitoring and laboratory analyses) has been designed to identify and assess potential ground related problems and to allow cost effective solutions to be advised. It has been planned on the basis of the desk study, site inspection and the proposed development layout (where available). All fieldwork and soil descriptions were carried out in general accordance with relevant British Standards.

The exploratory holes have been positioned and advanced to depths to determine the general ground/groundwater/gas conditions below the site. A general grid pattern has been adopted, where possible, to provide sufficient information based on the current proposed layout scheme. Some holes have been targeted at particular hazards identified in the Phase I assessment. The resultant exploratory hole density is considered to be commensurate with the complexity of the site conditions and detail of information required for this phase of the investigation.

v

GROUND GAS RISK ASSESSMENT METHODOLOGY

Gas monitoring programmes undertaken by GRM are designed to broadly comply with the recommendations outlined in BS8576:2013.

To assess the risks posed by ground gases such as carbon dioxide and methane, the relevant current guidance has been used (i.e. BS8485:2015). For radon the site has been assessed following the guidelines in 'Radon: guidance on protective measures for new dwellings (BR211: 2007)'.

vi

HUMAN HEALTH RISK ASSESSMENT METHODOLOGY

Guidance contained in the Environment Agency's CLEA Report has been used to assess the risks posed to human health.

For residential developments that include domestic gardens the default Tier 1 Assessment Criteria (TAC) for 'residential land with plant uptake' are used, i.e. a female with a start age class of one and an end age class of six. All pathways are considered including the consumption of home-grown vegetables.

For residential developments that do not include domestic gardens the default Tier 1 Assessment Criteria (TAC) for 'residential land without plant uptake' are used, i.e. a female with a start age class of one and an end age class of six. All pathways are considered except the consumption of home-grown vegetables.

For commercial/industrial developments the default Tier 1 Assessment Criteria (TAC) for 'commercial/industrial' are used, i.e. a female with a start age class of sixteen and an end age class of eighteen. All pathways are considered except the consumption of home-grown vegetables.

The TAC used by C4SLs published by DEFRA, values calculated by GRM using the CLEA v1.07 risk assessment and values and chemical data developed by LQM/CIEH.

Where soil chemical analysis results are found to exceed the TAC, Site-Specific Risk Assessments may be undertaken using the CLEA v1.07 risk assessment software using the age classes and pathways described above.

vii RISK TO SITE WORKERS – GENERAL COMMENTS

The risks to site workers are similar to those posed to site end users, although likely to be less severe due to the site workers' shorter exposure to the identified contamination. However, site workers (particularly groundworkers) are more likely to come into direct contact with contaminated soils due to the nature of their work. On this basis ground and construction workers should be provided with basic Personal Protective Equipment based on the site's general health and safety risk assessment, but including as a minimum safety footwear, gloves and overalls.

A site specific risk assessment should be carried out for all hazards identified within the ground investigation in accordance with current health and safety legislation. This assessment should identify any measures required to further reduce risks i.e. providing further Personal Protective Equipment, welfare facilities and if necessary preventing access to certain areas.

Demolition and dismantling of existing structures on the site must be carried out to a safe and acceptable standard, in accordance with current UK guidance and best practice. Whilst not ground related, asbestos and hazardous substances surveys should be conducted prior to any demolition.

Any unusual colours, odours and suspicious ground should be reported immediately to site management and then GRM.

Whilst this appraisal has considered the long-term effects of contamination, GRM can also help during the formulation of Health and Safety documentation, if required.

viii CONTROLLED WATERS RISK ASSESSMENT METHODOLOGY

Where the desk study and fieldwork do not reveal a potential source of contamination no leachate or groundwater testing will be performed. Where a potential source is identified the testing will comprise leachate testing on the material considered most likely to pose a risk, groundwater testing will be undertaken if water is present at shallow depth.

The UK Drinking Water Standards (UKDWS) or Environmental Quality Standards (EQS) are usually adopted for comparison with the leachate/groundwater test results. When the most sensitive receptor is considered to be the an aquifer (groundwater) UKDWS will be adopted as the Initial Tier 1 screening values. Where the most sensitive receptor is a surface water feature the EQS values will be used as Initial Tier I Screening values.

ix CONSTRUCTION MATERIALS RISK ASSESSMENT METHODOLOGY

The 'screening levels' adopted for the assessment of risk to construction materials are taken from the following documents:

- UK Water Industry Research (UKWIR) Contamination thresholds for sub-surface water pipes, for the protection of buried pipes.
- Building Research Establishment (BRE) Special Digest SD1 (2005), 'Concrete in Aggressive Ground', for the protection of buried concrete.

x WASTE DISPOSAL AND SITE WASTE MANAGEMENT PLANS

Under current Waste Management Regulations, waste soil materials produced from the site will require characterisation to enable it to be disposed of correctly.

The chemical analysis results included in this report should be provided to the relevant landfill operators to establish the characterisation of the waste, confirm its suitability for landfill disposal and provide estimated costings. If material is classified as hazardous, then the site will need to be registered with the Environment Agency prior to the movement of the waste.

Depending on the receiving landfill's current permit, further chemical analysis, incorporating Waste Acceptance Criteria (WAC) leachate analysis, may be required.

All materials removed from the site will be classified as 'waste' and therefore must be removed by a suitably licensed carrier of waste. This applies whether or not the waste is contaminated. All waste removed to landfill will attract Landfill Tax.

The developer/builder is likely to be classed as the waste producer and therefore, has a duty of care to ensure that all waste is disposed of appropriately. This includes ensuring the waste carrier is licensed and disposes of the waste to a suitably licensed landfill site. They are also required to keep a paper trail from 'cradle to grave' including copies of the waste disposal tickets.

Efficient materials management on site is recommended as it can lead to significant cost savings when compared to the traditional side casting or single stockpile of arisings. Likewise making the site as volume neutral as possible will reduce the costs of development.

Site Waste Management Plans allow better waste management practices, help to reduce the amount of waste produced and identify best environmental disposal options. Implementing a Site Waste Management Plan (SWMP) can reduce costs (increasing business profits) and maximise resource efficiency.

SWMPs are a legal requirement for all projects with an overall development cost of over £300k. GRM can assist in the production of SWMPs which comply with the Code of Practice and identify best environmental disposal options when dealing with waste.

xi GEOTECHNICAL ASSESSMENT GENERAL COMMENTS

Where finished floor levels of proposed structures have not been provided by the Client, then for the purposes of initial assessment, GRM will assume that finished levels will not vary appreciably from the existing ground levels. If the depths of any underground engineering works (i.e. sewers, pumping stations etc.) are unknown they will not be taken in to account in the assessment and it will be assumed that any such works will not compromise foundation or ground stability.

Should the development proposals or finished levels be different from these assumptions then the comments/recommendations in the Geotechnical Assessment may require revising.

It should be noted that the results of window sampling and/or cable percussive boreholes may not give a true indication of a soils actual engineering properties (i.e. stability, mass structure etc). GRM consider that that prior to development trial pitting should be undertaken to confirm the recommendations in the Geotechnical Assessment.

xii GEOTECHNICAL ASSESSMENT – ENGINEERING GROUND TREATMENT

Near surface soils have the potential to be disturbed by weathering and site traffic. Precautions should always be taken to avoid this, as excessive disturbance may lead to more onerous floor slab designs, road cap thickness and increased amounts of off site disposal etc.

Near surface soils may need treatment or reinforcing to allow safe movement of construction plant and labour. An assessment by the contractor should be undertaken once the type of machinery/plant needed to complete the development is known.

GEOTECHNICAL ASSESSMENT – EXCAVATIONS

Excavation instability (over-break) can result in damage to existing services or structures (e.g. foundations, roads or boundary walls/fences) both on and off-site, as well as increased foundation concrete costs. In order to minimise this, all excavations deeper than 1.2m deep (or any excavation within 1.5m of any existing structure or service) should be supported. Full support should be provided to the full depth of all near vertically sided excavations in made ground, soft and very soft clays and granular soils. A reduction to intermediate support should be acceptable within firm and stiffer natural clays.

Wherever possible, man entry into excavations should be prevented; however, where this is not possible, entry to, and time spent in, excavations should be kept to a minimum.

The build program should be tailored to reflect the impact that deep excavations through potentially unstable strata can have on adjacent properties, so that they are not undermined.

All excavations on site should be in accordance with HSE guidelines and stability should be practically maintained at all times. Reference should be made to HSE construction information sheet No. 8 (Revision 1) 'Safety in Excavations'.

Care should be taken to ensure that falls from excavation faces do not adversely affect the integrity of foundation concrete.

If contaminated water enters excavations it should be removed and transported to an appropriate treatment facility by a suitably licensed carrier before construction begins.

xiv

GEOTECHNICAL ASSESSMENT – SUBSTRUCTURES

Where practicable, existing buried construction should be fully removed; however, if this is not practicable all new foundations should be carried down to fully penetrate it and it should be broken well away from all new structures.

There may be existing structures and/or infrastructure in close proximity to the proposed development. New build foundations may be constructed next to pavements with existing underground services beneath them, or excavations may be required near existing footings associated with adjacent properties. These potential hazards need to be taken into consideration when designing foundations and the groundworker needs to be made aware of their potential impact during the redevelopment works. Foundations close to existing underground services or buildings may require alternative foundation techniques (such as piling) to protect the integrity of these structures.

The contractor for the works should carry them out in such a fashion so as to not cause excessive overbreak, concrete usage or undermine existing buildings/roads/ services that are to be retained.

xv

GEOTECHNICAL ASSESSMENT – SOAKAWAYS

Soakaway testing in trial pits by GRM is broadly carried out in accordance with BRE 365 (1991). The testing comprises the excavation of a test pit to a suitable depth, and the placement of water into the pit. The level of water present is then monitored over time. For borehole installations, the permeability testing (falling head/rising head) is undertaken in accordance with BS5930.

If it is decided to proceed with the use of soakaway drainage, then the following general points should be noted:

- Soakaways should not be placed so that water can be discharged through potentially contaminated made ground.
- The Environment Agency may require soakaways to be sealed systems such that only roof run off falls to soakaway.
- Interceptors are likely to be required for soakaways for highway drainage. The adopting authority for the highways should be consulted at the earliest opportunity regarding the use of soakaways for highways drainage.
- Consideration of site levels and slopes should be taken into account during the design.

- The construction of all soakaways should be in accordance with the current building regulations.
- Soakaways should not be placed within 5m of a proposed building.
- Placement of soakaways needs to be considered so as to avoid ponding of water down slope.
- The base of a soakaway should not be below the highest recorded water level.
- The Environment Agency prefer 1m of dry soil to be present between the base of a soakaway and the water table to provide attenuation for contamination.

xvi GEOTECHNICAL ASSESSMENT – FOUNDATIONS

If soft or hard spots are encountered during foundation excavation then they should be replaced with suitably compacted material or the footings deepened to suitable strata, to avoid differential settlement.

If strata of differing bearing character (e.g. sand and clay) are encountered at foundation levels within the excavations for a single plot then the excavation depths should be altered as appropriate to ensure the foundations rest on a single stratum, or strata that will not induce differential settlement. Where this is impractical then GRM should be contacted to assess a reinforced concrete detail or an alternative foundation solution (e.g. piles or vibro-replacement).



NOTES ON LIMITATIONS**General**

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Phase I Environmental Audits/ Desk Studies

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, GRM Development Solutions Limited reserves the right to review such information and as considered necessary and appropriate to modify the opinions accordingly. It should be noted that any risks identified in a Phase 1 report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Environmental Audits (Contamination Investigations)

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, ground and groundwater conditions to allow a reasonable risk assessment to be made. The objectives of the investigation have been limited to establishing the risks associated with potential human targets, building materials, and controlled waters.

The amount of exploratory work and chemical testing undertaken has necessarily been restricted by the short timescale available, and the locations of exploratory holes have been restricted to the areas unoccupied by the building(s) on the site and by buried services. A more comprehensive investigation may be required if the site is to be redeveloped as, in addition to risk assessment, a number of important engineering and environmental issues need to be resolved.

For these reasons if costs have been included in relation to site remediation these must be considered as provisional only and must, in any event, be confirmed by a commercial adviser.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. Whilst exploratory testing is intended to gain an accurate representation of the site, the very nature of sampling and testing is such that it cannot ensure that all localised conditions are detected.

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

Phase II Geo-environmental Investigations (Combined Geotechnical and Contamination Investigations)

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, geotechnical characteristics, and ground and groundwater conditions to provide a reasonable assessment of the environment risks together with engineering and development implications. If costs have been included in relation to site development a commercial adviser must confirm these.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site for each of the exploratory holes. There may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

The comments made on groundwater conditions are based on observations made at the time the site work was conducted. It should be noted that groundwater levels will vary owing to seasonal, tidal and weather related effects. The scope of the investigation was selected on the basis of the specific development proposed by the Client and may be inappropriate to another form of development or scheme.

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



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info@grm-uk.com www.grm-uk.com

CLIENT:

Cubic Surveying

PROJECT:

2 Inchfield Close

TITLE:

Proposed Development Plan

SCALE@SIZE

NTS

ISSUE:

Final

DESIGN/DRAWN:

GS

DATE:

March 2018

PROJECT No:

P8364

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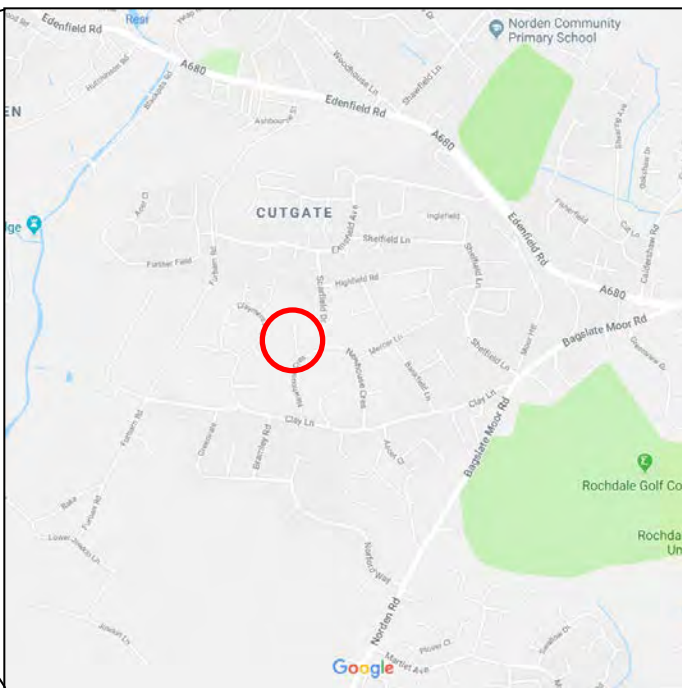
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CLIENT:

Cubic Surveying

PROJECT:

2 Inchfield Close

TITLE:

**Site Location and
Boundary Plan**

SCALE@SIZE

NTS

ISSUE:

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PROJECT:

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TITLE:

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PROJECT:

2 Inchfield Close

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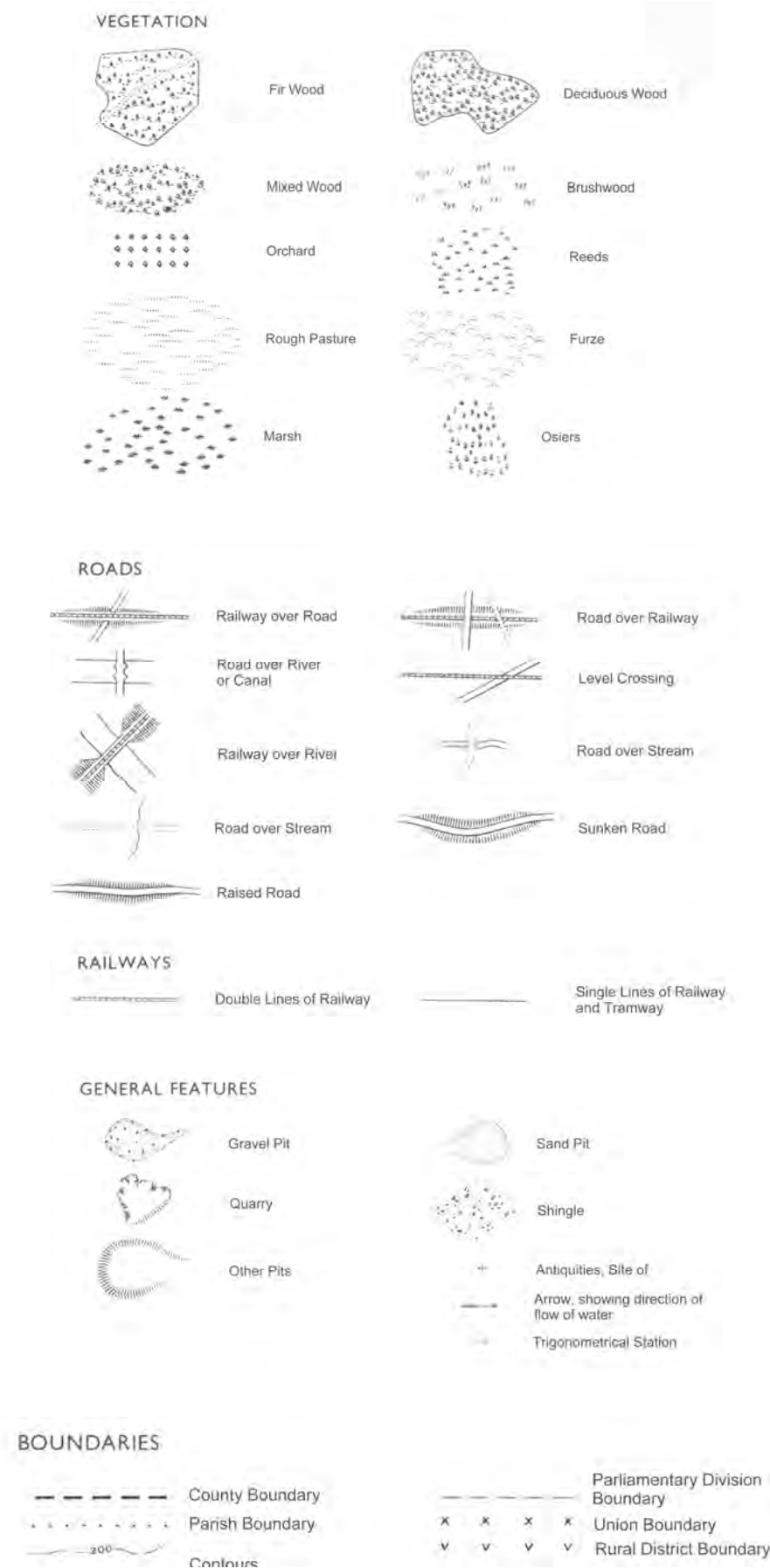
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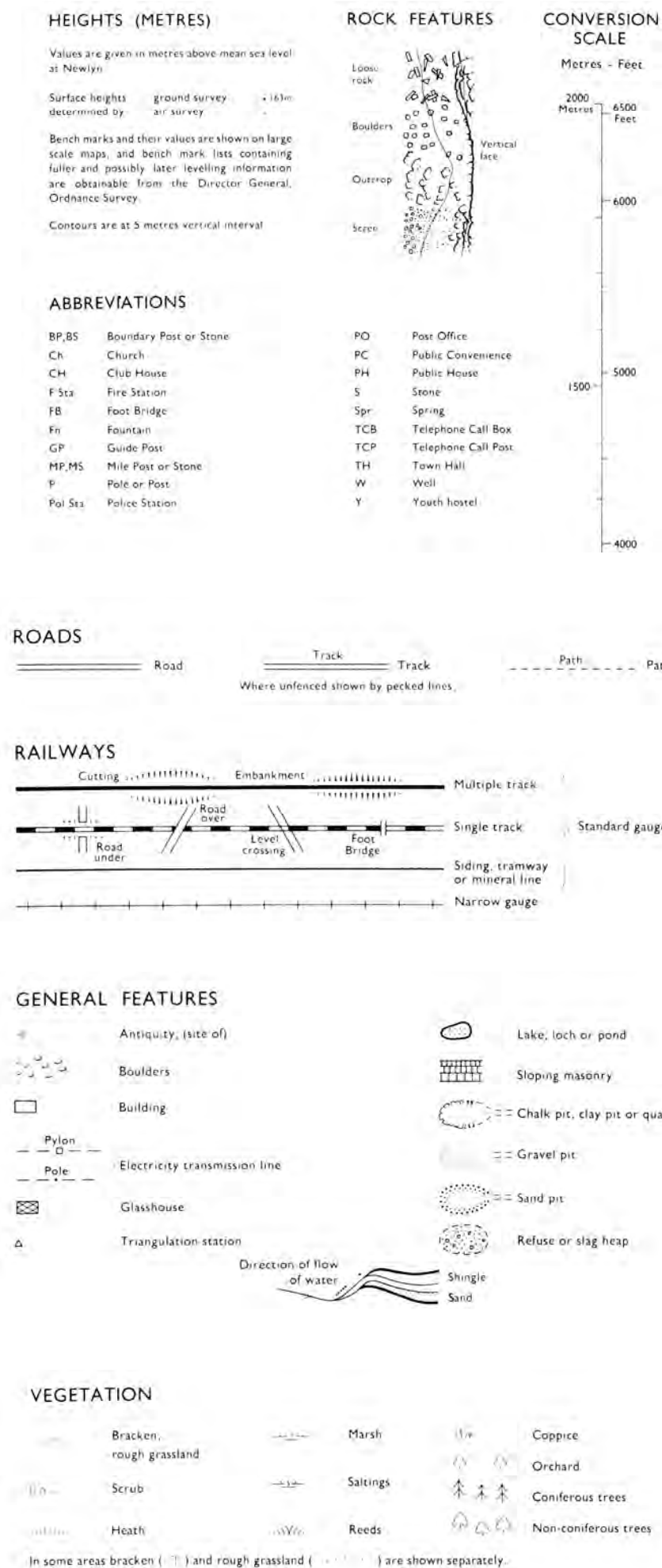
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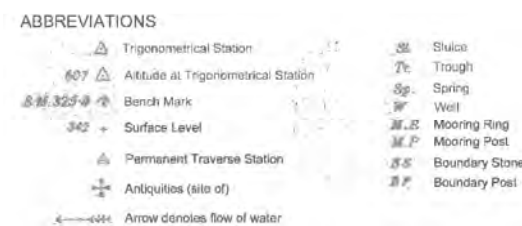
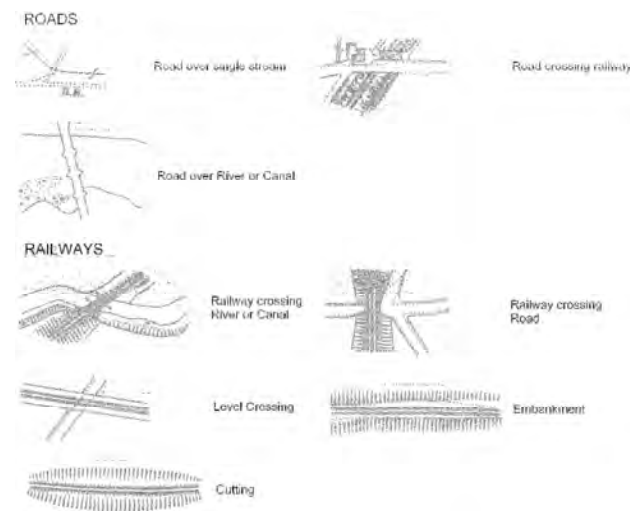
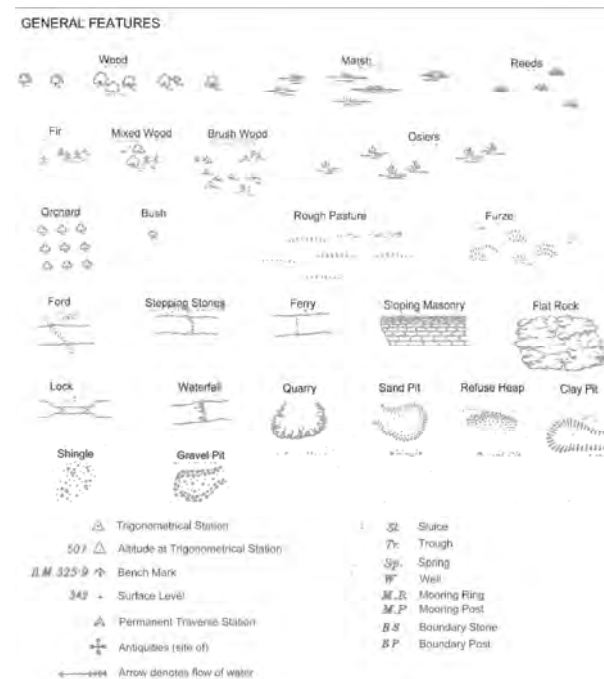
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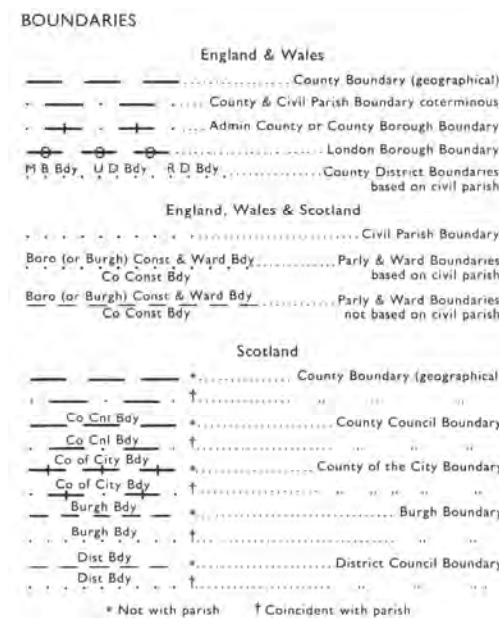
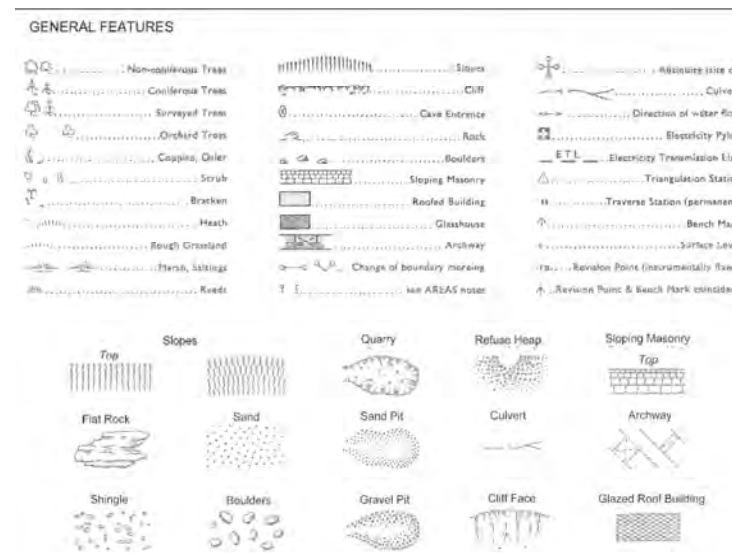
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National Grid 1:2,500 / 1:1,250 scale



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Map Name: County Series

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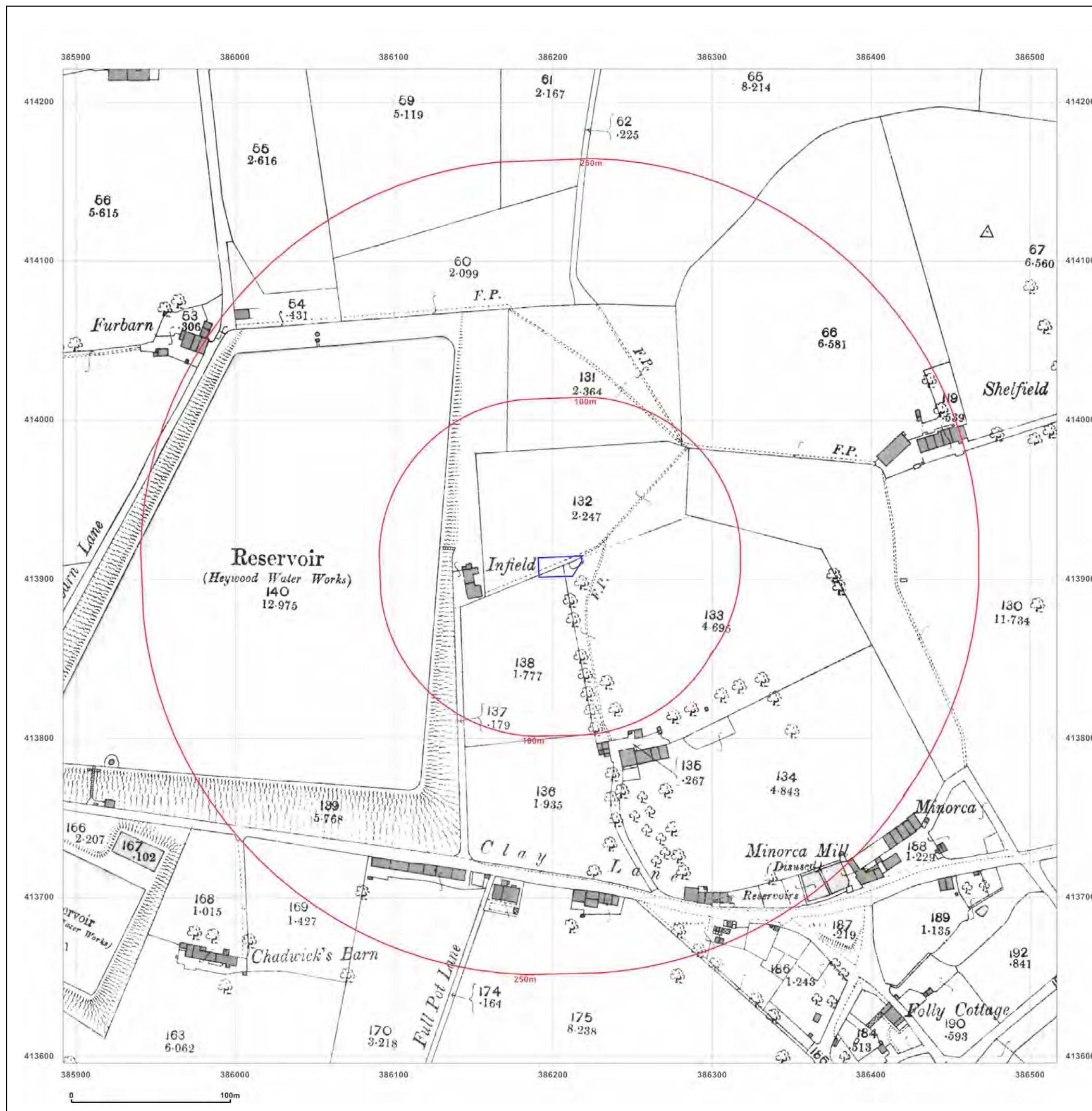


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Map Name: County Series

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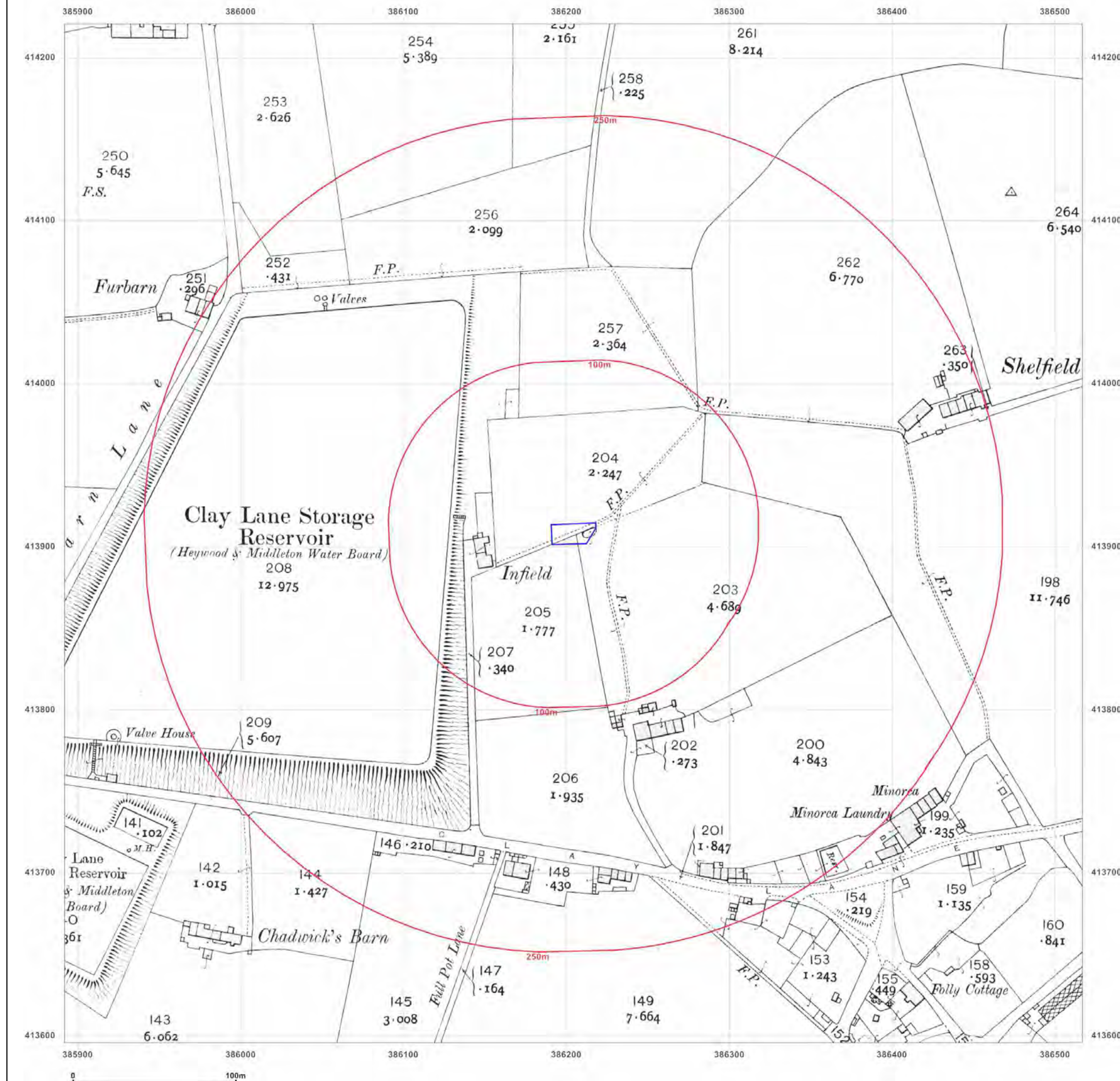


