



# Land at Tollgate Road Colney Heath

## Phase 1 Ground Conditions Assessment (GCA)

On behalf of **Vistry Group**

# Vistry Group

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## Document Control Sheet

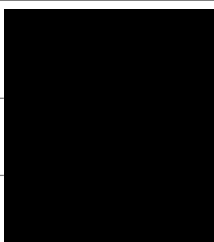
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## Contents

<b>1</b>	<b>Introduction.....</b>	<b>1</b>
1.1	Preamble.....	1
1.2	Objective .....	1
1.3	Methodology & Report Format.....	1
1.4	Sources of Information.....	2
1.5	Previous Investigations .....	3
<b>2</b>	<b>Site Setting .....</b>	<b>4</b>
2.1	Site Location .....	4
2.2	Site Location and Description .....	4
2.3	Historical Land Use.....	5
2.4	Review of Database Searches .....	5
2.5	Industrial Setting .....	6
2.6	Consultation with Regulators .....	6
2.7	Review of Unexploded Bomb Risk Map .....	7
<b>3</b>	<b>Environmental Setting .....</b>	<b>8</b>
3.1	Introduction .....	8
3.2	Geological Setting.....	8
3.3	Geodiversity .....	9
3.4	Hydrogeological Setting.....	9
3.5	Hydrological Setting.....	9
3.6	Ecological Setting and Property – Animal or Crop Effect .....	10
3.7	Ground Gases.....	10
<b>4</b>	<b>Land Contamination - Tier 1 Preliminary Risk Assessment .....</b>	<b>12</b>
4.1	Introduction .....	12
4.2	Conceptual Model.....	12
4.3	Hazard Identification .....	12
4.4	Hazard Assessment.....	13
4.6	Ground Investigation Recommendations .....	15
<b>5</b>	<b>Preliminary Land Stability Assessment.....</b>	<b>16</b>
5.1	Introduction .....	16
5.2	Ground Instability - Unstable Slopes .....	16
5.3	Ground Movements (subsidence) due to Artificial Cavities .....	16
5.4	Ground Movements (subsidence) due to Natural Cavities .....	17
5.5	Ground Movements (subsidence) due to Clay-Soils or Potential Adverse Foundation Conditions .....	17
<b>6</b>	<b>Conclusions and Recommendations .....</b>	<b>19</b>
6.1	General .....	19
6.2	Geoenvironmental.....	19

6.3	Geotechnical .....	19
<b>7</b>	<b>Essential Guidance for Report Readers.....</b>	<b>21</b>
<b>8</b>	<b>References .....</b>	<b>22</b>

## Figures

Figure 1	Site Location Plan
Figure 2	Site Layout Plan

## Tables

Table 2.1 - Summary of Database Searches .....	5
Table 3.1 - BGS borehole Records Summary.....	8
Table 3.2 - Summary of Hydrogeology and Groundwater Vulnerability .....	9
Table 3.3 - Summary of Hydrological Site Data .....	10
Table 5.1 - Hazard Classification of On Site PSC.....	12
Table 5.2 - Hazard Classification of Off Site PSC.....	13
Table 5.3 - Potential Sources of Contamination and Potential Contaminants .....	13
Table 5.4 - Identification of Potential Receptors.....	13
Table 5.5 - Estimated Risks.....	14

## Appendices

Appendix A	Stantec Methodology for Assessing Land Contamination in England
Appendix B	Site Walkover Photographs
Appendix C	GroundSure Report
Appendix D	Regulatory Correspondence
Appendix E	Zetica UXO Map
Appendix F	Risk Assessment Tables
Appendix G	Cavities Occurrence Assessment

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# 1 Introduction

## 1.1 Preamble

- 1.1.1 Stantec UK Limited has been instructed by Vistry Group (the Client), to prepare a Phase 1 Ground Conditions Assessment (GCA) report to support an outline planning application for the proposed development of a site known as Land at Tollgate Road, Colney Heath. The site location is illustrated on the attached **Figure 1**.
- 1.1.2 The proposed development comprises the provision of up to 150 new homes, including affordable housing, set within a network of green infrastructure including new public landscaping, a children's play area and new pedestrian walkways.
- 1.1.3 This report presents the findings of desk study research carried out together with the observations from a reconnaissance walkover. A Preliminary Conceptual Site Model (CSM) has been developed and a Tier 1 land contamination Preliminary Risk Assessment (PRA) (qualitative) has been conducted. In addition, a preliminary land instability assessment has been undertaken, including an assessment of the potential occurrence of natural and artificial cavities.
- 1.1.4 It should be noted that this report is a land condition assessment and does not purport to be an ecological, flood risk, agricultural land quality assessment, archaeological survey etc. and as such, additional surveys may be required to support a planning application. Guidance for readers of this report is presented in **Section 7**.

## 1.2 Objective

- 1.2.1 The objective of this report is to identify the likely ground conditions and environmental setting using published and publicly available information (see **Section 1.4** below for sources of information) that might have associated environmental liabilities or land stability hazards that may require management (remediation or mitigation).
- 1.2.2 The primary aim of this assessment is to meet the requirements of the National Planning Policy Framework (NPPF, MHCLG, 2021) and the requirements in Clauses 174 (e) & (f) and 183. As per Clause 183, planning policies and decisions should ensure that *"a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination"*.
- 1.2.3 To support planning applications an appropriate risk assessment of contamination, ground and slope stability is required (NPPF Glossary Annex 2 Site Investigation Information). A PRA forms the first stage of this risk assessment process and is generally considered to be the minimum requirement to support any planning application.

## 1.3 Methodology & Report Format

### Assessment of Ground Conditions – Contamination

- 1.3.1 The Stantec methodology for ground condition assessment (contamination) is presented in **Appendix A**.
- 1.3.2 In order to meet the requirements of the NPPF, the assessment has been carried out in accordance with 'established procedures' using current UK good practice and guidance as given in:
- British Standard 10175:2011 +A2:2017

- Land Contamination: Risk Management (LC:RM, EA, 2021),
- Development of Potentially Contaminated Land/or for Sensitive End Use: Technical Guide for Planning Applicants and Developers (HBCLF, 2018), and
- NHBC Standards (NHBC, 2022).

1.3.3 The principal components of this assessment are generally as described in the Environment Agency's Land Contamination: Risk Management (LC:RM) guidance, published on 08 October 2020 (updated April 2021) and available through the [www.gov.uk](http://www.gov.uk) website. LC:RM sets out a risk management process based on a tiered risk assessment with an increasing level of detail required to progress through the tiers.

- Tier 1 – “Preliminary Risk Assessment (PRA)” – a qualitative assessment forming part of a Phase 1 report,
- Tier 2 – “Generic Quantitative Risk Assessment” - a quantitative assessment using published criteria to screen site specific ground condition data forming part of a Phase 2 report and
- Tier 3 – “Detailed Quantitative Risk Assessment” – a quantitative assessment involving the generation of site-specific assessment criteria (SSAC).

1.3.4 The underlying principle is the evaluation of pollutant linkages in order to assess whether the presence of a source of contamination could potentially lead to harmful consequences. A pollutant linkage consists of the following three elements:

- A source of contamination or hazard that has the potential to cause harm or pollution,
- A pathway for the hazard to move along / generate exposure, and
- A receptor which is affected by the hazard.

1.3.5 For each potential pollutant linkage identified, the risk is estimated through consideration of the magnitude of the potential consequences and the likelihood or probability of an event occurring.

1.3.6 This report is divided into sections identifying potential sources (hazard identification), potential pathway and receptor identification and risk estimation and assessment.

#### **Assessment of Ground Conditions – Land Instability**

1.3.7 The preliminary land instability appraisal includes for example, where relevant, a review of geological hazards for the Site such as natural and man-made (mining) cavities, landslide, collapsible and compressible soils, running sand, and subsidence and heave due to volumetric change in the ground.

## **1.4 Sources of Information**

1.4.1 The following publicly available sources of information were used in the preparation of this report:

- A walkover survey was undertaken by a Stantec engineer on 16 March 2022 to observe existing conditions both on the site and surrounding land. Photographs are presented in **Appendix B**.

- Groundsure was commissioned to provide an Enviro and Geo Insight report (report ref POEPL009405\_Colney\_Heath) including historical maps and environmental data searches, and this information is presented in its entirety in **Appendix C**.
- Geology maps and borehole records held by the British Geological Survey (BGS) accessed via their website and Geological Survey of England and Wales 1:63,360/1:50,000 geological map series.
- Historical borehole records held in the BGS database.
- Defra's MAGIC website and the UK Government's data website for information on surface and groundwater quality, significant environmental features and historic structures (accessed May 2022).
- Communication with the Local Authority Contaminated Land Officer (CLO) and an environmental enquiry on groundwater and contaminated land information to the Environment Agency. Correspondence with regulators is in **Appendix D**.
- CSA Environmental Vision Document for land at Colney Heath, dated March 2021.
- Google Earth Pro, historical imagery dated from 2000 – 2020 (accessed May 2022).

## **1.5 Previous Investigations**

- 1.5.1 Stantec has not been made aware of any desk-based or ground investigations having been carried out at the Site previously.



## 2 Site Setting

### 2.1 Site Location

- 2.1.1 The site is located on the southern edge of Colney Heath, Hertfordshire, approximately 5km south-east of St Albans.
- 2.1.2 The site is approximately centred at Grid Reference 520891, 205504 with the approximate postcode AL4 0NZ. A Site Location Plan is presented as **Figure 1**.

### 2.2 Site Location and Description

- 2.2.1 A Site walkover inspection was undertaken by Stantec on 16 March 2022. Photographs taken during the walkover are presented in **Appendix B**. Salient site features are shown on **Figure 2**.

#### Onsite

- 2.2.2 The site comprises an irregularly shaped parcel of land occupied by a large horse paddock with stables on the western site boundary and a residential property (No.42 Tollgate Road) on the north-western corner of the site. The site is accessed via a gravel surfaced driveway located to the west of the residential property.
- 2.2.3 The stable buildings were located just south of the access into the site and comprised a long single storey wooden structure with steel storage containers adjacent. The land immediately surrounding the stables was used for the storage of horse boxes.
- 2.2.4 In front of the stable building was a small outdoor arena with show jumping apparatus which was covered with shredded rubber surfacing.
- 2.2.5 The field area closest to the stables had been sub-sectioned using electric fencing to provide smaller paddocks for the horses.
- 2.2.6 The north-eastern boundary of the site runs along the back of houses fronting onto Tollgate Road.

#### Off Site

- 2.2.7 The following off site land uses have been identified:
- North - Residential properties fronting Tollgate Road.
  - East and South-east - Fields with isolated residential properties beyond.
  - West and South-west - River Colne with wooded area and isolated residential properties beyond.
  - North-west - Field with isolated residential properties beyond.

#### Topography

- 2.2.8 The site slopes downhill to the south-west towards the River Colne. The highest point occurs in the north-western corner of the site at around 76m AOD and the lowest point occurs in the south-western corner at around 70m AOD.

## 2.3 Historical Land Use

2.3.1 The OS map records and Google Earth imagery indicate that the site has been in agricultural usage since at least the late 19<sup>th</sup> century. The residential properties adjacent to the northern side of the site date from the early through to the late twentieth century.

2.3.2 Other features of note are:

- Two blacksmiths were located between 200m and 460m to the north-west of the site on the 1896 map.
- A Gravel Pit was located 750m to the south-east of the site and an Old Chalk Pit approximately 1km to the west of the site on the 1896 map.
- An unspecified 'pit' was located 220m to the west of the site on the opposite bank of the River Colne to the site on 1930s mapping.

2.3.3 The Google Earth images dated between 2000 and 2021 revealed no additional information to supplement the site history.

## 2.4 Review of Database Searches

2.4.1 The results of the database searches relating to land-use are summarised in the following table and discussed in the following sections.

Table 2.1 - Summary of Database Searches

Data Type	Number on Site <sup>(1)</sup>	Number within 250 m of Site <sup>(1)</sup>
<b>Waste Regulation</b>		
Landfill Sites	0 (0)	0 (0)
Historical Waste Sites	0 (0)	1 (0)
Licensed Waste Management Facilities	0 (0)	0 (0)
Potentially Infilled Land (Non-Water)	0 (0)	0 (0)
<b>Statutory Permits/Authorisations</b>		
Pollution Prevention and Control <sup>(2)</sup>	0 (0)	0 (0)
Radioactive Substance Authorisations	0 (0)	0 (0)
Planning Hazardous Substances	0 (0)	0 (0)
COMAH Sites <sup>(3)</sup>	0	0
NIHHS Sites <sup>(4)</sup>	0	0
<b>Recorded Pollution / Potential Pollution</b>		
Substantiated Pollution Incidents	0	5
Contaminated Land <sup>(5)</sup>	0	0
<b>Potential Contaminative Uses</b>		
Fuel Stations	0	0
Trade Directory or Recent industrial land uses	0	2
<b>Notes:</b>		
1) Numbers in brackets denotes number of authorisations, licenses or permits that are lapsed, revoked, cancelled, superseded, defunct, surrendered, not applicable, inactive, withdrawn or not yet started.		
2) Includes Integrated Pollution Controls, Integrated Pollution Prevention and Control, Local Authority Integrated Pollution Prevention and Control and Local Authority Pollution Prevention and Control permits.		
3) COMAH denotes Control of Major Accident Hazards		
4) denotes Notification of Installations Handling Hazardous Substances		
5) Sites determined as Contaminated Land under Part 2A of the Environmental Protection Act		

## 2.5 Industrial Setting

### Landfill and Waste Sites

- 2.5.1 No landfill sites, historical waste sites or licenced waste management facilities are located on site.
- 2.5.2 Records indicate that the field adjacent to the north-western boundary of the site is classified as an historical landfill. Detail provided in the Groundsure report is limited but suggests that Inert waste materials were deposited starting in May 1993.

### Petrol Stations

- 2.5.3 No fuel station entries are recorded within 250 radius of the site.

### Pollution Incidents

- 2.5.4 Five pollution incidents have been recorded within a 250 radius of the site.
- 2.5.5 The closest to the site was the release of sewerage materials in 2003 approximately 81m to the south-west of the site. This incident recorded a minor impact to land and no impact to air or water.
- 2.5.6 The remaining four incidents related to the release of air pollutants and were recorded as having no effect on land and water.

### Trade Directory Entries or Recent Industrial Land Uses

- 2.5.7 Eighteen recent industrial land uses were recorded within a 250m radius of the site. The nearest was a lampshade and lighting designer located 90m to the east of the site. Other nearby recorded land uses included electricity substations (closest 110m to the north-east), pumping stations (closest 207m to the north-east) and a vehicle repair, testing and servicing centre 200m to the east.

## 2.6 Consultation with Regulators

- 2.6.1 Requests for environmental information were been submitted to St Albans Council (SAC) and the Environment Agency (EA). The responses are included in **Appendix D**.
- 2.6.2 Information provided by SAC gives some limited details on the historical landfill to the north-west of the site. The details provided state that Colney Heath Farm has been identified as a closed historical landfill area (see **Figure 2**). The land was not licensed for tipping, but waste input started in May 1993. The Council hold no records on the type of waste materials placed. An application was submitted to the Council in September 1993 to appeal against an enforcement notice issued with respect to the filling. The application does suggest that some works were undertaken which involved the bringing of material onto the site to change the levels. The application was reported to have been withdrawn on 18 January 1994.
- 2.6.3 In addition to the above information, the Council also confirmed they held no records for private water supplies within 500m of the site.
- 2.6.4 The response from the EA confirmed that inert waste was deposited in the historical landfill and that it was unlicensed with the date of first waste input given as 10<sup>th</sup> May 1993.

## 2.7 Review of Unexploded Bomb Risk Map

- 2.7.1 A review of the Zetica bomb map for the site area indicates a Low risk for unexploded ordnance (UXO). A copy of the Zetica UXO map is presented in **Appendix E**.

## 3 Environmental Setting

### 3.1 Introduction

3.1.1 The information from published and publicly available information sources is summarised below and is used to provide context for the ground stability appraisal in **Section 5** and identify potential receptors in the Tier 1 PRA presented in **Section 4**.

### 3.2 Geological Setting

3.2.1 The 1:50,000 series geological map (BGS, 1978) and BGS GeoIndex (onshore) (BGS, 2021) indicate the following geological sequence underlying the Site:

- Deposits of the Lowestoft Formation (Boulder Clay) comprising a chalky till containing sands, gravels, silts and clays outcrop on the northern and north-eastern areas of the site.
- Deposits of the Kesgrave Catchment Subgroup, typically comprising sands and gravels outcrop over the central area of the site.
- The south-western edge of the site, closest to the River Colne, is mapped as being underlain by Alluvium.
- Beneath the superficial deposits the site is underlain by the Lewes Nodular Chalk Formation and Seaford Chalk Formation. These form part of the White Chalk Sub-Group which typically comprise chalk with flints, with discrete marl seams, nodular chalk and flint seams throughout.

#### Historical BGS Boreholes

3.2.2 The BGS borehole record viewer (BGS, 2021) includes two nearby borehole records. These are summarised in Table 3.1 below.

Table 3.1 - BGS borehole Records Summary

BGS Described Lithology	Depth from (m bgl)	Depth to (m bgl)
<b>Borehole TL20NW14 200m west of the Site</b>		
Made Ground	0.0	0.1
Topsoil	0.1	0.8
Boulder Clay	0.8	5.9
Glacial Gravel	5.9	11.0
Boulder Clay	11.0	13.0
Glacial Gravel	13.0	20.0
Upper Chalk	20.0	>21.0
<b>Borehole TL20NW17 450m south-east of the Site</b>		
Topsoil	0.0	0.2
Glacial Gravel	0.2	5.9
Lake Deposits	5.9	6.5
Boulder Clay	6.5	9.9
Upper Chalk	9.9	>10.2

### 3.3 Geodiversity

3.3.1 Geodiversity can be defined as the natural range (diversity) of geological (rocks, minerals, fossils), geomorphological (landforms, topography, physical processes), soil and hydrological features. It includes their assemblages, structures, systems and contributions to landscapes. These protected sites include geological Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Geology Sites (formerly known as RIGS - Regionally Important Geological and Geomorphological Sites). No such features have been identified on-site or within 100m, which is generally considered the likely extent of influence.

### 3.4 Hydrogeological Setting

3.4.1 The following table summarises information regarding hydrogeology and groundwater vulnerability based on available information.

Table 3.2 - Summary of Hydrogeology and Groundwater Vulnerability

Item and Source	Details
Aquifer Classification (Groundsure)	The superficial Kesgrave sand and gravels and the Alluvium are classed as a Secondary A Aquifers – these are permeable layers capable of supporting water supplies at a local, rather than strategic scale. The Lowestoft Formation is classed as a Secondary Aquifer – Undifferentiated. ‘Undifferentiated’ is assigned where it is not possible to attribute either Secondary category A or B to a rock type. In general, these layers have previously been designated as both minor and non-aquifers in different locations due to the variable characteristics of the rock type. The Chalk bedrock is classed as a Principal Aquifer.
Depth to Groundwater (BGS)	Shallow perched groundwater is expected within the Lowestoft Formation and Kesgrave sands and gravels. Groundwater within the chalk is anticipated to be between 10 and 15m bgl.
Groundwater Flow Direction (BGS Hydrogeological Mapping)	Groundwater within the Chalk aquifer is identified as flowing towards the south east. Shallow perched groundwater in the Superficial deposits is considered likely to flow south or south-west towards the River Colne.
Groundwater Abstraction (Groundsure)	No groundwater abstractions have been identified within a 250m radius of the site. The closest is located 260m to the north-east of the site associated with Thames Water groundwater pumping ptation.
Groundwater Vulnerability (Groundsure)	The onsite groundwater vulnerability is recorded as being Medium to High for the superficial geology deposits and Low for the Principal Chalk Aquifer. ‘High’ is defined as areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
Groundwater Flood Risk* (Groundsure)	The site is considered to be at Moderate risk from groundwater flooding.
Source Protection Zone (SPZ) (Groundsure)	The site is located within Zone II (Outer Catchment Zone). Zone I (Inner Catchment) is located 5m to the north east of the site.

\* The scope of this report does not include a flood risk assessment.

### 3.5 Hydrological Setting

3.5.1 The following table summarises the information regarding hydrology concerns at or related to the Site.

Table 3.3 - Summary of Hydrological Site Data

Item and <i>Source</i>	Description
Surface Water Feature ( <i>Groundsure Report and site visit</i> )	The River Colne runs parallel to the southern/south western site boundary. A secondary drainage ditch is located just south-west of the River Colne and runs parallel to the river.
Catchment and WFD ( <a href="https://environment.data.gov.uk/catchment-planning/">https://environment.data.gov.uk/catchment-planning/</a> )	River Basin District – Thames. Management Catchment – Colne. Operational Catchment – Colne upper east arm (including Mimshall Brook). The River Colne has an Ecological classification of 'Bad', and a 'Fail' for Chemical classification.
Surface Water Abstractions ( <i>Groundsure Report</i> )	No surface water abstractions were recorded within a 1km radius of the site.
Discharge Consents ( <i>Groundsure</i> )	One discharge consent was recorded within a 250m radius of the site. This consent related to sewerage discharge into the River Colne approximately 210m to the south east of the site.
Pollution Incidents and Substantiated Pollution Incidents to Controlled Waters ( <i>Groundsure</i> )	No pollution incidents with respect to waters have been recorded on site or within a 250m radius of the site.
River Flood Risk* ( <i>Groundsure</i> )	The south-western area of the site next to the River Colne is located within Flood Risk Zones 2 and 3. Six fluvial flooding events on site have been recorded between 1987 and 2012.
* The scope of this report does not include a flood risk assessment.	

### 3.6 Ecological Setting and Property – Animal or Crop Effect

- 3.6.1 Colney Heath Local Nature Reserve lies approximately 235m to the west of the site on the south-western side of the River Colne.
- 3.6.2 No National Nature Reserves, Special Conservation Areas, Ramsar sites, Special Protection Areas or Sites of Special Scientific Interest (SSSI) were located within a 1 km radius of the site.

### 3.7 Ground Gases

#### Natural Soil Gases – Radon & Carbon Dioxide

- 3.7.1 The Groundsure report and HPA/BGS Indicative Atlas of Radon in England and Wales (BGS, 2007) indicates the majority of the Site is located within a low probability radon area, as less than 1% of homes are above the action level.
- 3.7.2 Radon protection measures are not considered to be required for the construction of new dwellings across the site.
- 3.7.3 The geological maps indicate the presence of Chalk at depth beneath the site. Weathered chalk can produce carbon dioxide, usually at relatively low concentrations with very low flow rates.

### Made Ground and Landfills

- 3.7.4 The Groundsure Report has identified the presence of a potential historical landfill adjacent to the north-western site boundary. Limited information is available, but records do suggest the site accepted inert waste. Part of the site is shown to be overlain by sands and gravels of the Kesgrave Catchment Subgroup and therefore a potential pathway exists for ground gases produced in the adjacent landfill to migrate onto site.
- 3.7.5 There is considered to be limited potential for made ground on site and if it is present locally it would be expected to be localised and of limited thickness.



## 4 Land Contamination - Tier 1 Preliminary Risk Assessment

### 4.1 Introduction

4.1.1 A Tier 1 qualitative contamination risk assessment has been undertaken for the Site. The methodology and criteria adopted by Stantec for the preliminary geo-environmental risk assessment is presented in **Appendix A**.

4.1.2 When there is a pollutant linkage (and therefore some measure of risk) it is necessary to determine whether the risk matters and therefore whether further action is required. Stantec provide an estimation of the level of risk but do not comment on whether or not it is an unacceptable risk because the significance or acceptability of a risk depends on the individual stakeholder. Risk estimation involves predicting the likely consequence (what degree of harm might result) and the probability that the consequences will arise (how likely is the outcome).

### 4.2 Conceptual Model

4.2.1 The Tier 1 Preliminary Risk Assessment includes the development of a conceptual site model (CSM). The CSM describes the types and locations of potential contamination sources, the identification of potential receptors and the identification of potential transport/migration pathways.

### 4.3 Hazard Identification

#### On Site

4.3.1 The site has a history of agricultural use and a recent history of usage as horse paddocks, a stable area and a residential property.

4.3.2 No particular site-wide or localised hazards have been identified associated with Potential Sources of Contamination (PSC) from past or current land-use activities other than the general agricultural activities.

4.3.3 For the site the potential for the identified current and historical land uses to generate significant contamination is considered to be generally Very Low and assigned a hazard classification of 1 (out of 5), as defined in Table 1 of the Stantec Assessment Methodology (see **Appendix A**).

Table 5.1 - Hazard Classification of On Site PSC

Potential Sources of Contamination	Hazard Classification / Score
Residential and Agricultural Land Usage	Very Low / 1

#### Off Site

4.3.4 One localised hazard has been identified associated with a PSC from past land-use activities. This is the historical landfill adjacent to the north-west of the site, which has the potential for contaminants in the landfilled material to migrate on to the site via groundwater flow or runoff and for soil gases generated in the filled material to migrate on to the site. The hazard is considered localised because it will diminish across the Site with distance from the landfill edge.

- 4.3.5 The assigned hazard classifications for the Site, based on the potential for the identified current and historical on-site land uses to generate significant contamination, as defined in Table 1 of the Stantec Assessment Methodology (see **Appendix A**), are as follows:

Table 5.2 - Hazard Classification of Off Site PSC

Potential Sources of Contamination	Hazard Classification / Score
Historical landfill	Low / 2

### Summary of Potential Sources of Contamination (PSC)

- 4.3.6 PSC identified on the Site or within the vicinity of the Site are described on Table 5.3.

Table 5.3 - Potential Sources of Contamination and Potential Contaminants

PSC Ref	Description	Potential Contaminants
1	On Site - Agricultural land use - Site Wide.	Herbicides, pesticides and fertilisers.
2	Off Site - Historical Landfill	Dependant on fill material but could include heavy metals, petroleum hydrocarbons, poly-cyclic aromatic hydrocarbons, asbestos and ground gases.

## 4.4 Hazard Assessment

- 4.4.1 In order to determine whether the identified hazards pose a risk it is necessary to identify the presence of potential receptors and pathways by which they can be exposed to the hazard.

### Identification of Potential Receptors

- 4.4.2 Details of the potential receptors considered, whether or not the receptor is plausible and the receptor sensitivity, are presented in the following table:

Table 5.4 - Identification of Potential Receptors

Receptor Type	Plausible Receptor	Sensitivity/ Value <sup>1</sup>
Humans [Current users]	Yes - Horse owners	High - 4
Humans [Future occupiers, primary school]	Yes - Future residents	Very High - 5
Humans [Construction & maintenance workers]	Yes - During development	Very High - 5
Humans [Neighbouring residents]	Yes - Residential properties	High - 4
Controlled Waters [Surface water]	Yes - Poor surface water quality identified	Very Low - 1
Controlled Waters [Shallow Groundwater]	Yes - Superficial deposits are Secondary A aquifers in SPZ 2	High - 4
Controlled Waters [Deep Groundwater]	Yes - Bedrock is a Principal aquifer in SPZ 2	High - 4
Buildings / Materials	Yes - Buildings are proposed	Very Low - 1
Property: Including buildings.	Yes	Very Low - 1
Ecological Systems	Yes	Very Low - 1
Designated archaeological sites (other than listed buildings) and other	No - None identified	-

Receptor Type	Plausible Receptor	Sensitivity/ Value <sup>1</sup>
ancient monuments		
<sup>1</sup> Based on Table 2 of Stantec Guide: Methodology for Assessment of Land Contamination (England) - see Appendix A.		

### Identification of Potential Pathways and Pollutant Linkages

- 4.4.3 Table 3 in the Stantec methodology describes possible pathways for each receptor type. Each of these possible pathways is then considered when assessing the possible pollutant linkage. The assessment of the potential pollutant linkages identified using information on potential sources, receptors and exposure pathways are presented as tables within **Appendix F**.
- 4.4.4 Possible pollutant linkages have been identified for human health, groundwater, surface water, buildings/ materials, property and ecological systems.

### 4.5 Risk Estimation

- 4.5.1 When there is a pollutant linkage (and therefore some measure of risk) it is necessary to determine whether the risk matters and therefore whether further action is required. Risk estimation involves predicting the likely consequence (what degree of harm might result) and the probability that the consequence will arise (how likely the outcome is).
- 4.5.2 **Appendix F** presents in summary table format, assessments of consequence and probability for each potential pollutant linkage identified for the Site in general. Based on the information available, and assuming a worst-case scenario, the estimated risks have been designated as follows as shown in the table below:

Table 5.5 - Estimated Risks

Receptor	Site Generally PSC 1 (Table 1 Appendix F)	Localised PSC 2 (Table 2 Appendix F)
Human Health Current Users (Farm workers, Public)	Very Low	Very Low
Human Health Future Users (Residential Properties)	Very Low	Low
Human Health Off Site (Residential Properties)	Very Low	Very Low
Human Health (Construction Workers)	Very Low	Low
Groundwater	Very Low	Very Low
Surface waters	Very Low	Very Low
Buildings/ Materials	Very Low	Very Low
Property	Very Low	Very Low
Ecological Systems	Very Low	Very Low

- 4.5.3 The risks to current Site users are assessed as Very Low. During the construction phase there is an enhanced short-term risk associated with the PSCs to construction workers from contact with the soil which is assessed as Low with respect to the localised PSCs.

- 4.5.4 Post construction in the medium and long term, there are theoretical localised risks to future occupiers of the Site that are assessed as Low.
- 4.5.5 Both during construction and in the medium to long term there are theoretical risks to groundwater and surface waters that are assessed as Very Low and buildings, property and ecological systems that are assessed as Very Low.
- 4.5.6 A low risk is defined as '*It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild*'.
- 4.5.7 A very low risk is defined as '*There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe*'.

## 4.6 Ground Investigation Recommendations

- 4.6.1 A Phase 2 intrusive (geo-environmental) ground investigation will be required to fully characterise the ground conditions at the Site and to target the identified PSCs. This should include a programme of chemical analysis of soil and as well as a general spread of exploratory hole locations. Furthermore, monitoring wells should be installed along the north-western boundary of the site with the historical landfill to allow ground gas levels on the Site to be monitored.
- 4.6.2 The geo-environmental investigation work should be carried out in accordance with:
- BS 10175:2011+A2:2017 Investigation of potentially contaminated land - code of practice, and
  - The guidelines for Phase 2 Intrusive investigations outlined in the Hertfordshire, Bedfordshire & Neighbouring Authorities Contaminated Land Forum document 'Development On Potentially Contaminated Land And/Or For A Sensitive End Use: Technical Guide for Planning Applicants and Developers' (HBCLF, 2018).

## 5 Preliminary Land Stability Assessment

### 5.1 Introduction

- 5.1.1 It is understood that the study Site will be developed with a residential estate and associated infrastructure. It is expected that some earthworks cut and fill operations will be employed to create development platforms. The risk assessment requires consideration of the potential risk of:
- a. Ground instability due to existing unstable slopes;
  - b. Future ground instability induced by development;
  - c. Ground movements (subsidence) due to artificial or natural cavities, the presence of clay-soils or potential adverse foundation conditions.
- 5.1.2 Stantec have undertaken a cavities risk assessment for the site and surrounding area. A copy of this assessment is present in **Appendix G** and a summary is given below.

### 5.2 Ground Instability - Unstable Slopes

- 5.2.1 The reconnaissance walkover did not observe any evidence of current ground instability at the study Site. Furthermore, the geological formations present on Site are not known for their propensity for landsliding. This would suggest that there is generally a very low risk of slope instability occurring at the Site presently.
- 5.2.2 Sloping ground generally and weak soils such as the Alluvium, which is characterised by low strength clays, have an increased potential to become unstable as a result of construction activities such as:
- Forming permanent or temporary excavations in the ground;
  - Altering the groundwater regime beneath the Site by localising water infiltration at balancing ponds or via soakaways or dewatering excavations during construction; and
  - Loading the ground by the placement of fill material such as to create development platforms or bunds.
- 5.2.3 To reduce the risks of future ground instability a thorough ground investigation should be carried out to provide an accurate ground model for the Site and to supply geotechnical properties and groundwater levels for design of slopes and earthworks.

### 5.3 Ground Movements (subsidence) due to Artificial Cavities

- 5.3.1 The site does not lie within a coal mining area and therefore there is no risk of historical coal mining having occurred beneath the site or surrounding area.
- 5.3.2 Historical chalk mining is well documented in Hertfordshire and the nearest potential chalk mine on the database is approximately 1km from the site to the north-east. However, from study of the site geology, hydrogeology and geomorphology it is considered that the potential for past chalk mining to have occurred at the site is LOW.

## 5.4 Ground Movements (subsidence) due to Natural Cavities

- 5.4.1 Chalk is prone to dissolution and the development of solution features such as sinkholes, swallow holes and solution pipes. The nearest potential solution features in the database are five swallow holes approximately 1km from the site to the south-east.
- 5.4.2 An assessment of the site has been undertaken regarding the potential for solution feature development in the geological, hydrogeological and geomorphological setting of the site. This has also taken into consideration the wider spatial factors pertaining to solution feature hazards, resulting in a hazard rating of MODERATELY HIGH, where the groundwater is proven to be deeper than the top of the Chalk, which would have allowed underdrainage to occur. However, this hazard rating reduces to MODERATE where the groundwater is at the Chalk interface because this reduces the potential for underdrainage of the chalk.

## 5.5 Ground Movements (subsidence) due to Clay-Soils or Potential Adverse Foundation Conditions

### General presence of 'Clay soils'

- 5.5.1 The BGS mapping infers that the majority of the Site is directly underlain predominantly by Lowestoft Formation (typically gravelly clays) and locally by Alluvium (typically silty clays).
- 5.5.2 All clay soils are to a varying degree susceptible to shrinkage and swelling due to both seasonal effects and due to the effect of trees and other vegetation. Standard geotechnical classification tests are likely to classify the clays of the Lowestoft Formation as low to medium volume change potential and the Alluvium as medium volume change potential soils (BRE, 1993).
- 5.5.3 Design and construction protocols to manage the risk of shrinkage/ swelling movements on clay soil sites are well established with published guidelines produced by the Building Research Establishment and NHBC. Adherence to these published guidelines, including guidelines on new proposed landscape plantings, should ensure no increased risk to structures or foundations as a result of the presence of clays.