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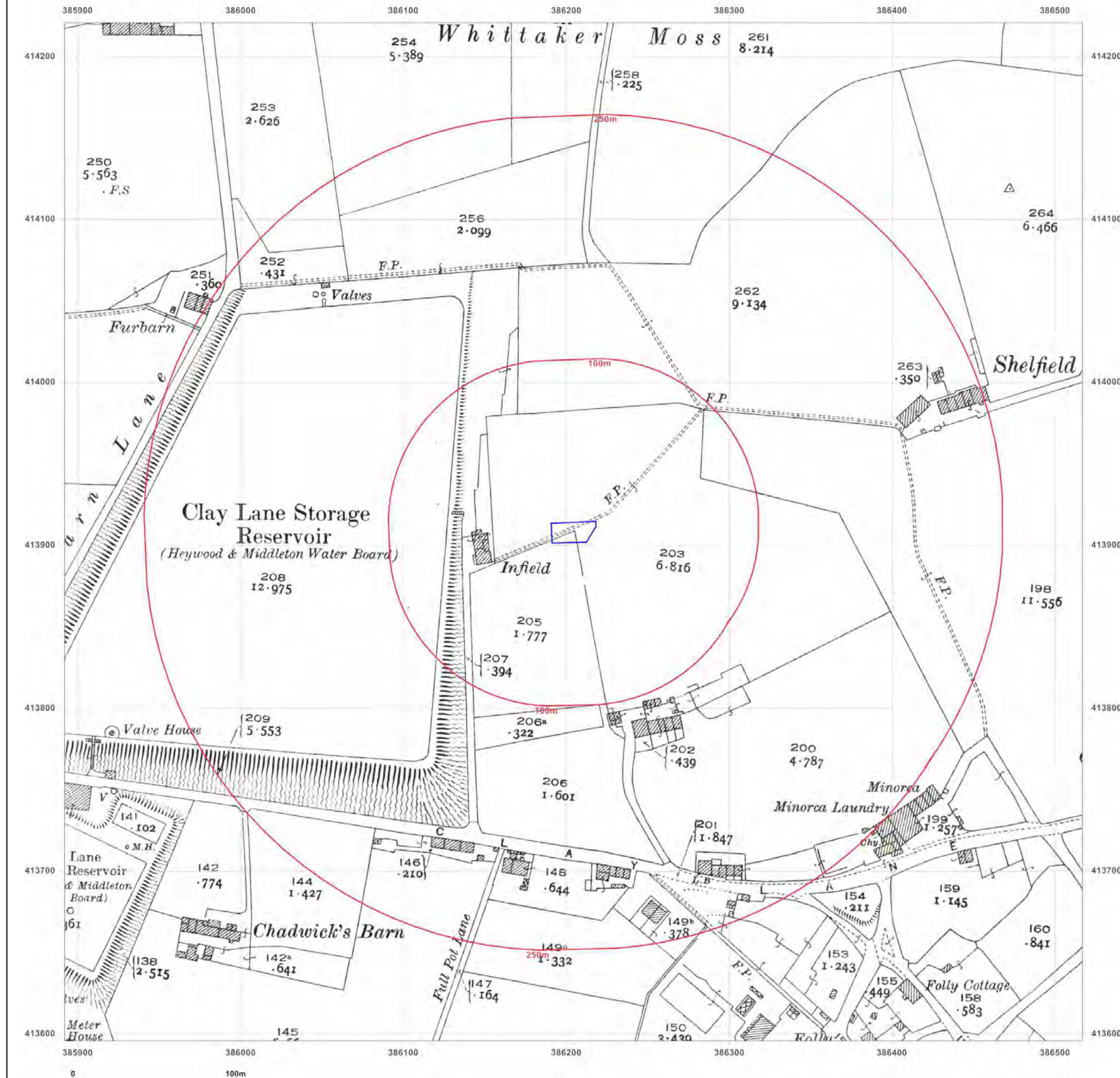


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Map Name: National Grid

Map date: 1959

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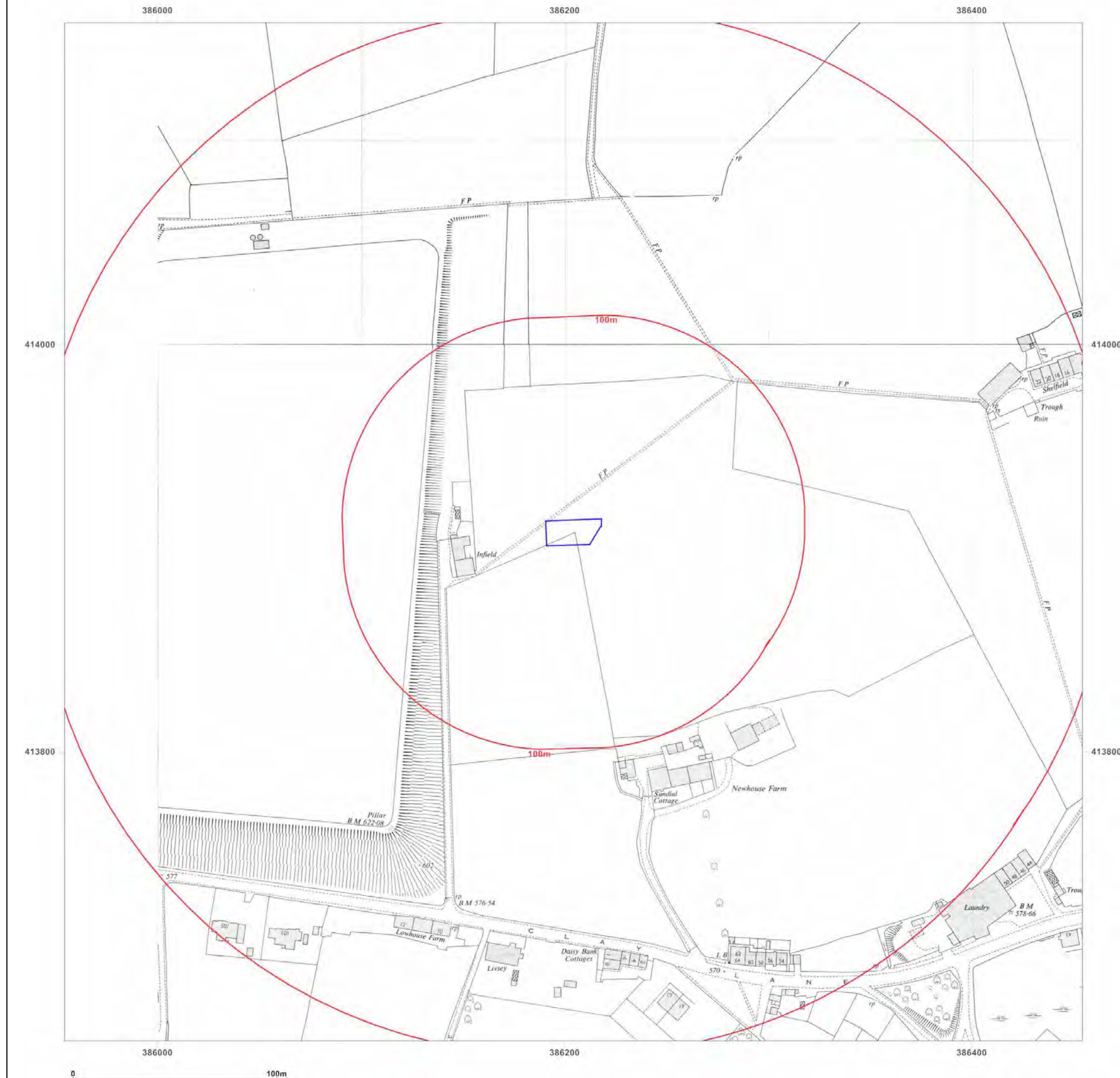


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Map Name: National Grid

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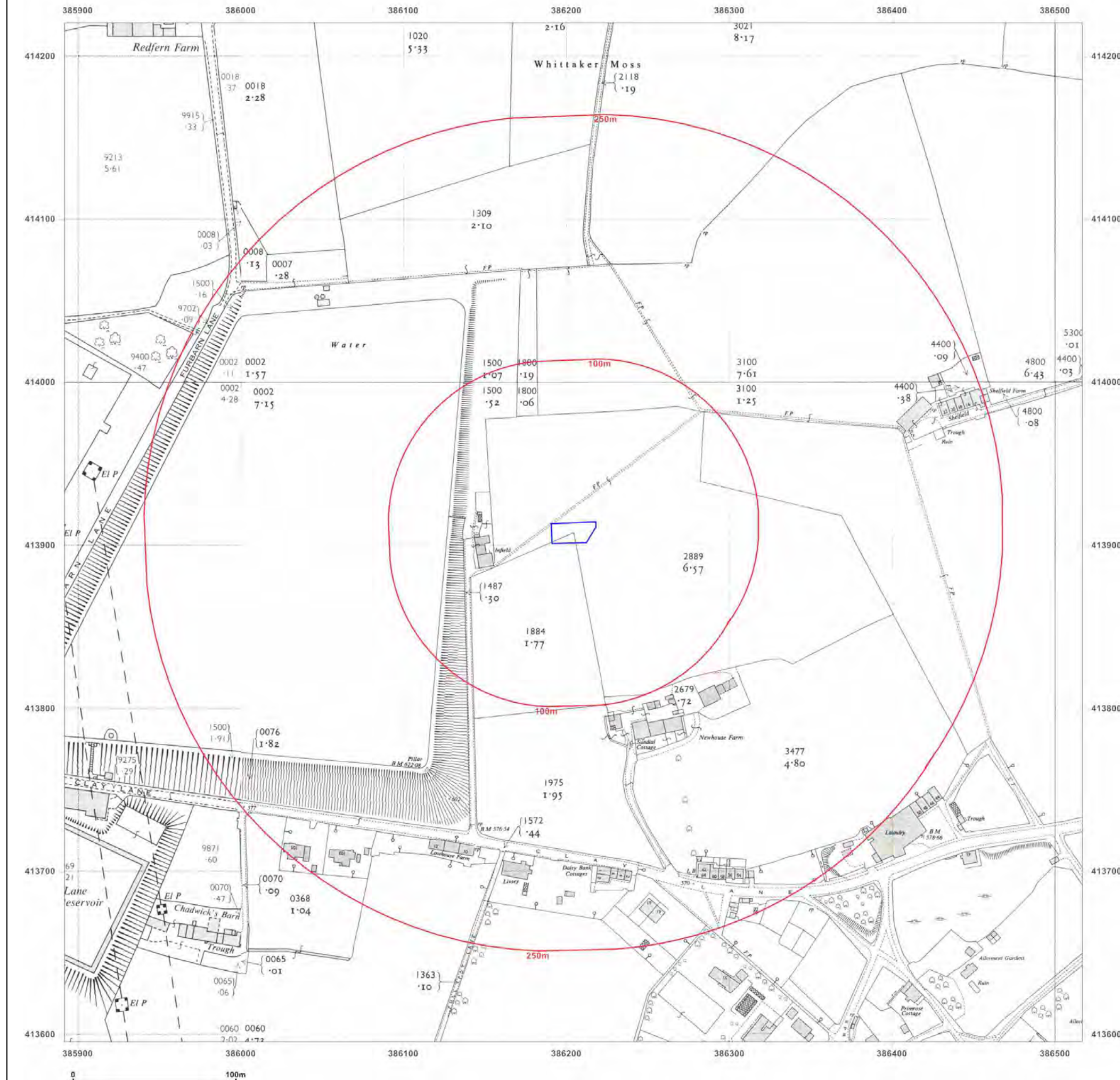


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Client Ref: EMS_464665_623681
Report Ref: EMS-464665_623681
Grid Ref: 386204, 413908

Map Name: National Grid

Map date: 1966-1968

Scale: 1:1,250

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Grid Ref: 386204, 413908

Map Name: National Grid

Map date: 1974-1975

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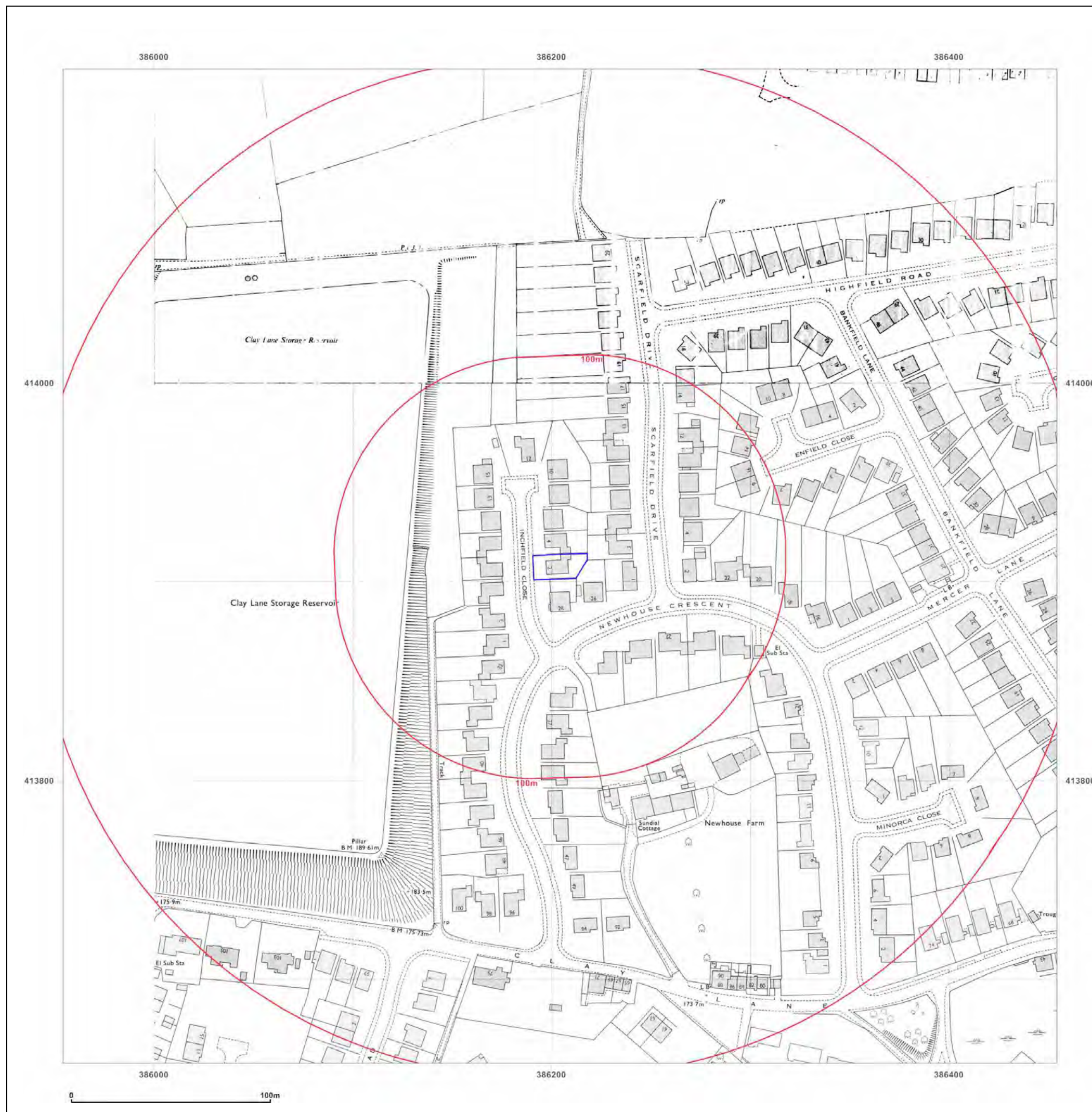


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Report Ref: EMS-464665_623681
Grid Ref: 386204, 413908

Map Name: National Grid

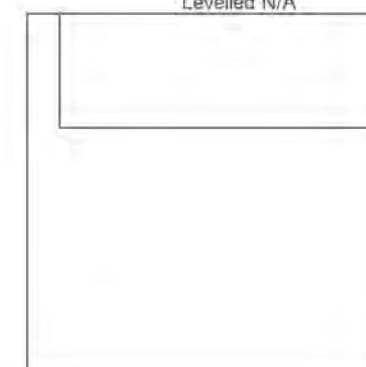
Map date: 1975

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Grid Ref: 386204, 413908

Map Name: National Grid

Map date: 1981-1985

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Client Ref: EMS_464665_623681
Report Ref: EMS-464665_623681
Grid Ref: 386204, 413908

Map Name: National Grid

Map date: 1988-1992

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Client Ref: EMS_464665_623681
Report Ref: EMS-464665_623681
Grid Ref: 386204, 413908

Map Name: National Grid

Map date: 1991-1992

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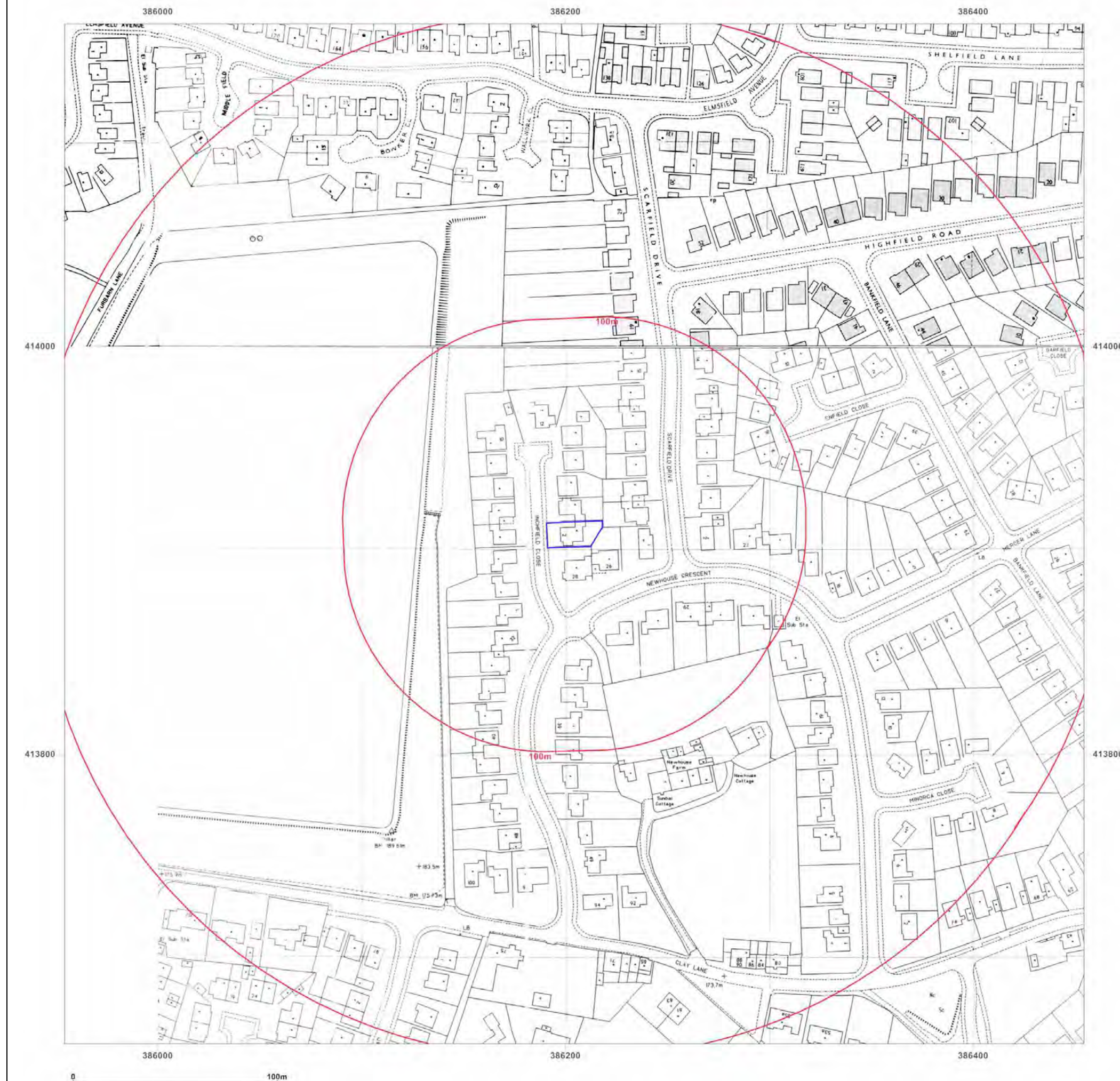


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Client Ref: EMS_464665_623681
Report Ref: EMS-464665_623681
Grid Ref: 386204, 413908

Map Name: National Grid

Map date: 1992

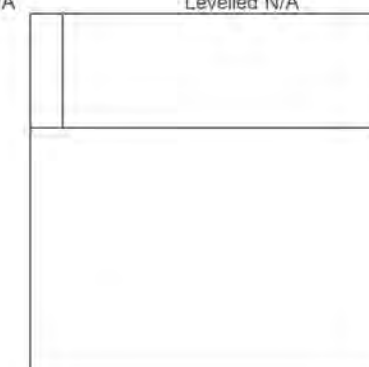
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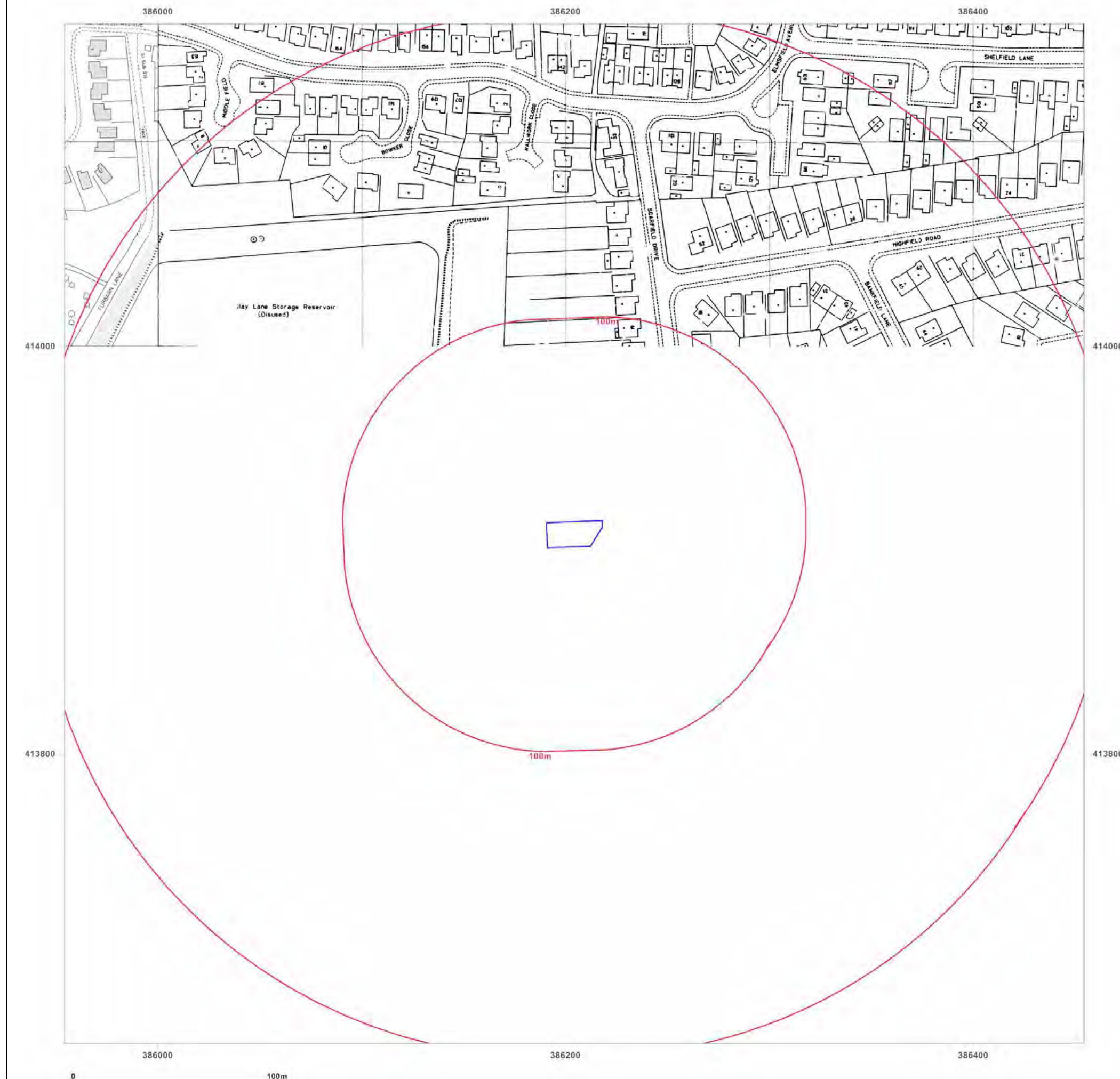


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Client Ref: EMS_464665_623681
Report Ref: EMS-464665_623681
Grid Ref: 386204, 413908

Map Name: County Series

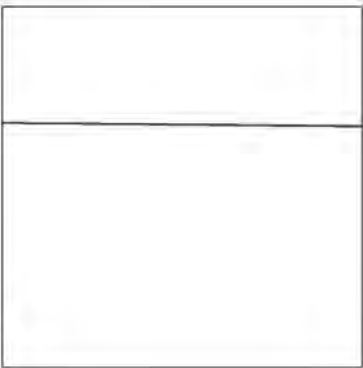
Map date: 1851

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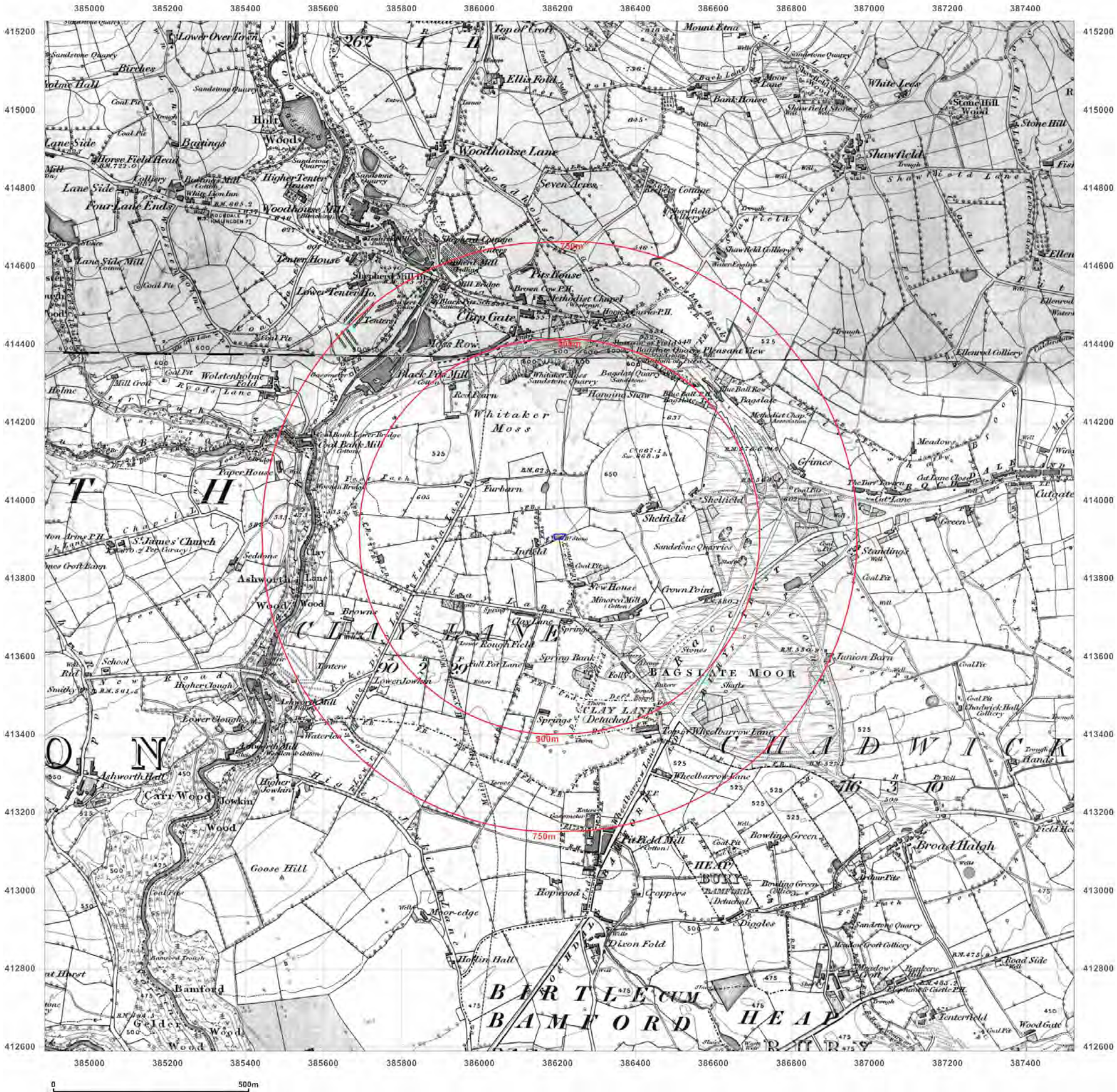


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Map Name: County Series

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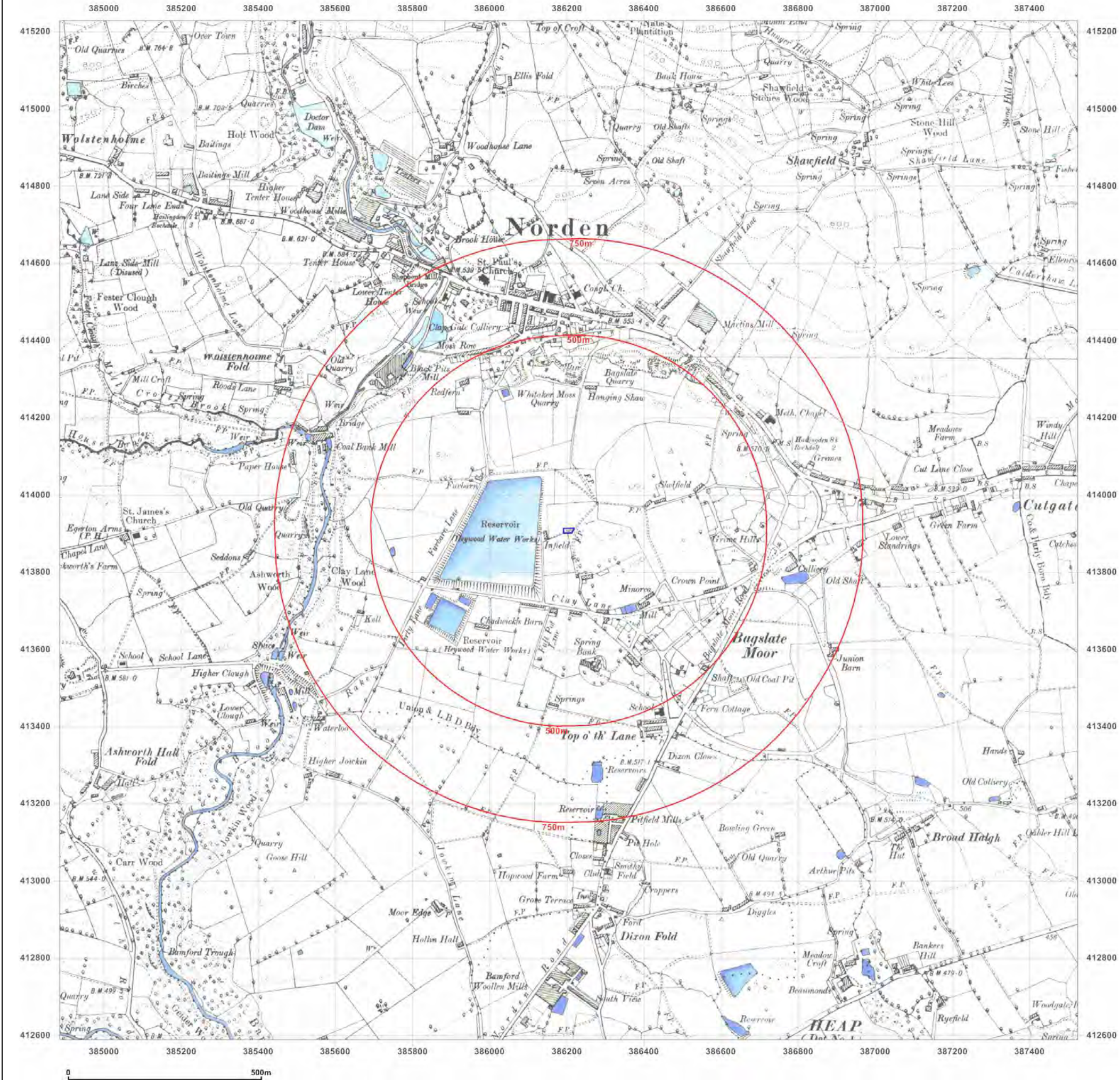