### Potential Adverse Foundation Conditions

#### Compressible Soils

- 5.5.4 The mapping predicts Alluvium on the south-western part of the site which is typically soft, highly compressible and poorly consolidated and has the potential for unacceptably high magnitudes of total and/or differential settlement to take place when loaded by foundations or earthworks. Foundations in this area will typically require to be deepened into a more competent stratum or for piled foundations to be used.
- 5.5.5 The Lowestoft Formation clays are typically of low compressibility and should not settle excessively when loaded by foundations or earthworks that do not exceed the bearing resistance of the soil.

#### Granular Soils

- 5.5.6 The granular soils in the Kesgrave Catchment deposits are expected to be water bearing at relatively shallow depths. Therefore, excavations for foundations or service trenches in these strata generally will require full side support and groundwater control when they reach the groundwater table.

## 5.6 Geotechnical Investigation

- 5.6.1 A geotechnical ground investigation will be required in due course to provide site specific information to assist in the temporary and permanent works design of earthworks, foundations and infrastructure. Specifically, the investigation work should:
- Check for the presence of Made Ground and record its composition, thickness and geotechnical properties.
  - Record the lateral and vertical extents of the Superficial deposits.
  - Determine the geotechnical properties of the geological formations present.
  - Record groundwater levels.
- 5.6.2 The geotechnical investigations should be carried out in accordance with current best practice and the requirements of BS5930: 2015 Code of practice for ground investigations. BS5930 gives best practice recommendations on information gathering on ground related features that might affect the design and construction of development works.

## 6 Conclusions and Recommendations

### 6.1 General

- 6.1.1 The Site comprises horse paddocks with a stable area on the north-western side of the site and a residential property in the north-western corner. The site has historically been occupied by farmland. The Site is bordered by farmland and residential properties generally.
- 6.1.2 The site is bordered to the north-west by an historical landfill associated with unlicensed importation of inert waste material for ground raising.
- 6.1.3 The site is underlain by deposits of the Lowestoft Formation and Kesgrave Catchment Subgroup generally and by Alluvium on the south-western side. The bedrock strata comprises chalk.
- 6.1.4 Groundwater is expected to be shallow in the low lying south-western part of the site.

### 6.2 Geoenvironmental

- 6.2.1 No on site potential on site sources of contamination have been identified.
- 6.2.2 One off site potential source of contamination has been identified with pollutant linkages to the Site. This is associated with the historical landfill that lies in the field adjacent to the north-west of the site.
- 6.2.3 Potential pollutant linkages have been identified using the information on potential sources (contaminant types), receptors and exposure pathways. The estimated risks for the identified pollutant linkages that exist locally on the Site are Very Low to Low.
- 6.2.4 It is considered that the risks to all receptors can be managed and reduced to very low levels as follows:
- Ground investigation to identify any contamination (including ground gas) and further risk assessment to determine if remediation ahead of development is required, followed, if necessary, by remediation to remove the source of contamination or mitigation measures.
  - During construction through adoption of good hygiene practices for workers coming into contact with the soil or groundwater during construction works and the employment of dust suppression during construction.
- 6.2.5 There is no reason, based on the evidence available presently, that the Site would be designated as Contaminated Land under Part 2a of the Environmental Protection Act 1990.
- 6.2.6 It is recommended that Phase 2 geoenvironmental ground investigation work in accordance with the recommendations of Section 4.6 of this report is implemented. This can be secured through a suitably worded planning condition to any planning consent.

### 6.3 Geotechnical

- 6.3.1 Potential sources of ground instability have been identified at the Site including:
- The potential for Natural Cavities in the Chalk.
  - Shrinkable clays;
  - Compressible ground associated with soft clays in the Alluvium; and



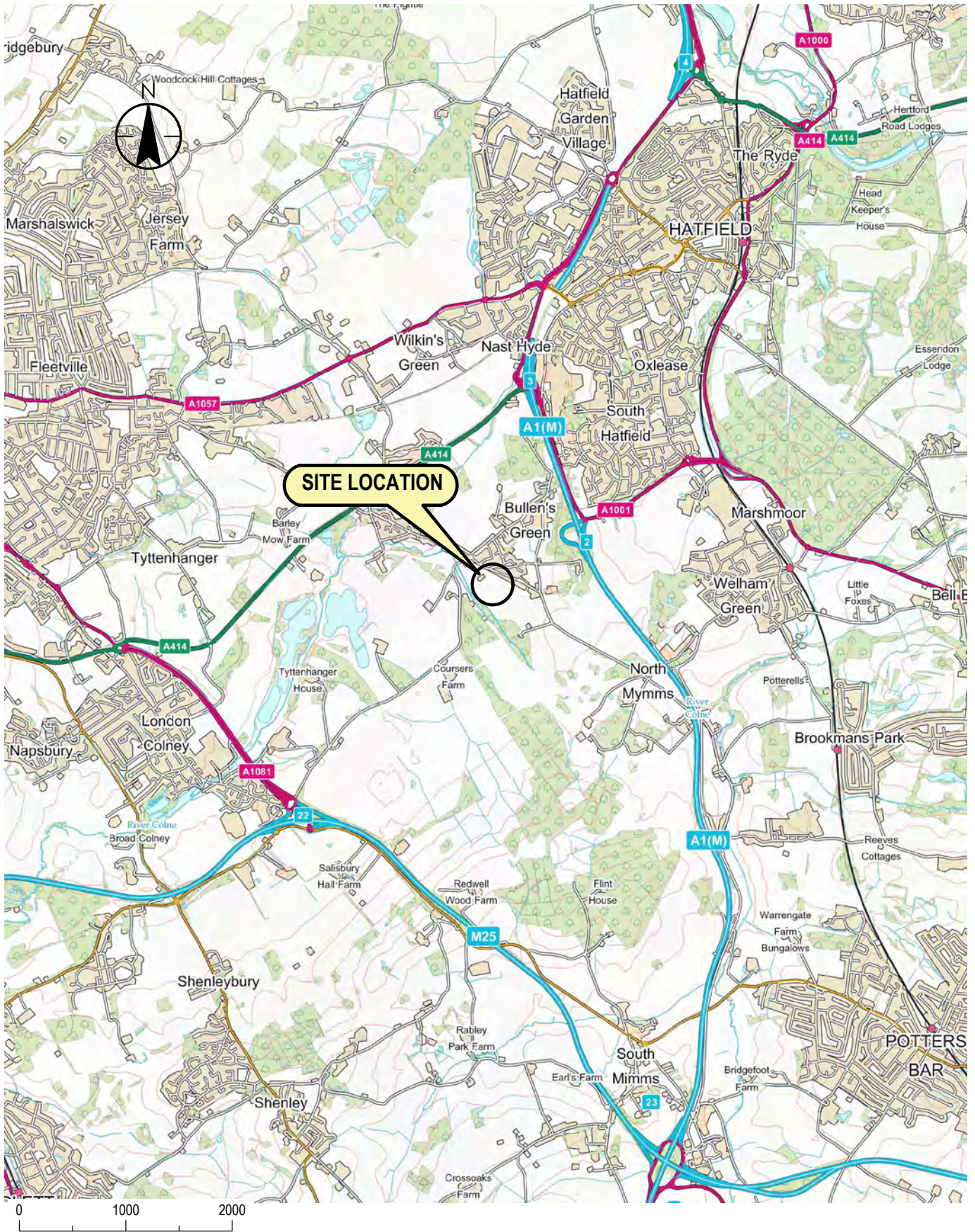
- Running sands associated with shallow groundwater and granular soils.
- 6.3.2 These have the potential to result in development abnormal costs associated with the need for special foundations and mitigation measures.
- 6.3.3 To understand the ground stability risks and potential development abnormal costs associated with them it is recommended that geotechnical ground investigation work and assessment (as recommended in **Section 5.6**) is undertaken at an early stage.

## 7 Essential Guidance for Report Readers

- 7.1.1 This report has been prepared within an agreed timeframe and to an agreed budget that will necessarily apply some constraints on its content and usage. The remarks below are presented to assist the reader in understanding the context of this report and any general limitations or constraints. If there are any specific limitations and constraints, they are described in the report text.
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- 7.1.4 The conclusions and recommendations made in this report and the opinions expressed are based on the information reviewed and/or the ground conditions encountered in exploratory holes and the results of any field or laboratory testing undertaken. There may be ground conditions at the site that have not been disclosed by the information reviewed or by the investigative work undertaken. Such undisclosed conditions cannot be taken into account in any analysis and reporting.
- 7.1.5 It should be noted that this report is a land condition assessment and does not purport to be an ecological, flood risk or archaeological survey and additional specific surveys may be required.
- 7.1.6 This report has been written for the sole use of the Client stated at the front of the report in relation to a specific development or scheme. The conclusions and recommendations presented herein are only relevant to the scheme or the phase of project under consideration. This report shall not be relied upon or transferred to any other party without the expressed written authorisation of Stantec. Any such party relies upon the report at its own risk.
- 7.1.7 The interpretation carried out in this report is based on scientific and engineering appraisal carried out by suitably experienced and qualified technical consultants based on the scope of our engagement. We have not taken into account the perceptions of, for example, banks, insurers, other funders, lay people, etc., unless the report has been prepared specifically for that purpose. Advice from other specialists may be required such as the legal, planning and architecture professions, whether specifically recommended in our report or not.
- 7.1.8 Public or legal consultations or enquiries, or consultation with any Regulatory Bodies (such as the Environmental Agency or Local Planning Authorities) have taken place only as part of this work where specifically stated.

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Land at Colney Heath

Prepared:  
davco

Checked:  
JC

Date:  
2022.02.24

Title


Site Location Plan

Revision: 0

Figure



Key

 Approximate Site Boundary

Approximate Extent of  
Historical Landfill

No. 42 Tollgate Road

Storage Containers

Stables



SCALE 1:2000

Client/Project:

Vistry

Land at Colney Heath

Prepared:  
davco

Checked:  
LT

Date:  
2022.06.27

Title

Site Layout Plan

Revision:  
0

Figure

2

## **Appendix A    Stantec Methodology for Assessing Land Contamination in England**

# Stantec Guide: Methodology for Assessment of Land Contamination (England)

## 1 INTRODUCTION

This document defines the approach adopted by Stantec in relation to the assessment of land contamination in England. The aim is for the approach to (i) be systematic and objective, (ii) provide for the assessment of uncertainty and (iii) provide a rational, consistent, transparent framework.

When preparing our methodology, we have made reference to various technical guidance documents and legislation referenced in Section 7 of which the principal documents are (i) Contaminated Land Statutory Guidance (Defra 2012), (ii) online guidance Land Contamination: Risk Management (LC:RM) accessed from GOV.UK which is expected to replace Contaminated Land Research (CLR) Report 11: Model Procedures for the Management of Contamination (EA 2004). It should be noted that LCRM is currently due to be revised following consultation and CLR 11 is archived, (iii) Contaminated land risk assessment: A guide to good practice (C552) (CIRIA 2001) (iv) National Planning Policy Framework (NPPF, 2019) (v) BS 10175 Investigation of potentially contaminated sites - Code of Practice (BSI 2017) and (vi) The series of British Standards on Soil Quality BS 18400.

## 2 DEALING WITH LAND CONTAMINATION

Government policy on land contamination aims to prevent new contaminated land from being created and promotes a risk-based approach to addressing historical contamination. For historical contamination, regulatory intervention is held in reserve for land that meets the legal definition and cannot be dealt with through any other means, including through planning. Land is only considered to be “contaminated land” in the legal sense if it poses an unacceptable risk.

UK legislation on contaminated land is principally contained in Part 2A of the Environmental Protection Act, 1990 (which was inserted into the 1990 Act by section 57 of the Environment Act 1995). Part 2A was introduced in England on 1 April 2000 and provides a risk-based approach to the identification and remediation of land where contamination poses an unacceptable risk to human health or the environment.

The Model Procedures for the Management of Land Contamination (CLR 11), were developed to provide the technical framework for applying a risk management process when dealing with land affected by contamination. The process involves identifying, making decisions on, and taking appropriate action to deal with land contamination in a way that is consistent with government policies and legislation within the UK. The approach, concepts and principles for land contamination management promoted by LC:RM (and its predecessor CLR 11) are applied to the determination of planning applications. The

guidance given in LC:RM follows the same principles.

Other legislative regimes may also provide a means of dealing with land contamination issues, such as the regimes for waste, water, environmental permitting, and environmental damage. Further, the law of statutory nuisance may result in contaminants being unacceptable to third parties whilst not attracting action under Part 2A or other environmental legislation.

### 2.1 Part 2A

The Regulations and Statutory Guidance that accompanied the Act, including the Contaminated Land (England) Regulations 2006, has been revised with the issue of The Contaminated Land (England) (Amendment) Regulations 2012 (SI 2012/263) and the Contaminated Land Statutory Guidance for England 2012.

Part 2A defines contaminated land as “*land which appears to the Local Authority in whose area it is situated to be in such a condition that, by reason of substances in, on or under the land that significant harm is being caused, or there is a significant possibility that such significant harm (SPOSH) could be caused, or significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution (SPOSP) being caused*”.

Harm is defined as “*harm to the health of living organisms or other interference with the ecological systems of which they form part, and in the case of man, includes harm to his property*”.

Part 2A provides a means of dealing with unacceptable risks posed by land contamination to human health and the environment, and under the guidance enforcing authorities should seek to find and deal with such land. It states that “*under Part 2A the starting point should be that land is not contaminated land unless there is reason to consider otherwise. Only land where unacceptable risks are clearly identified, after a risk assessment has been undertaken in accordance with the Guidance, should be considered as meeting the Part 2A definition of contaminated land*”. Further, the guidance makes it clear that “*regulatory decisions should be based on what is reasonably likely, not what is hypothetically possible*”.

The overarching objectives of the Government’s policy on contaminated land and the Part 2A regime are:

- “(a) To identify and remove unacceptable risks to human health and the environment.
- (a) To seek to ensure that contaminated land is made suitable for its current use.
- (b) To ensure that the burdens faced by individuals, companies and society as a whole are proportionate, manageable and compatible with the principles of

## Stantec Guide: Methodology for Assessment of Land Contamination (England)

*sustainable development*".

The enforcing authority may need to decide whether and how to act in situations where decisions are not straight forward, and where there is uncertainty. *"In so doing, the authority should use its judgement to strike a reasonable balance between: (a) dealing with risks raised by contaminants in land and the benefits of remediating land to remove or reduce those risks; and (b) the potential impacts of regulatory intervention including financial costs to whoever will pay for remediation, health and environmental impacts of taking action, property blight, and burdens on affected people"*.

The authority is required to *"take a precautionary approach to the risks raised by contamination, whilst avoiding a disproportionate approach given the circumstances of each case"*. The aim is *"that the regime produces net benefits, taking account of local circumstances"*.

The guidance recognises that *"normal levels of contaminants in soils should not be considered to cause land to qualify as contaminated land, unless there is a particular reason to consider otherwise"*. Normal levels are quoted as:

- "a) natural presence of contaminants' such as from underlying geology 'that have not been shown to pose an unacceptable risk to health and the environment*
- b) ...low level diffuse pollution, and common human activity..."*

Similarly the guidance states that significant pollution or significant possibility of significant pollution of controlled waters is required for land to be considered contaminated and the *"fact that substances are merely entering water"* or *"where discharge from land is not discernible at a location immediately downstream"* does not constitute contaminated land.

To help achieve a more targeted approach to identifying and managing contaminated land in relation to the risk (or possibility) of harm to human health, the revised Statutory Guidance presented a new four category system for considering land under Part 2A, ranging from Category 4, where there is no risk that land poses a significant possibility of significant harm (SPOSH), or the level of risk is low, to Category 1, where the risk that land poses a significant possibility of significant harm (SPOSH) is unacceptably high.

For land that cannot be readily placed into Categories 1 or 4 further assessment is required. If there is sufficient concern that the risks could cause significant harm or have the significant possibility of significant harm the land is to be placed into Category 2. If the concern is not met land is considered Category 3.

The technical guidance clearly states that the currently published Soil Guidance Values (SGV's) and Generic Assessment Criteria (GAC's) represent *"cautious estimates of level of contaminants in soils"* which should be considered *"no risk to health or, at most, a minimal risk"*. These values do not represent the boundary between categories 3 and 4 and *"should be considered to be comfortably within Category 4"*.

At the end of 2013 technical guidance in support of Defra's revised Statutory Guidance (SG) was published and then revised in 2014 (CL: AIRE 2014) which provided:

- A methodology for deriving C4SLs for four generic land-uses comprising residential, commercial, allotments and public open space; and
- A demonstration of the methodology, via the derivation of C4SLs for six substances – arsenic, benzene, benzo(a)pyrene, cadmium, chromium (VI) and lead.

For controlled waters, the revised Statutory Guidance states that the following types of pollution should be considered to constitute significant pollution of controlled waters:

- "(a) Pollution equivalent to "environmental damage" to surface water or groundwater as defined by The Environmental Damage (Prevention and Remediation) Regulations 2009, but which cannot be dealt with under those Regulations.*
- (b) Inputs resulting in deterioration of the quality of water abstracted, or intended to be used in the future, for human consumption such that additional treatment would be required to enable that use.*
- (c) A breach of a statutory surface water Environment Quality Standard, either directly or via a groundwater pathway.*
- (d) Input of a substance into groundwater resulting in a significant and sustained upward trend in concentration of contaminants (as defined in Article 2(3) of the Groundwater Daughter Directive (2006/118/EC)".*

The guidance also states that, in some circumstances, significant concentrations at a compliance point (in groundwater or surface water) may constitute pollution of controlled waters.

As with SPOSH for human health, the revised Statutory Guidance presents a four-category system for Significant Pollution of controlled waters. Category 1 covers land where there is a strong and compelling case for SPOSP, for example where significant pollution would almost certainly occur if no action was taken to avoid it. Category 4 covers land where there is no risk or the risk is low, for



## Stantec Guide: Methodology for Assessment of Land Contamination (England)

example, where the land contamination is having no discernible impact on groundwater or surface water quality. Category 2 is for land where the risks posed to controlled waters are not high enough to consider the land as Category 1 but nonetheless are of sufficient concern to constitute SPOSP, Category 3 is for land where the risks posed to controlled waters are higher than low but not of sufficient concern to constitute SPOSP.

### 2.2 Planning

The Local Planning Authority (LPA) is responsible for the control of development, and in doing so it has a duty to take account of all material considerations, including contamination.

The principal planning objective is to ensure that any unacceptable risks to human health, buildings and other property and the natural and historical environment from the contaminated condition of the land are identified so that appropriate action can be considered and taken to address those risks.

The National Planning Policy Framework (NPPF, 2021), includes the following.

Paragraph 120 states that planning policies and decisions should “(c) give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land.”

Paragraph 184 states “Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner”.

Paragraph 174 states “planning policies and decisions should contribute to and enhance the natural and local environment by:

- (e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
- (f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.”

Paragraph 183 describes the policy considerations the Government expects LPA’s to have in regard to land affected by contamination when preparing policies for development plans and in taking decisions on applications.

Paragraph 183 states “planning policies and decisions should ensure that:

- (a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);
- (b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and
- c) adequate site investigation information, prepared by a competent person, is available to inform these assessments.”

Paragraph 187 states “The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.”

The Glossary in Annex 2 provides the following:

**Brownfield land registers:** Registers of previously developed land that local planning authorities consider to be appropriate for residential development, having regard to criteria in the Town and Country Planning (Brownfield Land Registers) Regulations 2017. Local planning authorities will be able to trigger a grant of permission in principle for residential development on suitable sites in their registers where they follow the required procedures.

**Competent person (to prepare site investigation information):** A person with a recognised relevant qualification, sufficient experience in dealing with the type(s) of pollution or land instability, and membership of a relevant professional organisation.

**Previously developed land:** Land which is or was occupied by a permanent structure, including the curtilage of the developed land (although it should not be assumed that the whole of the curtilage should be developed) and any associated fixed surface infrastructure. This excludes: land that is or was last occupied by agricultural or forestry buildings; land that has been developed for minerals extraction or waste disposal by landfill, where provision for restoration has been made through development management procedures; land in built-up areas such as residential gardens, parks, recreation grounds and allotments; and land that was previously developed but where the

# Stantec Guide: Methodology for Assessment of Land Contamination (England)

remains of the permanent structure or fixed surface structure have blended into the landscape.

**Site investigation information:** Includes a risk assessment of land potentially affected by contamination, or ground stability and slope stability reports, as appropriate. All investigations of land potentially affected by contamination should be carried out in accordance with established procedures (such as BS10175 Investigation of Potentially Contaminated Sites – Code of Practice).

Stantec adopt the principle that a Preliminary Investigation (Desk Study and Site Reconnaissance) and Preliminary Risk Assessment (see below) is the minimum assessment requirement to support a planning application.

The level at which contamination is deemed to be unacceptable, or, gives rise to adverse effects under a planning context has not been identified but is envisaged to be more precautionary than the level required to determine land as contaminated under Part 2A.

## 2.3 Building Control

The building control department of the local authority or private sector approved inspectors are responsible for the operation and enforcement of the Building Regulations (DCLG 2010) to protect the health, safety and welfare of people in and around buildings. Approved Document C requires the protection of buildings and associated land from the effects of contamination, to be applied (non-exclusively) in all changes of use from commercial or industrial premises, to residential property.

## 3 APPROACH

As with CLR11 the guidance given in LC:RM presents three stages of land contamination management: -

- (a) Stage 1 - Risk Assessment;
- (b) Stage 2 - Options Appraisal; and
- (c) Stage 3 - Remediation.

Each stage has three tiers. The three tiers of Stage 1 Risk Assessment are: -

- Tier 1 - Preliminary Risk Assessment (PRA) - first tier of RA that develops the outline conceptual model (CM) and establishes whether there are any potentially unacceptable risks.
- Tier 2 - Generic Quantitative Risk Assessment (GQRA) - carried out using generic assessment criteria and assumptions to estimate risk.
- Tier 3 - Detailed Quantitative Risk Assessment (DQRA) - carried out using detailed site-specific information to generate Site Specific

Assessment Criteria (SSAC) as risk evaluation criteria.

For each tier of a Stage 1 - Risk Assessment you must:

1. Identify the hazard - establish contaminant sources.
2. Assess the hazard - use a source-pathway-receptor (S-P-R) pollutant linkage approach to find out if there is the potential for unacceptable risk.
3. Estimate the risk - predict what degree of harm or pollution might result and how likely it is to occur.
4. Evaluate the risk - decide whether a risk is unacceptable.

A Stantec Preliminary Investigation report normally comprises a desk study, walkover site reconnaissance and preliminary risk assessment (PRA). The project specific proposal defines the actual scope of work which might include review of ground investigation data in which case the report includes a GQRA.

Risk estimation involves identifying the magnitude of the potential consequence (taking into account both the potential severity of the hazard and the sensitivity of the receptor) and the magnitude of the likelihood i.e. the probability (taking into account the presence of the hazard and the receptor and the integrity of the pathway). This approach is promoted in current guidance such as R&D 66 (NHBC 2008).

For a PRA, Stantec's approach is that if a pollution linkage is identified then it represents a potentially unacceptable risk which either (1) remediation / direct risk management or (2) progression to further tiers of risk assessment (GQRA and DQRA) requiring additional data collection and enabling refinement of the CM using the site specific data.

## 4 IDENTIFICATION OF POLLUTANT LINKAGES AND DEVELOPMENT OF A CONCEPTUAL MODEL (CM)

For all Tiers of a Stage 1 Risk Assessment, the underlying principle to ground condition assessment is the identification of *pollutant linkages* in order to evaluate whether the presence of a source of contamination could potentially lead to harmful consequences. A pollutant linkage consists of the following three elements: -

- A source/hazard – a substance or situation which has the potential to cause harm or pollution;
- A pathway – a means by which the hazard moves along / generates exposure; and
- A receptor/target – an entity which is vulnerable to the potential adverse effects of the hazard.

# Stantec Guide: Methodology for Assessment of Land Contamination (England)

The *Conceptual Model* identifies the types and locations of potential contaminant sources/hazards and potential receptors and potential migration/transportation pathway(s). The CM is refined through progression to further tiers of risk assessment (GQRA and GQRA) requiring additional data collection.

## 4.1 Hazard Identification

A hazard is a substance or situation that has the potential to cause harm. Hazards may be chemical, biological or physical.

In a PRA the potential for hazards to be present is determined from consideration of the previous or ongoing activities on or near to the site in accordance with the criteria presented in the **Table 1**.

Based on the land use information Contaminants of Potential Concern (COPC) are identified. The COPC direct the scope of the collection of site-specific data and the analytical testing selected for subsequent Tiers.

At Tier 2 the site-specific data is evaluated using appropriate published assessment criteria (refer to Stantec document entitled Rationale for the Selection of Evaluation Criteria for a Generic Quantitative Risk Assessment (GQRA)). In general, published criteria have been developed using highly conservative assumptions and therefore if the screening criterion is not exceeded (and if enough samples from appropriate locations have been analysed) then the COPC is eliminated as a potential Hazard. It should be noted that exceedance does not necessarily indicate that a site is contaminated and/or unsuitable for use only that the COPC is retained as a potential Hazard. Published criteria are generated using models based on numerous and complex assumptions. Whether or not these assumptions are appropriate or sufficiently protective requires confirmation on a project by project basis. Manipulation of the default assumptions would normally form part of a Tier 3 Detailed Quantitative Risk Assessment (DQRA).

When reviewing or assessing site specific data Stantec utilise published guidance on comparing contamination data with a critical concentration (CL:AIRE/CIEH 2008) which presents a structured

process for employing statistical techniques for data assessment purposes.

## 4.2 Receptor and Pathway Identification

For all Tiers the potential receptors (for both on site and adjoining land) that will be considered are:

- Human Health – including current and future occupiers, construction and future maintenance workers, and neighbouring properties/third parties;
- Ecological Systems;<sup>1</sup>
- Controlled Waters<sup>2</sup> – Under section 78A(9) of Part 2A the term “pollution of controlled waters” means the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter. The term “controlled waters” in relation to England has the same meaning as in Part 3 of the Water Resources Act 1991, except that “ground waters” does not include waters contained in underground strata but above the saturation zone.
- Property - Animal or Crop (including timber; produce grown domestically, or on allotments, for consumption; livestock; other owned or domesticated animals; wild animals which are the subject of shooting or fishing rights); and
- Property - Buildings (any structure or erection, and any part of a building including any part below ground level, but does not include plant or machinery comprised in a building, or buried services such as sewers, water pipes or electricity cables including archaeological sites and ancient monuments).

If a receptor is taken forward for further assessment it will be classified in terms of its sensitivity, the criteria for which are presented in **Table 2**. Table 2 has been generated using descriptions of environmental receptor importance/value given in various guidance documents including R&D 66 (NHBC 2008), EA 2017 and Transport Analysis Guidance (based on DETR 2000). Human health and buildings classifications have been generated by Stantec using the attribute description for each class. Surface water sensitivity is classified using the Water Framework Directive (WFD) status for the River Basin obtained from: <https://environment.data.gov.uk/catchment-planning/>

without such a survey a Land Contamination risk assessment may conclude that the identification of potential ecological receptors is inconclusive (refer to Stantec Specification for a Preliminary Investigation (Desk Study and Site Reconnaissance).

<sup>2</sup> The definition of “pollution of controlled water” was amended by the introduction of Section 86 of the Water Act 2003. For the purposes of Part 2A groundwater does not include waters above the saturated zone and our assessment does not therefore address perched water other than where development causes a pathway to develop.

<sup>1</sup> International or nationally designated sites (as defined in the statutory guidance (Defra Circular 04/12)) “in the local area” will be identified as potential ecological receptors. A search radius of 1, 2 or 5km will be utilised depending on the site-specific circumstances (see also pathway identification). The Environment Agency has published an ecological risk assessment framework (EA 2008) which promotes (as opposed to statutorily enforces) consideration of additional receptors to include locally protected sites and protected or notable species. These additional potential receptors will only be considered if a Phase 1 habitat survey, undertaken in accordance with guidance (JNCC 1993), is commissioned and the data provided to Stantec. It should be noted that

## Stantec Guide: Methodology for Assessment of Land Contamination (England)

The exposure pathway and modes of transport that will be considered are presented in **Table 3**.

### 4.3 Note regarding Ecological Systems

The Environment Agency (EA) has developed an ecological risk assessment framework which aims to provide a structured approach for assessing the risks to ecology from chemical contaminants in soils (EA 2008). In circumstances where contaminants in water represent a potential risk to aquatic ecosystems then risk assessors will need to consider this separately.

The framework consists of a three-tiered process: -

- Tier 1 is a screening step where the site soils chemical data is compared to a soil screening value (SSV)
- Tier 2 uses various tools (including surveys and biological testing) to gather evidence for any harm to the ecological receptors
- Tier 3 seeks to attribute the harm to the chemical contamination

Tier 1 is preceded by a desk study to collate information about the site and the nature of the contamination to assess whether pollutant linkages are feasible. The framework presents ten steps for ecological desk studies and development of a conceptual model as follows.

1. Establish Regulatory Context
2. Collate and Assess Documentary Information
3. Summarise Documentary Information
4. Identify Contaminants of Potential Concern
5. Identify Likely Fate Transport of Contaminants
6. Identify Potential Receptors of Concern
7. Identify Potential Pathways of Concern
8. Create a Conceptual Model
9. Identify Assessment and Measurement Endpoints
10. Identify Gaps and Uncertainties

The information in a standard PRA report covers Steps 1 to 4 inclusive. Step 5 considers fate and transport of contaminants and it should be noted that our standard report adopts a simplified approach considering only transport mechanisms. A simplified approach has also been adopted in respect of Steps 6 and 7 receptors (a detailed review of the ecological attributes has not been undertaken) and pathways (a food chain assessment has not been undertaken). Step 9 is outside the scope of our standard PRA report.

It should be noted that the PRA report will present an assessment for ecological systems (where identified as a receptor for a land contamination assessment) considering the viability of the mode of transport given the site-specific circumstances and not specific pathways. The PRA may conclude that the risk to potential ecological receptors is inconclusive.

### 4.4 Note regarding controlled waters

Controlled waters are rivers, estuaries, coastal waters, lakes and groundwaters, but not perched waters.

The EU Water Framework Directive (WFD) 2000/60/EC provides for the protection of sub-surface, surface, coastal and territorial waters through a framework of river basin management. The EU Updated Water Framework Standards Directive 2014/101/EU amended the EU WFD to update the international standards therein; it entered into force on 20 November 2014 with the requirements for its provisions to be transposed in Member State law by 20 May 2016. Other EU Directives in the European water management framework include:

- the EU Priority Substances Directive 2013/39/EU;
- EU Groundwater Pollutants Threshold Values Directive 2014/80/EU amending the EU Groundwater Directive 2006/118/EC; and
- EU Biological Monitoring Directive 2014/101/EU.

The Ground Water Daughter Directive (GWDD) was enacted by the Groundwater Regulations (2009), which were subsumed by the Environmental Permitting Regulations (2010) which provide essential clarification including on the four objectives specifically for groundwater quality in the WFD: -

Achieve 'Good' groundwater chemical status by 2015, commonly referred to as 'status objective';  
Achieve Drinking Water Protected Area Objectives;  
Implement measures to reverse any significant and sustained upward trend in groundwater quality, referred to as 'trend objective'; and

Prevent or limit the inputs of pollutants into groundwater, commonly referred to as 'prevent or limit' objectives

The Water Act 2003 (Commencement No.11) Order 2012 amends the test for 'contaminated land' which relates to water pollution so that pollution of controlled waters must now be "significant" to meet the definition of contaminated land.

The Water Framework Directive (WFD) requires the preparation, implementation and review of River Basin Management Plans (RBMP) on a six-year cycle. River basins are made up of lakes, rivers, groundwaters, estuaries and coastal waters, together with the land they drain. River Basin Districts (RBD) and the WFD Waterbodies that they comprise are important spatial management units, regularly used in catchment management studies. River Basin Management Plans (RBMP) have been developed for the 11 River Basin Districts in England and Wales.

## Stantec Guide: Methodology for Assessment of Land Contamination (England)

These were released by Defra in 2009 (Defra 2009) and updated in 2015.

These RBMP's establish the current status of waters within the catchments of the respective Districts and the current status of adjoining waters identified. As part of a Tier 2 risk assessment water quality data is screened against the WFD assessment criteria. Comparison with the RBMP's current status of waters for the catchment under consideration would form part of a Tier 3 assessment.

### 5 RISK ESTIMATION

Risk estimation classifies what degree of harm might result to a receptor (defined as consequence) and how likely it is that such harm might arise (probability).

At Tier 1 the consequence classification is generated by multiplying the hazard classification score and the receptor sensitivity score. This approach follows that presented in the republished R&D 66 (NHBC 2008).

The criteria for classifying probability are set out in **Table 4** and have been taken directly from Table 6.4 CIRIA C552 (CIRIA 2001). Probability considers the integrity of the exposure pathway.

The consequence classifications detailed in **Table 5** have been adapted from Table 6.3 presented in C552 and R&D 66 (Annex 4 Table A4.3).

The Tier 1 risk classification is estimated for each pollutant linkage using the matrix given in **Table 6** which is taken directly from C552 (Table 6.5).

Subsequent Tiers refine the CM through retention or elimination of potential hazards and pollutant linkages.

### 6 RISK EVALUATION

Evaluation criteria are the parameters used to judge whether harm or pollution needs further assessment or is unacceptable. The evaluation criteria used will depend on:

- the reasons for doing the RA and the regulatory context such as Part 2A or planning;
- the CM and pollutant linkages present;
- any criteria set by regulators;
- any advisory requirements such as from Public Health England;
- the degree of confidence and precaution required;
- the level of confidence required to judge whether a risk is unacceptable;
- how you've used or developed more detailed assessment criteria in the later tiers of RA;
- the availability of robust scientific data;
- how much is known - for example, about the pathway mechanism and how the contaminants affect receptors; and

- any practical reasons such as being able to measure or predict against the criteria.

In order to put the Tier 1 risk classification into context the likely actions are described in **Table 7** which is taken directly from Table 6.6 of C552 (CIRIA 2001).

### REFERENCES

BSI 2017 BS 10175:2011+A2:2017 Investigation of potentially contaminated sites - Code of Practice

BSI 2019 BS 8485:2015+A1:2019 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings

CIRIA 2001: Contaminated land risk assessment – a guide to good practice C552.