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Map Name: County Series

Map date: 1908-1909

Scale: 1:10,560

Printed at: 1:10,560



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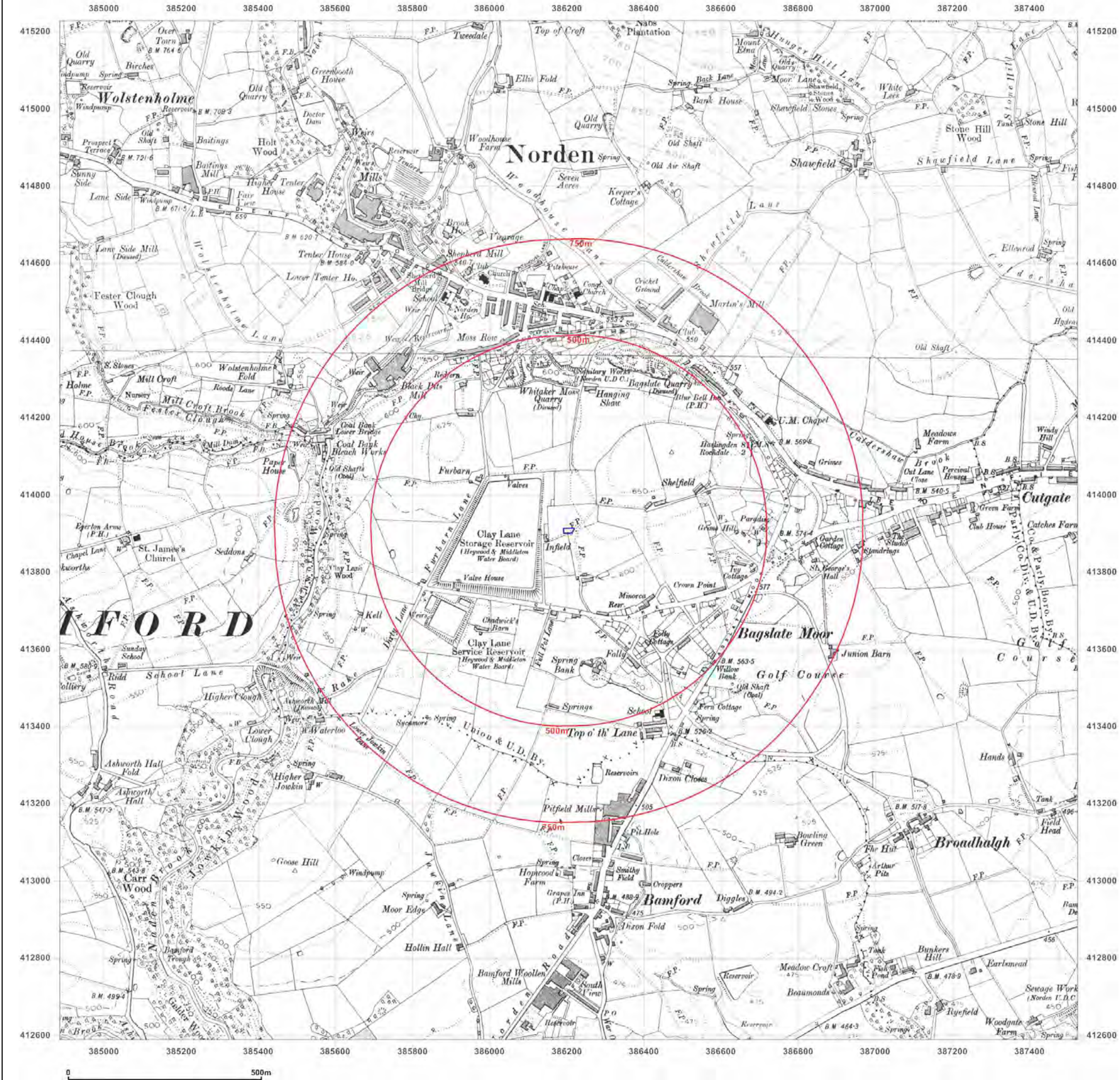


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Site Details:

2 Inchfield Close, Rochdale,
OL11 5SB, 2 Inchfield
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Client Ref: EMS_464665_623681
Report Ref: EMS-464665_623681
Grid Ref: 386204, 413908

Map Name: County Series

Map date: 1928

Scale: 1:10,560

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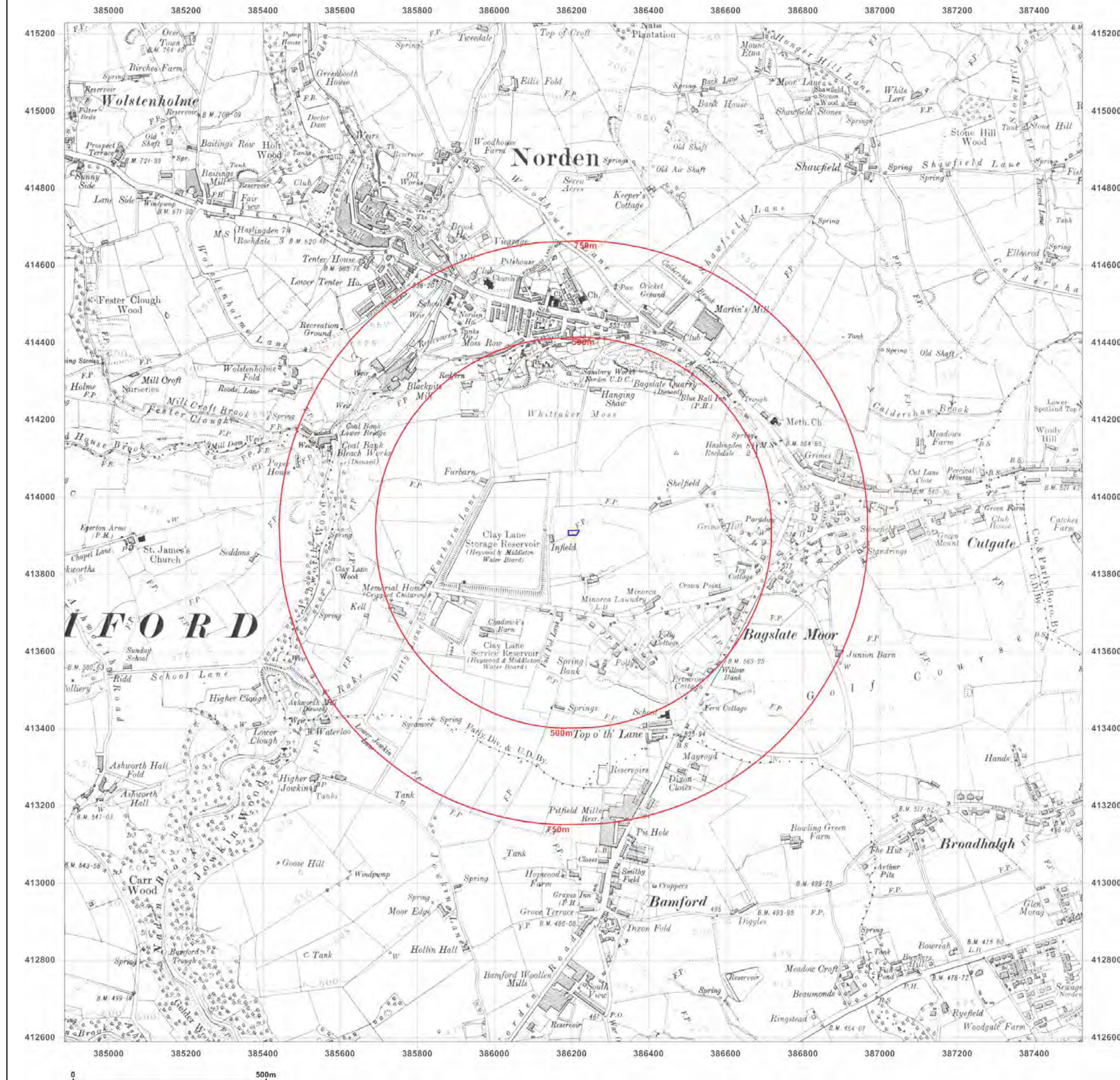


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Client Ref: EMS_464665_623681
Report Ref: EMS-464665_623681
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Map Name: County Series

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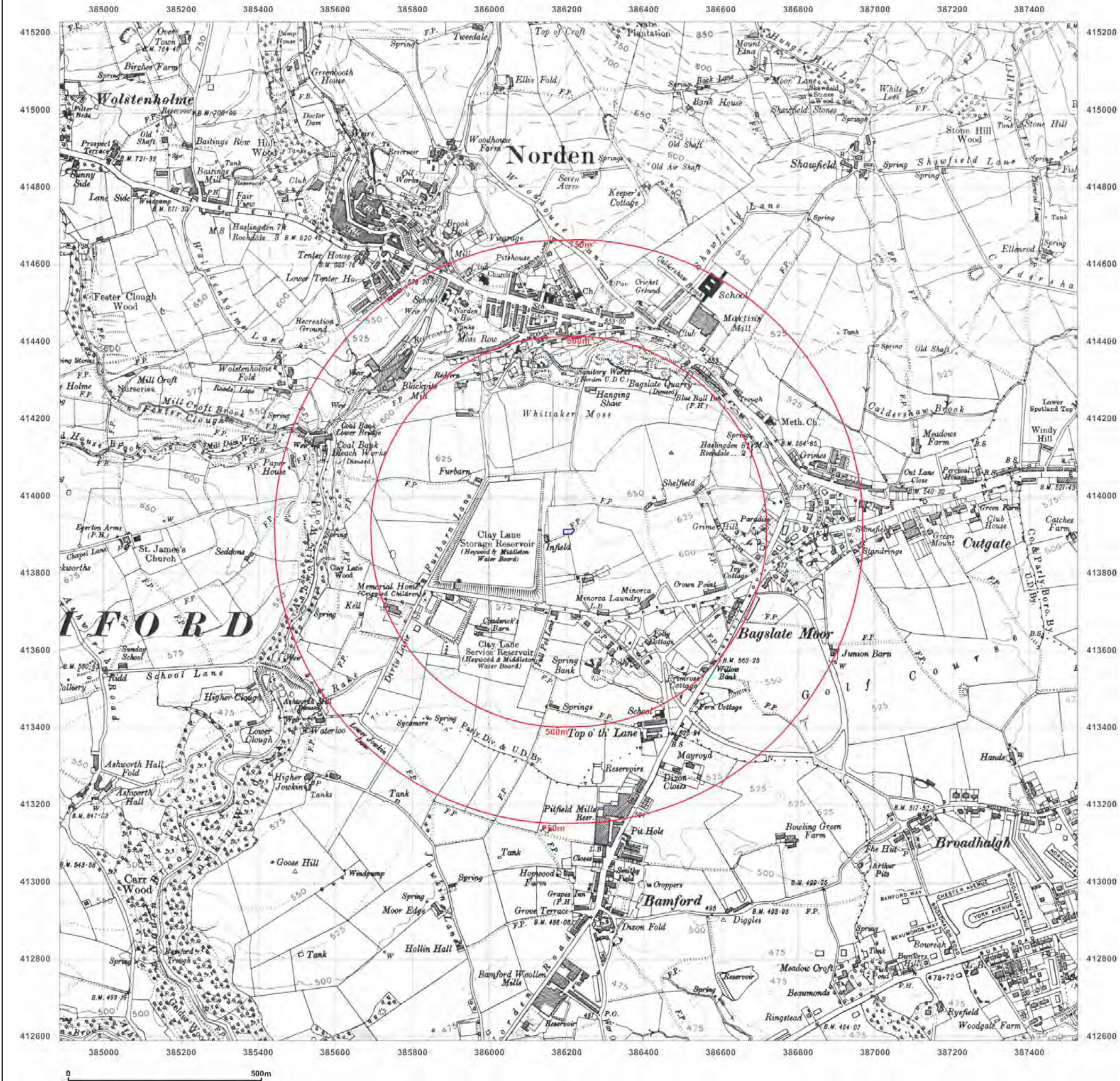


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Client Ref: EMS_464665_623681
Report Ref: EMS-464665_623681
Grid Ref: 386204, 413908

Map Name: Provisional

Map date: 1956

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Printed at: 1:10,560



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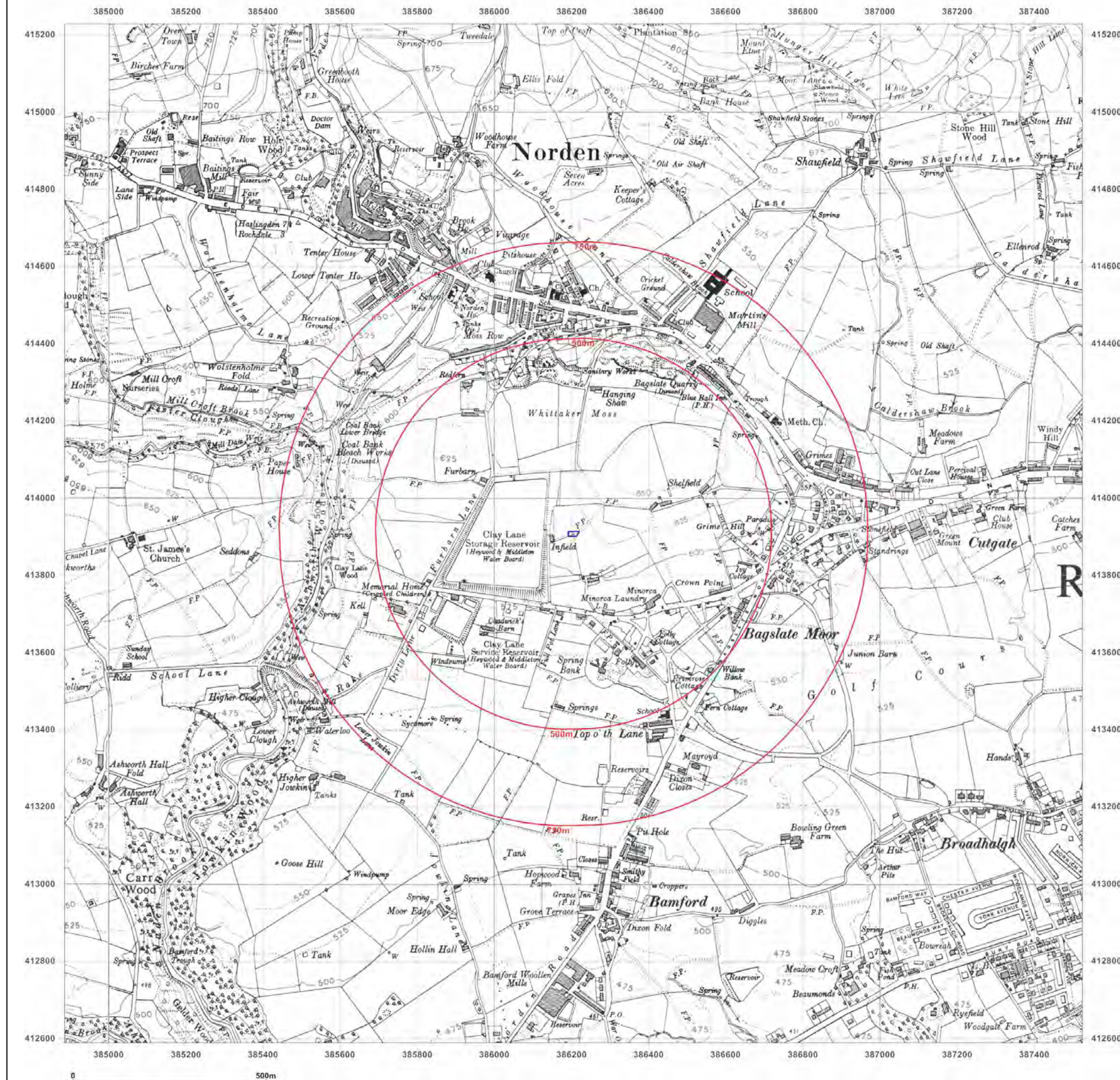


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Client Ref: EMS_464665_623681
Report Ref: EMS-464665_623681
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Scale: 1:10,560

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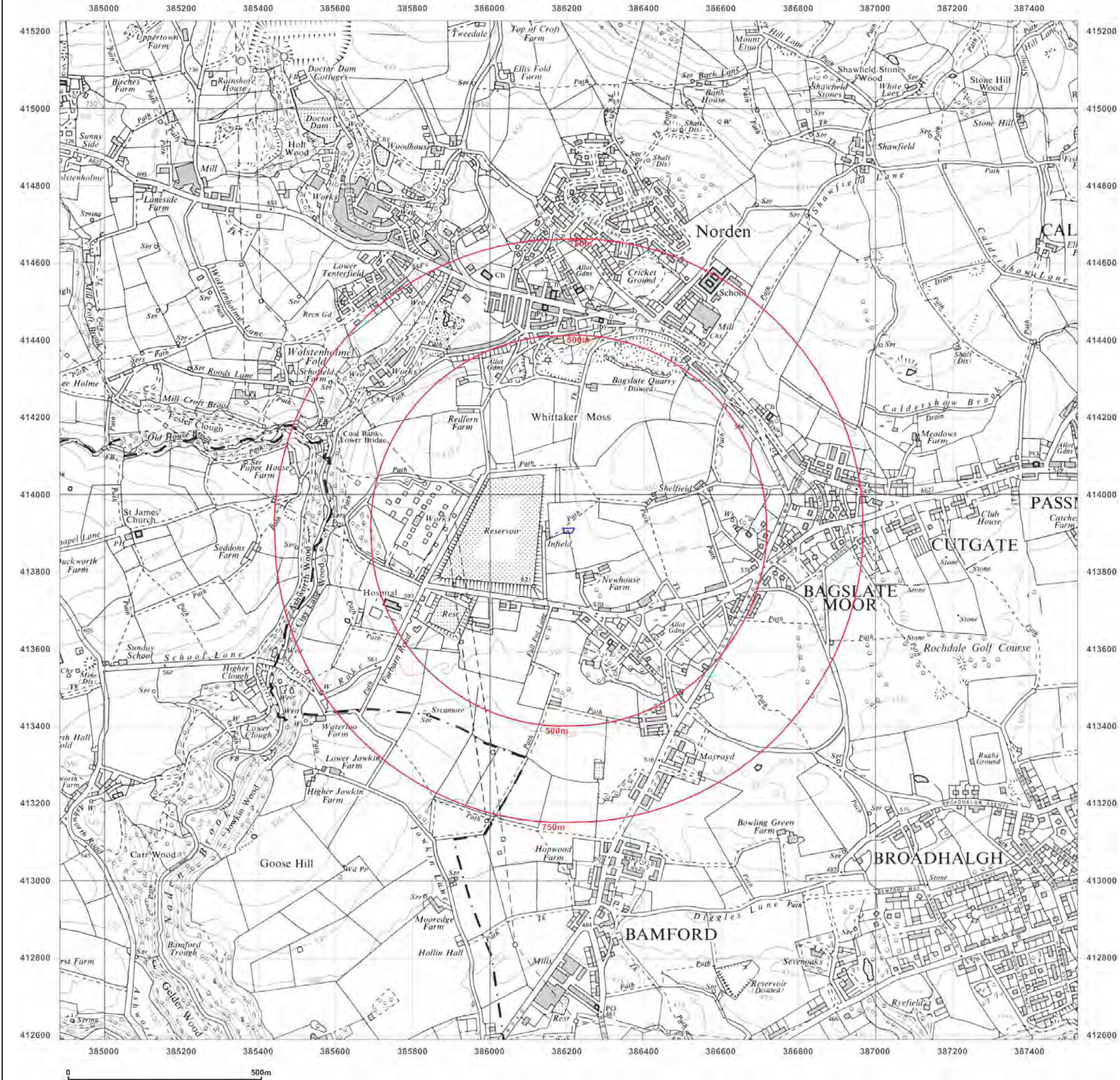


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Client Ref: EMS_464665_623681
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Map Name: National Grid

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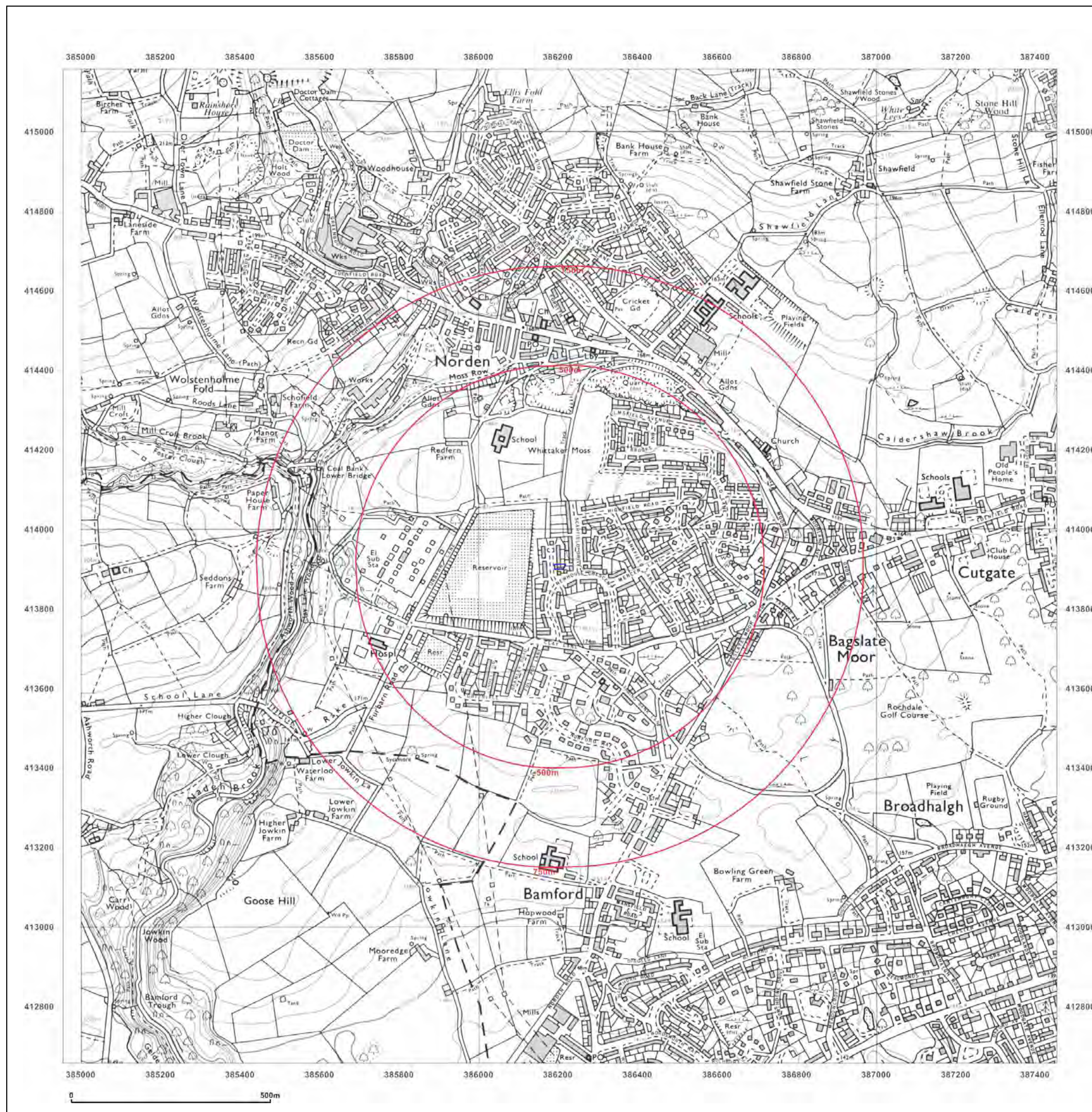


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Report Ref: EMS-464665_623681
Grid Ref: 386204, 413908

Map Name: National Grid

Map date: 1983-1987

Scale: 1:10,000

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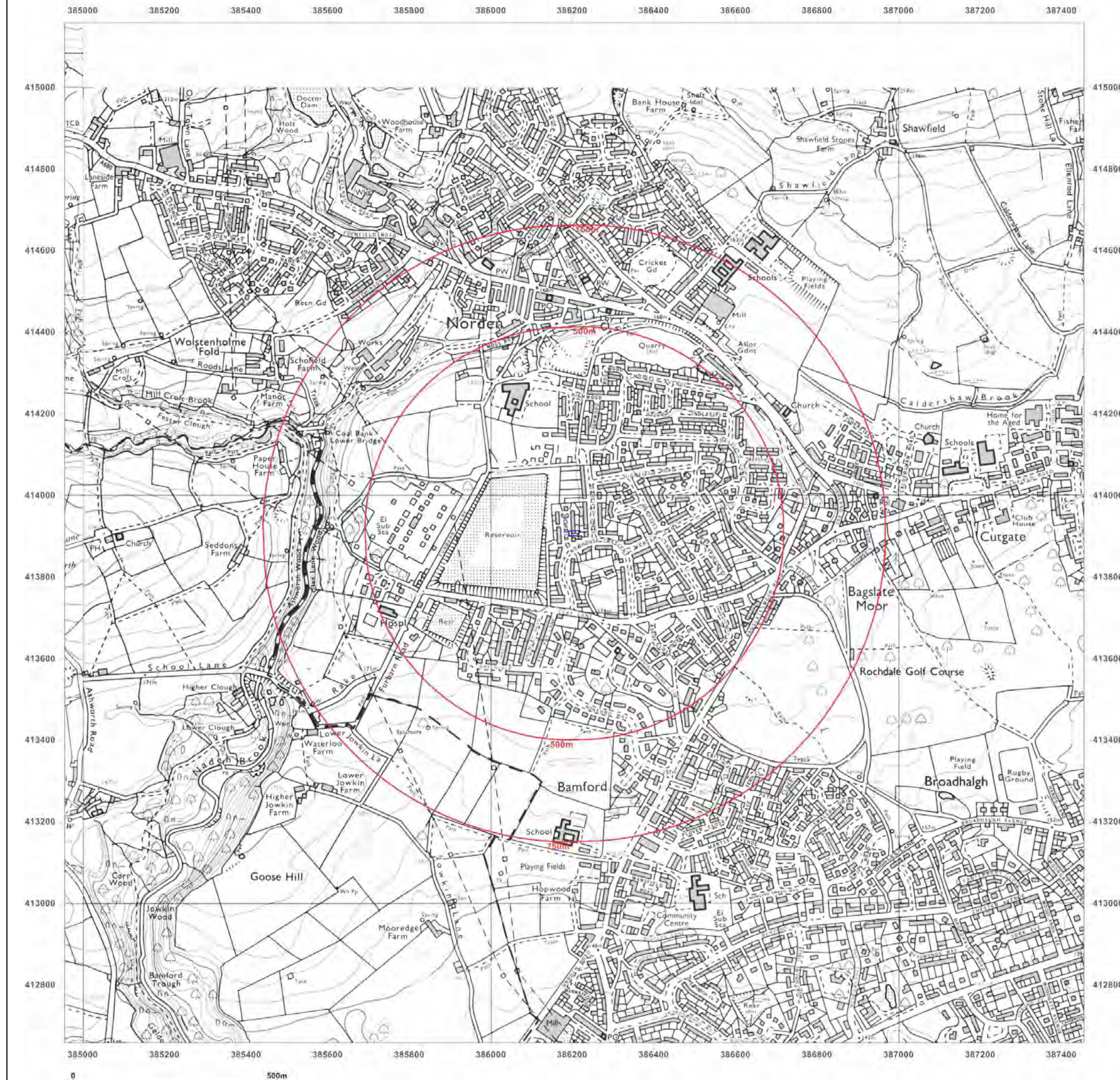


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Client Ref: EMS_464665_623681
Report Ref: EMS-464665_623681
Grid Ref: 386204, 413908

Map Name: National Grid

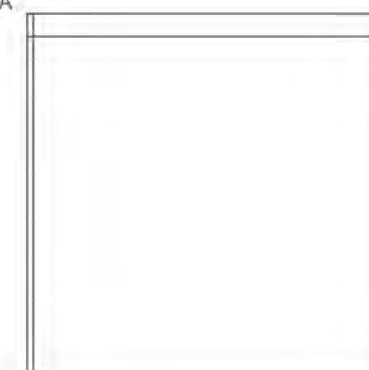
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Scale: 1:10,000

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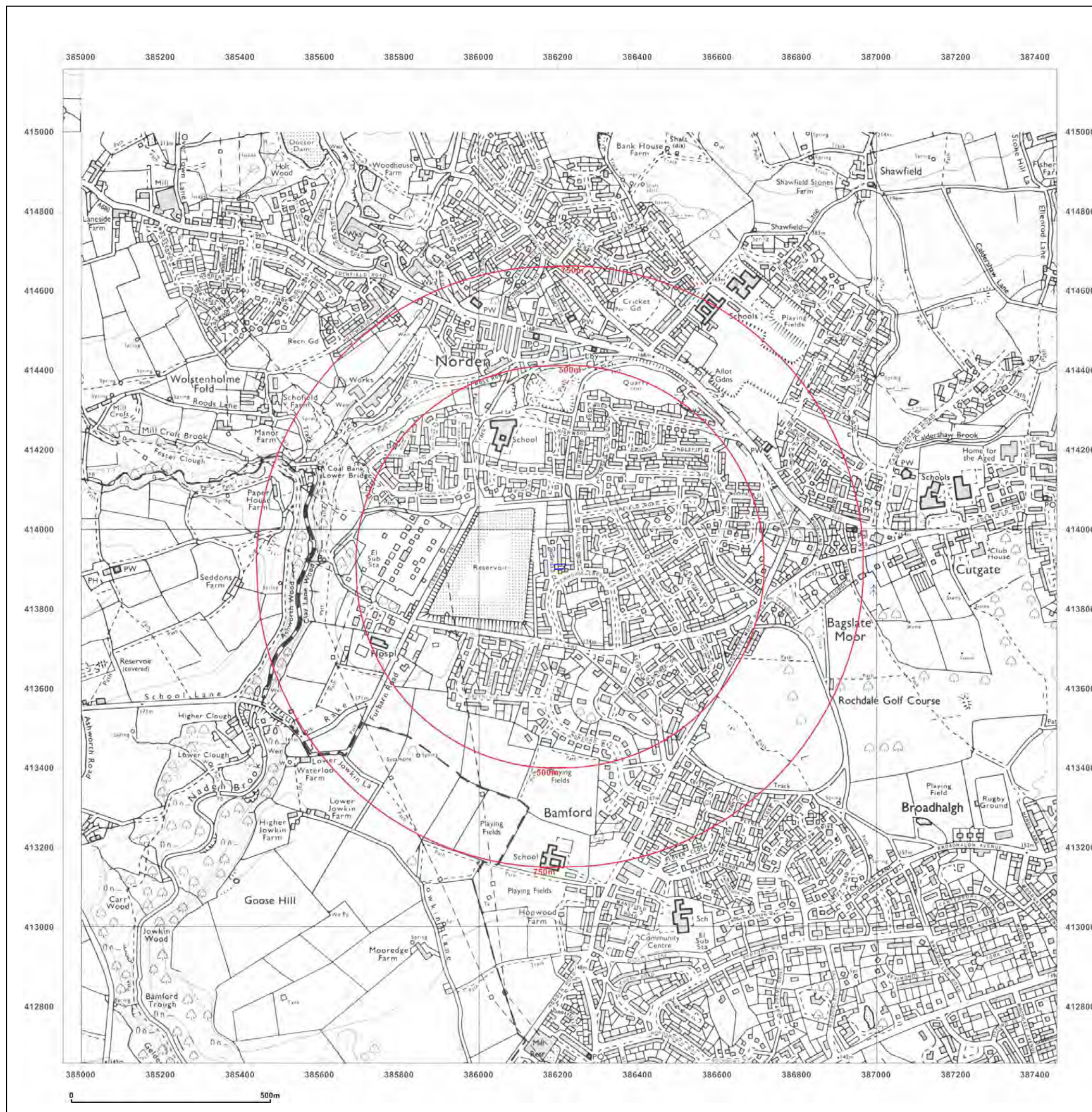


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Client Ref: EMS_464665_623681
Report Ref: EMS-464665_623681
Grid Ref: 386204, 413908

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

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Site Details:

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Client Ref: EMS_464665_623681
Report Ref: EMS-464665_623681
Grid Ref: 386204, 413908

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

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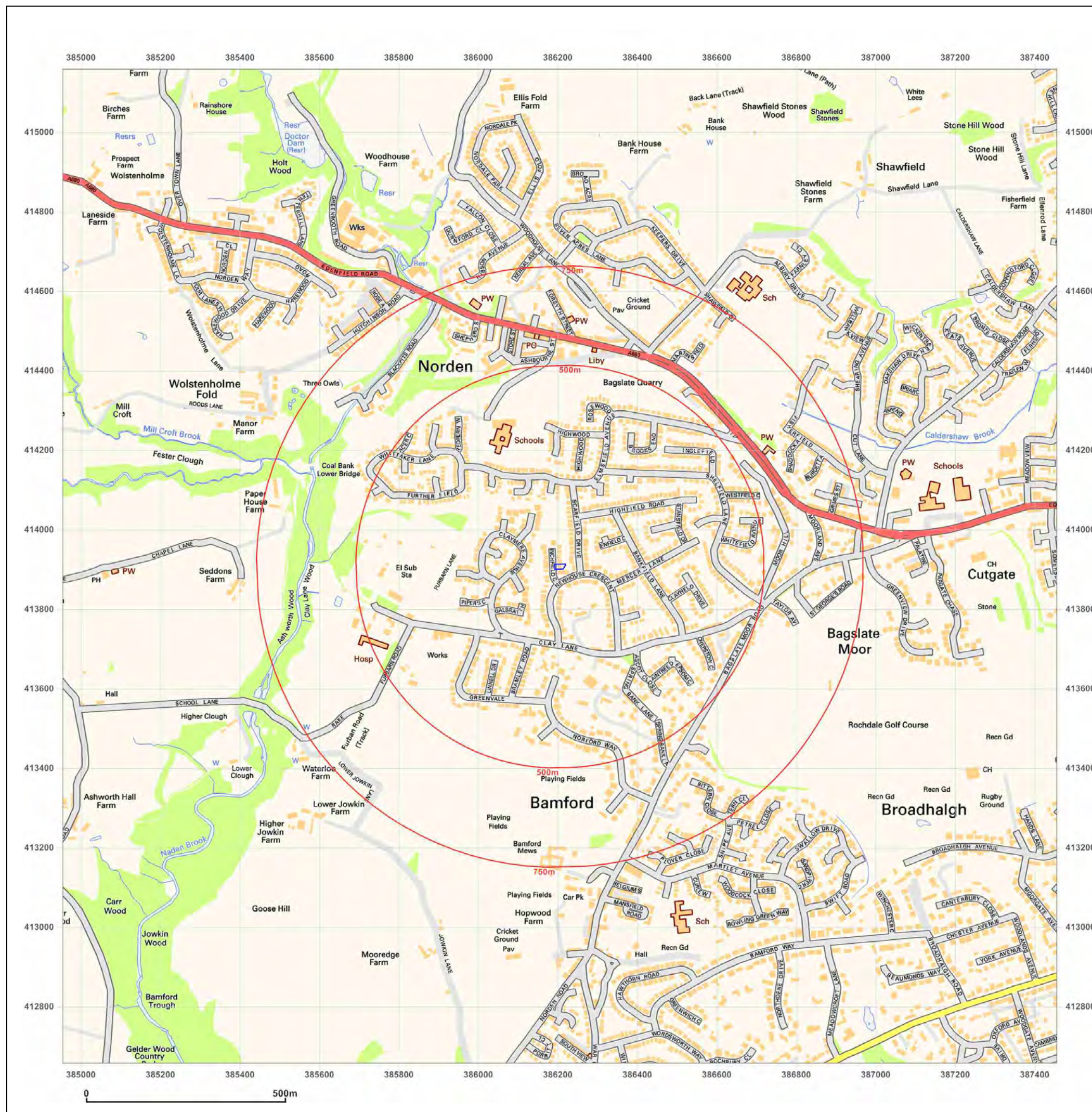


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Client Ref: EMS_464665_623681
Report Ref: EMS-464665_623681
Grid Ref: 386204, 413908

Map Name: National Grid

Map date: 2014

Scale: 1:10,000

Printed at: 1:10,000



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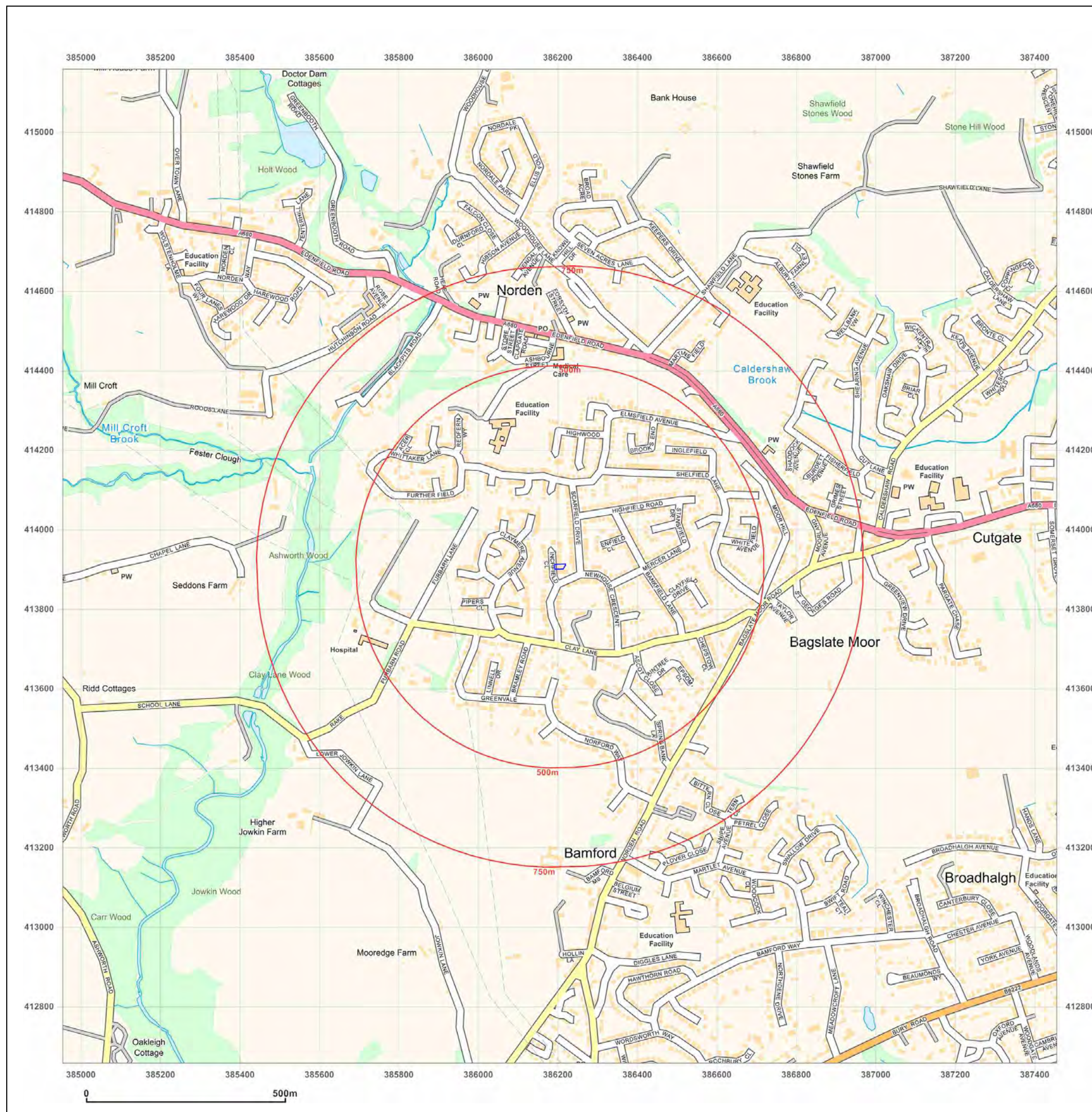


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DE14 2WH
Tel: 01283 551 249
Web: www.grm-uk.com
Our Ref: P8364 – CMRA.1
Date: 13th March 2018

Mr M McCabe
Cubic Surveying
63 Wilmslow Rd
Handforth
Wilmslow
Cheshire
SK9 3EW

Dear Matt,

RE: Proposed Replacement Dwelling at 2 Inchfield Close, Rochdale

We have as requested carried out a Coal Mining Risk Assessment in accordance with guidance provided by the Coal Authority and as required by the Local Authority as part of the planning process.