CIRIA 2008: Assessing risks posed by hazardous ground gases to buildings C655

CL: AIRE/CIEH 2008 Guidance on Comparing Soil Contamination Data with a Critical Concentration. Published by Contaminated Land: Applications in Real Environments (CL: AIRE) and the Chartered Institute of Environmental Health (CIEH)

CL: AIRE 2013 SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. Final Project Report published by Contaminated Land: Applications in Real Environments (CL: AIRE) 20th December 2013

DCLG 2010 Building Regulations 2010 Approved Document C Site preparation and resistance to contaminants and moisture.

DETR 2000 Methodology for Multi Modal Studies. Volume 2 Section 4. The Environmental Objective.

DEFRA 2012 Environmental Protection Act 1990: Part 2A. Contaminated Land Statutory Guidance. Department for Environment, Food and Rural Affairs

DEFRA, 2006 The Contaminated Land (England) Regulations 2006.

DEFRA, 2012 The Contaminated Land (England) (Amendment) Regulations 2012 (SI2012/263).

DEFRA, 2012 Environmental Protection Act 1990: Part 2A. Contaminated Land Statutory Guidance. April 2012.

DEFRA, 2013 Environmental Damage (Prevention and Remediation) Regulations 2009: Guidance for England and Wales

Defra '2009 Water for Life and Livelihoods. River Basin Management Plan. (11 Districts: Anglia, Dee, Humber, Northumbria, Northwest, Severn, Solway

## **Stantec Guide: Methodology for Assessment of Land Contamination (England)**

and Tweed, Southeast, Thames, Western Wales)  
December 2009

EA 2004: Contaminated Land Research (CLR) Report 11: The Model Procedures for the Management of Land Contamination CRL 11 by the Environment Agency (EA).

EA 2008 Ecological Risk Assessment Science Report Series SC070009 published by the Environment Agency (EA).

EA 2017 New groundwater vulnerability mapping methodology in England and Wales Report – SC040016/R Environment Agency (EA) September 2017

JNCC 1993 Handbook for Phase 1 Habitat Survey – A Technical for Environmental Audit prepared by the Joint Nature Conservancy Council (JNCC)

NHBC/EA/CIEH 2008: R&D Publication 66 Guidance for the safe development of housing on land affected by contamination.

National Planning Policy Framework (February 2019 revised), published by the Ministry of Housing, Communities and Local Government (MHCLG) at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1005759/NPPF\\_July\\_2021.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf)

## Stantec Methodology for Assessment of Land Contamination (England)

**Table 1: Criteria for Classifying Hazards / Potential for Generating Contamination**

Classification/Score	Potential for generating contamination/gas based on land use
Very Low 1	Land Use: Residential, retail or office use, agriculture Contamination: Limited. Gas generation potential: Soils with low organic content
Low 2	Land Use: Recent small scale industrial and light industry Contamination: locally slightly elevated concentrations. Gas generation potential: Soils with high organic content (limited thickness)
Moderate 3	Land Use: Railway yards, collieries, scrap yards, engineering works. Contamination: Possible widespread slightly elevated concentrations and locally elevated concentrations. Gas generation potential: Dock silt and substantial thickness of organic alluvium/peat
High 4	Land Use: Heavy industry, non-hazardous landfills. Contamination: Possible widespread elevated concentrations. Gas generation potential: Shallow mine workings Pre 1960s landfill
Very High 5	Land Use: Hazardous waste landfills, gas works, chemical works, Contamination: Likely widespread elevated concentrations. Gas generation potential: Landfill post 1960

*“Greenfield” is land which has not been developed and there has been no use of agrochemicals*

**Table 2: Criteria for Classifying Receptor Sensitivity/Value**

Classification	Definition
Very Low 1	Receptor of limited importance <ul style="list-style-type: none"> <li>Groundwater: Unproductive strata (Strata with negligible significance for water supply or river baseflow) (previously Non-aquifer), Secondary B (water-bearing parts of non-aquifers), Secondary undifferentiated (previously minor or non-aquifer, but information insufficient to classify as secondary A or B)</li> <li>Surface water: WFD Surface Water status Bad</li> <li>Ecology: No local designation</li> <li>Buildings: Replaceable</li> <li>Human health: Unoccupied/limited access</li> </ul>
Low 2	Receptor of local or county importance with potential for replacement <ul style="list-style-type: none"> <li>Groundwater: Secondary A aquifer</li> <li>Surface water: WFD Surface Water status Poor</li> <li>Ecology: local habitat resources</li> <li>Buildings: Local value</li> <li>Human health: Minimum score 4 where human health identified as potential receptor</li> </ul>
Moderate 3	Receptor of local or county importance with potential for replacement <ul style="list-style-type: none"> <li>Groundwater: Principal aquifer</li> <li>Surface water: WFD Surface Water status Moderate</li> <li>Ecology: County wildlife sites, Areas of Outstanding Natural Beauty (AONB)</li> <li>Buildings: Area of Historic Character</li> <li>Human health: Minimum score 4 where human health identified as potential receptor</li> </ul>
High 4	Receptor of county or regional importance with limited potential for replacement <ul style="list-style-type: none"> <li>Groundwater: Source Protection Zone 2 or 3</li> <li>Surface water: WFD Surface Water status Good</li> <li>Ecology: SSSI, National or Marine Nature Reserve (NNR or MNR)</li> <li>Buildings: Conservation Area</li> <li>Human health: Minimum score 4 where human health identified as potential receptor</li> </ul>
Very High 5	Receptor of national or international importance <ul style="list-style-type: none"> <li>Groundwater: Source Protection Zone (SPZ) 1</li> <li>Surface water: WFD Surface Water status High</li> <li>Ecology: Special Areas of Conservation (SAC and candidates), Special Protection Areas (SPA and potentials) or wetlands of international importance (RAMSAR)</li> <li>Buildings: World Heritage site</li> </ul>

## Stantec Methodology for Assessment of Land Contamination (England)

	<ul style="list-style-type: none"><li>• Human health: Residential, open spaces and uses where children are present</li></ul>
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## Stantec Methodology for Assessment of Land Contamination (England)

**Table 3: Exposure Pathway and Modes of Transport**

Receptor	Pathway	Mode of transport
<b>Human health</b>	Ingestion	Fruit or vegetable leaf or roots
		Contaminated water
		Soil/dust indoors
		Soil/dust outdoors
	Inhalation	Particles (dust / soil) – outdoor
		Particles (dust / soil) - indoor
		Vapours – outdoor - migration via natural or anthropogenic pathways
		Vapours - indoor - migration via natural or anthropogenic pathways
	Dermal absorption	Direct contact with soil
		Direct contact with waters (swimming / showering)
Irradiation		
<b>Groundwater</b>	Leaching	Gravity / permeation
	Migration	Natural – groundwater as pathway Anthropogenic (e.g. boreholes, culverts, pipelines etc.)
<b>Surface Water</b>	Direct	Runoff or discharges from pipes
	Indirect	Recharge from groundwater
	Indirect	Deposition of windblown dust
<b>Buildings</b>	Direct contact	Sulphate attack on concrete, hydrocarbon corrosion of plastics
	Gas ingress	Migration via natural or anthropogenic paths
<b>Ecological systems</b>	See Notes	Runoff/discharge to surface water body
	See Notes	Windblown dust
	See Notes	Groundwater migration
	See Notes	At point of contaminant source
<b>Animal and crop</b>	Direct	Windblown or flood deposited particles / dust / sediments
	Indirect	Plants via root up take or irrigation. Animals through watering
	Inhalation	By livestock / fish - gas / vapour / particulates / dust
	Ingestion	Consumption of vegetation / water / soil by animals

**Table 4: Classification of Probability**

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

## Stantec Methodology for Assessment of Land Contamination (England)

**Table 5: Classification of Consequence (score = magnitude of hazard and sensitivity of receptor)**

<b>Classification Score</b>	<b>Examples</b>
<b>Severe</b> <b>17-25</b> <b>(3 out of 25 outcomes)</b>	Human health effect - exposure likely to result in “significant harm” as defined in the Defra (2012) Part 2A Statutory Guidance <sup>1</sup> . Controlled water effect - short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Equivalent to EA Category 1 incident (persistent and/or extensive effects on water quality leading to closure of potable abstraction point or loss of amenity, agriculture or commercial value. Major fish kill. Ecological effect - short-term exposure likely to result in a substantial adverse effect. Catastrophic damage to crops, buildings or property
<b>Medium</b> <b>10-16</b> <b>(7 out of 25 outcomes)</b>	Human health effect - exposure could result in “significant harm” <sup>1</sup> . Controlled water effect - equivalent to EA Category 2 incident requiring notification of abstractor Ecological effect - short-term exposure may result in a substantial adverse effect. Damage to crops, buildings or property
<b>Mild</b> <b>5-9</b> <b>(7 out of 25 outcomes)</b>	Human health effect - exposure may result in “significant harm” <sup>1</sup> . Controlled water effect - equivalent to EA Category 3 incident (short lived and/or minimal effects on water quality). Ecological effect - unlikely to result in a substantial adverse effect. Minor damage to crops, buildings or property. Damage to building rendering it unsafe to occupy (for example foundation damage resulting in instability).
<b>Minor</b> <b>1-4</b> <b>(8 out of 25 outcomes)</b>	No measurable effect on humans. Protective equipment is not required during site works. Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Repairable effects to crops, buildings or property. The loss of plants in a landscaping scheme. Discolouration of concrete.

<sup>1</sup> Significant harm includes death, disease, serious injury, genetic mutation, birth defects or impairment of reproductive function. The local authority may also consider other health effects to constitute significant harm such as physical injury; gastrointestinal disturbances; respiratory tract effects; cardio-vascular effects; central nervous system effects; skin ailments; effects on organs such as the liver or kidneys; or a wide range of other health impacts. Whether or not these would constitute significant harm would depend on the seriousness of harm including impact on health, quality of life and scale of impact.

**Table 6: Classification of Risk (Combination of Consequence Table 5 and Probability Table 4)**

<b>Probability</b>	<b>Consequence</b>			
	<b>Severe</b>	<b>Medium</b>	<b>Mild</b>	<b>Minor</b>
<b>High likelihood</b>	Very high	High	Moderate	Low
<b>Likely</b>	High	Moderate	Moderate/	Low
<b>Low likelihood</b>	Moderate	Moderate	Low	Very low
<b>Unlikely</b>	Low	Low	Very low	Very low

## Stantec Methodology for Assessment of Land Contamination (England)

**Table 7: Description of Risks and Likely Action Required**

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

## Appendix B Site Walkover Photographs



Photo 1 – Access on to site from Tollgate Road leading into a gravel car park area.



Photo 2 – Looking north east towards Tollgate Road from the second metal gate accessing the stable area.

 <b>Stantec</b>	Client	<b>Photos from Site Reconnaissance Visit on 16 March 2022</b>	Date	16/03/22
	<b>Vistry Group</b>		Scale	NTS
3 <sup>rd</sup> Floor, 50-60 Station Road, Cambridge, CB1 2JH Tel 01223 882000			Drawn	JEC
			Checked	OB
			Page 1	



Photo 3 – Track into the site from Tollgate Road. Area either side used for general storage of materials and vehicles associated with the stables.



Photo 4 – Looking north west towards stables and small horse arena.


	Client	<b>Photos from Site Reconnaissance Visit on 16 March 2022</b>	Date	16/03/22
			Scale	NTS
	Drawn		JEC	
	Checked		OB	
3 <sup>rd</sup> Floor, 50-60 Station Road, Cambridge, CB1 2JH Tel 01223 882000			Page 2	



Photo 5 – Looking east. Children’s play equipment at the back of property No.42 Tollgate Road.



Photo 6 – Looking east along the northern site boundary


	Client	Date	16/03/22
	<b>Photos from Site Reconnaissance Visit on 16 March 2022</b>	Scale	NTS
Drawn		JEC	
Checked		OB	
3 <sup>rd</sup> Floor, 50-60 Station Road, Cambridge, CB1 2JH Tel 01223 882000		Page 3	



Photo 7 – Looking west along the northern site boundary.



Photo 8 – Looking south west towards the River Colne, along the eastern site boundary.


 <b>Stantec</b>	Client	<b>Photos from Site Reconnaissance Visit on 16 March 2022</b>	Date	16/03/22
	<b>Vistry Group</b>		Scale	NTS
Drawn			JEC	
Checked			OB	
3 <sup>rd</sup> Floor, 50-60 Station Road, Cambridge, CB1 2JH Tel 01223 882000			Page 4	





Photo 9 – A more pronounced drop in ground levels towards the River Colne noted in the far southern area of the site.



Photo 12 – River Colne located along the south western site boundary.



	Client	<b>Photos from Site Reconnaissance Visit on 16 March 2022</b>	Date	16/03/22
			Scale	NTS
Drawn	JEC			
Checked	ON			
3 <sup>rd</sup> Floor, 50-60 Station Road, Cambridge, CB1 2JH Tel 01223 882000			Page 5	



Photo 13 – Yellow flags and marker paint indicating the location of the underground oil pipeline in the south western area of the site.



Photo 14 – Looking south east from the western site boundary showing gradual drop in ground levels towards the River Colne.

 <b>Stantec</b>	Client	<b>Photos from Site Reconnaissance Visit on 16 March 2022</b>	Date	16/03/22
	<b>Vistry Group</b>		Scale	NTS
Drawn			JEC	
Checked			OB	
Page 6				
3 <sup>rd</sup> Floor, 50-60 Station Road, Cambridge, CB1 2JH Tel 01223 882000				

## **Appendix C    GroundSure Report**

## Colney Heath

### Order Details

**Date:** 22/02/2022  
**Your ref:** POEPL009405\_Colney\_Heath  
**Our Ref:** HMD-8538313  
**Client:** Stantec UK Ltd

### Site Details

**Location:** 520845 205504  
**Area:** 7.82 ha  
**Authority:** [St Albans City and District Council](#)



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**Summary of findings**

p. 2

**Aerial image**

p. 8

**OS MasterMap site plan**

p.13

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## Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
<a href="#">14</a>	<a href="#">1.1</a>	<b><u>Historical industrial land uses</u></b>	0	0	15	6	-
<a href="#">15</a>	<a href="#">1.2</a>	<b><u>Historical tanks</u></b>	0	0	3	1	-
<a href="#">16</a>	<a href="#">1.3</a>	<b><u>Historical energy features</u></b>	0	0	6	2	-
16	1.4	Historical petrol stations	0	0	0	0	-
<a href="#">17</a>	<a href="#">1.5</a>	<b><u>Historical garages</u></b>	0	0	0	1	-
17	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
<a href="#">18</a>	<a href="#">2.1</a>	<b><u>Historical industrial land uses</u></b>	0	0	20	8	-
<a href="#">20</a>	<a href="#">2.2</a>	<b><u>Historical tanks</u></b>	0	0	6	1	-
<a href="#">20</a>	<a href="#">2.3</a>	<b><u>Historical energy features</u></b>	0	0	15	5	-
21	2.4	Historical petrol stations	0	0	0	0	-
<a href="#">21</a>	<a href="#">2.5</a>	<b><u>Historical garages</u></b>	0	0	0	2	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
23	3.1	Active or recent landfill	0	0	0	0	-
23	3.2	Historical landfill (BGS records)	0	0	0	0	-
24	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
<a href="#">24</a>	<a href="#">3.4</a>	<b><u>Historical landfill (EA/NRW records)</u></b>	1	0	0	0	-
<a href="#">24</a>	<a href="#">3.5</a>	<b><u>Historical waste sites</u></b>	0	0	1	0	-
25	3.6	Licensed waste sites	0	0	0	0	-
<a href="#">25</a>	<a href="#">3.7</a>	<b><u>Waste exemptions</u></b>	0	0	25	0	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
<a href="#">28</a>	<a href="#">4.1</a>	<b><u>Recent industrial land uses</u></b>	0	0	18	-	-
29	4.2	Current or recent petrol stations	0	0	0	0	-
30	4.3	Electricity cables	0	0	0	0	-
30	4.4	Gas pipelines	0	0	0	0	-
30	4.5	Sites determined as Contaminated Land	0	0	0	0	-



30	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
30	4.7	Regulated explosive sites	0	0	0	0	-
31	4.8	Hazardous substance storage/usage	0	0	0	0	-
31	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
31	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
31	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
31	4.12	Radioactive Substance Authorisations	0	0	0	0	-
<b>32</b>	<b>4.13</b>	<b><u>Licensed Discharges to controlled waters</u></b>	0	0	1	5	-
33	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
33	4.15	Pollutant release to public sewer	0	0	0	0	-
33	4.16	List 1 Dangerous Substances	0	0	0	0	-
33	4.17	List 2 Dangerous Substances	0	0	0	0	-
<b>33</b>	<b>4.18</b>	<b><u>Pollution Incidents (EA/NRW)</u></b>	0	0	5	0	-
34	4.19	Pollution inventory substances	0	0	0	0	-
34	4.20	Pollution inventory waste transfers	0	0	0	0	-
35	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
<b>36</b>	<b>5.1</b>	<b><u>Superficial aquifer</u></b>	Identified (within 500m)				
<b>38</b>	<b>5.2</b>	<b><u>Bedrock aquifer</u></b>	Identified (within 500m)				
<b>40</b>	<b>5.3</b>	<b><u>Groundwater vulnerability</u></b>	Identified (within 50m)				
<b>41</b>	<b>5.4</b>	<b><u>Groundwater vulnerability- soluble rock risk</u></b>	Identified (within 0m)				
<b>42</b>	<b>5.5</b>	<b><u>Groundwater vulnerability- local information</u></b>	Identified (within 0m)				
<b>43</b>	<b>5.6</b>	<b><u>Groundwater abstractions</u></b>	0	0	0	1	14
47	5.7	Surface water abstractions	0	0	0	0	0
<b>47</b>	<b>5.8</b>	<b><u>Potable abstractions</u></b>	0	0	0	1	1
<b>48</b>	<b>5.9</b>	<b><u>Source Protection Zones</u></b>	1	2	0	0	-
48	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
<b>49</b>	<b>6.1</b>	<b><u>Water Network (OS MasterMap)</u></b>	0	2	18	-	-



<b>51</b>	<b>6.2</b>	<b><u>Surface water features</u></b>	1	1	9	-	-
<b>51</b>	<b>6.3</b>	<b><u>WFD Surface water body catchments</u></b>	1	-	-	-	-
<b>52</b>	<b>6.4</b>	<b><u>WFD Surface water bodies</u></b>	0	1	0	-	-
<b>52</b>	<b>6.5</b>	<b><u>WFD Groundwater bodies</u></b>	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
<b>53</b>	<b>7.1</b>	<b><u>Risk of flooding from rivers and the sea</u></b>	High (within 50m)				
<b>54</b>	<b>7.2</b>	<b><u>Historical Flood Events</u></b>	6	1	12	-	-
55	7.3	Flood Defences	0	0	0	-	-
55	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
56	7.5	Flood Storage Areas	0	0	0	-	-
<b>57</b>	<b>7.6</b>	<b><u>Flood Zone 2</u></b>	Identified (within 50m)				
<b>58</b>	<b>7.7</b>	<b><u>Flood Zone 3</u></b>	Identified (within 50m)				
Page	Section	Surface water flooding					
<b>59</b>	<b>8.1</b>	<b><u>Surface water flooding</u></b>	1 in 30 year, Greater than 1.0m (within 50m)				
Page	Section	Groundwater flooding					
<b>61</b>	<b>9.1</b>	<b><u>Groundwater flooding</u></b>	Moderate (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
<b>62</b>	<b>10.1</b>	<b><u>Sites of Special Scientific Interest (SSSI)</u></b>	0	0	0	0	1
63	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
63	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
63	10.4	Special Protection Areas (SPA)	0	0	0	0	0
63	10.5	National Nature Reserves (NNR)	0	0	0	0	0
<b>64</b>	<b>10.6</b>	<b><u>Local Nature Reserves (LNR)</u></b>	0	0	1	0	0
<b>64</b>	<b>10.7</b>	<b><u>Designated Ancient Woodland</u></b>	0	0	0	0	7
65	10.8	Biosphere Reserves	0	0	0	0	0
65	10.9	Forest Parks	0	0	0	0	0
65	10.10	Marine Conservation Zones	0	0	0	0	0
<b>65</b>	<b>10.11</b>	<b><u>Green Belt</u></b>	1	0	1	1	0
66	10.12	Proposed Ramsar sites	0	0	0	0	0



66	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
66	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
66	10.15	Nitrate Sensitive Areas	0	0	0	0	0
<b>67</b>	<b>10.16</b>	<b><u>Nitrate Vulnerable Zones</u></b>	0	0	1	0	1
<b>68</b>	<b>10.17</b>	<b><u>SSSI Impact Risk Zones</u></b>	3	-	-	-	-
<b>69</b>	<b>10.18</b>	<b><u>SSSI Units</u></b>	0	0	0	0	1
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
71	11.1	World Heritage Sites	0	0	0	-	-
72	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
72	11.3	National Parks	0	0	0	-	-
<b>72</b>	<b>11.4</b>	<b><u>Listed Buildings</u></b>	0	0	5	-	-
73	11.5	Conservation Areas	0	0	0	-	-
73	11.6	Scheduled Ancient Monuments	0	0	0	-	-
73	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
<b>74</b>	<b>12.1</b>	<b><u>Agricultural Land Classification</u></b>	Grade 3 (within 250m)				
<b>75</b>	<b>12.2</b>	<b><u>Open Access Land</u></b>	0	0	2	-	-
<b>75</b>	<b>12.3</b>	<b><u>Tree Felling Licences</u></b>	0	1	0	-	-
<b>76</b>	<b>12.4</b>	<b><u>Environmental Stewardship Schemes</u></b>	0	0	5	-	-
<b>76</b>	<b>12.5</b>	<b><u>Countryside Stewardship Schemes</u></b>	0	0	2	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
<b>77</b>	<b>13.1</b>	<b><u>Priority Habitat Inventory</u></b>	3	4	16	-	-
<b>79</b>	<b>13.2</b>	<b><u>Habitat Networks</u></b>	3	1	2	-	-
79	13.3	Open Mosaic Habitat	0	0	0	-	-
79	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
<b>81</b>	<b>14.1</b>	<b><u>10k Availability</u></b>	Identified (within 500m)				
82	14.2	Artificial and made ground (10k)	0	0	0	0	-
83	14.3	Superficial geology (10k)	0	0	0	0	-





83	14.4	Landslip (10k)	0	0	0	0	-
84	14.5	Bedrock geology (10k)	0	0	0	0	-
84	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
<b>85</b>	<b>15.1</b>	<b><u>50k Availability</u></b>	Identified (within 500m)				
86	15.2	Artificial and made ground (50k)	0	0	0	0	-
86	15.3	Artificial ground permeability (50k)	0	0	-	-	-
<b>87</b>	<b>15.4</b>	<b><u>Superficial geology (50k)</u></b>	3	1	1	1	-
<b>88</b>	<b>15.5</b>	<b><u>Superficial permeability (50k)</u></b>	Identified (within 50m)				
88	15.6	Landslip (50k)	0	0	0	0	-
88	15.7	Landslip permeability (50k)	None (within 50m)				
<b>89</b>	<b>15.8</b>	<b><u>Bedrock geology (50k)</u></b>	1	0	0	0	-
<b>90</b>	<b>15.9</b>	<b><u>Bedrock permeability (50k)</u></b>	Identified (within 50m)				
90	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
<b>91</b>	<b>16.1</b>	<b><u>BGS Boreholes</u></b>	0	0	5	-	-
Page	Section	Natural ground subsidence					
<b>93</b>	<b>17.1</b>	<b><u>Shrink swell clays</u></b>	Low (within 50m)				
<b>95</b>	<b>17.2</b>	<b><u>Running sands</u></b>	Low (within 50m)				
<b>97</b>	<b>17.3</b>	<b><u>Compressible deposits</u></b>	Moderate (within 50m)				
<b>99</b>	<b>17.4</b>	<b><u>Collapsible deposits</u></b>	Very low (within 50m)				
<b>101</b>	<b>17.5</b>	<b><u>Landslides</u></b>	Very low (within 50m)				
<b>102</b>	<b>17.6</b>	<b><u>Ground dissolution of soluble rocks</u></b>	Low (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
104	18.1	Natural cavities	0	0	0	0	-
105	18.2	BritPits	0	0	0	0	-
<b>105</b>	<b>18.3</b>	<b><u>Surface ground workings</u></b>	0	0	9	-	-
105	18.4	Underground workings	0	0	0	0	0
106	18.5	Historical Mineral Planning Areas	0	0	0	0	-



<b>106</b>	<b>18.6</b>	<b><u>Non-coal mining</u></b>		<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>10</b>
108	18.7	Mining cavities		0	0	0	0	0
108	18.8	JPB mining areas		None (within 0m)				
108	18.9	Coal mining		None (within 0m)				
108	18.10	Brine areas		None (within 0m)				
108	18.11	Gypsum areas		None (within 0m)				
109	18.12	Tin mining		None (within 0m)				
109	18.13	Clay mining		None (within 0m)				
<b>Page</b>	<b>Section</b>	<b>Radon</b>						
<b>110</b>	<b>19.1</b>	<b><u>Radon</u></b>	<b>Less than 1% (within 0m)</b>					
<b>Page</b>	<b>Section</b>	<b>Soil chemistry</b>	<b>On site</b>	<b>0-50m</b>	<b>50-250m</b>	<b>250-500m</b>	<b>500-2000m</b>	
<b>111</b>	<b>20.1</b>	<b><u>BGS Estimated Background Soil Chemistry</u></b>	<b>12</b>	<b>2</b>	-	-	-	
112	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-	
112	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-	
<b>Page</b>	<b>Section</b>	<b>Railway infrastructure and projects</b>	<b>On site</b>	<b>0-50m</b>	<b>50-250m</b>	<b>250-500m</b>	<b>500-2000m</b>	
113	21.1	Underground railways (London)	0	0	0	-	-	
113	21.2	Underground railways (Non-London)	0	0	0	-	-	
113	21.3	Railway tunnels	0	0	0	-	-	
113	21.4	Historical railway and tunnel features	0	0	0	-	-	
113	21.5	Royal Mail tunnels	0	0	0	-	-	
114	21.6	Historical railways	0	0	0	-	-	
114	21.7	Railways	0	0	0	-	-	
114	21.8	Crossrail 1	0	0	0	0	-	
114	21.9	Crossrail 2	0	0	0	0	-	
114	21.10	HS2	0	0	0	0	-	



## Recent aerial photograph



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Capture Date: 08/04/2020

Site Area: 7.82ha



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Date: 22 February 2022

## Recent site history - 2016 aerial photograph



Capture Date: 12/08/2016

Site Area: 7.82ha



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Date: 22 February 2022



## Recent site history - 2005 aerial photograph



Capture Date: 29/08/2005

Site Area: 7.82ha



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Date: 22 February 2022

## Recent site history - 2000 aerial photograph



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Capture Date: 10/06/2000

Site Area: 7.82ha



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Date: 22 February 2022

## Recent site history - 1999 aerial photograph

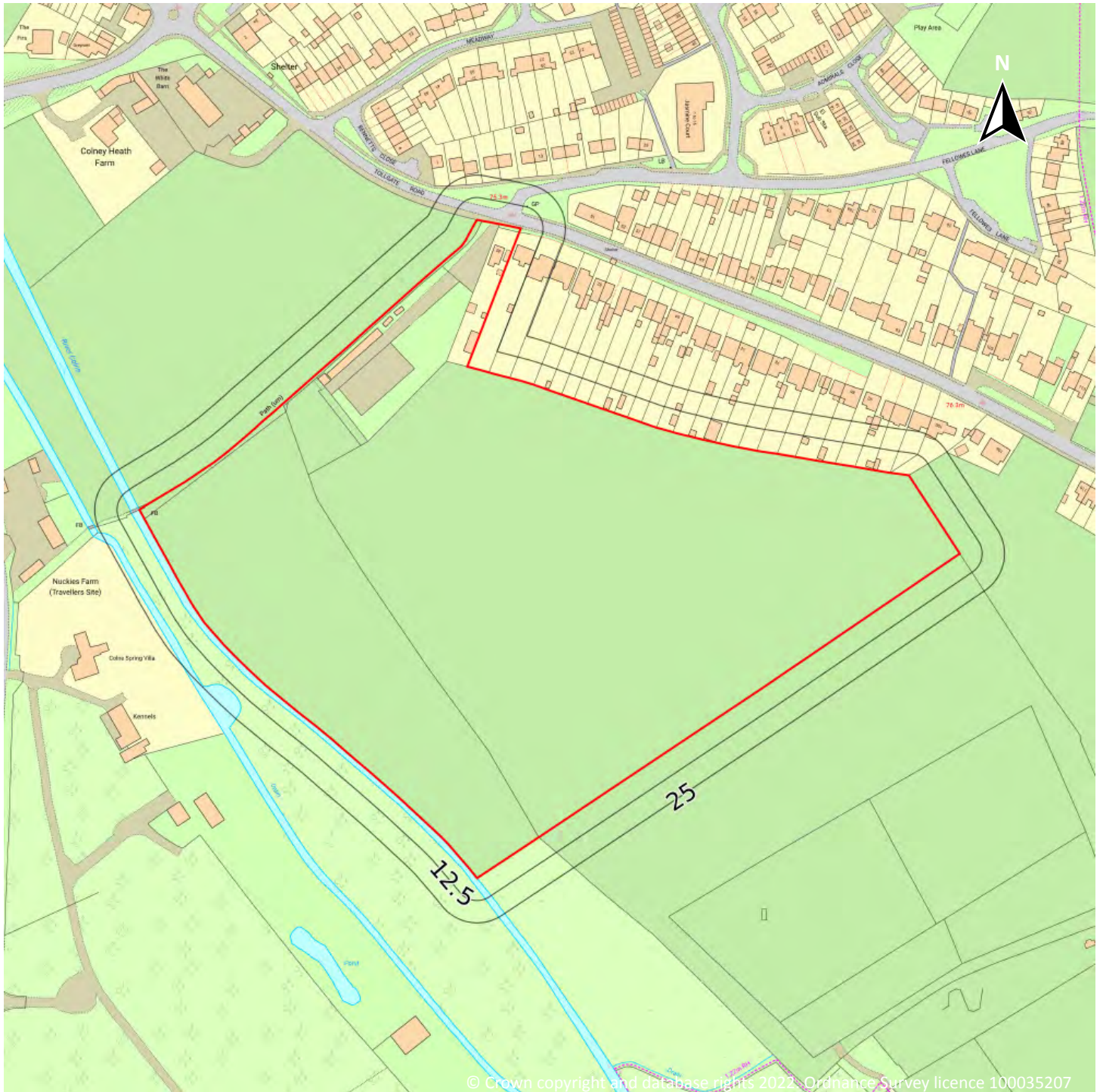


Capture Date: 27/05/1999

Site Area: 7.82ha



## OS MasterMap site plan



Site Area: 7.82ha



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# 1 Past land use



**Site Outline**

**Search buffers in metres (m)**

- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

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## 1.1 Historical industrial land uses

**Records within 500m** **21**

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

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
B	163m W	Unspecified Mill	1971	2056399



ID	Location	Land use	Dates present	Group ID
B	165m SW	Unspecified Disused Mill	1988	2078460
B	165m W	Unspecified Disused Mill	1938	2072293
B	172m SW	Corn Mill	1879	2047594
B	172m SW	Unspecified Disused Mill	1896 - 1938	2118128
4	206m NW	Smithy	1896	2059084
D	207m NE	Pumping Station	1973	2066556
D	207m NE	Pumping Station	1988	2115333
E	223m W	Unspecified Pit	1937 - 1938	2105305
E	226m W	Unspecified Pit	1971	2064141
E	231m W	Unspecified Pit	1879	2082875
E	232m W	Unspecified Pit	1896	2116552
E	232m W	Unspecified Pit	1922	2118436
E	235m W	Unspecified Pit	1938	2091519
5	237m NW	Unspecified Pit	1879	2040269
D	294m NE	Unspecified Pit	1937 - 1938	2075446
D	303m NE	Pumping Station	1937 - 1938	2109142
F	333m NW	Garage	1988	2062727
6	418m NW	Smithy	1896	2059085
7	423m SE	Unspecified Beds	1959	2056372
8	482m NE	Unspecified Pit	1879	2040268

*This data is sourced from Ordnance Survey / Groundsure.*

## 1.2 Historical tanks

### Records within 500m

4

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

Features are displayed on the Past land use map on **page 14**



ID	Location	Land use	Dates present	Group ID
A	149m E	Tanks	1965 - 1970	355394
A	156m E	Tank or Trough	1873	357184
3	205m N	Unspecified Tank	1965 - 1970	352330
D	340m NE	Unspecified Tank	1937	342359

This data is sourced from Ordnance Survey / Groundsure.

### 1.3 Historical energy features

**Records within 500m**

**8**

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

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
1	108m NE	Electricity Substation	1965 - 1996	236539
B	154m SW	Electricity Substation	1970	224499
C	171m E	Electricity Substation	1993 - 1996	238203
C	172m E	Electricity Substation	1965	228716
C	172m E	Electricity Substation	1970	228261
2	196m NW	Electricity Substation	1970 - 1993	239020
D	266m NE	Gas and Water Pumping Station	1937	227331
D	313m NE	Electricity Substation	1993 - 1996	230026

This data is sourced from Ordnance Survey / Groundsure.