The result of our assessment is detailed below:-

1.0 Introduction

We have been informed that your Client proposes to develop the existing plot with a single storey replacement building, following a fire at the above property which led to the property being demolished due to severe structural damage.

As far as we are aware the site has not been the subject of an Intrusive Ground Investigation (Phase II).

Recommendations will be made as to how the risks associated with coal mining can be mitigated.

A site layout and boundary plan is included in Appendix A. A site location plan is attached to the Coal Authority mining report included in Appendix B.

2.0 Sources of Information

The following sources of information have been used:-

- Coal Authority Mining Reports (Con29 and Consultants Report)
- Coal Authority Interactive Maps
- BGS Geological Mapping at a scale of 1:10000.
- BGS Memoirs
- BGS Borehole Records

3.0 Identification and Assessment of Site Specific Risks

The Coal Authority (CA) mining reports confirm that the site is in the likely zone of influence from recorded workings in 2 seams of coal (Lower Mountain Coal and Sand Rock Coal) beneath the site at shallow to 110m depth last worked in 1892. The Coal Authority **does not** confirm that any ground movement from the above mentioned coal seams should by now have stopped. Therefore the risk posed to the ground surface from recorded workings is assessed as **high** and some form of mitigation may be required. The Coal Authority confirms that they hold plans of mine workings for which the property is within the zone of influence.

The CA report **confirms** the likely presence of coal seams at or close to the ground surface that may have been worked at some time in the past by unrecorded means. Accordingly the risk posed to the ground surface from any un-recorded workings in shallow coal seams is assessed as **high**.

The CA confirms that the site does not lie within 200m of the boundary of an opencast site from which coal is being removed by opencast methods. The CA confirms that the property does not lie within 800m of an opencast site for which a licence has been granted or is currently being determined. The CA confirms that the site is not within the boundary of an opencast from which coal has been removed by opencast methods. The risk from current, future or past opencast workings is therefore assessed as **negligible**.

The CA confirms that there are two recorded coal mining entries within 20 metres of the boundary of the property. The CA also states that there is no record of what steps, if any have been taken to treat the mine entries. Therefore the risk to surface stability from recorded mine entries is assessed as **high**.

The Coal Authority also confirms that their records may be incomplete, consequently, there may exist in the local area additional mine entries of which the Coal Authority have no knowledge and if shallow recorded or un-recorded workings are present beneath the site, the risk of un-recorded mine entries should be increased to **moderate**.

The CA states that there is no record of mine gas emission requiring action by the CA within the boundary of the property. It seems reasonable to conclude that the risk to the proposed development from mine gas emissions is **negligible**. However, this does not preclude a risk from ground gases from other sources.

Where coal measures strata lies close to the ground surface foundations could potentially penetrate or encounter coal seams within their excavation. There is therefore a potential for spontaneous combustion. The risk from spontaneous combustion from near surface coal seams is generally assessed as **low** but some form of precautionary mitigation might be required.

The site is underlain by the following geological formations:-

- Glacial Till
- Pennine Lower Coal Measures

4.0 Mitigation Strategy Proposed

The mitigation strategy proposed relates to the potential presence of shallow recorded workings, shallow un-recorded workings, the identified recorded mine entries, potential unrecorded mine entries and spontaneous combustion.

The 1:10000 scale geological mapping, CA consultant's report, Geologist Memoirs and BGS borehole records suggest the following:-

- BGS suggest superficial deposits of Glacial Till which generally comprises sandy clay with occasional pockets of gravel and sand. Depth of superficial deposits is unknown.
- Pennine Lower Coal Measures rock head comprising mudstone.
- The strata dip between 6° to 7° to the south.
- The Lower Mountain Coal outcropping approximately 23m to the west of the site.
- The Lower Mountain Coal has an extractable thickness of 0.6m and is anticipated to be present at 7m depth below ground level (begl).

The CA report the Lower Mountain Coal seam present below the property at shallow depth; approximately 7m begl and that it has been worked. The extractable thickness recorded by the Coal Authority is 0.6m and therefore it is unlikely that there will be 10x the seam thickness of competent rock cover. Therefore the risk at this stage is considered to remain as **high**.

In order to reduce the risk to negligible it is recommended that a drill and grout programme be undertaken to stabilise the workings beneath the plot. There is the potential for unrecorded workings to exist in the Lower Mountain seam and these would also have insufficient rock cover. A drill and grout program would treat any such unrecorded workings at the same time as the recorded workings, reducing the risk from both recorded and unrecorded workings within the seam to **negligible**.

The next seams below the Lower Mountain Coal is the Lower Foot Coal at 17m begl followed by the Bassy Coal at 35m, neither of which are recorded to be worked by the CA. As they are only recorded to have thicknesses of 0.2m and 0.1m respectively they are considered to be seams of little economic importance and are unlikely to have been worked by unrecorded means. Considering the amount of cover above these seams in relation to their thickness, mitigation measures for them are not considered to be required.

The next coal in the sequence is the Sand Rock Coal which does have recorded workings. However, the coal is recorded to be approximately at 107m depth, therefore, the risk posed to surface is assessed as negligible due to the presence of sufficient competent rock cover.

There are no other seams that have the potential to affect the ground surface below the property even if worked by un-recorded methods.

The risk from mine entries to surface stability has been assessed as high based on the Coal Authority records (Section 3.0). There are two mine entries located within 20m of the site boundary; 386413-001 located approximately 2m from the site boundary and 386413-002 located approximately 19m from the site boundary. Both mine shafts have a departure of 8m (+/- 8m of given location), which means only 386413-001 is close enough to have an impact on the site.

Currently the risk from mine entries to surface stability has been assessed as **high** based on the CA records (Section 3.0). The exact location of 386413-001 is unknown, so in order to identify if it poses a risk to the site it is suggested to undertake a site strip in the area onsite that is within 8m of the recorded shaft location. Should the shaft be found it would require treatment in the form of grouting and possibly capping followed by planning the development around it in order to reduce the risk to an acceptable limit.

If the recorded mine entry is off site, then the area of high risk from it collapsing in the future is dependent on it's location and the depth to rock head. A worst case scenario is that rockhead is present at 7m begl, i.e. top of the coal, to provide a stable roof to the workings, and that the mine

entry is immediately off site. This would mean that a zone extending 7m into the site would be at risk of future subsidence.

Whilst locating the shaft offsite would be problematic, the depth to rockhead could be determined at the same time as the site strip to confirm the recorded mine entry is off site. If rockhead were to be proven at a depth of 4m then the zone at high risk could be reduced to this distance.

Traditional development within the area at high risk of future ground movement is unlikely to be permitted so the confirmation of the shaft being off site and determination of depth to rockhead is recommended so that this zone can be accurately assessed. If the development has to extend into the high risk zone then the use of piled foundations (through the workings) or a raft may be permitted following consultation with the CA.

For the area at high risk that is not developed, it is recommended that a geotextile mattress, i.e. geogrid and stone, be used in the affected area to mitigate against any future ground movement or general catastrophic collapse from occurring.

As the recorded workings that underlie the property at shallow depth are generally considered productive the risk of mine entries being present below the property is initially assessed as moderate. However, as the site is recorded to be worked, considering the sites size and with a recorded mine entry already 2m offsite from the site boundary, it is considered that the chance of having another mine entry so close to 386413-001 is low, therefore the risk posed from unrecorded mine entries is considered to be **low**. The drill and grout scheme to treat recorded and unrecorded workings will also provide mitigation in the form of further investigation and treatment of any anomalies encountered which could be unrecorded mine entries.

The shallowest coals present are recorded to be at approximately 7m begl, therefore they are considerably deeper than the likely founding depths of the bungalow and do not pose a risk to structures from the potential for spontaneous combustion within the seam creating sufficient volume change to affect foundations. However should coal be encountered below the property the following plot specific advice has been provided:-

- A cover of mudstone / clay of 0.5m thickness be maintained between the shallow coals and the base of the foundations. A thickness of at least 0.5m of clay should also be maintained above coals out cropping in garden areas.
- Poor quality or thin coals < 0.5m in thickness are not considered to be a risk.
- Foundations that are likely to have less than 0.5m of cover will have to be deepened through the coal.

5.0 Conclusion

The risks amended in line with 4.0 above can be summarised as follows:-

Recorded and potential unrecorded workings – **High**, can be reduced to **Negligible** by carrying out a drill and grout scheme to stabilise the ground.

Recorded mine entries – **High**, can be re-assessed by stripping the ground to natural in the area of the recorded shaft in order to determine if the mine entry is on site. Treatment and planning of the development can reduce the risk to **Low to Negligible**.

Un-recorded mine entries – **Low**.

Opencast workings – **Negligible**.

Mine gas emissions – **Negligible.**

Spontaneous combustion – **Low.**

We trust that the information provided is sufficient for your current requirements. If you require any additional information or clarification of the contents of this letter then do not hesitate to contact us.

Yours faithfully,



George Salloway BSc, MSc, FGS
Geo-environmental Scientist



James Lawrence FGS CGeol
Senior Geotechnical Engineer

Appendices

Appendix A – Site Layout and Boundary Plan.

Appendix B – Coal Authority Mining Report which includes a Site Location Plan.

Appendix C – Shaft Location Plan and Potential Mine Shaft Location Area.



DO NOT SCALE



Site boundary.



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 Laurus House, Centrum 100
 Burton-on-Trent, Staffs, DE14 2WH
 Tel: 01283 551249 Fax: 01283 211968
info@grm-uk.com www.grm-uk.com

CLIENT:

Cubic Surveying

PROJECT:

2 Inchfield Close

TITLE:

**Site Layout and
Boundary Plan**

SCALE@SIZE

NTS

ISSUE:

Final

DESIGN/DRAWN:

GS

DATE:

March 2018

PROJECT No:

P8364

DRAWING No:

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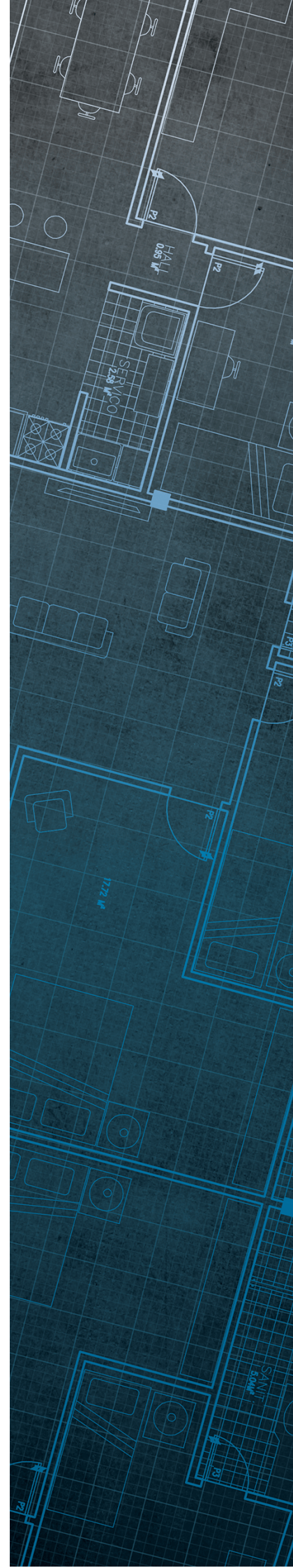


The Coal
Authority

Consultants Coal Mining Report

2 Inchfield Close
Rochdale
OL11 5SB

Date of enquiry:	26 February 2018
Date enquiry received:	26 February 2018
Issue date:	26 February 2018
Our reference:	51001797971001
Your reference:	P8364



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

GRM DEVELOPMENT SOLUTIONS LIMITED

Enquiry address

2 Inchfield Close
Rochdale
OL11 5SB

How to contact us

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

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

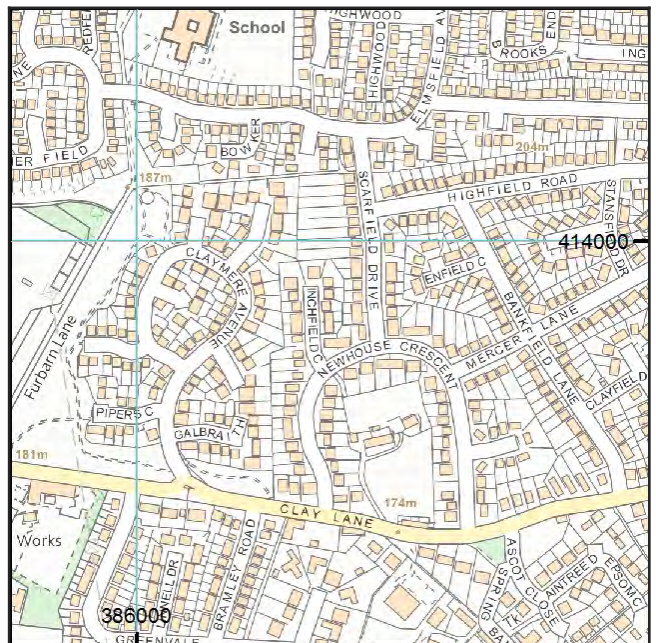
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Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	LOWER MOUNTAIN	Coal	3XSE	7	Beneath Property	7.0	South	60	1856
unnamed	SAND ROCK	Coal	3VQ2	107	Beneath Property	6.3	South	80	1892

Probable unrecorded shallow workings

Yes.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Shaft	386413-001	386195 413899		Coal	
Shaft	386413-002	386218 413883		Coal	
Shaft	386413-003	386239 413829		Coal	

Abandoned mine plan catalogue numbers

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

NW158	2748	16647
16820	PO0	

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

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
LOWER MOUNTAIN	Coal	Yes	23.4	West	202

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 31st October 1994.

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

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

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

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

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.

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.

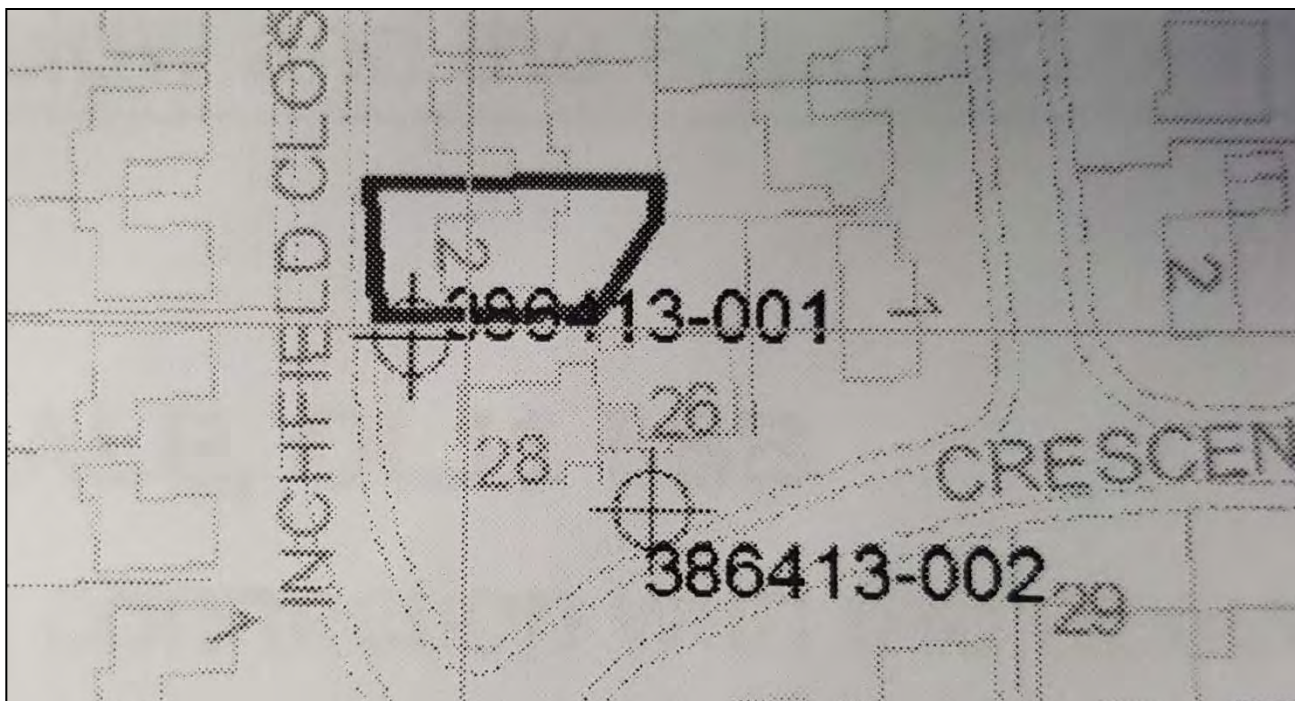
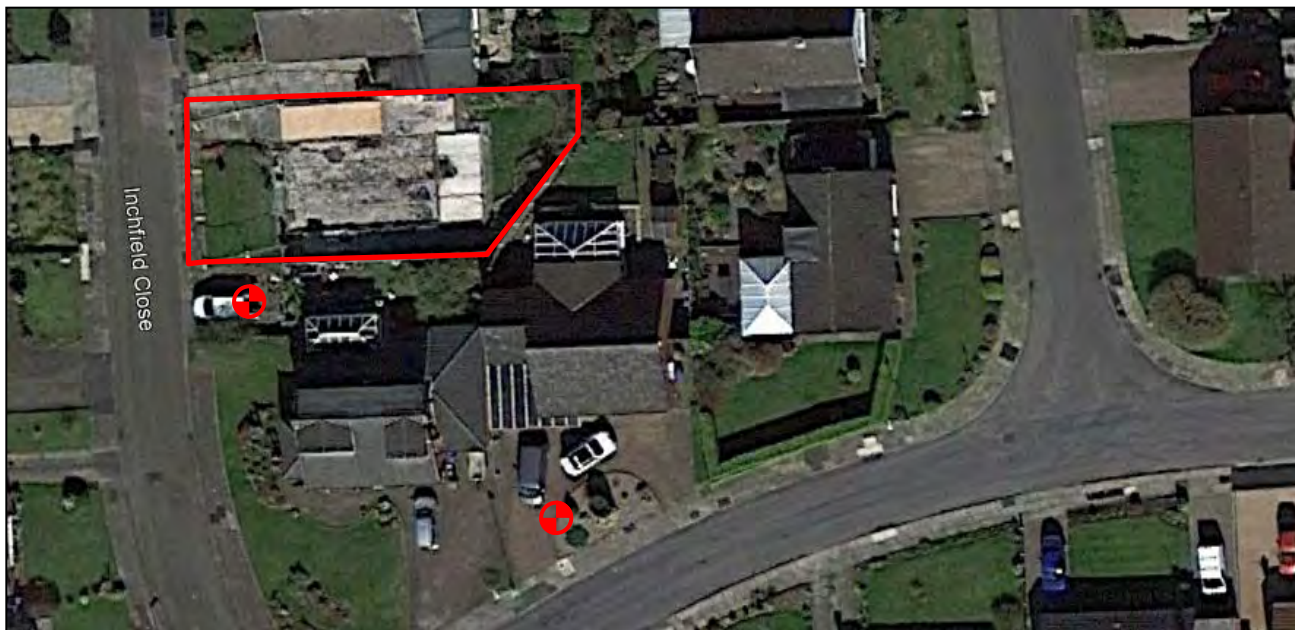
Withdrawal of support notices

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.

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



DO NOT SCALE



Approximate CA
location of mine shaft.



Site boundary.



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Laurus House, Centrum 100
Burton-on-Trent, Staffs, DE14 2WH
Tel: 01283 551249 Fax: 01283 211968
info@grm-uk.com www.grm-uk.com

CLIENT:

Cubic Surveying

PROJECT:

2 Inchfield Close

TITLE:

**Approximate Recorded
Mine Shaft Location**

SCALE@SIZE

NTS

ISSUE:

Final

DESIGN/DRAWN:

GS

DATE:

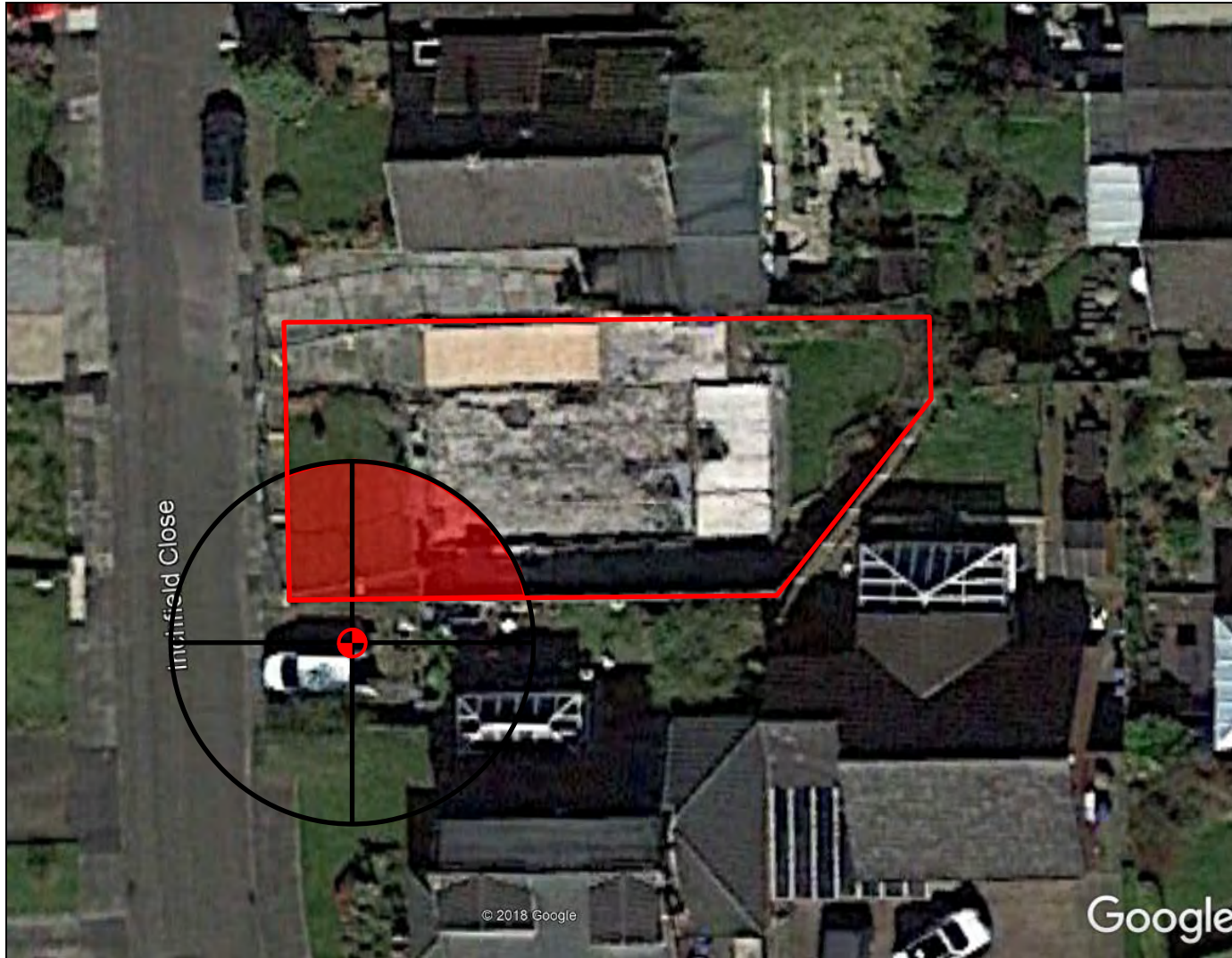
March 2018

PROJECT No:

P8364

DRAWING No:

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DO NOT SCALE



Potential location area of mine shaft based on an 8m departure



Approximate CA location of mine shaft.



Site boundary.



Area of site potentially affected by mine shaft.



GRM Development Solutions Ltd
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Burton-on-Trent, Staffs, DE14 2WH
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info@grm-uk.com www.grm-uk.com

CLIENT:

Cubic Surveying

PROJECT:

2 Inchfield Close

TITLE:

**Potential Mine Shaft
Location Area**

SCALE@SIZE

NTS

ISSUE:

Final

DESIGN/DRAWN:

GS

DATE:

March 2018

PROJECT No:

P8364

DRAWING No:

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emapsite

Masdar House, 1 Reading Road,
Eversley, RG27 0RP

Groundsure
Reference:

EMS-464665_623683

Your Reference:

EMS_464665_623683

Report Date

26 Feb 2018

Report Delivery
Method:

Email - pdf

Enviro Insight

Address: 2 Inchfield Close, Rochdale, OL11 5SB, 2 Inchfield Close, Rochdale, OL11 5SB

Dear Sir/ Madam,

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

If you would like further assistance regarding this report then please contact the emapsite customer services team on 0118 9736883 quoting the above report reference number.

Yours faithfully,

emapsite customer services team

Enc.

Groundsure Enviroinsight

Address: 2 Inchfield Close, Rochdale, OL11 5SB, 2 Inchfield Close, Rochdale, OL11 5SB

Date: 26 Feb 2018

Reference: EMS-464665_623683

Client: emapsite

NW

N

NE

W

E



SW

S

SE

Aerial Photograph Capture date: 26-Mar-2012

Grid Reference: 386203,413908

Site Size: 0.03ha

Report Reference: EMS-464665_623683

Client Reference: EMS_464665_623683

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Overview of Findings

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

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	0	6	61
1.2 Additional Information – Historical Tank Database	0	0	7	6
1.3 Additional Information – Historical Energy Features Database	0	0	3	16
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	0
1.6 Potentially Infilled Land	0	0	12	58
Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	0	3
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	0
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	1	2	0
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	2	4
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	1	0

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

Section 5: Geology						
5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	Yes					
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes					
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.						

Section 6: Hydrogeology and Hydrology	0-500m					
6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes					
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes					
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	2	17
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	16
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	8
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	0	0	1	Not searched	Not searched

Section 6: Hydrogeology and Hydrology		0-500m				
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site?	No	No	No	No	Yes	Yes
6.10 Detailed River Network entries within 500m of the site	0	0	0	0	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	No	Not searched	Not searched	Not searched

Section 7: Flooding	
7.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	No
7.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	No
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Very Low
7.4 Are there any Flood Defences within 250m of the study site?	No
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Limited potential
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Low

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	2	9
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
8.14 Records of Green Belt land	0	0	0	1	0	0

Section 9: Natural Hazards

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

Section 10: Mining

10.1 Are there any coal mining areas within 75m of the study site?	Yes
10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?	No
10.3 Are there any brine affected areas within 75m of the study site?	No

Using this report

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

1. Historical Industrial Sites

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

2. Environmental Permits, Incidents and Registers

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

3. Landfills and Other Waste Sites

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

4. Current Land Uses

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

5. Geology

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

6. Hydrogeology and Hydrology

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

7. Flooding

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

8. Designated Environmentally Sensitive Sites

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

9. Natural Hazards

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

10. Mining

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

11. Contacts

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

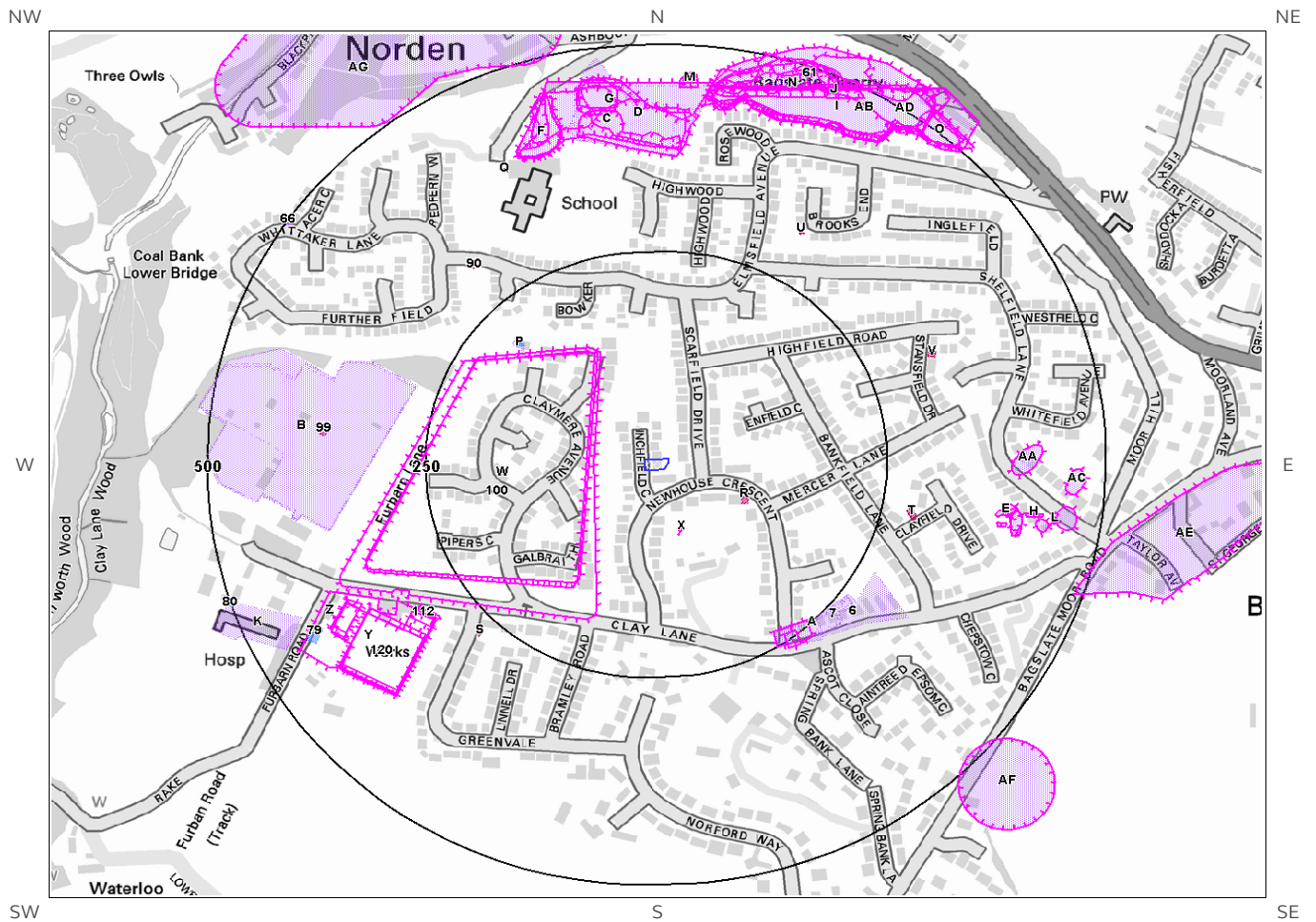
Note: Maps

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

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

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

1. Historical Land Use



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1. Historical Industrial Sites

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

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

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 67

ID	Distance [m]	Direction	Use	Date
1X	72	S	Coal Pit	1851
2P	191	NW	Unspecified Tanks	1949
3A	232	SE	Unspecified Mill	1890
4A	234	SE	Laundry	1949
5A	236	SE	Laundry	1928
6	241	SE	Cotton Mill	1851
7	252	SE	Laundry	1938
8B	275	W	Electric Substation	1992
9B	276	W	Electric Substation	1987
10B	276	W	Electric Substation	1975
11B	276	W	Unspecified Works	1968
12C	365	N	Unspecified Quarry	1890
13C	366	N	Sanitary Works	1908
14D	367	N	Sanitary Works	1938
15D	367	N	Sanitary Works	1928
16C	374	N	Refuse Heap	1949
17D	374	N	Sanitary Works	1949
18D	376	N	Unspecified Ground Workings	1992
19D	376	N	Unspecified Ground Workings	1968
20D	376	N	Unspecified Ground Workings	1975
21D	376	N	Unspecified Ground Workings	1987
22E	378	E	Unspecified Ground Workings	1908
23E	382	E	Unspecified Ground Workings	1908
24F	385	N	Unspecified Disused Quarry	1908
25F	387	N	Unspecified Ground Workings	1928
26F	387	N	Unspecified Ground Workings	1938
27E	392	E	Sandstone Quarries	1851
28AA	392	E	Sandstone Quarries	1851

29E	397	E	Unspecified Pit	1908
30G	401	N	Sandstone Quarry	1851
31H	412	E	Unspecified Ground Workings	1908
32G	420	N	Unspecified Heap	1928
33G	420	N	Unspecified Heap	1938
34I	425	N	Unspecified Disused Quarry	1908
35H	426	E	Unspecified Quarry	1908
36G	426	N	Unspecified Heap	1949
37I	427	N	Unspecified Disused Quarry	1938
38I	427	N	Unspecified Disused Quarry	1928
39AB	427	N	Unspecified Quarry	1890
40J	429	N	Unspecified Disused Quarry	1992
41J	429	N	Unspecified Disused Quarry	1987
42K	431	SW	Hospital	1992
43K	431	SW	Hospital	1968
44K	431	SW	Hospital	1975
45K	431	SW	Hospital	1987
46J	433	N	Unspecified Disused Quarry	1968
47J	433	N	Unspecified Disused Quarry	1975
48J	433	N	Unspecified Disused Quarry	1949
49N	442	N	Unspecified Ground Workings	1928
50L	444	E	Shaft	1851
51L	448	E	Sandstone Quarries	1851
52M	448	N	Unspecified Pit	1992
53M	448	N	Unspecified Pit	1987
54M	448	N	Unspecified Pit	1968
55M	448	N	Unspecified Pit	1975
56N	451	N	Unspecified Ground Workings	1938
57N	452	N	Unspecified Ground Workings	1909
58N	453	N	Unspecified Ground Workings	1890
59AC	456	E	Sandstone Quarries	1851
60AD	477	N	Sandstone Quarry	1851
61	478	N	Sandstone Quarry	1851
62O	488	NE	Unspecified Quarry	1968
63O	488	NE	Unspecified Quarry	1975
64AE	490	E	Colliery	1890
65AF	491	SE	Unspecified Shaft	1890

66	495	NW	Chimney	1908
67AG	495	N	Colliery	1890

1.2 Additional Information – Historical Tank Database

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

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

13

ID	Distance (m)	Direction	Use	Date
68P	196	NW	Unspecified Tanks	1992
69P	196	NW	Tanks	1988
70P	196	NW	Tanks	1991
71P	196	NW	Tanks	1961
72P	196	NW	Tanks	1959
73P	196	NW	Tanks	1968
74P	196	NW	Tanks	1981
75Q	381	NW	Unspecified Tank	1988
76Q	381	NW	Unspecified Tank	1991
77Q	382	NW	Unspecified Tank	1992
78Z	398	SW	Unspecified Tank	1930
79	416	SW	Settling Tanks	1930
80	499	W	Unspecified Tank	1961

1.3 Additional Information – Historical Energy Features Database

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

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

19

ID	Distance (m)	Direction	Use	Date
81R	89	E	Electricity Substation	1992
82R	94	SE	Electricity Substation	1985
83R	95	SE	Electricity Substation	1975
84S	271	SW	Electricity Substation	1992
85S	272	SW	Electricity Substation	1985
86S	272	SW	Electricity Substation	1975
87T	278	E	Electricity Substation	1985
88T	278	E	Electricity Substation	1975
89T	278	E	Electricity Substation	1992

90	302	NW	Electricity Substation	1992
91U	310	NE	Electricity Substation	1991
92U	310	NE	Electricity Substation	1988
93U	310	NE	Electricity Substation	1992
94U	310	NE	Electricity Substation	1981
95V	321	NE	Electricity Substation	1996
96V	321	NE	Electricity Substation	1990
97V	321	NE	Electricity Substation	1988
98V	321	NE	Electricity Substation	1977
99	364	W	Electricity Substation	1979

1.4 Additional Information – Historical Petrol and Fuel Site Database

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

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

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

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

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

Database searched and no data found.

1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 70

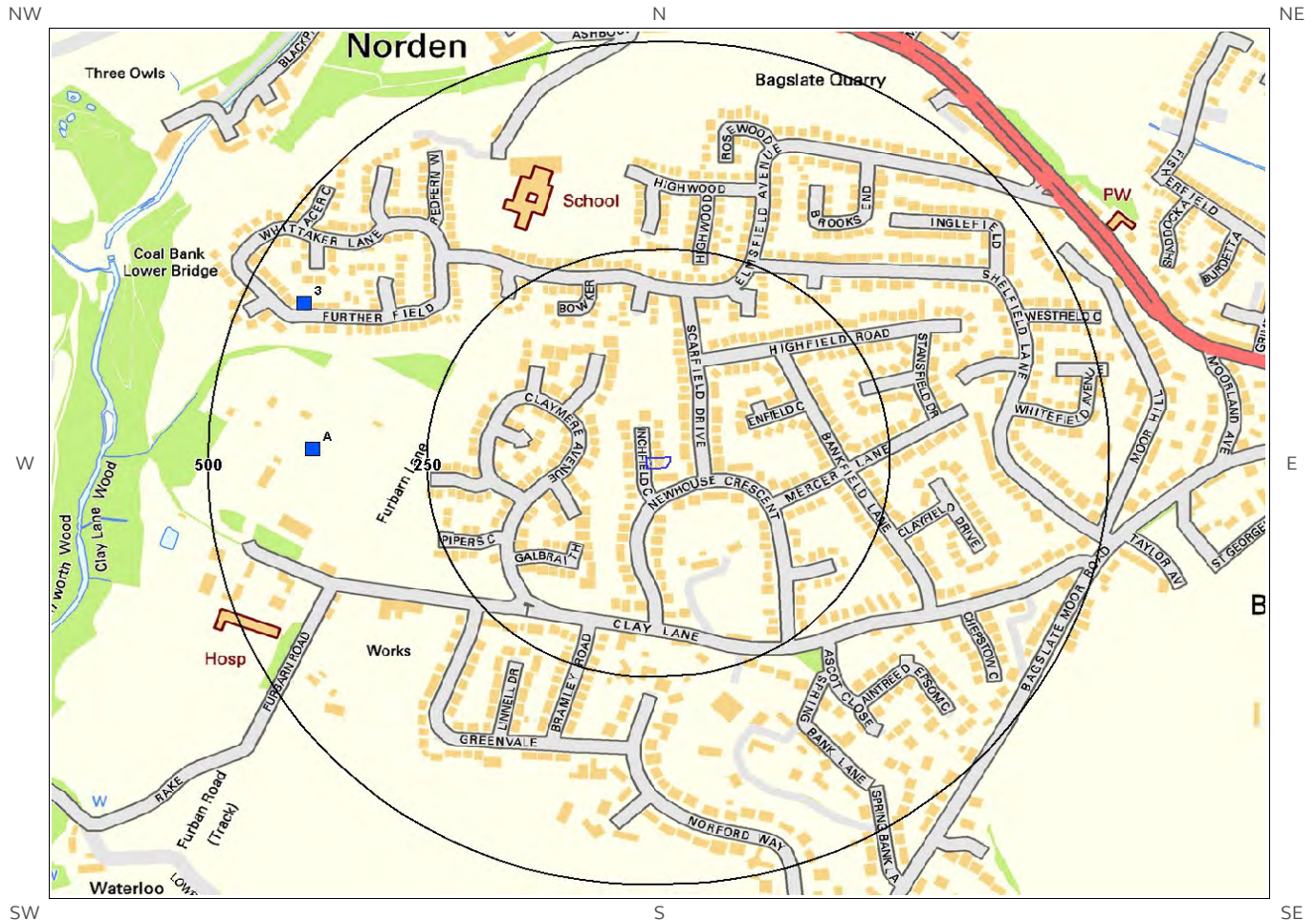
The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
100	58	W	Reservoir	1908
101W	63	W	Reservoir	1968
102W	63	W	Reservoir	1975
103W	63	W	Reservoir	1987
104W	63	W	Reservoir	1949
105W	63	W	Reservoir	1992
106W	66	W	Reservoir	1890
107W	66	W	Reservoir	1938
108W	66	W	Reservoir	1928

109X	72	S	Coal Pit	1851
110A	232	SE	Ponds	1890
111A	242	SE	Reservoir	1908
112	295	SW	Reservoir	1949
113Y	299	SW	Reservoir	1938
114Y	299	SW	Reservoir	1890
115Y	300	SW	Reservoir	1908
116Y	320	SW	Reservoir	1968
117Y	320	SW	Reservoir	1949
118Y	320	SW	Reservoir	1975
119Y	320	SW	Reservoir	1987
120	324	SW	Reservoir	1928
121Z	362	SW	Reservoir	1949
122C	365	N	Unspecified Quarry	1890
123Z	367	SW	Pond	1928
124C	374	N	Refuse Heap	1949
125D	376	N	Unspecified Ground Workings	1987
126D	376	N	Unspecified Ground Workings	1975
127D	376	N	Unspecified Ground Workings	1992
128D	376	N	Unspecified Ground Workings	1968
129E	378	E	Unspecified Ground Workings	1908
130E	382	E	Unspecified Ground Workings	1908
131F	385	N	Unspecified Disused Quarry	1908
132F	387	N	Unspecified Ground Workings	1938
133F	387	N	Unspecified Ground Workings	1928
134E	392	E	Sandstone Quarries	1851
135AA	392	E	Sandstone Quarries	1851
136E	397	E	Unspecified Pit	1908
137G	401	N	Sandstone Quarry	1851
138L	412	E	Unspecified Ground Workings	1908
139G	420	N	Unspecified Heap	1928
140G	420	N	Unspecified Heap	1938
141I	425	N	Unspecified Disused Quarry	1908
142L	426	E	Unspecified Quarry	1908
143G	426	N	Unspecified Heap	1949
144J	427	N	Unspecified Disused Quarry	1928
145J	427	N	Unspecified Disused Quarry	1938

146AB	427	N	Unspecified Quarry	1890
147J	429	N	Unspecified Disused Quarry	1987
148J	429	N	Unspecified Disused Quarry	1992
149J	433	N	Unspecified Disused Quarry	1975
150J	433	N	Unspecified Disused Quarry	1968
151J	433	N	Unspecified Disused Quarry	1949
152N	442	N	Unspecified Ground Workings	1928
153L	444	E	Shaft	1851
154L	448	E	Sandstone Quarries	1851
155M	448	N	Unspecified Pit	1975
156M	448	N	Unspecified Pit	1992
157M	448	N	Unspecified Pit	1968
158M	448	N	Unspecified Pit	1987
159N	451	N	Unspecified Ground Workings	1938
160N	452	N	Unspecified Ground Workings	1909
161N	453	N	Unspecified Ground Workings	1890
162AC	456	E	Sandstone Quarries	1851
163AD	477	N	Sandstone Quarry	1851
164N	478	N	Sandstone Quarry	1851
165O	488	NE	Unspecified Quarry	1975
166O	488	NE	Unspecified Quarry	1968
167AE	490	E	Colliery	1890
168AF	491	SE	Unspecified Shaft	1890
169AG	495	N	Colliery	1890

2. Environmental Permits, Incidents and Registers Map



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2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

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

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

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

3

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

ID	Distance (m)	Direction	NGR	Details
1A	381	W	385810 413925	Address: ROCHDALE SUB STN, ROCHDALE, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: 01M/239 Permit Version: 1 Receiving Water: - Status: REVOKED - UNSPECIFIED Issue date: - Effective Date: 01-Apr-1991 Revocation Date: 31/12/1994
2A	381	W	385810 413925	Address: ROCHDALE SUB STN, ROCHDALE, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: 01M/239 Permit Version: 2 Receiving Water: - Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: -
3	433	NW	385800 414100	Address: HOUSING DEVELOPMENT SWO, WHITTAKER MOSS, NORDEN, ROCHDALE, GREATER MANCHESTER Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 016990557 Permit Version: 1 Receiving Water: NADEN BROOK Status: REVOKED - UNSPECIFIED Issue date: - Effective Date: 30-Nov-1985 Revocation Date: 01/12/1991

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

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

0

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

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

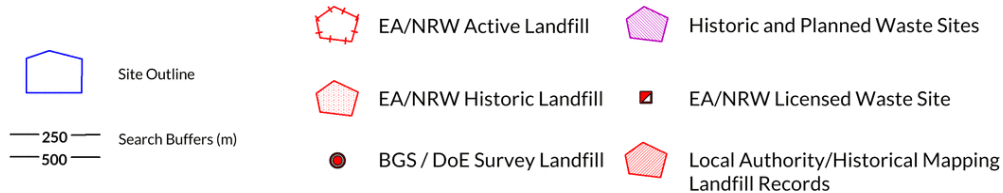
0

Database searched and no data found.

3. Landfill and Other Waste Sites Map



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3. Landfill and Other Waste Sites

3.1 Landfill Sites

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

0

Database searched and no data found.

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

3

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

ID	Distance (m)	Direction	NGR	Details
1	306	SW	385800 413600	Site Address: Clay Lane Water treatment Works, Clay Lane, Norden, Rochdale Waste Licence: - Site Reference: RD/LIC/496/87 Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -
2	636	NW	385600 414200	Site Address: Dexine Works, Norden, Greater Manchester Waste Licence: - Site Reference: D081 Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -
Not shown	836	NW	385800 414600	Site Address: Woodhouse Mill, Norden, Rochdale Waste Licence: Yes Site Reference: D030, RD/LIC/460/87 Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 01-Jun-1987 Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: Tack Lea Works Limited First Recorded: 31-Dec-1987 Last Recorded: 31-Dec-1991

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

0

Database searched and no data found.

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

6

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

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
5	548	NW	385877 414437	Refuse Tip	1962 mapping	Polygon
6	660	W	385525 413930	Refuse Tip	1961 mapping	Polygon
Not shown	1102	NW	385378 414675	Refuse Tip	1962 mapping	Polygon
Not shown	1104	NW	385369 414675	Refuse Tip	1984 mapping	Polygon
Not shown	1337	NW	385297 414937	Refuse Tip	1962 mapping	Polygon
Not shown	1338	NW	385295 414936	Refuse Tip	1984 mapping	Polygon

3.2 Other Waste Sites

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

0

Database searched and no data found.

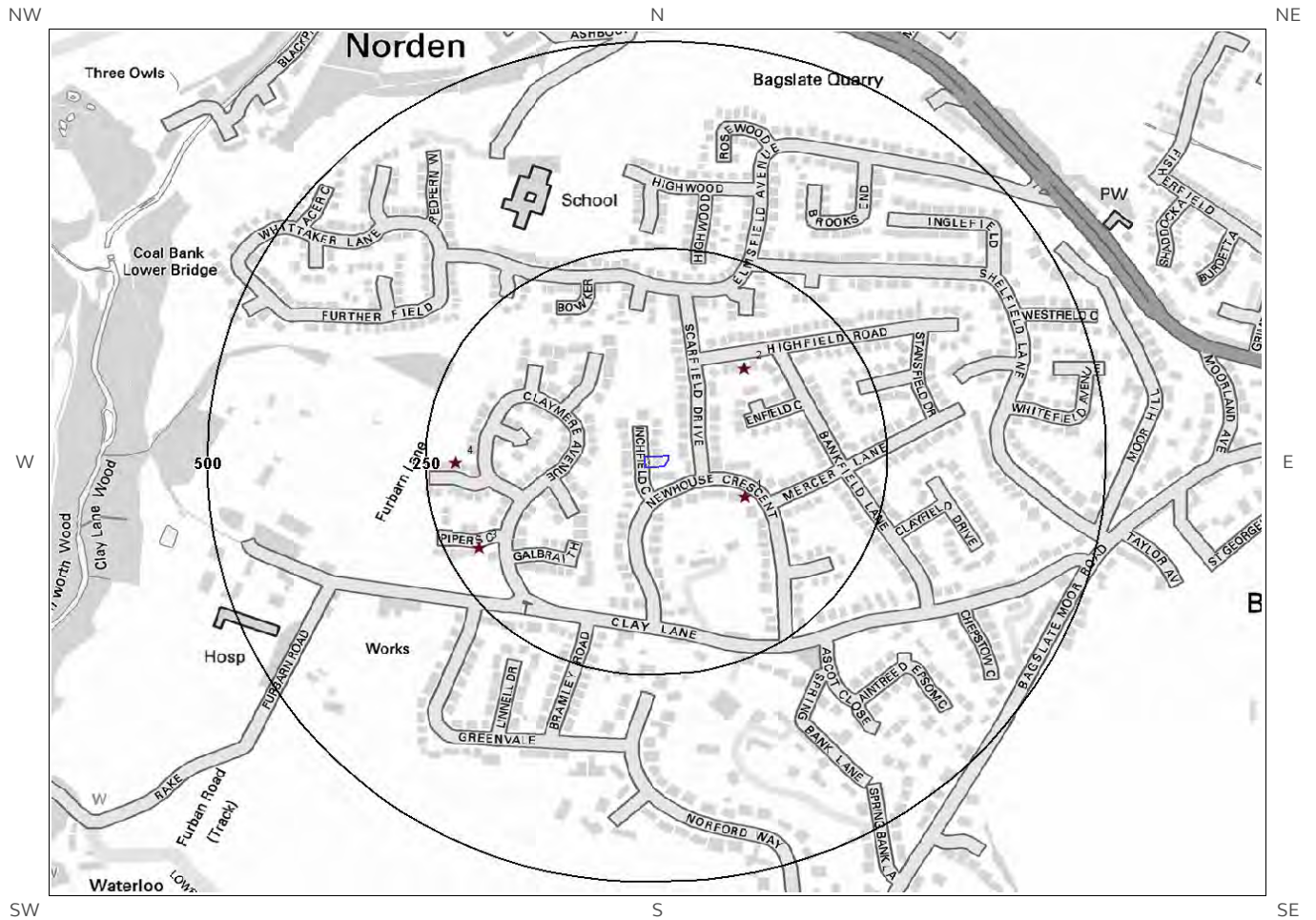
3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

1

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

ID	Distance (m)	Direction	NGR	Details
Not shown	946	NW	385684 414713	Site Address: Tenter House Mill, Unit 3, Greenbooth Road, Rochdale, Lancashire, OL12 7TD Type: Vehicle Depollution Facility <5000 tps Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WOR044 EPR reference: EA/EPR/NP3491EW/A001 Operator: Ali Amer Waste Management licence No: 102022 Annual Tonnage: 4999.0 Issue Date: 09/06/2011 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Rochdale Auto Parts Correspondence Address: Tenter House Mill, Unit 3, Greenbooth Road, Rochdale, Lancashire, OL12

4. Current Land Use Map



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Site Outline

★ Current Industrial Sites

— Electricity Transmission Cables

— 250 — Search Buffers (m)
— 500 —

● Petrol & Fuel Sites

— Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

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

4

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	98	SE	Electricity Sub Station	386305 413866	OL11	Electrical Features	Infrastructure and Facilities
2	137	NE	M S C Technologies	386304 414021	35, Highfield Road, Rochdale, OL11 5RZ	Industrial Repairs and Servicing	Repair and Servicing
3	213	SW	Electricity Sub Station	386001 413805	OL11	Electrical Features	Infrastructure and Facilities
4	217	W	Penco Catering Systems	385973 413907	6, Rilldene Walk, Rochdale, OL11 5WF	Service Industry Equipment Repairs	Repair and Servicing

4.2 Petrol and Fuel Sites

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

0

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

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

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

0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

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

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

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

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

Lex Code	Description	Rock Type
WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT

5.2 Superficial Ground and Drift Geology

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

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

5.3 Bedrock and Solid Geology

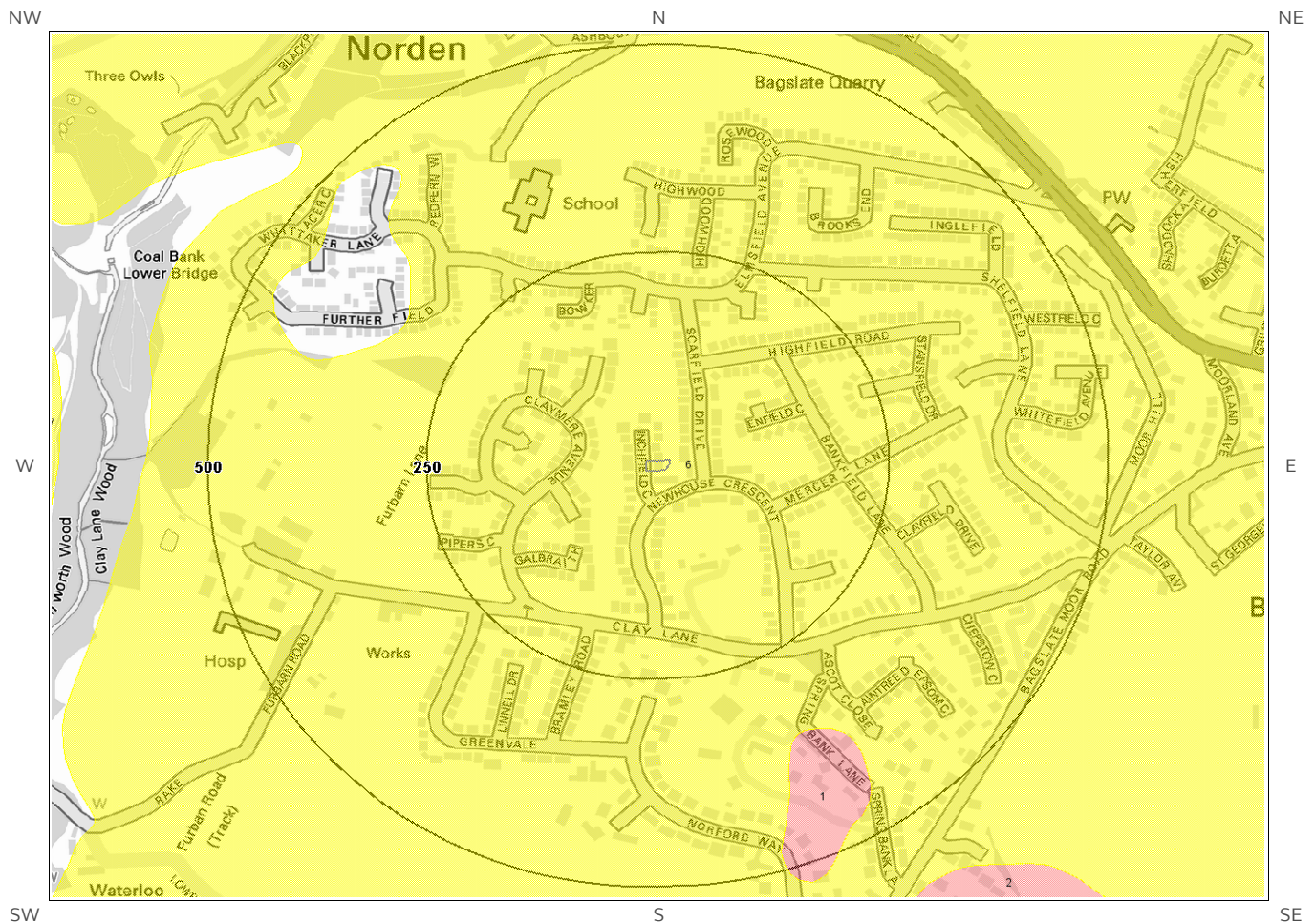
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
GAS-SDST	GREAT ARC SANDSTONE	SANDSTONE
PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE

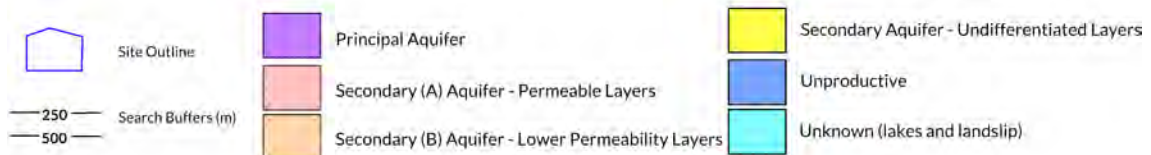
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

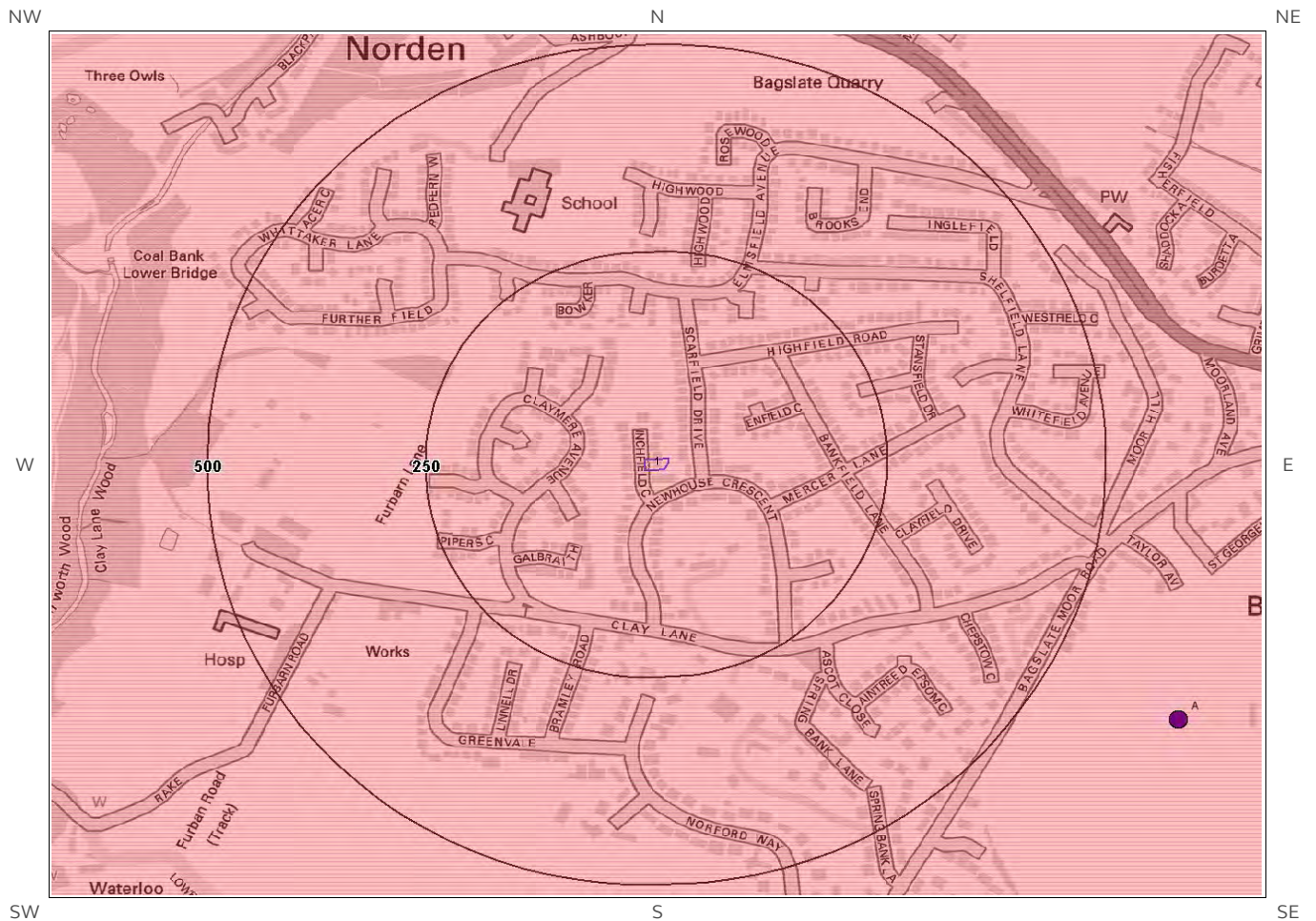
6a. Aquifer Within Superficial Geology



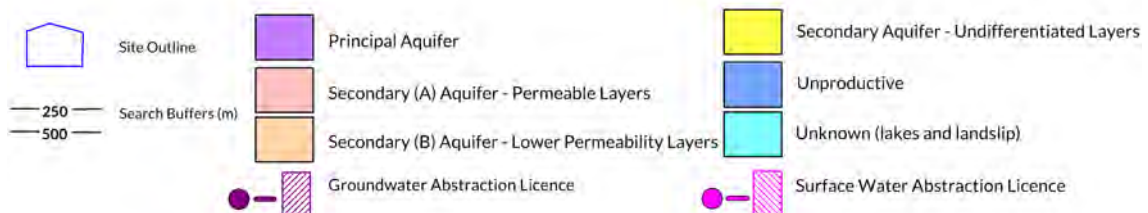
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6b. Aquifer Within Bedrock Geology and Abstraction Licenses

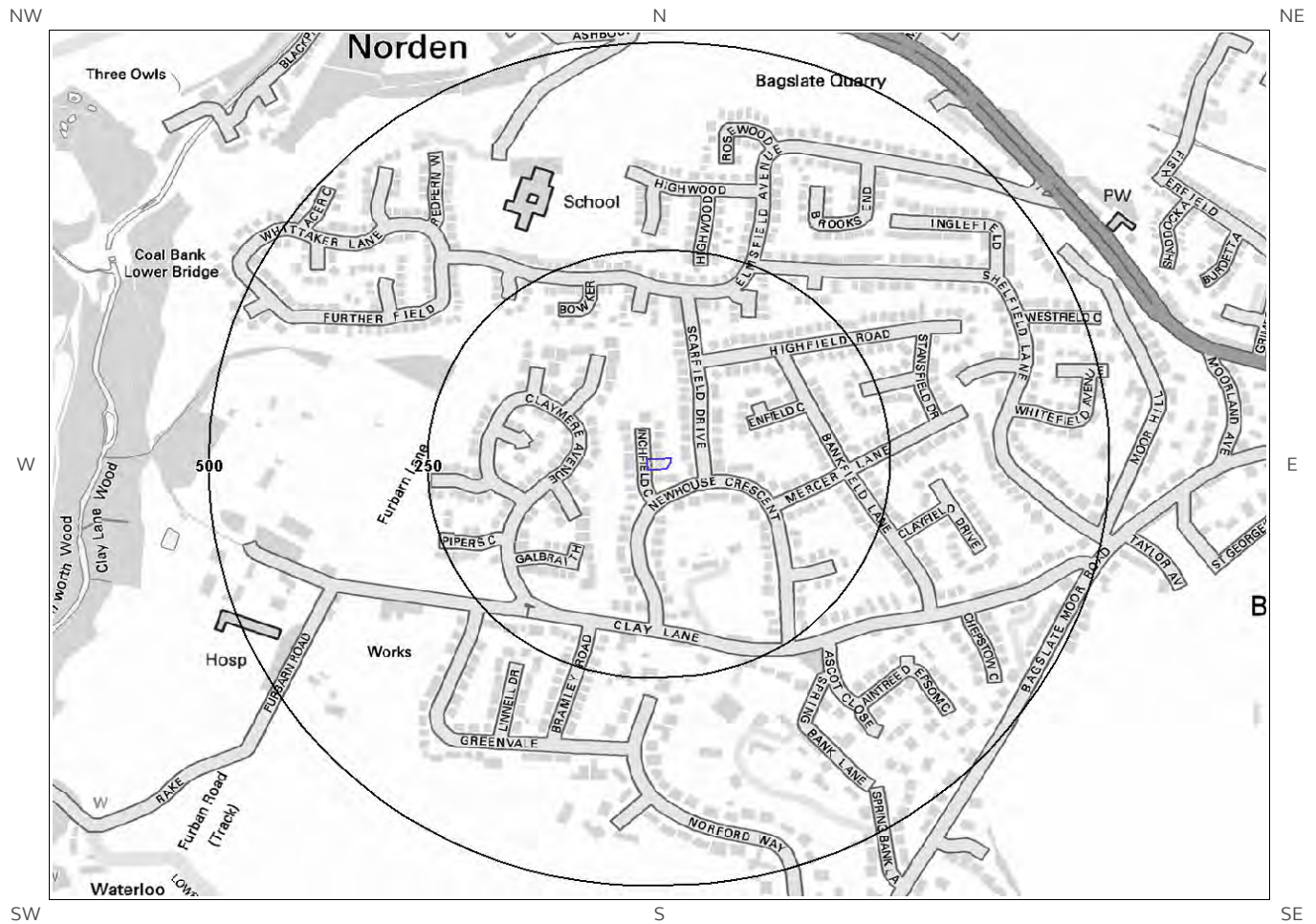


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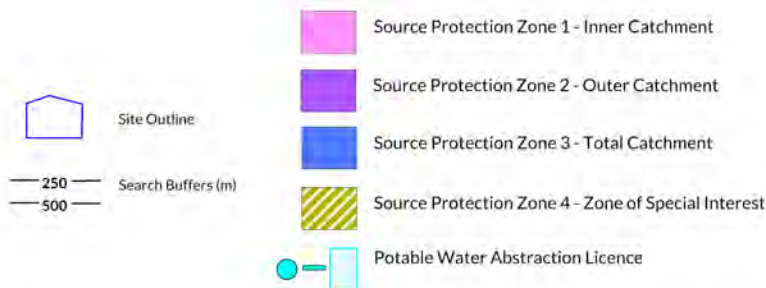