### 1.4 Historical petrol stations

**Records within 500m**

**0**

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding



or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

*This data is sourced from Ordnance Survey / Groundsure.*

## 1.5 Historical garages

**Records within 500m**

**1**

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

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
F	333m NW	Garage	1970 - 1993	72491

*This data is sourced from Ordnance Survey / Groundsure.*

## 1.6 Historical military land

**Records within 500m**

**0**

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

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

## 2 Past land use - un-grouped



**Site Outline**

**Search buffers in metres (m)**

- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

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### 2.1 Historical industrial land uses

Records within 500m

28

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

Features are displayed on the Past land use - un-grouped map on **page 18**

ID	Location	Land Use	Date	Group ID
C	163m W	Unspecified Mill	1971	2056399
C	165m SW	Unspecified Disused Mill	1988	2078460
C	165m W	Unspecified Disused Mill	1938	2072293

ID	Location	Land Use	Date	Group ID
C	172m SW	Unspecified Disused Mill	1938	2118128
C	172m SW	Unspecified Disused Mill	1937	2118128
C	172m SW	Unspecified Disused Mill	1922	2118128
C	172m SW	Unspecified Disused Mill	1896	2118128
C	172m SW	Corn Mill	1879	2047594
1	206m NW	Smithy	1896	2059084
G	207m NE	Pumping Station	1988	2115333
G	207m NE	Pumping Station	1973	2066556
H	223m W	Unspecified Pit	1938	2105305
H	223m W	Unspecified Pit	1937	2105305
H	226m W	Unspecified Pit	1971	2064141
H	231m W	Unspecified Pit	1879	2082875
H	232m W	Unspecified Pit	1922	2118436
H	232m W	Unspecified Pit	1896	2116552
H	235m W	Unspecified Pit	1938	2091519
H	235m W	Unspecified Pit	1938	2091519
2	237m NW	Unspecified Pit	1879	2040269
G	294m NE	Unspecified Pit	1938	2075446
G	294m NE	Unspecified Pit	1937	2075446
G	303m NE	Pumping Station	1938	2109142
G	303m NE	Pumping Station	1937	2109142
I	333m NW	Garage	1988	2062727
3	418m NW	Smithy	1896	2059085
4	423m SE	Unspecified Beds	1959	2056372
5	482m NE	Unspecified Pit	1879	2040268

*This data is sourced from Ordnance Survey / Groundsure.*



## 2.2 Historical tanks

Records within 500m

7

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

Features are displayed on the Past land use - un-grouped map on **page 18**

ID	Location	Land Use	Date	Group ID
B	149m E	Tanks	1970	355394
B	151m E	Tanks	1965	355394
B	156m E	Tank or Trough	1873	357184
B	156m E	Tank or Trough	1873	357184
F	205m N	Unspecified Tank	1965	352330
F	205m N	Unspecified Tank	1970	352330
G	340m NE	Unspecified Tank	1937	342359

*This data is sourced from Ordnance Survey / Groundsure.*

## 2.3 Historical energy features

Records within 500m

20

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

Features are displayed on the Past land use - un-grouped map on **page 18**

ID	Location	Land Use	Date	Group ID
A	108m NE	Electricity Substation	1993	236539
A	108m NE	Electricity Substation	1996	236539
A	108m NE	Electricity Substation	1996	236539
A	108m NE	Electricity Substation	1993	236539
A	110m NE	Electricity Substation	1970	236539
A	110m NE	Electricity Substation	1965	236539
C	154m SW	Electricity Substation	1970	224499



ID	Location	Land Use	Date	Group ID
D	171m E	Electricity Substation	1993	238203
D	171m E	Electricity Substation	1996	238203
D	171m E	Electricity Substation	1996	238203
D	171m E	Electricity Substation	1993	238203
D	172m E	Electricity Substation	1965	228716
D	172m E	Electricity Substation	1970	228261
E	196m NW	Electricity Substation	1993	239020
E	198m NW	Electricity Substation	1970	239020
G	266m NE	Gas and Water Pumping Station	1937	227331
G	313m NE	Electricity Substation	1993	230026
G	313m NE	Electricity Substation	1996	230026
G	313m NE	Electricity Substation	1996	230026
G	313m NE	Electricity Substation	1993	230026

*This data is sourced from Ordnance Survey / Groundsure.*

## 2.4 Historical petrol stations

**Records within 500m**

**0**

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

*This data is sourced from Ordnance Survey / Groundsure.*

## 2.5 Historical garages

**Records within 500m**

**2**

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

Features are displayed on the Past land use - un-grouped map on **page 18**





ID	Location	Land Use	Date	Group ID
I	333m NW	Garage	1993	72491
I	334m NW	Garage	1970	72491

*This data is sourced from Ordnance Survey / Groundsure.*



## 3 Waste and landfill



### 3.1 Active or recent landfill

Records within 500m

0

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

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

### 3.2 Historical landfill (BGS records)

Records within 500m

0

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

*This data is sourced from the British Geological Survey.*

### 3.3 Historical landfill (LA/mapping records)

Records within 500m

0

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

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

### 3.4 Historical landfill (EA/NRW records)

Records within 500m

1

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

Features are displayed on the Waste and landfill map on **page 23**

ID	Location	Details		
1	On site	<b>Site Address: Colney Heath Farm, Colney Heath, South Hatfield, Hertfordshire</b> Licence Holder Address: -	<b>Waste Licence: -</b> <b>Site Reference: 3142</b> <b>Waste Type: Inert</b> <b>Environmental Permitting Regulations (Waste) Reference: -</b> <b>Licence Issue: -</b> <b>Licence Surrender: -</b>	<b>Operator: -</b> <b>Licence Holder: Cleary and Robinson</b> <b>First Recorded 10/05/1993</b> <b>Last Recorded: -</b>

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

### 3.5 Historical waste sites

Records within 500m

1

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

Features are displayed on the Waste and landfill map on **page 23**

ID	Location	Address	Further Details	Date
2	198m NW	Site Address: N/A	Type of Site: Scrap Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1993

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



### 3.6 Licensed waste sites

Records within 500m

0

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

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

### 3.7 Waste exemptions

Records within 500m

25

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

Features are displayed on the Waste and landfill map on **page 23**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX175059	Treating waste exemption	On a farm	Aerobic composting and associated prior treatment
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX175059	Disposing of waste exemption	On a farm	Deposit of waste from dredging of inland waters
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX175059	Using waste exemption	On a farm	Spreading waste on agricultural land to confer benefit
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX175059	Disposing of waste exemption	On a farm	Burning waste in the open
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX175059	Treating waste exemption	On a farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX175059	Using waste exemption	On a farm	Use of waste in construction
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX175059	Using waste exemption	On a farm	Burning of waste as a fuel in a small appliance



ID	Location	Site	Reference	Category	Sub-Category	Description
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX015198	Disposing of waste exemption	On a farm	Deposit of waste from dredging of inland waters
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX015198	Disposing of waste exemption	On a farm	Burning waste in the open
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX015198	Treating waste exemption	On a farm	Aerobic composting and associated prior treatment
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX015198	Treating waste exemption	On a farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX015198	Using waste exemption	On a farm	Use of waste in construction
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX015198	Using waste exemption	On a farm	Spreading waste on agricultural land to confer benefit
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX015198	Using waste exemption	On a farm	Use of mulch
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX015198	Using waste exemption	On a farm	Spreading of plant matter to confer benefit
A	204m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST. ALBANS, AL4 0NY	WEX015198	Using waste exemption	On a farm	Burning of waste as a fuel in a small appliance
A	204m E	Tollgate Farm Tollgate Road ST. ALBANS Hertfordshire AL4 0NY	EPR/FE5956JH /A001	Disposing of waste exemption	Agricultural Waste Only	Deposit of waste from dredging of inland waters
A	204m E	Tollgate Farm Tollgate Road ST. ALBANS Hertfordshire AL4 0NY	EPR/FE5956JH /A001	Disposing of waste exemption	Agricultural Waste Only	Burning waste in the open

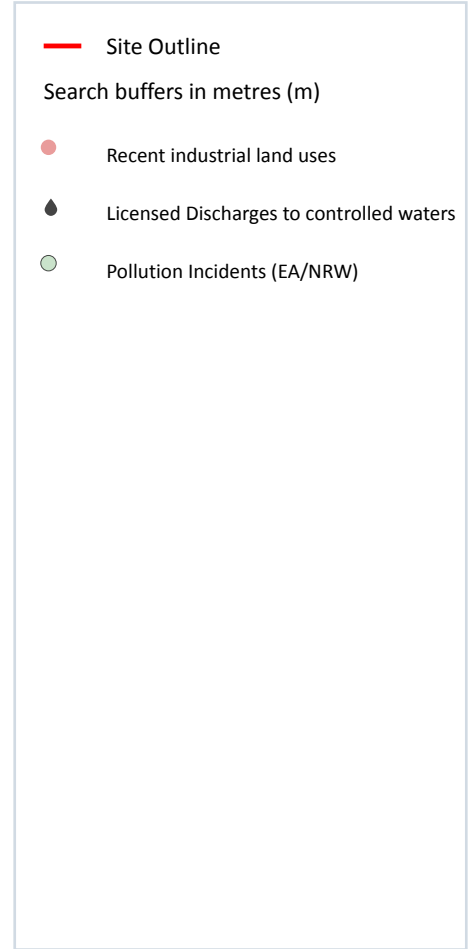


ID	Location	Site	Reference	Category	Sub-Category	Description
A	204m E	Tollgate Farm Tollgate Road ST. ALBANS Hertfordshire AL4 0NY	EPR/FE5956JH /A001	Treating waste exemption	Agricultural Waste Only	Aerobic composting and associated prior treatment
A	204m E	Tollgate Farm Tollgate Road ST. ALBANS Hertfordshire AL4 0NY	EPR/FE5956JH /A001	Treating waste exemption	Agricultural Waste Only	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
A	204m E	Tollgate Farm Tollgate Road ST. ALBANS Hertfordshire AL4 0NY	EPR/FE5956JH /A001	Using waste exemption	Agricultural Waste Only	Spreading waste on agricultural land to confer benefit
A	204m E	Tollgate Farm Tollgate Road ST. ALBANS Hertfordshire AL4 0NY	EPR/FE5956JH /A001	Using waste exemption	Agricultural Waste Only	Use of mulch
A	204m E	Tollgate Farm Tollgate Road ST. ALBANS Hertfordshire AL4 0NY	EPR/FE5956JH /A001	Using waste exemption	Agricultural Waste Only	Spreading of plant matter to confer benefit
A	204m E	Tollgate Farm Tollgate Road ST. ALBANS Hertfordshire AL4 0NY	EPR/FE5956JH /A001	Using waste exemption	Both agricultural and non- agricultural waste	Use of waste in construction
A	204m E	Tollgate Farm Tollgate Road ST. ALBANS Hertfordshire AL4 0NY	EPR/FE5956JH /A001	Using waste exemption	Both agricultural and non- agricultural waste	Burning of waste as a fuel in a small appliance

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



## 4 Current industrial land use



### 4.1 Recent industrial land uses

**Records within 250m** **18**

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 28**

ID	Location	Company	Address	Activity	Category
2	93m E	Corncrake Design	124, Tollgate Road, Colney Heath, St. Albans, Hertfordshire, AL4 0PY	Lampshades and Lighting	Consumer Products
3	112m NE	Electricity Sub Station	Hertfordshire, AL4	Electrical Features	Infrastructure and Facilities
A	142m E	Silo	Hertfordshire, AL4	Hoppers and Silos	Farming

ID	Location	Company	Address	Activity	Category
A	143m E	Silo	Hertfordshire, AL4	Hoppers and Silos	Farming
A	144m E	Silo	Hertfordshire, AL4	Hoppers and Silos	Farming
A	150m E	Silo	Hertfordshire, AL4	Hoppers and Silos	Farming
A	151m E	Silo	Hertfordshire, AL4	Hoppers and Silos	Farming
A	157m E	Silo	Hertfordshire, AL4	Hoppers and Silos	Farming
A	160m E	Silo	Hertfordshire, AL4	Hoppers and Silos	Farming
5	179m E	Electricity Sub Station	Hertfordshire, AL4	Electrical Features	Infrastructure and Facilities
A	204m E	Kimberley Motors	Tollgate Farm, Tollgate Road, Colney Heath, St. Albans, Hertfordshire, AL4 ONY	Vehicle Repair, Testing and Servicing	Repair and Servicing
A	204m E	Dewar's Forktrucks Ltd	Tollgate Farm, Tollgate Road, Colney Heath, St. Albans, Hertfordshire, AL4 ONY	Lifting and Handling Equipment	Industrial Products
A	204m E	Lord Cars	Tollgate Farm, Tollgate Road, Colney Heath, St. Albans, Hertfordshire, AL4 ONY	Vehicle Hire and Rental	Hire Services
A	204m E	Barnet Welding Supplies	Tollgate Farm, Tollgate Road, Colney Heath, St. Albans, Hertfordshire, AL4 ONY	Tools Including Machine Shops	Industrial Products
A	204m E	K M R Engineering	Tollgate Farm, Unit 13 Tollgate Road, Colney Heath, St. Albans, Hertfordshire, AL4 ONY	Motorsport Services	Sport and Entertainment Support Services
7	206m NE	The Rubbish Company	48, Fellowes Lane, Colney Heath, St. Albans, Hertfordshire, AL4 0QA	Waste Storage, Processing and Disposal	Infrastructure and Facilities
8	207m NW	Electricity Sub Station	Hertfordshire, AL4	Electrical Features	Infrastructure and Facilities
9	213m N	Permutit Quality Water Co	38, Admirals Close, Colney Heath, St. Albans, Hertfordshire, AL4 0QE	Colours, Chemicals and Water Softeners and Supplies	Industrial Products

*This data is sourced from Ordnance Survey.*

## 4.2 Current or recent petrol stations

**Records within 500m**

**0**

Open, closed, under development and obsolete petrol stations.

*This data is sourced from Experian.*





### 4.3 Electricity cables

Records within 500m

0

High voltage underground electricity transmission cables.

*This data is sourced from National Grid.*

### 4.4 Gas pipelines

Records within 500m

0

High pressure underground gas transmission pipelines.

*This data is sourced from National Grid.*

### 4.5 Sites determined as Contaminated Land

Records within 500m

0

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

*This data is sourced from Local Authority records.*

### 4.6 Control of Major Accident Hazards (COMAH)

Records within 500m

0

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

*This data is sourced from the Health and Safety Executive.*

### 4.7 Regulated explosive sites

Records within 500m

0

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

*This data is sourced from the Health and Safety Executive.*

## 4.8 Hazardous substance storage/usage

**Records within 500m** **0**

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

*This data is sourced from Local Authority records.*

## 4.9 Historical licensed industrial activities (IPC)

**Records within 500m** **0**

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

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

## 4.10 Licensed industrial activities (Part A(1))

**Records within 500m** **0**

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

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

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

**Records within 500m** **0**

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

*This data is sourced from Local Authority records.*

## 4.12 Radioactive Substance Authorisations

**Records within 500m** **0**

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

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

## 4.13 Licensed Discharges to controlled waters

Records within 500m

6

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

Features are displayed on the Current industrial land use map on **page 28**

ID	Location	Address	Details	
A	213m SE	STW, TOLLGATE FARM, NORTH MIMMS, HE, STW TOLLGATE FARM NORTH MIMMS, HERTS	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: CTCR.0596 Permit Version: 1 Receiving Water: COLNE	Status: TRANSFERRED FROM R(PP)A 1951-1961 Issue date: 11/03/1963 Effective Date: 11/03/1963 Revocation Date: -
B	383m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST ALBANS, HERTS, AL4 0NY	Effluent Type: AGRICULTURE - ARABLE FARMING Permit Number: CANG.0006 Permit Version: 2 Receiving Water: TO LAND	Status: VARIED UNDER EPR 2010 Issue date: 21/12/2012 Effective Date: 21/12/2012 Revocation Date: -
B	383m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST ALBANS, HERTS, AL4 0NY	Effluent Type: AGRICULTURE - ARABLE FARMING Permit Number: CANG.0006 Permit Version: 2 Receiving Water: TO LAND	Status: VARIED UNDER EPR 2010 Issue date: 21/12/2012 Effective Date: 21/12/2012 Revocation Date: -
B	383m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST ALBANS, HERTS, AL4 0NY	Effluent Type: AGRICULTURE - ARABLE FARMING Permit Number: CANG.0006 Permit Version: 1 Receiving Water: GW	Status: GROUNDWATER REGS AUTHORISATION (BY APPLIC OR FULL DETERM OF DEEMED) Issue date: 15/05/2000 Effective Date: 26/04/2000 Revocation Date: 20/12/2012
B	383m E	TOLLGATE FARM, TOLLGATE ROAD, COLNEY HEATH, ST ALBANS, HERTS, AL4 0NY	Effluent Type: AGRICULTURE - ARABLE FARMING Permit Number: CANG.0006 Permit Version: 2 Receiving Water: TO LAND	Status: VARIED UNDER EPR 2010 Issue date: 21/12/2012 Effective Date: 21/12/2012 Revocation Date: -
10	495m SW	COURSERS FARM, COLNEY HEATH, ST ALB, COURSERS FARM COLNEY HEATH ST, ALBANS HERTS	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: CNTW.1204 Permit Version: 1 Receiving Water: BOULDER CLAY	Status: LAPSED UNDER SCHEDULE 23 ENVIRONMENT ACT 1995 Issue date: 28/06/1991 Effective Date: 25/07/1991 Revocation Date: 01/10/1996

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



#### 4.14 Pollutant release to surface waters (Red List)

Records within 500m 0

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

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

#### 4.15 Pollutant release to public sewer

Records within 500m 0

Discharges of Special Category Effluents to the public sewer.