6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses

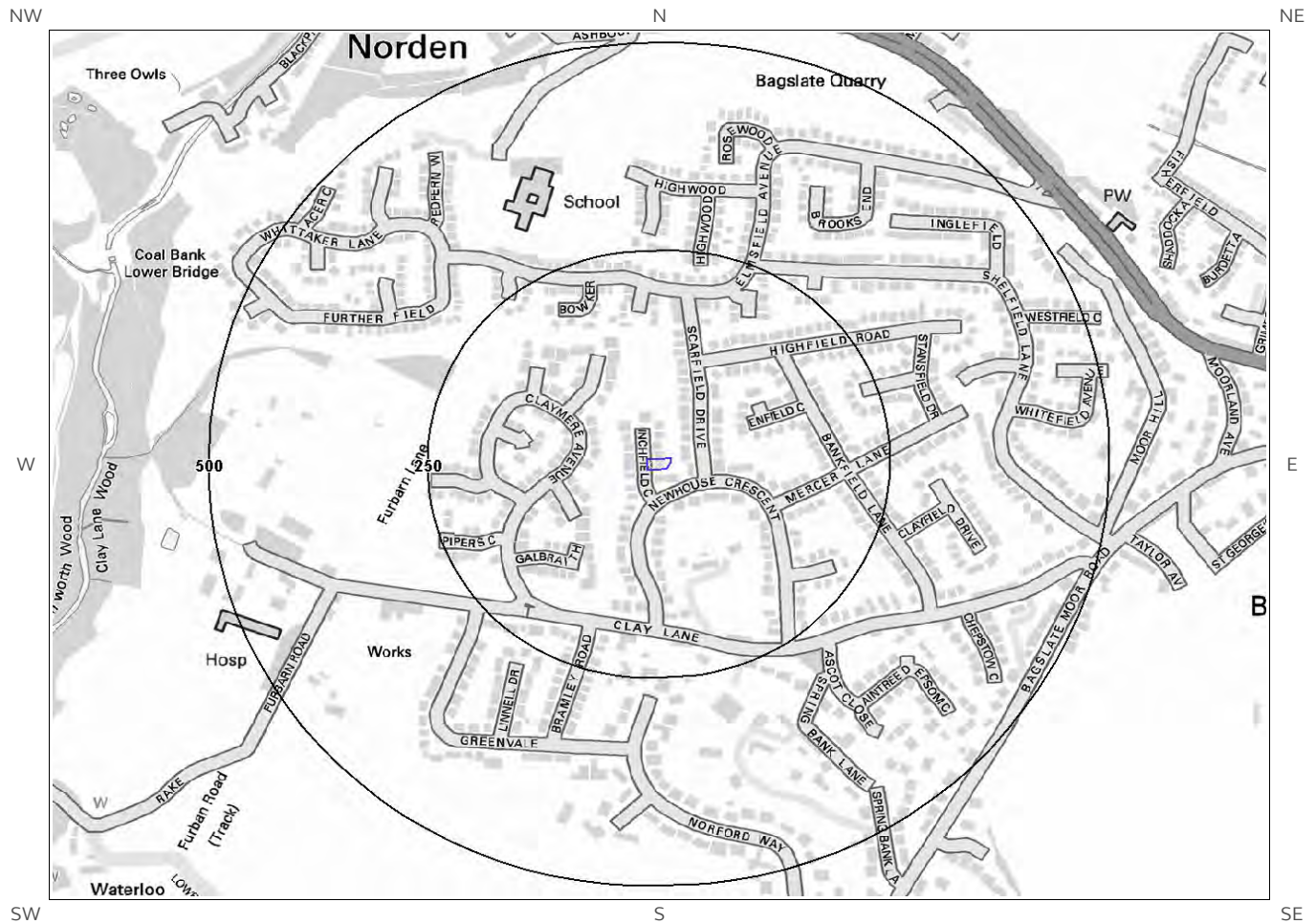


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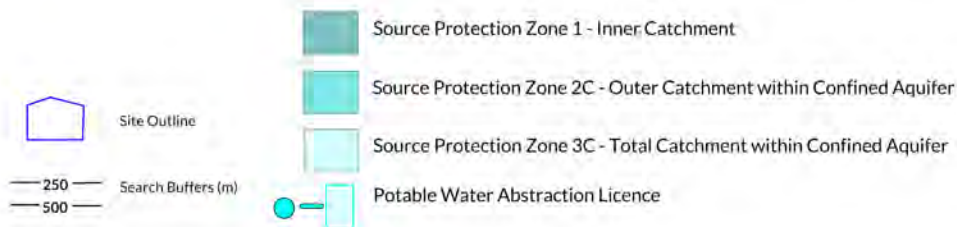




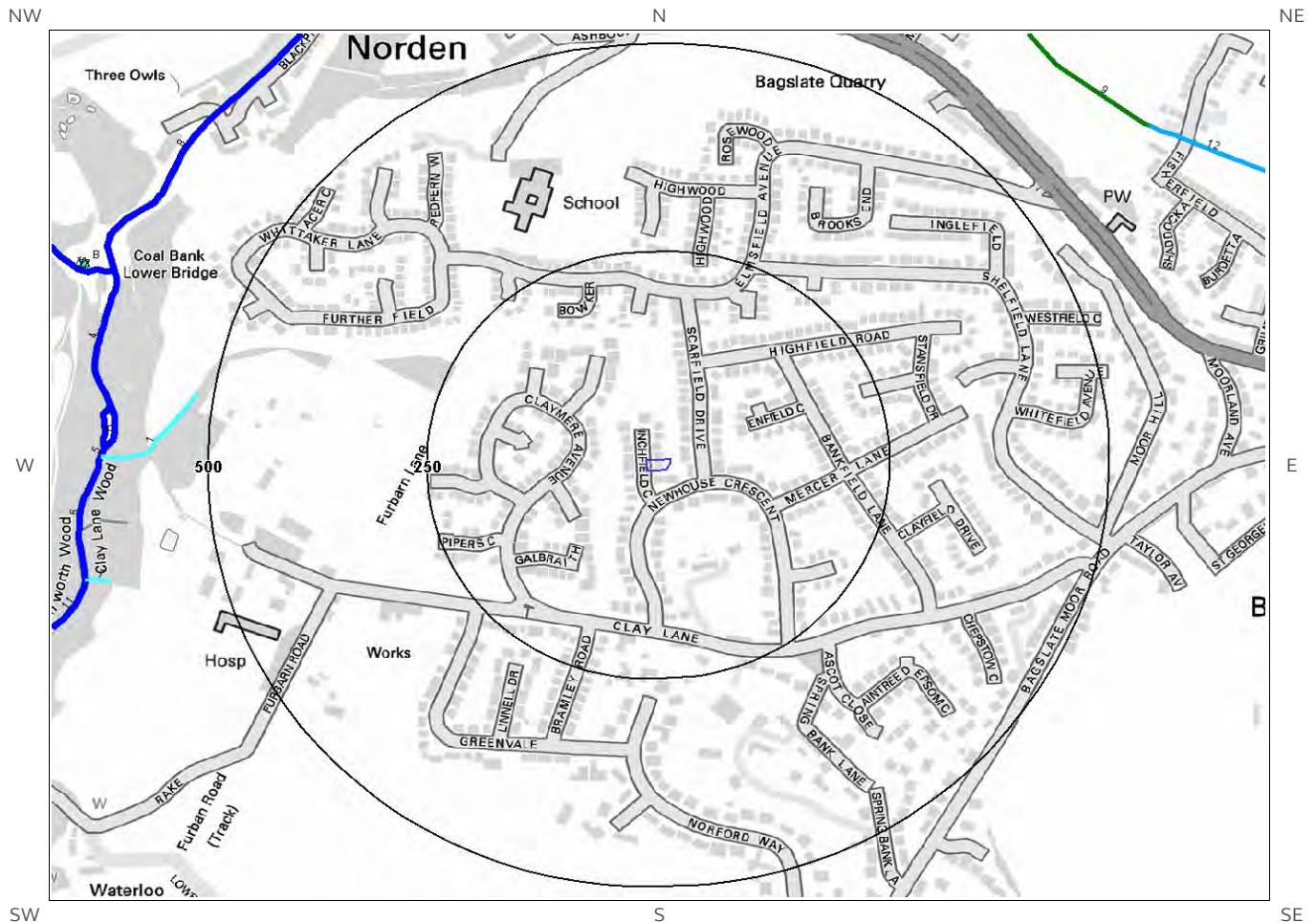
6d. Hydrogeology – Source Protection Zones within confined aquifer



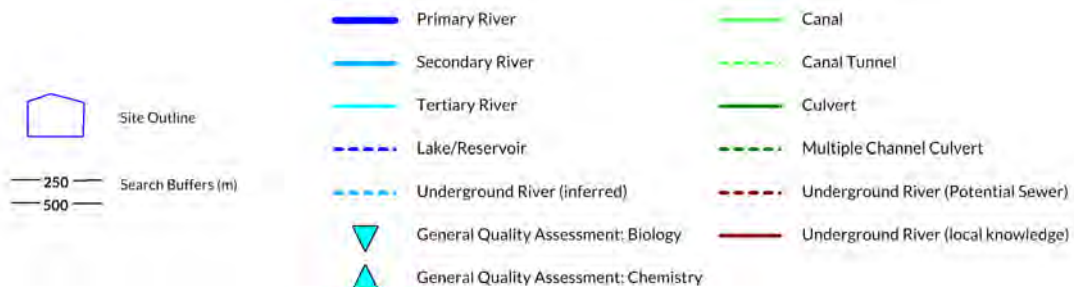
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6e. Hydrology – Detailed River Network and River Quality



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6. Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

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

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

ID	Distance (m)	Direction	Designation	Description
6	0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
1	351	SE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

6.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

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

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

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

6.3 Groundwater Abstraction Licences

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

Yes

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

ID	Distance (m)	Direction	NGR	Details
2A	660	SE	386800 413600	Status: Historical Licence No: 2569002140 Details: Spray Irrigation - Direct Direct Source: Ground Water - North West Region Point: "borehole At Rochdale Golf Course At Norden, Rochdale" Data Type: Point Name: ROCHDALE GOLF CLUB LTD Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 962 Original Start Date: 1/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 18/11/1997 Version End Date:
3A	660	SE	386800 413600	Status: Active Licence No: 2569002140 Details: Spray Irrigation - Direct Direct Source: Ground Water - North West Region Point: Borehole At Rochdale Golf Course At Norden, Rochdale Data Type: Point Name: ROCHDALE GOLF CLUB LTD Annual Volume (m³): 7272 Max Daily Volume (m³): 120 Original Application No: 0962 Original Start Date: 1/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 18/11/1997 Version End Date:
Not shown	1078	SW	385600 413000	Status: Historical Licence No: 2569002183 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: "well At Moor Edge Farm, Bamford, Rochdale" Data Type: Point Name: MILLS Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 1627 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 21/2/1966 Version End Date:
Not shown	1078	SW	385600 413000	Status: Historical Licence No: 2569002180 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: "well At Moor Edge Farm, Bamford, Rochdale" Data Type: Point Name: BLACKBOROUGH Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 1635 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 21/2/1966 Version End Date:
Not shown	1078	SW	385600 413000	Status: Historical Licence No: 2569002180 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: Well At Moor Edge Farm, Bamford, Rochdale Data Type: Point Name: BLACKBOROUGH Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 1635 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 21/2/1966 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1078	SW	385600 413000	Status: Historical Licence No: 2569002183 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: Well At Moor Edge Farm, Bamford, Rochdale Data Type: Point Name: MILLS	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 1627 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 21/2/1966 Version End Date:
Not shown	1551	S	385800 412400	Status: Historical Licence No: 2569002217 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: "borehole At Butterworth Fold Farm, Bamford, Rochdale" Data Type: Point Name: JAMES SWALLOW LTD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 2563 Original Start Date: 22/9/1980 Expiry Date: - Issue No: 100 Version Start Date: 22/9/1980 Version End Date:
Not shown	1551	S	385800 412400	Status: Historical Licence No: 2569002217 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: Borehole At Butterworth Fold Farm, Bamford, Rochdale Data Type: Point Name: JAMES SWALLOW LTD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 2563 Original Start Date: 22/9/1980 Expiry Date: - Issue No: 100 Version Start Date: 22/9/1980 Version End Date:
Not shown	1551	S	385800 412400	Status: Active Licence No: 2569002217 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: Borehole At Butterworth Fold Farm Bamford Rochdale Data Type: Point Name: JAMES SWALLOW LTD	Annual Volume (m³): 33185.8 Max Daily Volume (m³): 90.92 Original Application No: 2563 Original Start Date: 22/9/1980 Expiry Date: - Issue No: 100 Version Start Date: 1/4/2007 Version End Date:
Not shown	1733	NW	385300 415400	Status: Historical Licence No: 2569002187 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "boreholes (2) At Premises, Norden, Rochdale" Data Type: Point Name: ALEXANDER DREW & SONS LTD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/5/1990 Version End Date:
Not shown	1733	NW	385300 415400	Status: Historical Licence No: 2569002187 Details: Process water Direct Source: Ground Water - North West Region Point: "boreholes (2) At Premises, Norden, Rochdale" Data Type: Point Name: ALEXANDER DREW & SONS LTD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/5/1990 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1733	NW	385300 415400	Status: Historical Licence No: 2569002187 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Boreholes (2) At Premises, Norden, Rochdale Data Type: Point Name: ALEXANDER DREW & SONS LTD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 0204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/5/1990 Version End Date:
Not shown	1733	NW	385300 415400	Status: Historical Licence No: 2569002187 Details: Process water Direct Source: Ground Water - North West Region Point: Boreholes (2) At Premises, Norden, Rochdale Data Type: Point Name: ALEXANDER DREW & SONS LTD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 0204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/5/1990 Version End Date:
Not shown	1844	NW	385100 415400	Status: Historical Licence No: 2569002187 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Boreholes (2) At Premises, Norden, Rochdale Data Type: Point Name: ALEXANDER DREW & SONS LTD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 0204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/5/1990 Version End Date:
Not shown	1844	NW	385100 415400	Status: Historical Licence No: 2569002187 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "boreholes (2) At Premises, Norden, Rochdale \$106" Data Type: Point Name: ALEXANDER DREW & SONS LTD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/5/1990 Version End Date:
Not shown	1844	NW	385100 415400	Status: Historical Licence No: 2569002187 Details: Process water Direct Source: Ground Water - North West Region Point: Boreholes (2) At Premises, Norden, Rochdale Data Type: Point Name: ALEXANDER DREW & SONS LTD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 0204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/5/1990 Version End Date:
Not shown	1844	NW	385100 415400	Status: Historical Licence No: 2569002187 Details: Process water Direct Source: Ground Water - North West Region Point: "boreholes (2) At Premises, Norden, Rochdale \$106" Data Type: Point Name: ALEXANDER DREW & SONS LTD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/5/1990 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1844	NW	385100 415400	Status: Historical Licence No: 2569002187 Details: Process water Direct Source: Ground Water - North West Region Point: Boreholes (2) At Premises, Norden, Rochdale S106 Data Type: Point Name: ALEXANDER DREW & SONS LTD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 0204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/5/1990 Version End Date:
Not shown	1844	NW	385100 415400	Status: Historical Licence No: 2569002187 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Boreholes (2) At Premises, Norden, Rochdale S106 Data Type: Point Name: ALEXANDER DREW & SONS LTD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 0204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/5/1990 Version End Date:

6.4 Surface Water Abstraction Licences

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

Yes

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

ID	Distance (m)	Direction	NGR	Details	
Not shown	1065	NW	385600 414800	Status: Historical Licence No: 2569002221 Details: Process Water Direct Source: Surface, Non-tidal - North West Region Point: Naden Brk At Norden, Nr Rochdale Data Type: Point Name: TACKLEA WORKS LTD	Annual Volume (m³): 150018 Max Daily Volume (m³): 590.98 Application No: 2608 Original Start Date: 4/11/1981 Expiry Date: - Issue No: 100 Version Start Date: 5/2/1988 Version End Date:
Not shown	1065	NW	385600 414800	Status: Historical Licence No: 2569002221 Details: Process water Direct Source: "surface, Non-tidal - North West Region" Point: "naden Brk At Norden, Nr Rochdale" Data Type: Point Name: TACKLEA WORKS LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: 2608 Original Start Date: 4/11/1981 Expiry Date: - Issue No: 100 Version Start Date: 5/2/1988 Version End Date:
Not shown	1565	NW	385300 415200	Status: Historical Licence No: 2569002197 Details: Potable Water Supply - Direct Direct Source: Surface, Non-tidal - North West Region Point: Ashworth Moor, Naden & Greenbooth Reservoirs, Rochdale S31 Data Type: Point Name: UNITED UTILITIES WATER PLC	Annual Volume (m³): - Max Daily Volume (m³): - Application No: 1613 Original Start Date: 22/3/1966 Expiry Date: - Issue No: 100 Version Start Date: 14/3/1990 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1565	NW	385300 415200	Status: Historical Licence No: 2569002197 Details: Potable Water Supply - Direct Direct Source: "surface, Non-tidal - North West Region" Point: "ashworth Moor, Naden & Greenbooth Reservoirs, Rochdale*31" Data Type: Point Name: UNITED UTILITIES WATER PLC	Annual Volume (m³): - Max Daily Volume (m³): - Application No: 1613 Original Start Date: 22/3/1966 Expiry Date: - Issue No: 100 Version Start Date: 14/3/1990 Version End Date:
Not shown	1565	NW	385300 415200	Status: Active Licence No: 2569002197 Details: Potable Water Supply - Direct Direct Source: Surface, Non-tidal - North West Region Point: Ashworth Moor, Naden & Greenbooth Reservoirs, Rochdale Data Type: Point Name: UNITED UTILITIES WATER LTD	Annual Volume (m³): 9092000 Max Daily Volume (m³): 40914 Application No: 1613 Original Start Date: 22/3/1966 Expiry Date: - Issue No: 100 Version Start Date: 14/3/1990 Version End Date:
Not shown	1746	SW	385300 412400	Status: Historical Licence No: 2569002166 Details: Boiler Feed Direct Source: Surface, Non-tidal - North West Region Point: Cheesden Brk At Simpson Clough, Heywood Data Type: Point Name: J R CROMPTON LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: 0949 Original Start Date: 24/1/1966 Expiry Date: - Issue No: 100 Version Start Date: 21/5/2001 Version End Date:
Not shown	1746	SW	385300 412400	Status: Historical Licence No: 2569002166 Details: Boiler Feed Direct Source: "surface, Non-tidal - North West Region" Point: "cheesden Brk At Simpson Clough, Heywood" Data Type: Point Name: J R CROMPTON LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: 949 Original Start Date: 24/1/1966 Expiry Date: - Issue No: 100 Version Start Date: 21/5/2001 Version End Date:
Not shown	1746	SW	385300 412400	Status: Historical Licence No: 2569002166 Details: Process water Direct Source: Surface, Non-tidal - North West Region Point: Cheesden Brk At Simpson Clough, Heywood Data Type: Point Name: J R CROMPTON LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: 0949 Original Start Date: 24/1/1966 Expiry Date: - Issue No: 100 Version Start Date: 21/5/2001 Version End Date:
Not shown	1746	SW	385300 412400	Status: Historical Licence No: 2569002166 Details: Process water Direct Source: "surface, Non-tidal - North West Region" Point: "cheesden Brk At Simpson Clough, Heywood" Data Type: Point Name: J R CROMPTON LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: 949 Original Start Date: 24/1/1966 Expiry Date: - Issue No: 100 Version Start Date: 21/5/2001 Version End Date:
Not shown	1746	SW	385300 412400	Status: Active Licence No: 2569002166 Details: Boiler Feed Direct Source: Surface, Non-tidal - North West Region Point: Cheesden Brook At Simpson Clough Heywood Data Type: Point Name: UNION PAPERTECH LIMITED	Annual Volume (m³): 2136620 Max Daily Volume (m³): 12437.85 Application No: 949 Original Start Date: 24/1/1966 Expiry Date: - Issue No: 101 Version Start Date: 13/8/2007 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1746	SW	385300 412400	Status: Active Licence No: 2569002166 Details: Process Water Direct Source: Surface, Non-tidal - North West Region Point: Cheesden Brook At Simpson Clough Heywood Data Type: Point Name: UNION PAPERTECH LIMITED	Annual Volume (m³): 2136620 Max Daily Volume (m³): 12437.85 Application No: 949 Original Start Date: 24/1/1966 Expiry Date: - Issue No: 101 Version Start Date: 13/8/2007 Version End Date:
Not shown	1844	NW	385100 415400	Status: Historical Licence No: 2569002188 Details: Process water Direct Source: Surface, Non-tidal - North West Region Point: Reservoir Fed By Royds Brk At Premises, Norden, Rochda Data Type: Point Name: ALEXANDER DREW & SONS LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: 0205 Original Start Date: 18/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/5/1990 Version End Date:
Not shown	1844	NW	385100 415400	Status: Historical Licence No: 2569002188 Details: Process water Direct Source: "surface, Non-tidal - North West Region" Point: "reservoir Fed By Royds Brk At Premises, Norden, Rochda" Data Type: Point Name: ALEXANDER DREW & SONS LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: 205 Original Start Date: 18/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/5/1990 Version End Date:
Not shown	1866	SW	385360 412230	Status: Historical Licence No: 2569002255 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Surface, Non-tidal - North West Region Point: Naden Brook At Simpson Clough, Heywood \$112 Data Type: Point Name: J R CROMPTON LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: CW 0949 Original Start Date: 12/2/1993 Expiry Date: - Issue No: 101 Version Start Date: 10/10/2000 Version End Date:
Not shown	1866	SW	385360 412230	Status: Historical Licence No: 2569002255 Details: General use relating to Secondary Category (Medium Loss) Direct Source: "surface, Non-tidal - North West Region" Point: "naden Brook At Simpson Clough, Heywood \$112" Data Type: Point Name: J R CROMPTON LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: CW 0949 Original Start Date: 12/2/1993 Expiry Date: - Issue No: 101 Version Start Date: 10/10/2000 Version End Date:
Not shown	1866	SW	385360 412230	Status: Active Licence No: 2569002255 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Surface, Non-tidal - North West Region Point: Naden Brook At Simpson Clough, Heywood Data Type: Point Name: UNION PAPERTECH LIMITED	Annual Volume (m³): 2136620 Max Daily Volume (m³): 6219 Application No: 949 Original Start Date: 12/2/1993 Expiry Date: - Issue No: 102 Version Start Date: 13/8/2007 Version End Date:

6.5 Potable Water Abstraction Licences

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

Yes

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

ID	Distance (m)	Direction	NGR	Details
Not shown	1565	NW	385300 415200	Status: Historical Licence No: 2569002197 Details: Potable Water Supply - Direct Direct Source: "surface, Non-tidal - North West Region" Point: "ashworth Moor, Naden & Greenbooth Reservoirs, Rochdale*31" Data Type: Point Name: UNITED UTILITIES WATER PLC Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 1613 Original Start Date: 22/3/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1565	NW	385300 415200	Status: Historical Licence No: 2569002197 Details: Potable Water Supply - Direct Direct Source: Surface, Non-tidal - North West Region Point: Ashworth Moor, Naden & Greenbooth Reservoirs, Rochdale*31 Data Type: Point Name: UNITED UTILITIES WATER PLC Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 1613 Original Start Date: 22/3/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1565	NW	385300 415200	Status: Active Licence No: 2569002197 Details: Potable Water Supply - Direct Direct Source: Surface, Non-tidal - North West Region Point: Ashworth Moor, Naden & Greenbooth Reservoirs, Rochdale Data Type: Point Name: UNITED UTILITIES WATER LTD Annual Volume (m³): 9092000 Max Daily Volume (m³): 40914 Original Application No: 1613 Original Start Date: 22/3/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1733	NW	385300 415400	Status: Historical Licence No: 2569002187 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Boreholes (2) At Premises, Norden, Rochdale Data Type: Point Name: ALEXANDER DREW & SONS LTD Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 0204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1733	NW	385300 415400	Status: Historical Licence No: 2569002187 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "boreholes (2) At Premises, Norden, Rochdale" Data Type: Point Name: ALEXANDER DREW & SONS LTD Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

ID	Distance (m)	Direction	NGR	Details
Not shown	1844	NW	385100 415400	Status: Historical Licence No: 2569002187 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Boreholes (2) At Premises, Norden, Rochdale Data Type: Point Name: ALEXANDER DREW & SONS LTD Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 0204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1844	NW	385100 415400	Status: Historical Licence No: 2569002187 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "boreholes (2) At Premises, Norden, Rochdale \$106" Data Type: Point Name: ALEXANDER DREW & SONS LTD Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1844	NW	385100 415400	Status: Historical Licence No: 2569002187 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Boreholes (2) At Premises, Norden, Rochdale \$106 Data Type: Point Name: ALEXANDER DREW & SONS LTD Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 0204 Original Start Date: 21/2/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

6.6 Source Protection Zones

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

No

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

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

No

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

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

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

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
388	S	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.

6.9 River Quality

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

6.9.1 Biological Quality:

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

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

ID	Distance (m)	Direction	NGR	River Quality Grade	Biological Quality Grade				
					2005	2006	2007	2008	2009
44B	683	W	385550 414150	River Name: Oldhouse Bk Reach: Qsl At Ashworth Moor Resvr. To Naden Bk. End/Start of Stretch: End of Stretch NGR	B	B	B	C	C
Not shown	1193	NW	385600 414950	River Name: Naden Bk Reach: Qsl At Doctor Dam To Cheesden Bk. End/Start of Stretch: Start of Stretch NGR	B	B	B	C	C

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

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

ID	Distance (m)	Direction	NGR	River Quality Grade	Chemical Quality Grade				
					2005	2006	2007	2008	2009
46B	683	W	385550 414150	River Name: Oldhouse Bk. Reach: Qsl At Ashworth Moor Resvr. To Naden Bk. End/Start of Stretch: End of Stretch NGR	B	A	A	A	A
Not shown	756	W	385483 414180	River Name: Oldhouse Bk. Reach: Qsl At Ashworth Moor Resvr. To Naden Bk. End/Start of Stretch: Sample Point NGR	B	A	A	A	A
Not shown	1193	NW	385600 414950	River Name: Naden Bk. Reach: Qsl At Doctor Dam To Cheesden Bk. End/Start of Stretch: Start of Stretch NGR	A	A	A	A	A

6.10 Detailed River Network

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

No

Database searched and no data found.

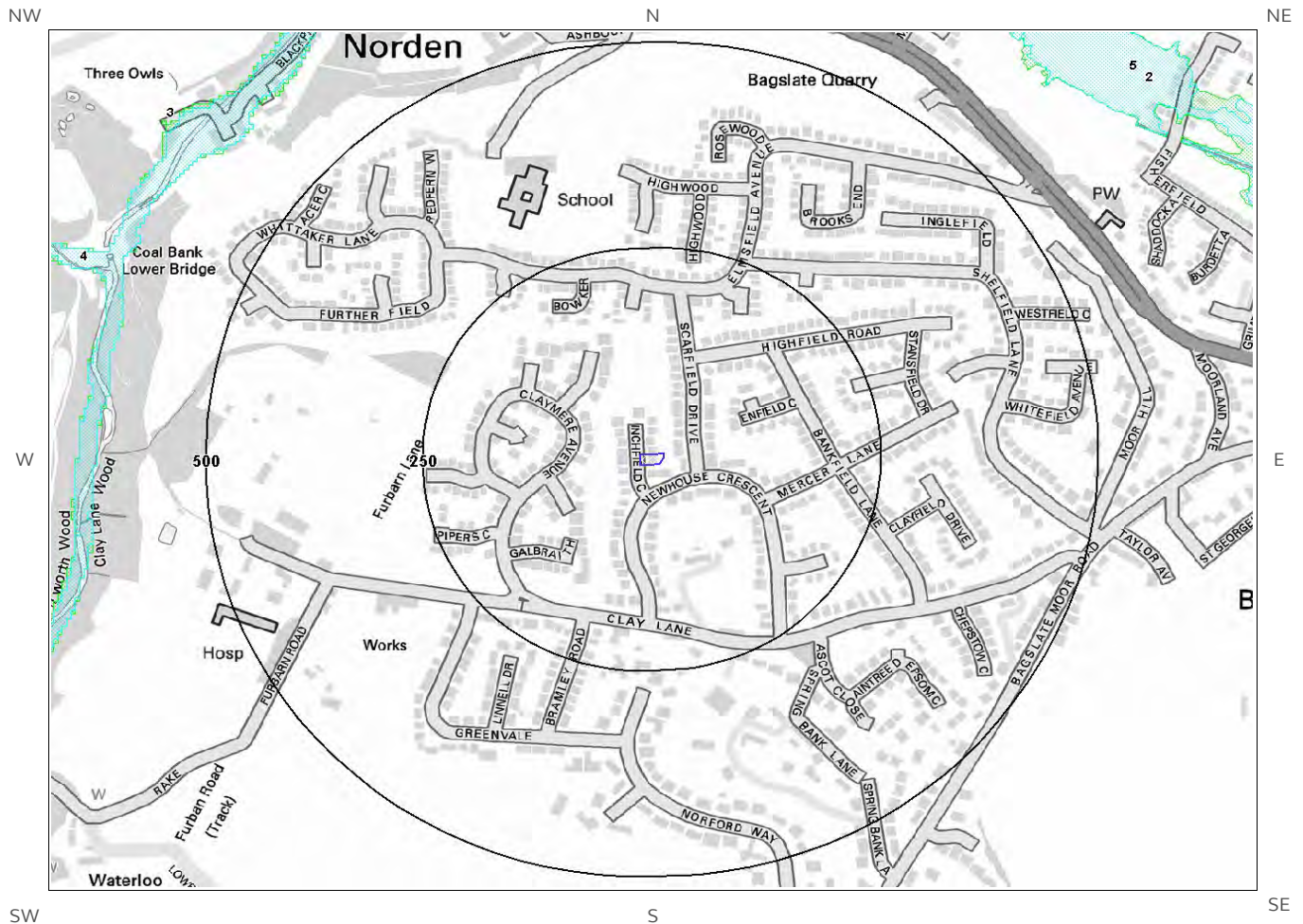
6.11 Surface Water Features

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

No

Database searched and no data found.

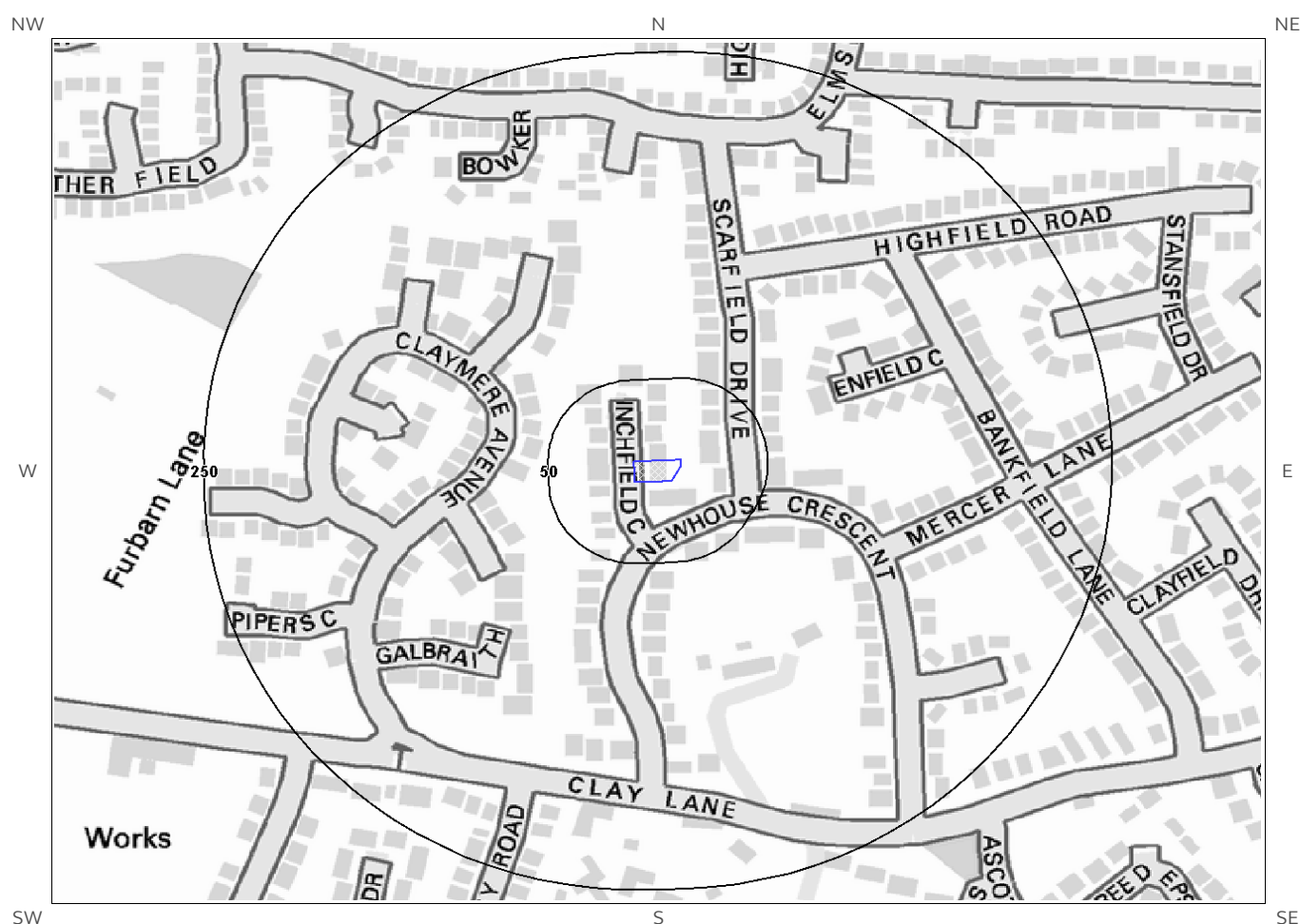
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



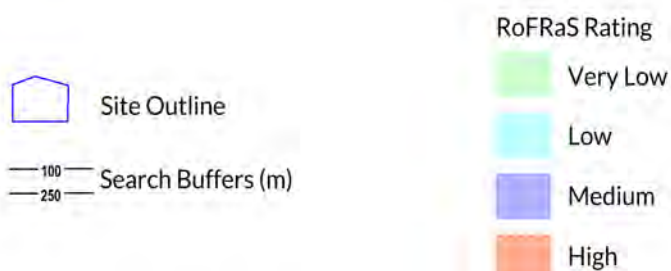
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7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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7 Flooding

7.1 River and Coastal Zone 2 Flooding

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

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

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

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

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

Database searched and no data found.

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

What is the highest risk of flooding onsite? Very Low

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

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

7.4 Flood Defences

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

7.5 Areas benefiting from Flood Defences

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

7.6 Areas benefiting from Flood Storage

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

No

7.7 Groundwater Flooding Susceptibility Areas

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

Does this relate to Clearwater Flooding or Superficial Deposits Flooding?

Clearwater Flooding

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

7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Limited potential

Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, you need take no further action in relation to groundwater flooding hazard.

7.8 Groundwater Flooding Confidence Areas

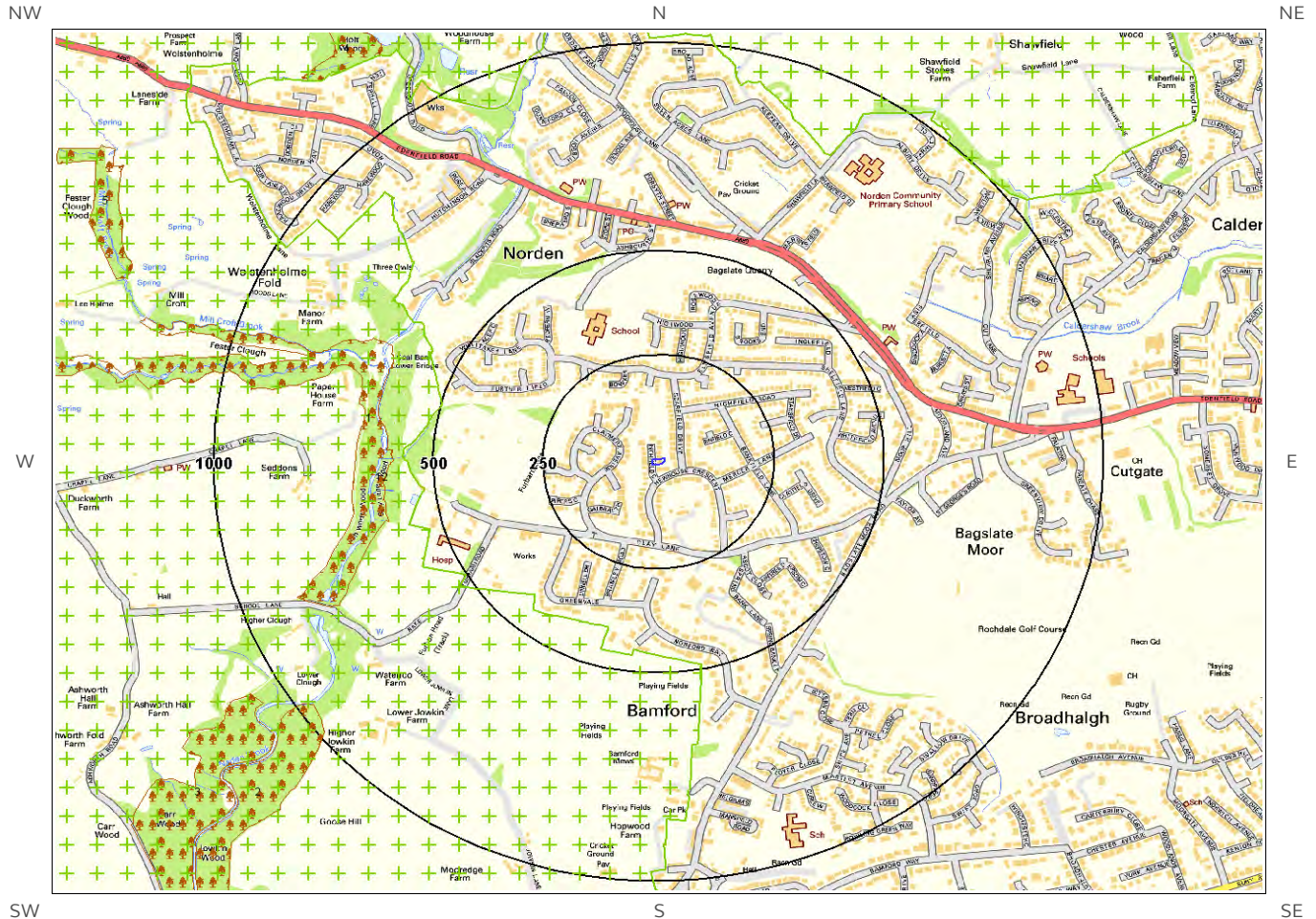
What is the British Geological Survey confidence rating in this result?

Low

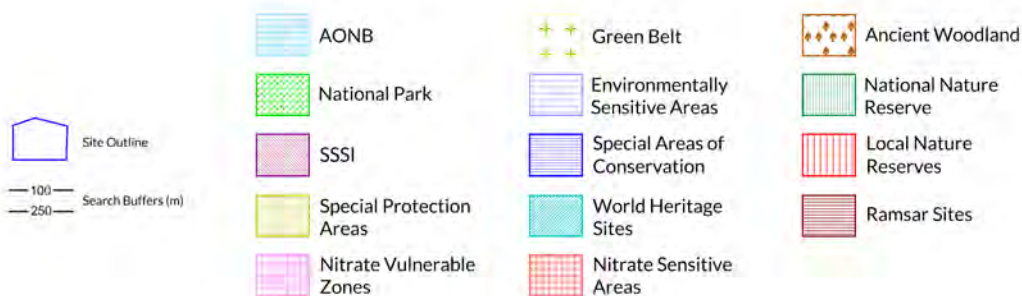
Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

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

8. Designated Environmentally Sensitive Sites Map



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8. Designated Environmentally Sensitive Sites

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

Yes

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

11

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

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
1	590	W	UNKNOWN	Ancient and Semi-Natural Woodland
2	966	SW	UNKNOWN	Ancient and Semi-Natural Woodland
3	1056	SW	UNKNOWN	Ancient and Semi-Natural Woodland
4	1155	NW	UNKNOWN	Ancient and Semi-Natural Woodland
5	1273	W	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1379	SW	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1429	SE	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1645	W	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1648	SW	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1751	S	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1782	SE	UNKNOWN	Ancient and Semi-Natural Woodland

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

1

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

ID	Distance	Direction	Green Belt Name	Local Authority Name
12	403	S	Liverpool, Manchester and West Yorks Greenbelt	Rochdale

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

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

9.1.1 Shrink Swell

What is the maximum Shrink-Swell* hazard rating identified on the study site? Very Low

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

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

9.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? Very Low

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

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

9.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site? Negligible

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

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

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

9.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site?

Moderate

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

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

9.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site?

Very Low

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

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

9.1.6 Running Sand

What is the maximum Running Sand** hazard rating identified on the study site?

Very Low

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

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

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

9.2.1 Radon Affected Areas

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

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

9.2.2 Radon Protection

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

10. Mining

10.1 Coal Mining

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

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

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

10.2 Non-Coal Mining

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

Database searched and no data found.

10.3 Brine Affected Areas

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

Guidance: No Guidance Required.

Contact Details

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Phone: 01706 647 474
Web: <http://www.rochdale.gov.uk/>
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Hampshire RG27 8NW
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Your Reference: EMS_464665_623682

Report Date 26 Feb 2018

Report Delivery Email - pdf
Method:

Geo Insight

Address: 2 Inchfield Close. Rochdale, OL11 5SB, 2 Inchfield Close, Rochdale, OL11 5SB

Dear Sir/ Madam,

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If you would like further assistance regarding this report then please contact the emapsite customer services team on 0118 9736883 quoting the above report reference number.

Yours faithfully,

emapsite customer services team

Enc.
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Date: 26 Feb 2018

Reference: EMS-464665_623682

Client: emapsite

NW N NE



SW S SE

Aerial Photograph Capture date: 26-Mar-2012

Grid Reference: 386203,413908

Site Size: 0.03ha

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Overview of Findings

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

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

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

Section 1: Geology 1:10,000 Scale

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

Section 2: Geology 1:50,000 Scale

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

Section 2: Geology 1:50,000 Scale

2.3 Bedrock, Solid Geology and linear features

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

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

Yes

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

Yes

Section 3: Radon

3. Radon

3.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?

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

3.2 Radon Protection

No radon protective measures are necessary.

Section 4: Ground Workings

	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	0	0	11	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	1	15
4.3 Current Ground Workings	0	0	0	5	5

Section 5: Mining, Extraction & Natural Cavities

	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	1	15
5.2 Coal Mining	1	0	0	0	0
5.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
5.4 Non-Coal Mining*	0	0	0	0	1
5.5 Non-Coal Mining Cavities	0	0	0	0	0
5.5 Natural Cavities	0	0	0	0	0

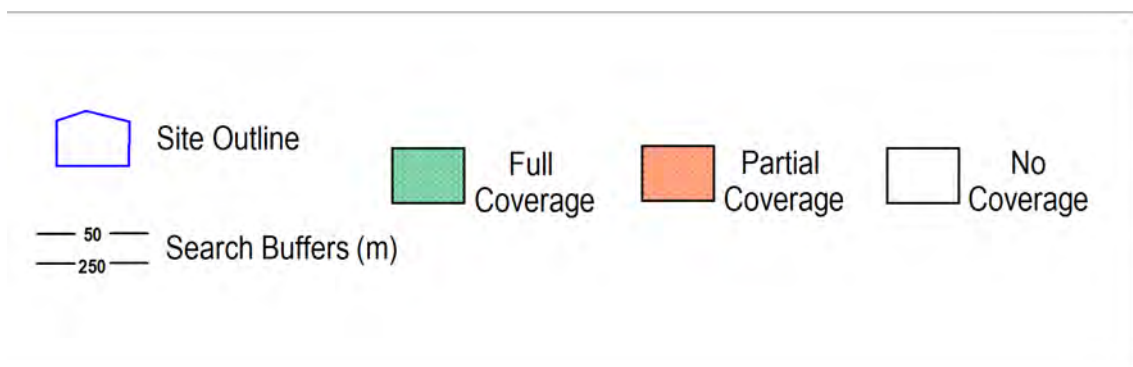
Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0
Section 6: Natural Ground Subsidence	On-site				
6.1 Shrink-Swell Clay	Very Low				
6.2 Landslides	Very Low				
6.3 Ground Dissolution of Soluble Rocks	Negligible				
6.4 Compressible Deposits	Moderate				
6.5 Collapsible Deposits	Very Low				
6.5 Running Sand	Very Low				
Section 7: Borehole Records	On-site	0-50m	51-250		
7 BGS Recorded Boreholes	0	0	17		
Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250		
8 Records of Background Soil Chemistry	1	1	0		
Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500	
9.1 Tunnels	0	0	0	Not Searched	
9.2 Historical Railway and Tunnel Features	0	0	0	Not Searched	
9.3 Historical Railways	0	0	0	Not Searched	
9.4 Active Railways	0	0	0	Not Searched	
9.5 Railway Projects	0	0	0	0	

1:10,000 Scale Availability



1_10,000 Availability Legend

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Availability of 1:10,000 Scale Geology Mapping

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

ID	Distance	Artificial Coverage	Superficial Coverage	Bedrock Coverage	Mass Movement Coverage
1	0.0	Some deposits are mapped	Full	Full	Some deposits are mapped
N2	1085.0	Some deposits are mapped	Full	Full	Some deposits are mapped
3	1191.0	Some deposits are mapped	Full	Full	Some deposits are mapped
N4	1612.0	Some deposits are mapped	Full	Full	Some deposits are mapped

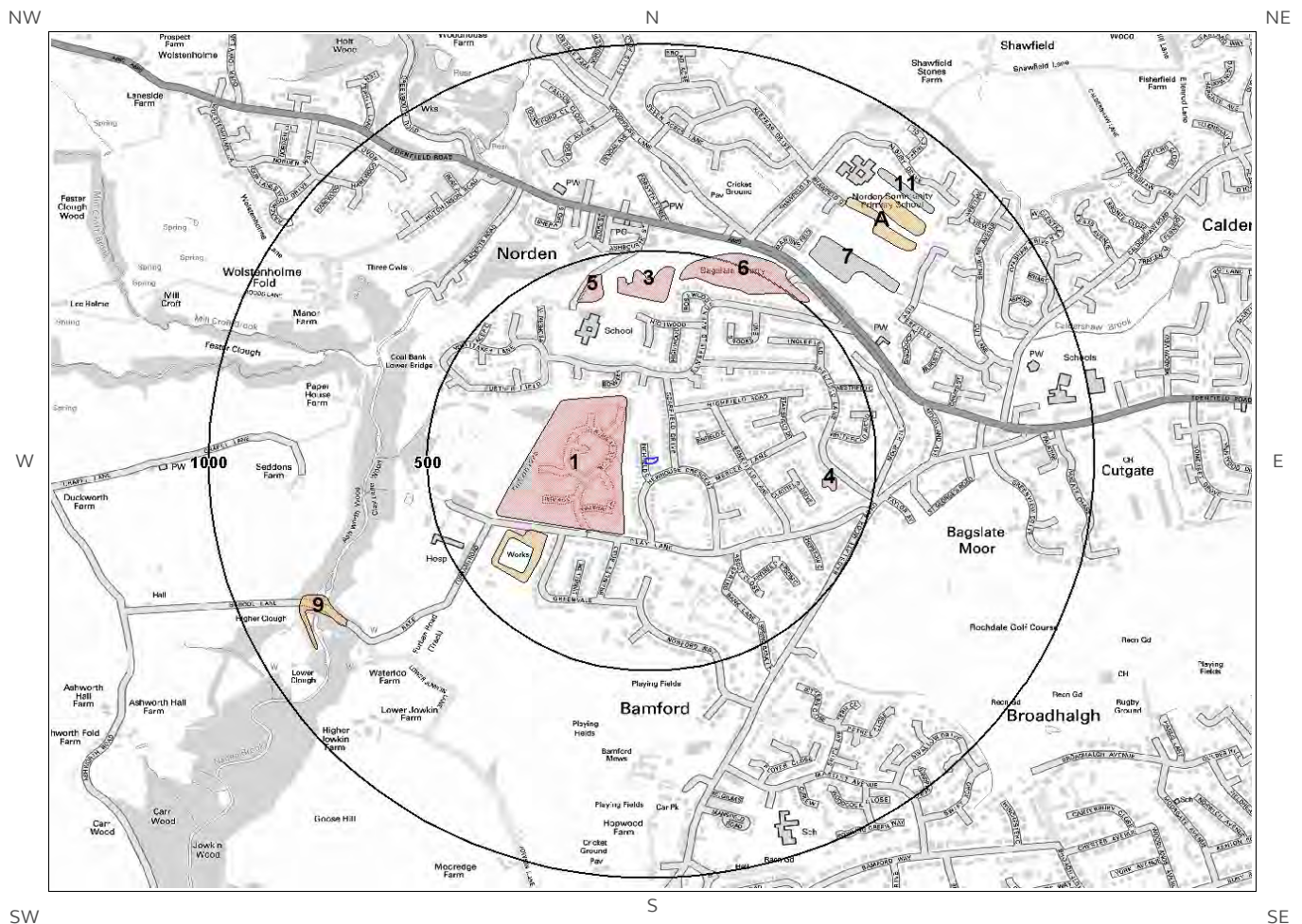
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not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

The definitions of coverage are as follows:

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

1 Geology (1:10,000 scale).

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



Artificial Ground Legend

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1. Geology 1:10,000 scale

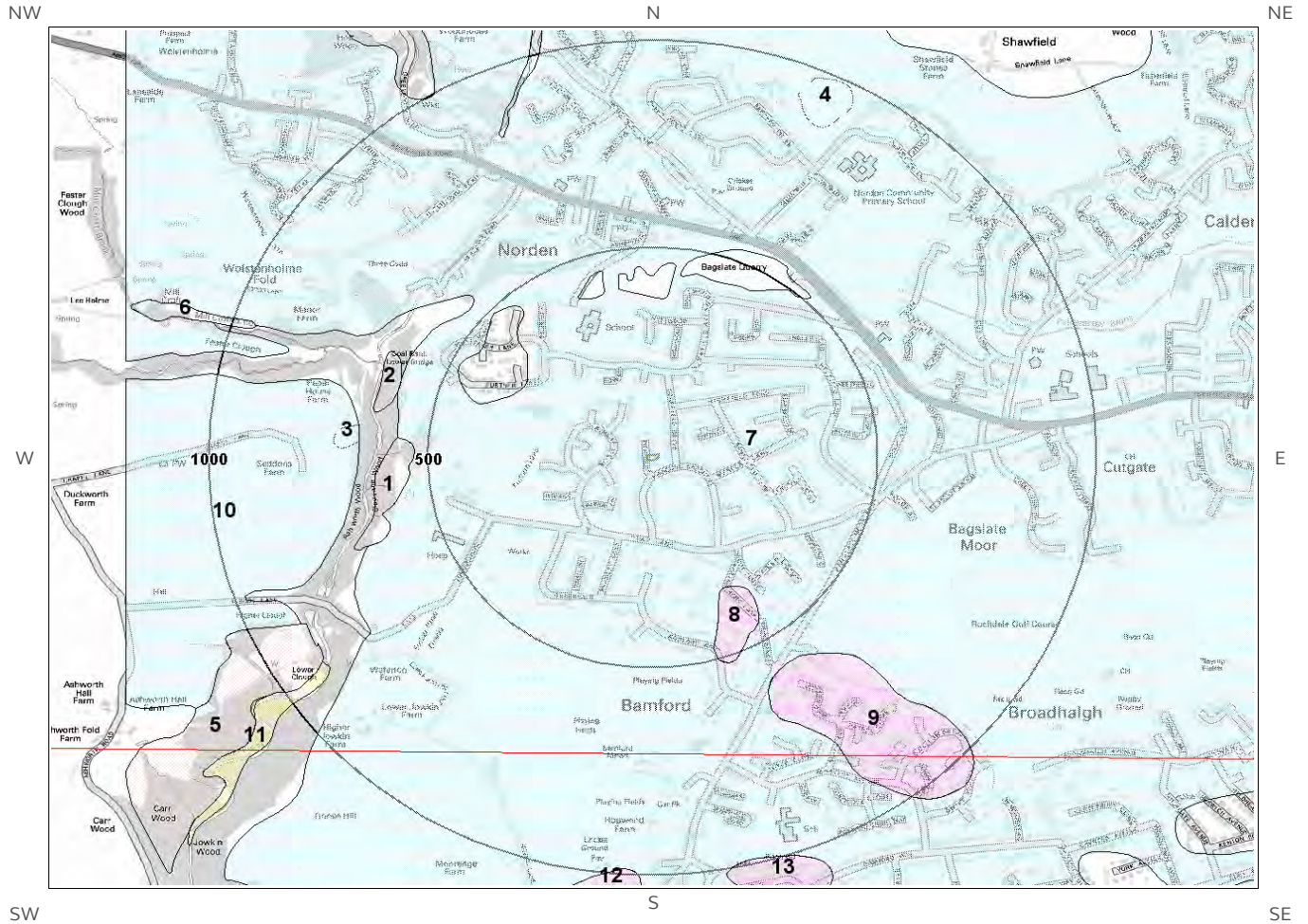
1.1 Artificial Ground

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

Are there any records of Artificial/ Made Ground within 500m of the study site boundary at 1:10,000 scale? Yes

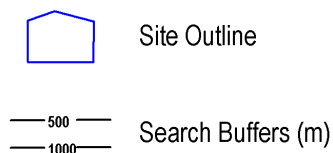
ID	Distance	Direction	LEX Code	Description	Rock Description
1	54.0	W	WMGR-ARTDP	Infilled Ground	Artificial Deposit
2	286.0	SW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
3	378.0	N	WMGR-ARTDP	Infilled Ground	Artificial Deposit
4	379.0	E	WMGR-ARTDP	Infilled Ground	Artificial Deposit
5	398.0	N	WMGR-ARTDP	Infilled Ground	Artificial Deposit
6	435.0	N	WMGR-ARTDP	Infilled Ground	Artificial Deposit

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



Artificial Ground Legend

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1.2 Superficial Deposits and Landslips

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

1.2.1 Superficial Deposits/ Drift Geology

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

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
7	0.0	On Site	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
8	345.0	SE	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel

1.2.2 Landslip

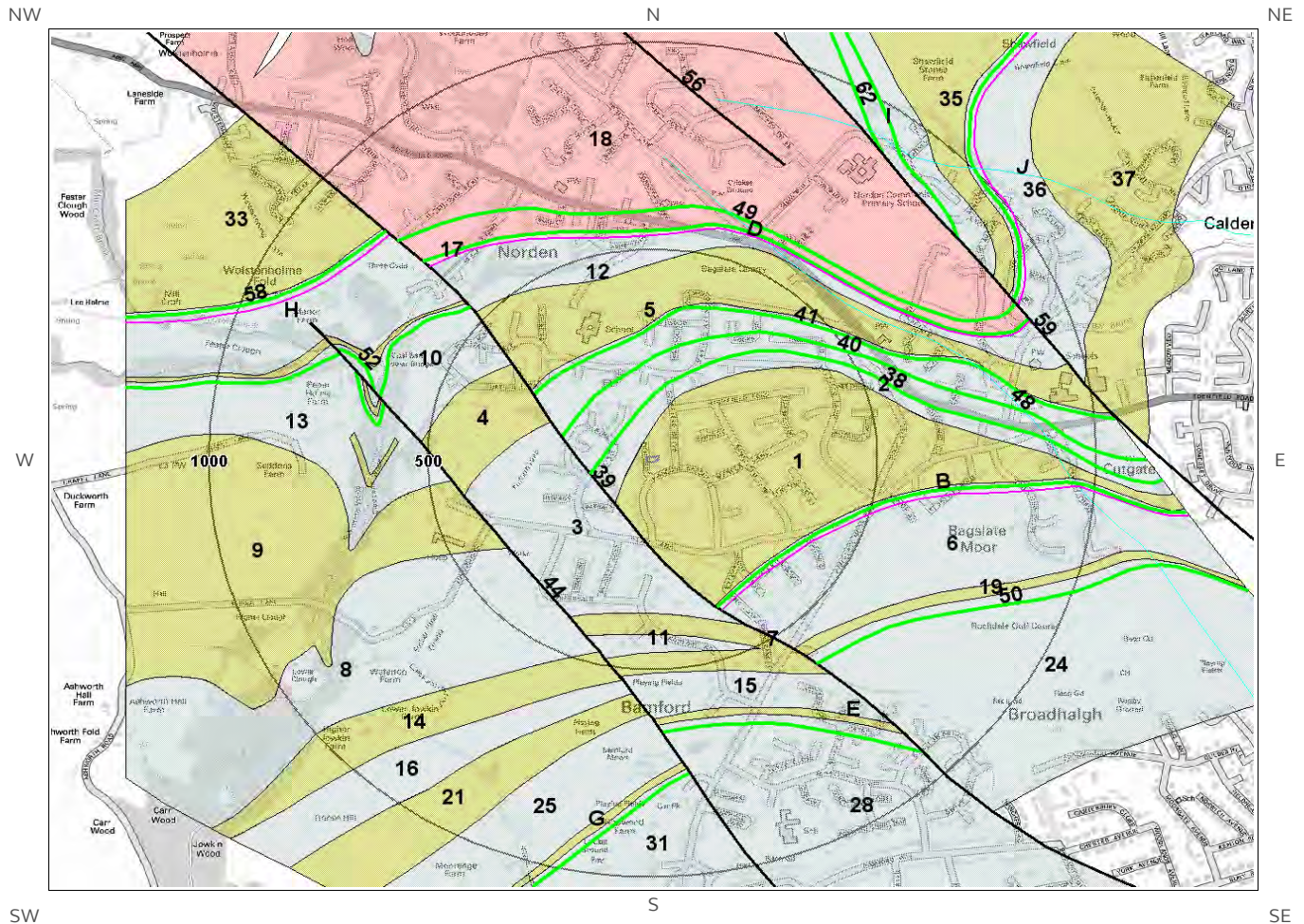
Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found.

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

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

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

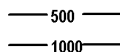


Bedrock and linear features Legend

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Site Outline



Search Buffers (m)

1.3 Bedrock and linear features

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

1.3.1 Bedrock/ Solid Geology

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

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	GAS-SDST	Great Arc Sandstone - Sandstone	Langsettian Sub-age
2	25.0	NW	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
3	120.0	SW	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
4	235.0	W	MLRS-SDST	Milnrow Sandstone - Sandstone	Langsettian Sub-age
5	284.0	NW	WH-SDST	Woodhead Hill Rock - Sandstone	Langsettian Sub-age
6	344.0	SE	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
7	365.0	S	OL-SDST	Old Lawrence Rock - Sandstone	Langsettian Sub-age
8	376.0	SW	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
9	379.0	SW	MLRS-SDST	Milnrow Sandstone - Sandstone	Langsettian Sub-age
10	382.0	NW	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
11	415.0	S	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
12	442.0	N	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
13	449.0	W	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
14	470.0	S	OL-SDST	Old Lawrence Rock - Sandstone	Langsettian Sub-age

1.3.2 Linear features

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

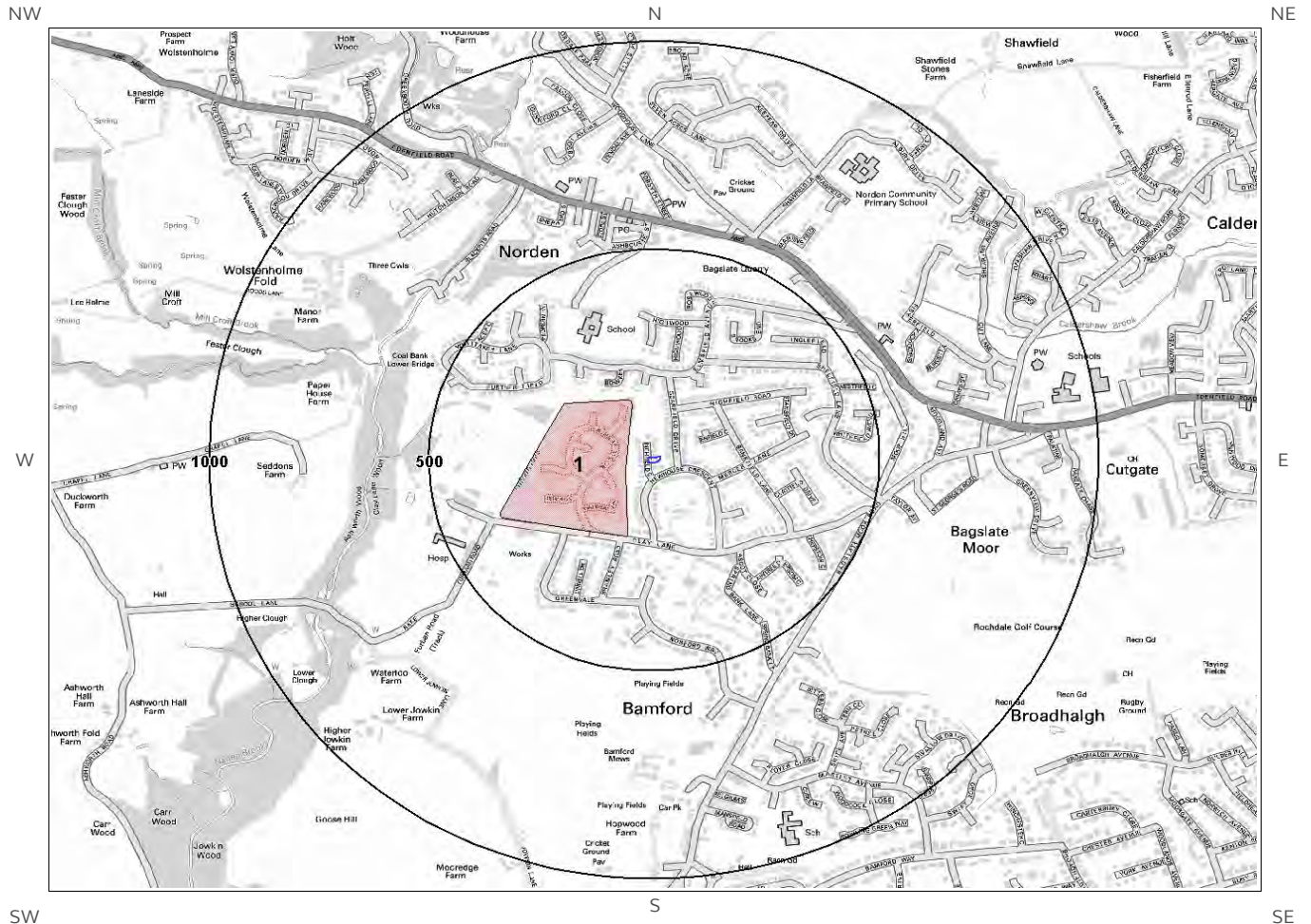
ID	Distance (m)	Direction	Category Description	Feature Description
38	83.0	NW	ROCK	Coal seam, inferred
39	120.0	SW	FAULT	Normal fault, inferred; crossmarks on downthrow side
40	185.0	NW	ROCK	Coal seam, inferred
41	273.0	NW	ROCK	Coal seam, inferred
42B	353.0	SE	ROCK	Coal seam, inferred
43B	365.0	SE	FOSSIL_HORIZON	Fossil horizon, marine band
44	376.0	SW	FAULT	Normal fault, inferred; crossmarks on downthrow side

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

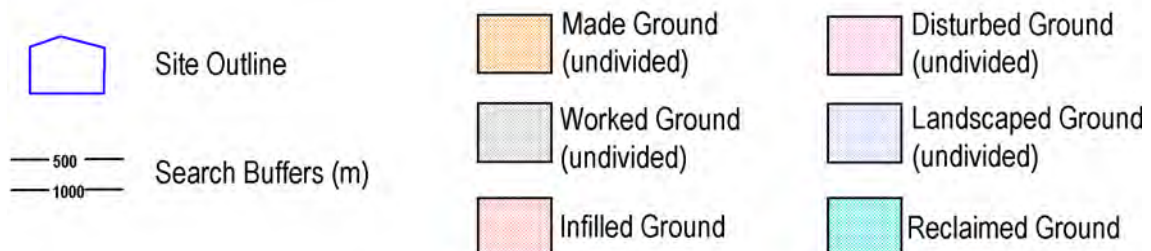
This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2 Geology 1:50,000 Scale

2.1 Artificial Ground map



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2. Geology 1:50,000 scale

2.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 076

2.1.1 Artificial/ Made Ground

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

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	49.0	W	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT

2.1.2 Permeability of Artificial Ground

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

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
49.0	W	Mixed	Very High	Low

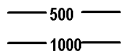
2.2 Superficial Deposits and Landslips map (1:50,000 scale)



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Site Outline



Search Buffers (m)

2.2 Superficial Deposits and Landslips

2.2.1 Superficial Deposits/ Drift Geology

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

ID	Distance	Direction	LEX Code	Description	Rock Description
2	0.0	On Site	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
3	351.0	SE	GFDUD-XSV	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL

2.2.2 Permeability of Superficial Ground

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

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

2.2.3 Landslip

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

Database searched and no data found.

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

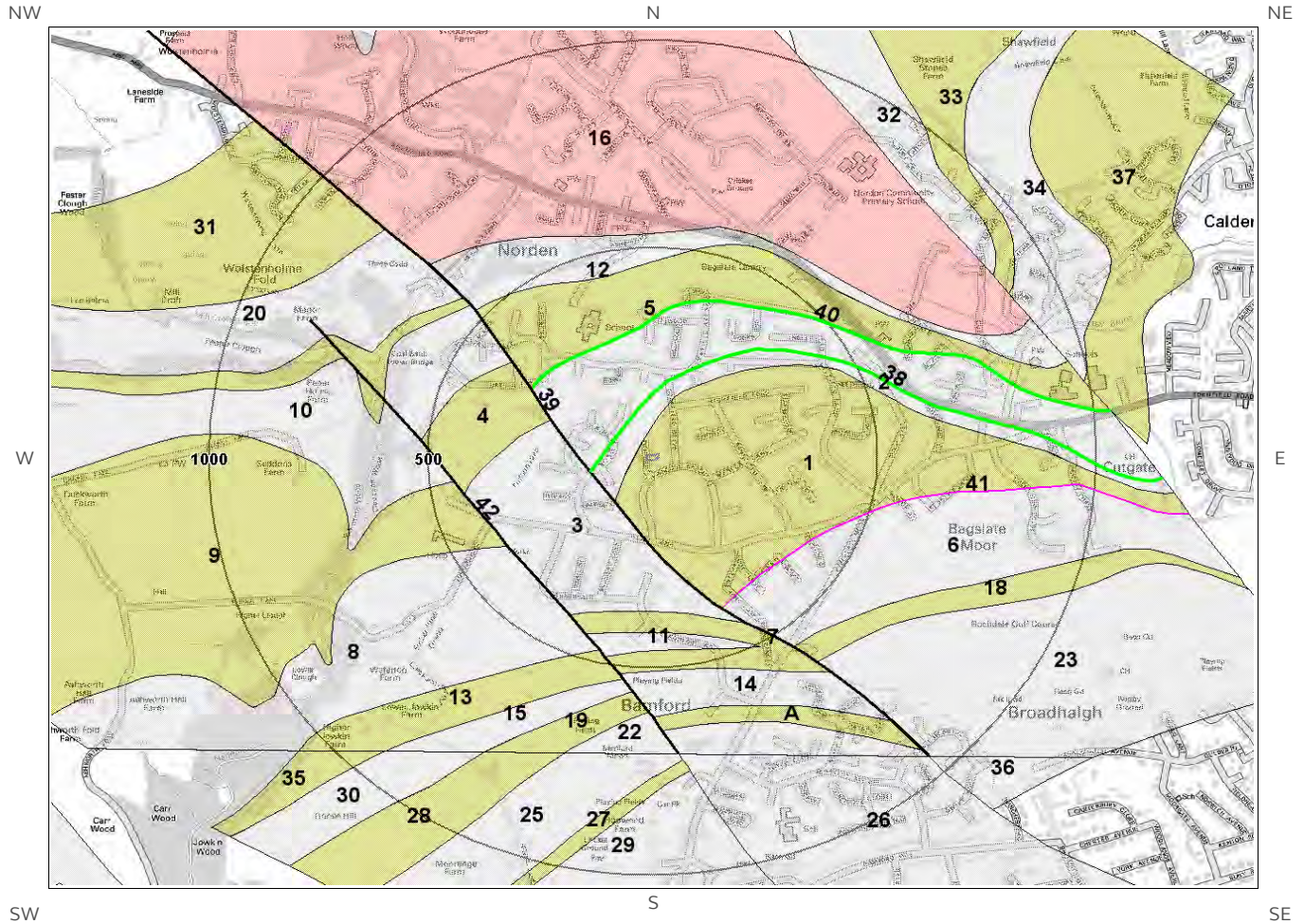
This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2.2.4 Landslip Permeability

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

Database searched and no data found.

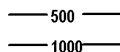
2.3 Bedrock and linear features map (1:50,000 scale)



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Site Outline



Search Buffers (m)

2.3 Bedrock, Solid Geology & linear features

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 076

2.3.1 Bedrock/Solid Geology

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

ID	Distance	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	GAS-SDST	GREAT ARC SANDSTONE - SANDSTONE	WESTPHALIAN
2	25.0	NW	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
3	120.0	SW	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
4	235.0	W	MLRS-SDST	MILNROW SANDSTONE - SANDSTONE	WESTPHALIAN
5	284.0	NW	WH-SDST	WOODHEAD HILL ROCK - SANDSTONE	WESTPHALIAN
6	364.0	SE	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
7	364.0	S	OL-SDST	OLD LAWRENCE ROCK - SANDSTONE	WESTPHALIAN
8	376.0	SW	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
9	379.0	SW	MLRS-SDST	MILNROW SANDSTONE - SANDSTONE	WESTPHALIAN
10	382.0	NW	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
11	415.0	S	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
12	442.0	N	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
13	470.0	S	OL-SDST	OLD LAWRENCE ROCK - SANDSTONE	WESTPHALIAN

2.3.2 Permeability of Bedrock Ground

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

Distance	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	High	Moderate
25.0	NW	Fracture	High	Low

2.3.3 Linear features

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

ID	Distance	Direction	Category Description	Feature Description
38	83.0	NW	ROCK	Coal seam, inferred
39	120.0	SW	FAULT	Fault, inferred
40	284.0	NW	ROCK	Coal seam, inferred
41	364.0	SE	FOSSIL_HORIZON	Marine band
42	376.0	SW	FAULT	Fault, inferred

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

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

3 Radon Data

3.1 Radon Affected Areas

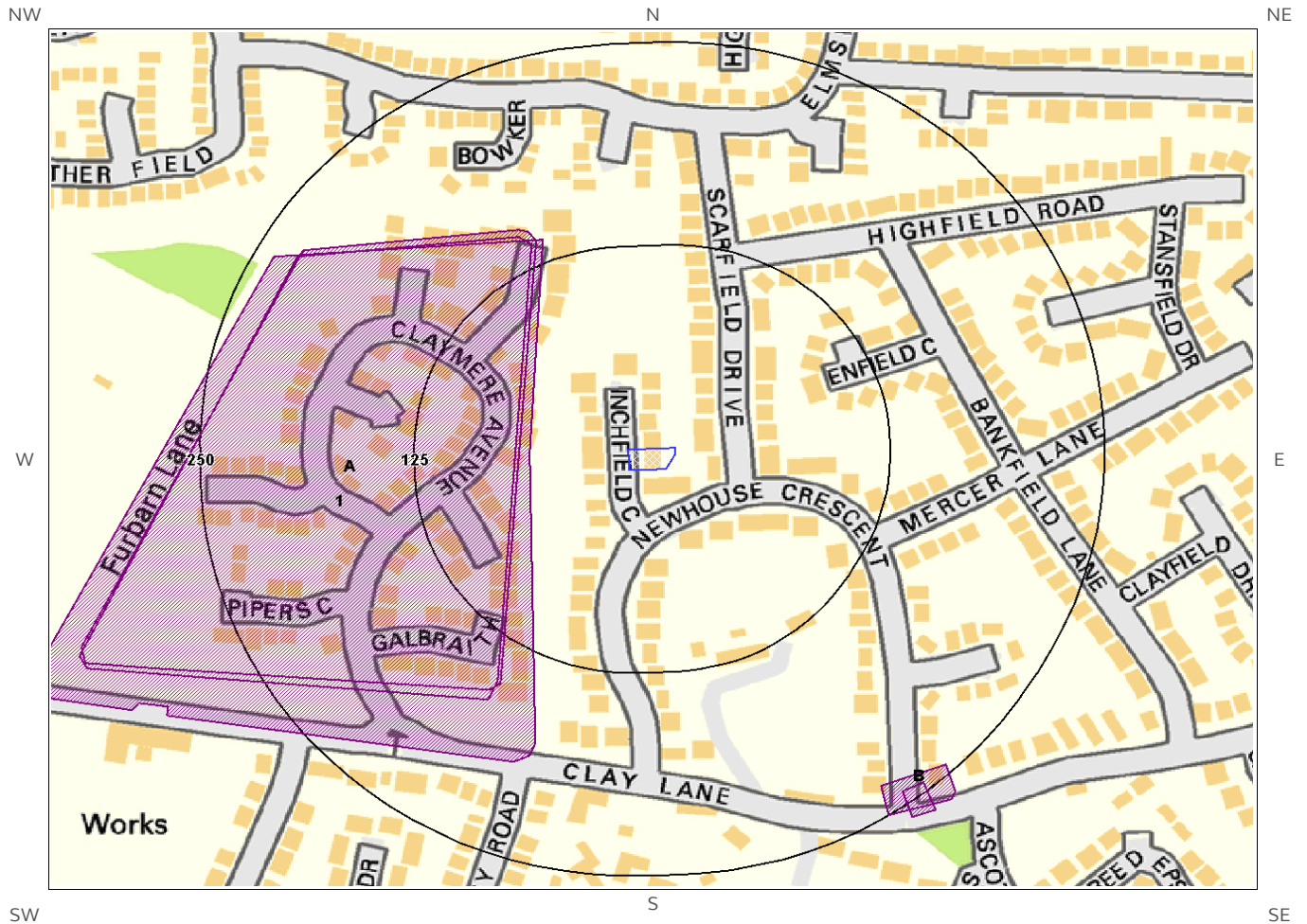
Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

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

3.2 Radon Protection

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

4 Ground Workings map



Ground Workings Legend

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

4 Ground Workings

4.1 Historical Surface Ground Working Features derived from Historical Mapping

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

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

ID	Distance (m)	Direction	NGR	Use	Date
1	58.0	W	385991 413884	Reservoir	1908
2A	63.0	W	386004 413908	Reservoir	1987
3A	63.0	W	386004 413908	Reservoir	1992
4A	63.0	W	386004 413908	Reservoir	1968
5A	63.0	W	386004 413908	Reservoir	1949
6A	63.0	W	386004 413908	Reservoir	1975
7A	66.0	W	386002 413902	Reservoir	1890
8A	66.0	W	386002 413902	Reservoir	1938
9A	66.0	W	386002 413902	Reservoir	1928
10B	232.0	SE	386359 413704	Ponds	1890
11B	242.0	SE	386360 413698	Reservoir	1908

4.2 Historical Underground Working Features derived from Historical Mapping

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

Are there any Historical Underground Working Features within 1000m of the study site boundary? Yes

The following Historical Underground Working Features are provided by Groundsure:

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	490.0	E	386772 413807	Colliery	1890

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	558.0	SE	386641 413500	Old Coal Pit	1890
Not shown	570.0	SE	386629 413508	Old Coal Shaft	1908
Not shown	595.0	NW	385953 414494	Colliery	1890
Not shown	621.0	W	385577 414029	Old Coal Shafts	1908
Not shown	736.0	E	386955 413795	Unspecified Old Shaft	1890
Not shown	782.0	S	386400 413129	Pit Hole	1928
Not shown	961.0	N	386410 414860	Old Air Shaft	1938
Not shown	961.0	N	386410 414860	Old Air Shaft	1928
Not shown	961.0	N	386410 414860	Unspecified Old Shaft	1890
Not shown	961.0	N	386410 414860	Old Air Shaft	1909
Not shown	972.0	N	386412 414871	Unspecified Disused Shaft	1968
Not shown	972.0	N	386412 414871	Unspecified Disused Shaft	1992
Not shown	972.0	N	386412 414871	Unspecified Disused Shaft	1987
Not shown	972.0	N	386412 414871	Unspecified Disused Shaft	1975
Not shown	972.0	N	386412 414871	Old Air Shaft	1949

4.3 Current Ground Workings

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

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

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

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	410.0	E	386628 413923	Sandstone	Shelfield	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	448.0	N	386123 414356	Sandstone	Whitaker Moss Quarry	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	448.0	N	386234 414362	Sandstone	Whitaker Moss Quarry	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	462.0	E	386676 413850	Sandstone	Shelfield	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

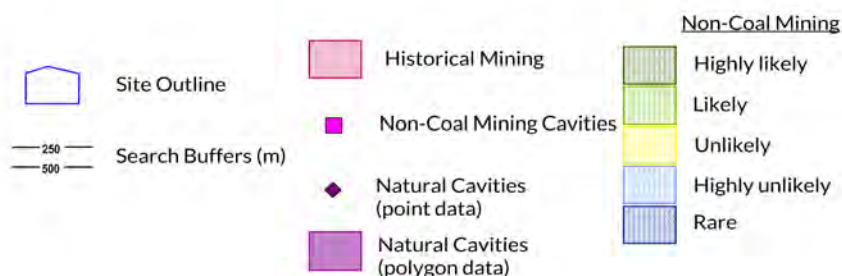
ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	470.0	E	386688 413898	Sandstone	Shelfield	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	512.0	NE	386514 414332	Sandstone	Bagslate Quarry	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	654.0	W	385537 413916	Sandstone	Ashworth Wood	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	688.0	NW	385619 414296	Sandstone	Wolstenholme Fold	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	700.0	W	385492 413963	Sandstone	Ashworth Wood	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	944.0	SE	386632 413056	Sandstone	Dixon Fold	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

5 Mining, Extraction & Natural Cavities map



Mining, Extraction and Natural Cavities Legend

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5 Mining, Extraction & Natural Cavities

5.1 Historical Mining

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

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

The following Historical Mining information is provided by Groundsure:

ID	Distance (m)	Direction	NGR	Details	Date
2	490.0	E	386772 413807	Colliery	1890
3A	558.0	SE	386641 413500	Old Coal Pit	1890
4A	570.0	SE	386629 413508	Old Coal Shaft	1908
Not shown	595.0	NW	385953 414494	Colliery	1890
6	621.0	W	385577 414029	Old Coal Shafts	1908
Not shown	736.0	E	386955 413795	Unspecified Old Shaft	1890
Not shown	782.0	S	386400 413129	Pit Hole	1928
Not shown	961.0	N	386410 414860	Unspecified Old Shaft	1890
Not shown	961.0	N	386410 414860	Old Air Shaft	1938
Not shown	961.0	N	386410 414860	Old Air Shaft	1928
Not shown	961.0	N	386410 414860	Old Air Shaft	1909
Not shown	972.0	N	386412 414871	Unspecified Disused Shaft	1992
Not shown	972.0	N	386412 414871	Unspecified Disused Shaft	1987
Not shown	972.0	N	386412 414871	Unspecified Disused Shaft	1975
Not shown	972.0	N	386412 414871	Unspecified Disused Shaft	1968
Not shown	972.0	N	386412 414871	Old Air Shaft	1949

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

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

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

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

5.3 Johnson Poole and Bloomer

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

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

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

5.4 Non-Coal Mining

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

Are there any Non-Coal Mining areas within 1000m of the study site boundary? Yes

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

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
1	566.0	N	Not available	Vein Mineral	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

5.5 Non-Coal Mining Cavities

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

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

Database searched and no data found.

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

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

Database searched and no data found.

5.7 Brine Extraction

This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

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

Database searched and no data found.

5.8 Gypsum Extraction

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

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

Database searched and no data found.

5.9 Tin Mining

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

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

Database searched and no data found.

5.10 Clay Mining

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

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

Database searched and no data found.

6 Natural Ground Subsidence

6.1 Shrink-Swell Clay map



Shrink Swell Clay Legend

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6.2 Landslides map

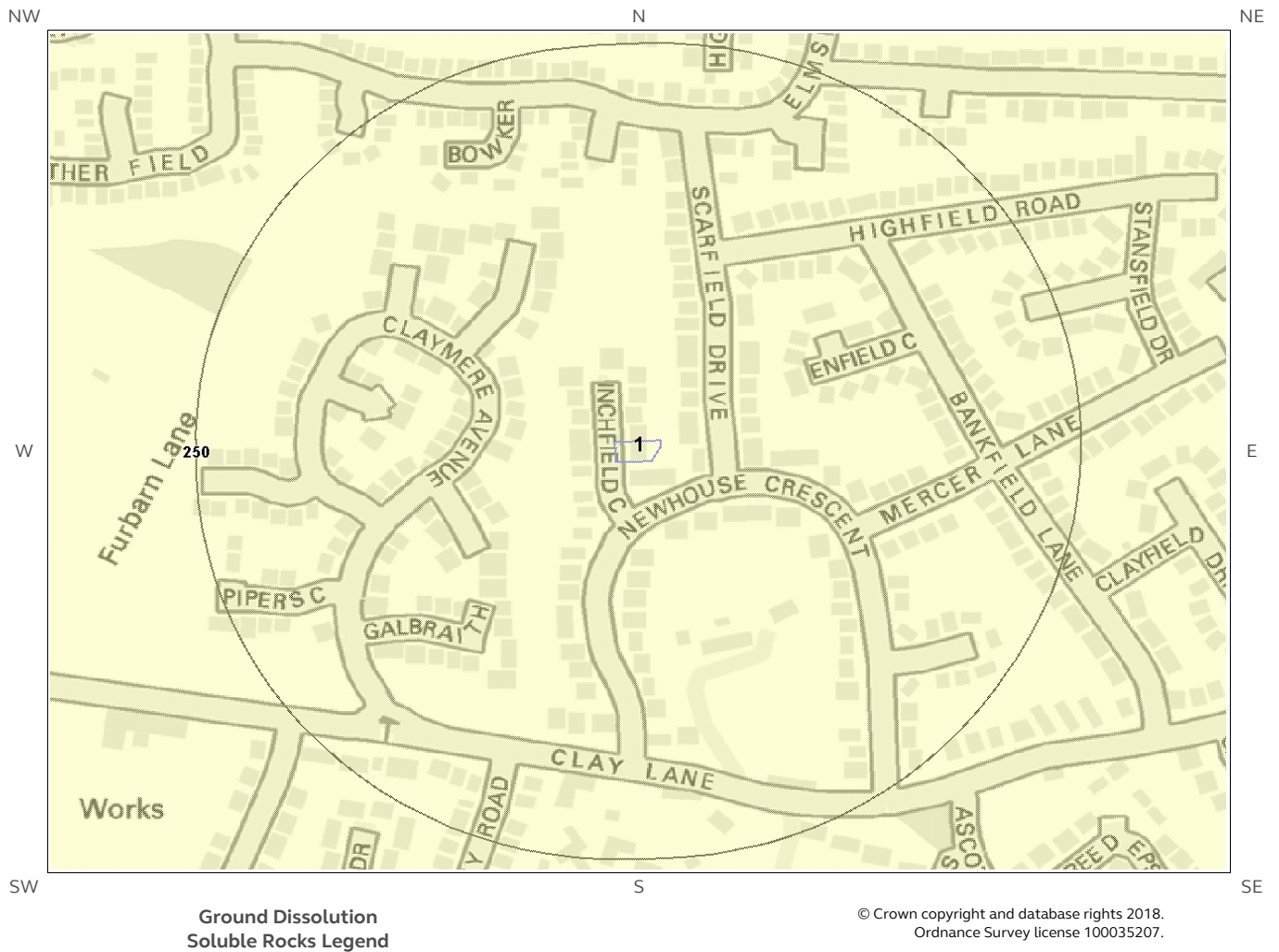


Landslides Legend

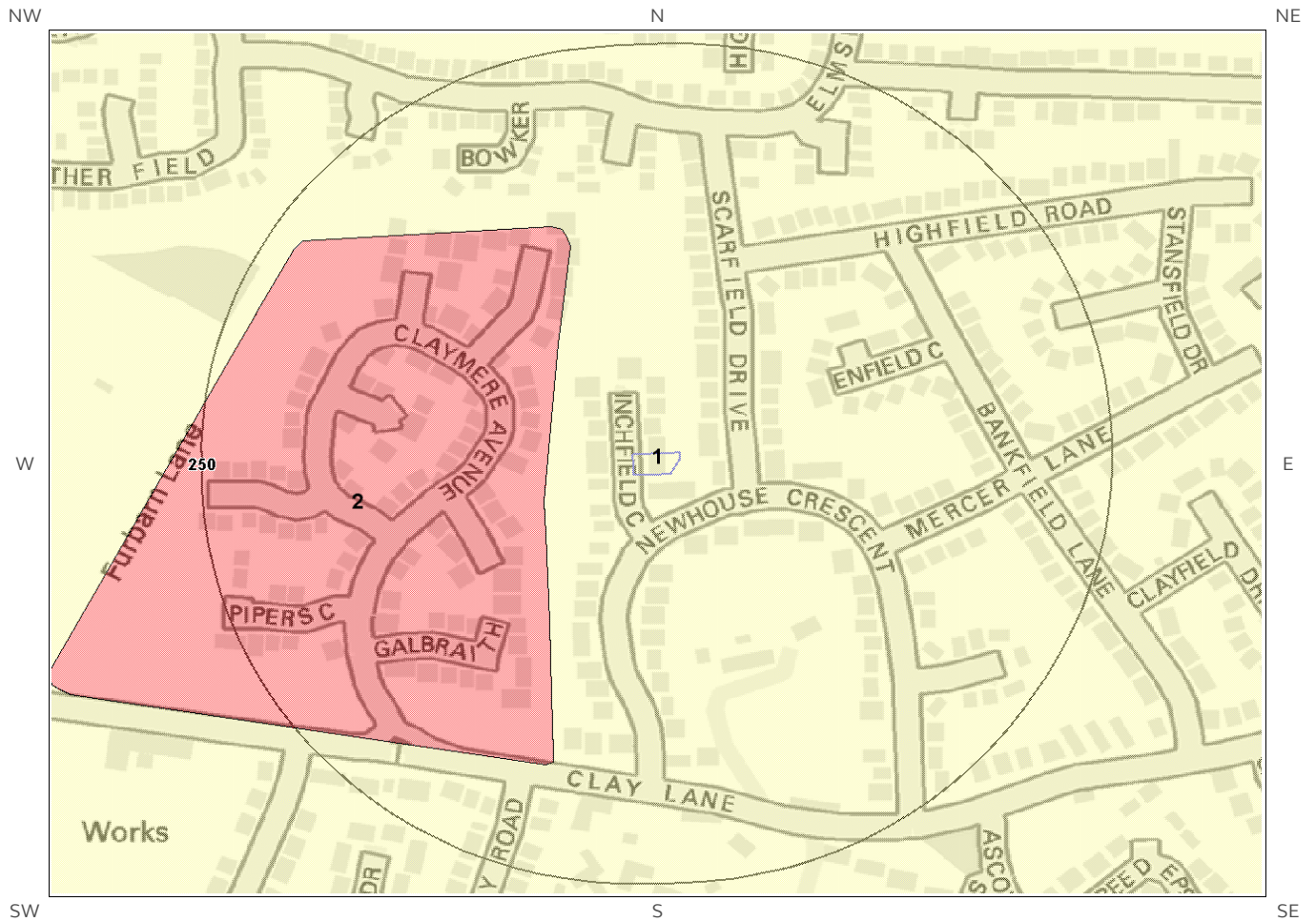
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6.3 Ground Dissolution of Soluble Rocks map



6.4 Compressible Deposits map



Compressible Deposits Legend

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6.5 Collapsible Deposits map



Collapsible Deposits Legend

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6.6 Running Sand map



Running Sand Legend

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6 Natural Ground Subsidence

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

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

What is the maximum hazard rating of natural subsidence within the study site* boundary? **Moderate**

6.1 Shrink-Swell Clays

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

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

6.2 Landslides

The following Landslides information provided by the British Geological Survey:

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

6.3 Ground Dissolution of Soluble Rocks

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

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

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

6.4 Compressible Deposits

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

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
2	49.0	W	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

6.5 Collapsible Deposits

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

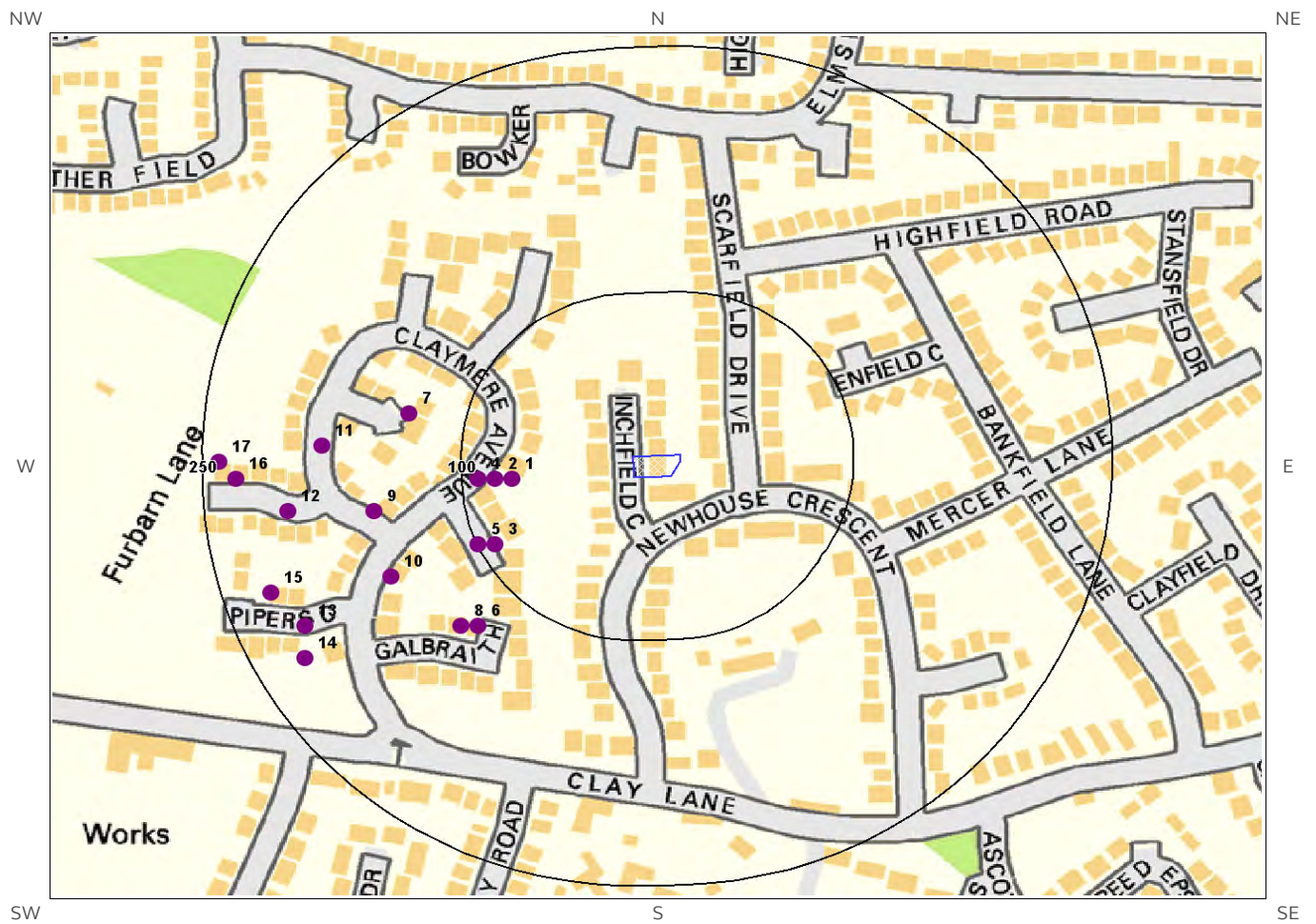
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible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

6.6 Running Sands

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

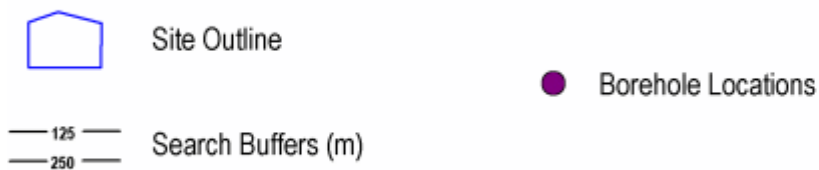
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased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

7 Borehole Records map



Borehole Records Legend

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7 Borehole Records

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

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

17

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	71.0	W	386120 413900	SD81SE398	10.3	FORMER CLAY LANE RESEVOIR 2
2	81.0	W	386110 413900	SD81SE399	3.2	FORMER CLAY LANE RESEVOIR TP A
3	91.0	SW	386110 413860	SD81SE401	3.4	FORMER CLAY LANE RESEVOIR TP 2A
4	91.0	W	386100 413900	SD81SE400	2.1	FORMER CLAY LANE RESEVOIR TP 1B
5	100.0	SW	386100 413860	SD81SE402	2.8	FORMER CLAY LANE RESEVOIR TP 2B
6	129.0	SW	386100 413810	SD81SE403	3.5	FORMER CLAY LANE RESEVOIR TP 3A
7	133.0	W	386060 413940	SD81SE415	1.6	FORMER CLAY LANE RESEVOIR TP A
8	136.0	SW	386090 413810	SD81SE404	3.7	FORMER CLAY LANE RESEVOIR TP 3B
9	152.0	W	386040 413880	SD81SE416	1.5	FORMER CLAY LANE RESEVOIR TP B
10	154.0	SW	386050 413840	SD81SE417	1.5	FORMER CLAY LANE RESEVOIR TP C
11	181.0	W	386010 413920	SD81SE420	1.5	FORMER CLAY LANE RESEVOIR TP F
12	202.0	W	385990 413880	SD81SE419	1.5	FORMER CLAY LANE RESEVOIR TP E
13	212.0	SW	386000 413810	SD81SE412	2.2	FORMER CLAY LANE RESEVOIR TP 7B
14	221.0	SW	386000 413790	SD81SE411	3.8	FORMER CLAY LANE RESEVOIR TP 7A
15	223.0	W	385980 413830	SD81SE418	1.5	FORMER CLAY LANE RESEVOIR TP D
16	231.0	W	385960 413900	SD81SE406	3.5	FORMER CLAY LANE RESEVOIR TP 4B
17	241.0	W	385950 413910	SD81SE405	3.5	FORMER CLAY LANE RESEVOIR TP 4A

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

#1: scans.bgs.ac.uk/sobi_scans/boreholes/30124
#2: scans.bgs.ac.uk/sobi_scans/boreholes/30125
#3: scans.bgs.ac.uk/sobi_scans/boreholes/30127
#4: scans.bgs.ac.uk/sobi_scans/boreholes/30126
#5: scans.bgs.ac.uk/sobi_scans/boreholes/30128
#6: scans.bgs.ac.uk/sobi_scans/boreholes/30129
#7: scans.bgs.ac.uk/sobi_scans/boreholes/30141
#8: scans.bgs.ac.uk/sobi_scans/boreholes/30130
#9: scans.bgs.ac.uk/sobi_scans/boreholes/30142
#10: scans.bgs.ac.uk/sobi_scans/boreholes/30143
#11: scans.bgs.ac.uk/sobi_scans/boreholes/30146
#12: scans.bgs.ac.uk/sobi_scans/boreholes/30145
#13: scans.bgs.ac.uk/sobi_scans/boreholes/30138
#14: scans.bgs.ac.uk/sobi_scans/boreholes/30137
#15: scans.bgs.ac.uk/sobi_scans/boreholes/30144
#16: scans.bgs.ac.uk/sobi_scans/boreholes/30132
#17: scans.bgs.ac.uk/sobi_scans/boreholes/30131

8 Estimated Background Soil Chemistry

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

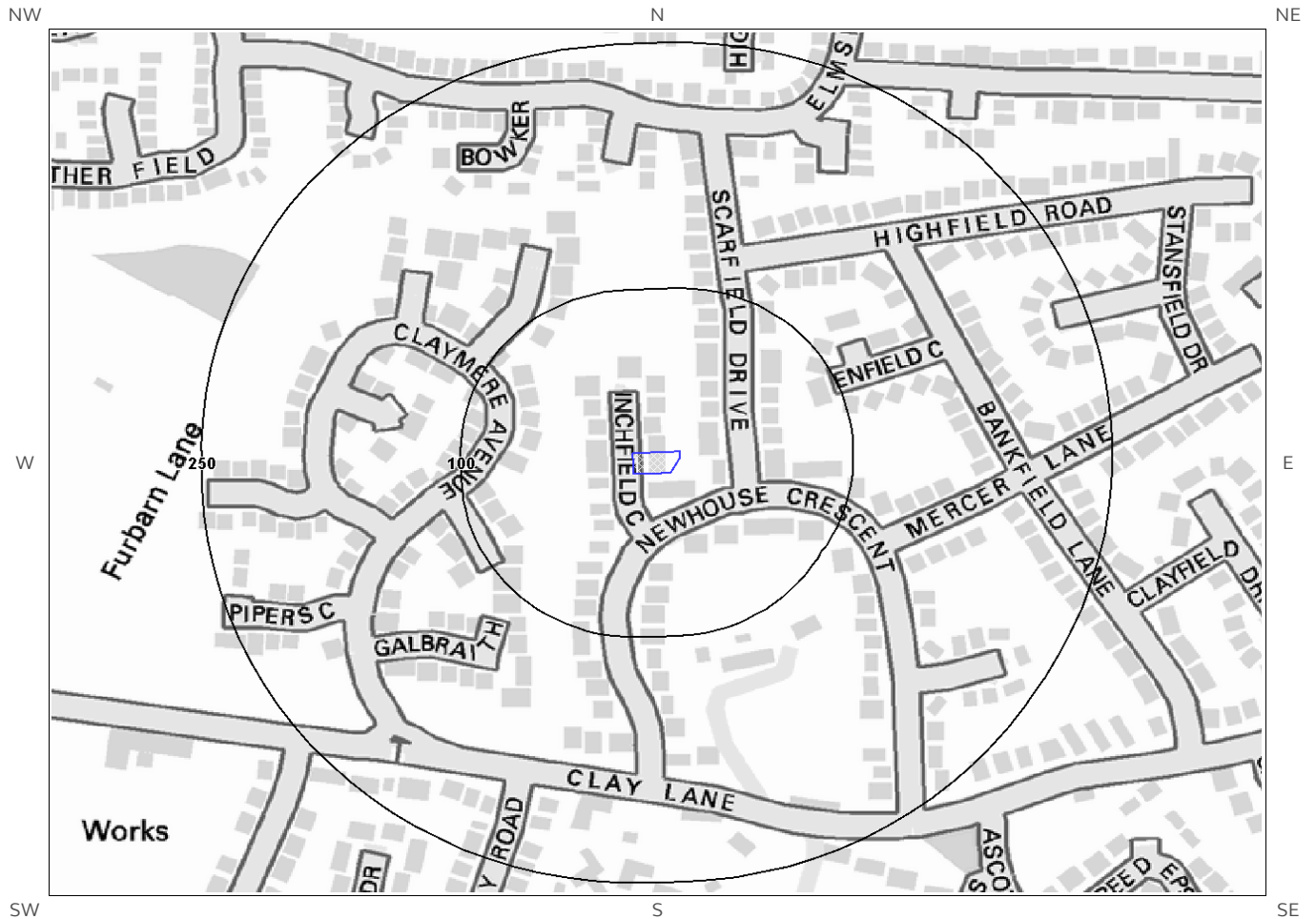
2

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

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	Sediment	<15 mg/kg	1.8 - 2.2 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
11.0	SE	Sediment	<15 mg/kg	1.8 - 2.2 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg

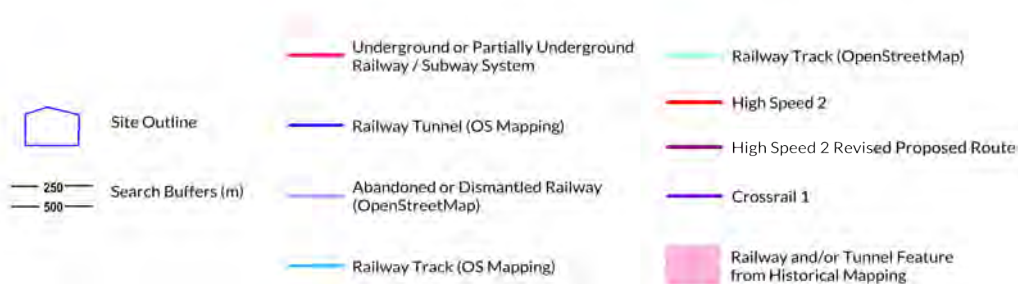
*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

9 Railways and Tunnels map



Railways and Tunnels Legend

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9 Railways and Tunnels

9.1 Tunnels

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

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

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

Database searched and no data found.

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

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

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

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

Database searched and no data found.

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

9.2 Historical Railway and Tunnel Features

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

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

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

Database searched and no data found.

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

9.3 Historical Railways

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

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

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

Database searched and no data found.

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

9.4 Active Railways

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

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

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

Database searched and no data found.

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

9.5 Railway Projects

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

Is the study site within 5km of the route of the High Speed 2 rail project? No

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

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

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

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

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