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

#### 4.16 List 1 Dangerous Substances

Records within 500m 0

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

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

#### 4.17 List 2 Dangerous Substances

Records within 500m 0

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

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

#### 4.18 Pollution Incidents (EA/NRW)

Records within 500m 5

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

Features are displayed on the Current industrial land use map on **page 28**

ID	Location	Details	
1	81m SW	Incident Date: 16/05/2003 Incident Identification: 158846 Pollutant: Sewage Materials Pollutant Description: Other Sewage Material	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
4	138m N	Incident Date: 15/07/2011 Incident Identification: 903231 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Other Atmospheric Pollutant or Effect	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 2 (Significant)
6	203m N	Incident Date: 20/02/2012 Incident Identification: 963180 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Other Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 2 (Significant)
A	203m E	Incident Date: 02/10/2011 Incident Identification: 928499 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Other Atmospheric Pollutant or Effect	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 2 (Significant)
A	203m E	Incident Date: 08/06/2012 Incident Identification: 999047 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Other Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 2 (Significant)

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

## 4.19 Pollution inventory substances

**Records within 500m**

**0**

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

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

## 4.20 Pollution inventory waste transfers

**Records within 500m**

**0**

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

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



## 4.21 Pollution inventory radioactive waste

Records within 500m

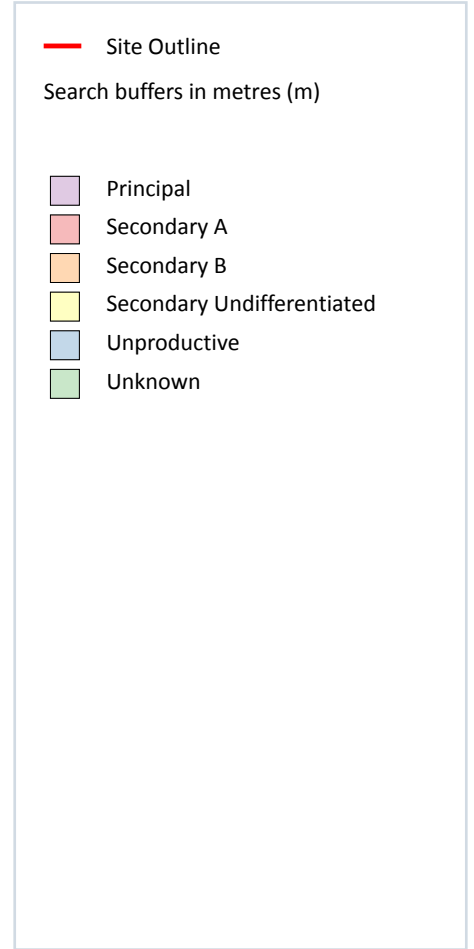
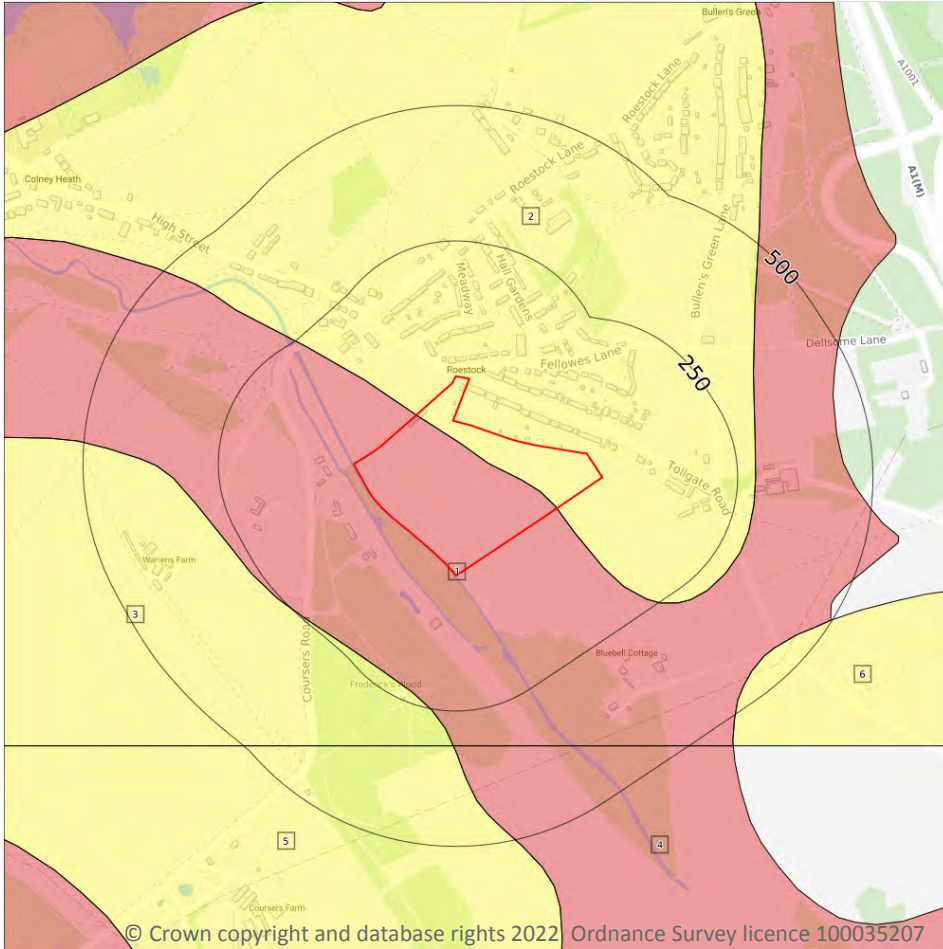
0

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

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



## 5 Hydrogeology - Superficial aquifer



### 5.1 Superficial aquifer

Records within 500m

6

Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on **page 36**

ID	Location	Designation	Description
1	On site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	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

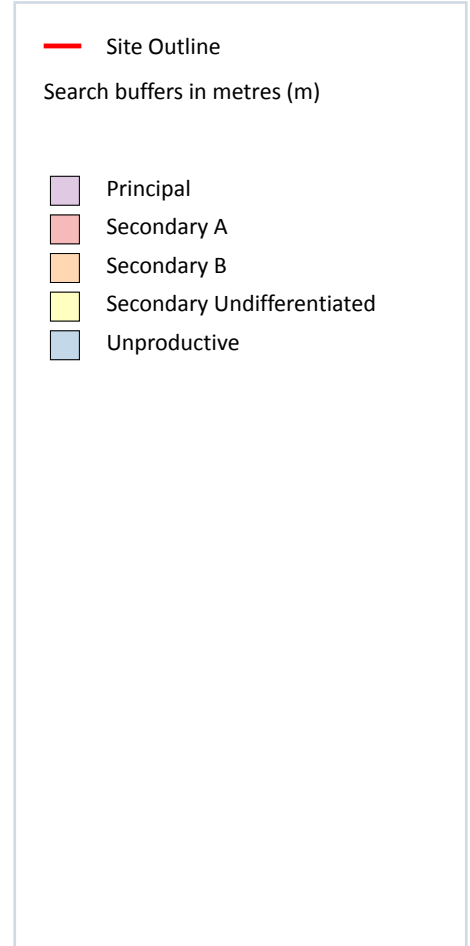
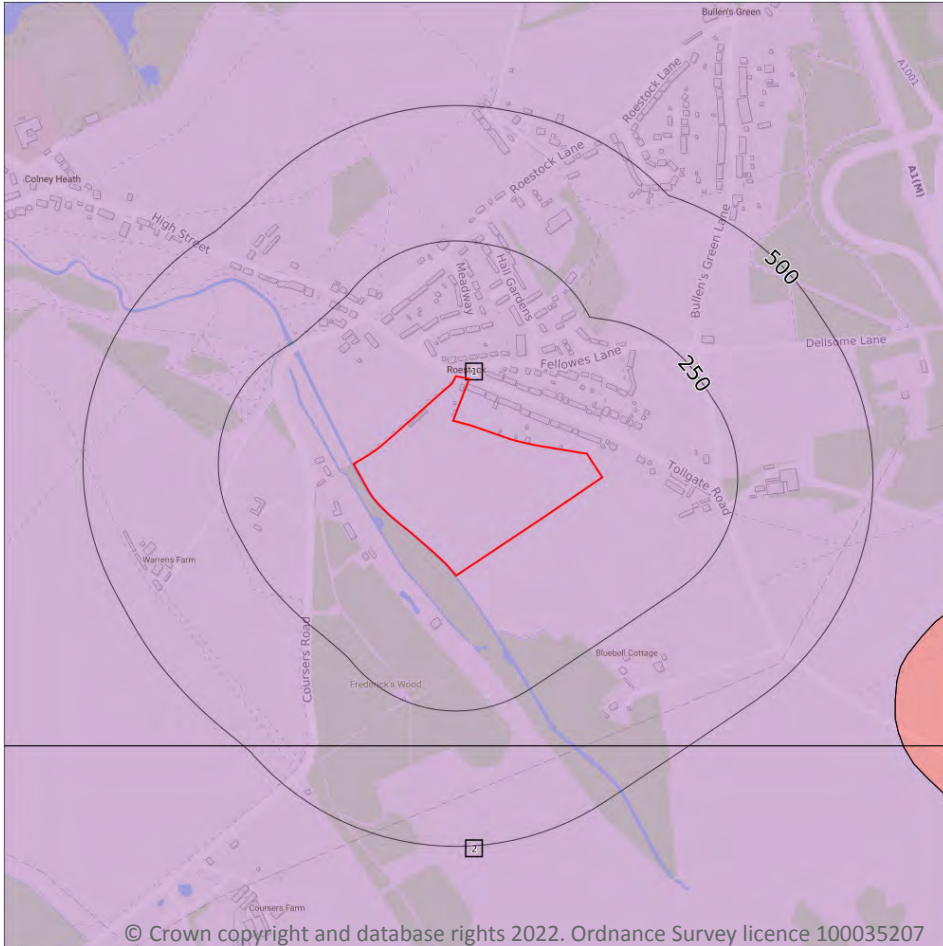
ID	Location	Designation	Description
3	222m SW	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
4	314m S	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
5	314m S	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
6	445m SE	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

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





## Bedrock aquifer



### 5.2 Bedrock aquifer

Records within 500m

2

Aquifer status of groundwater held within bedrock geology.

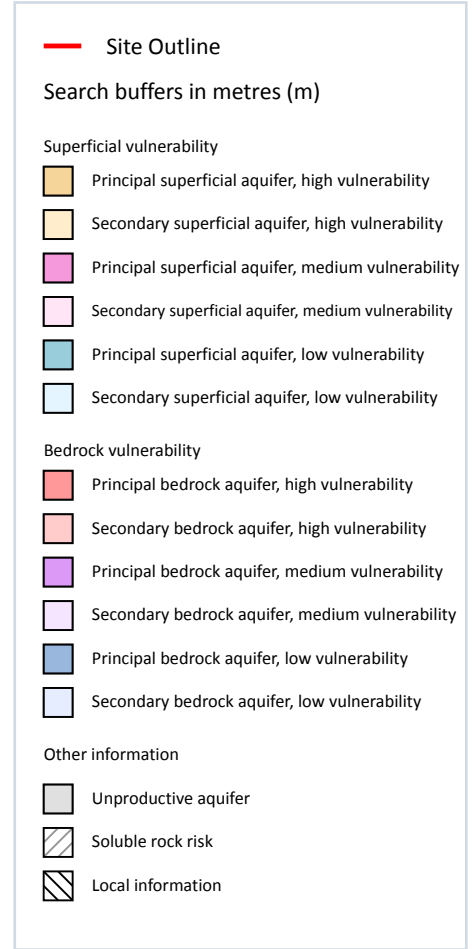
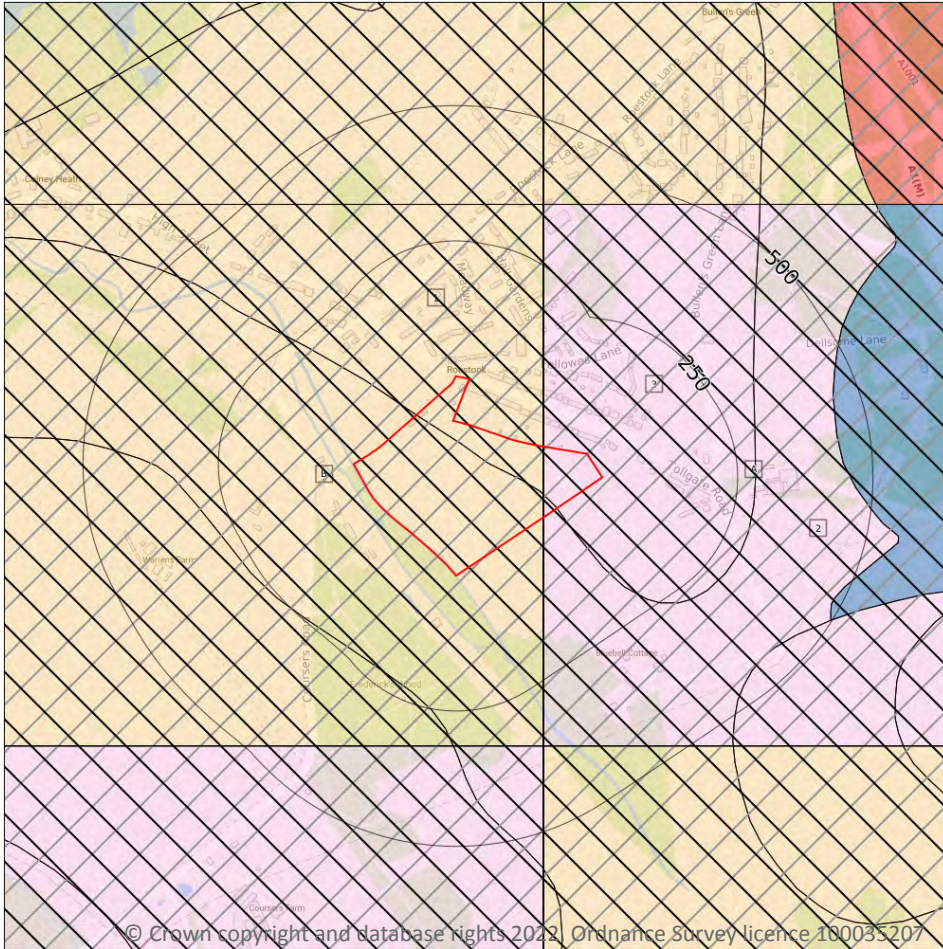
Features are displayed on the Bedrock aquifer map on **page 38**

ID	Location	Designation	Description
1	On site	Principal	<b>Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers</b>
2	314m S	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

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



## Groundwater vulnerability



### 5.3 Groundwater vulnerability

Records within 50m

4

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid.

Groundwater vulnerability is described as High, Medium or Low as follows:

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

Features are displayed on the Groundwater vulnerability map on **page 40**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	<b>Summary Classification:</b> Secondary superficial aquifer - High Vulnerability <b>Combined classification:</b> Productive Bedrock Aquifer, Productive Superficial Aquifer	<b>Leaching class:</b> Intermediate <b>Infiltration value:</b> >70% <b>Dilution value:</b> <300mm/year	<b>Vulnerability: High</b> <b>Aquifer type: Secondary</b> <b>Thickness: &gt;10m</b> <b>Patchiness value: &gt;90%</b> <b>Recharge potential: No Data</b>	<b>Vulnerability: Low</b> <b>Aquifer type: Principal</b> <b>Flow mechanism: Well connected fractures</b>
2	On site	<b>Summary Classification:</b> Secondary superficial aquifer - Medium Vulnerability <b>Combined classification:</b> Productive Bedrock Aquifer, Productive Superficial Aquifer	<b>Leaching class:</b> Intermediate <b>Infiltration value: 40-70%</b> <b>Dilution value:</b> <300mm/year	<b>Vulnerability: Medium</b> <b>Aquifer type: Secondary</b> <b>Thickness: &gt;10m</b> <b>Patchiness value: &gt;90%</b> <b>Recharge potential: No Data</b>	<b>Vulnerability: Low</b> <b>Aquifer type: Principal</b> <b>Flow mechanism: Well connected fractures</b>
3	On site	<b>Summary Classification:</b> Secondary superficial aquifer - Medium Vulnerability <b>Combined classification:</b> Productive Bedrock Aquifer, Productive Superficial Aquifer	<b>Leaching class:</b> Intermediate <b>Infiltration value: 40-70%</b> <b>Dilution value:</b> <300mm/year	<b>Vulnerability: Medium</b> <b>Aquifer type: Secondary</b> <b>Thickness: &gt;10m</b> <b>Patchiness value: &gt;90%</b> <b>Recharge potential: No Data</b>	<b>Vulnerability: Low</b> <b>Aquifer type: Principal</b> <b>Flow mechanism: Well connected fractures</b>
B	On site	<b>Summary Classification:</b> Secondary superficial aquifer - High Vulnerability <b>Combined classification:</b> Productive Bedrock Aquifer, Productive Superficial Aquifer	<b>Leaching class:</b> Intermediate <b>Infiltration value:</b> >70% <b>Dilution value:</b> <300mm/year	<b>Vulnerability: High</b> <b>Aquifer type: Secondary</b> <b>Thickness: &gt;10m</b> <b>Patchiness value: &gt;90%</b> <b>Recharge potential: No Data</b>	<b>Vulnerability: Low</b> <b>Aquifer type: Principal</b> <b>Flow mechanism: Well connected fractures</b>

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

## 5.4 Groundwater vulnerability- soluble rock risk

### Records on site

2

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

ID	Maximum soluble risk category	Percentage of grid square covered by maximum risk
A	<b>Very significant soluble rocks are likely to be present with a high possibility of localised subsidence or dissolution-related degradation of bedrock occurring naturally, especially in adverse conditions such as concentrated surface or subsurface water flow.</b>	<b>5.0%</b>



ID	Maximum soluble risk category	Percentage of grid square covered by maximum risk
B	Significant soluble rocks are likely to be present. Low possibility of localised subsidence or dissolution-related degradation of bedrock occurring naturally, but may be possible in adverse conditions such as high surface or subsurface water flow.	1.0%

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

## 5.5 Groundwater vulnerability- local information

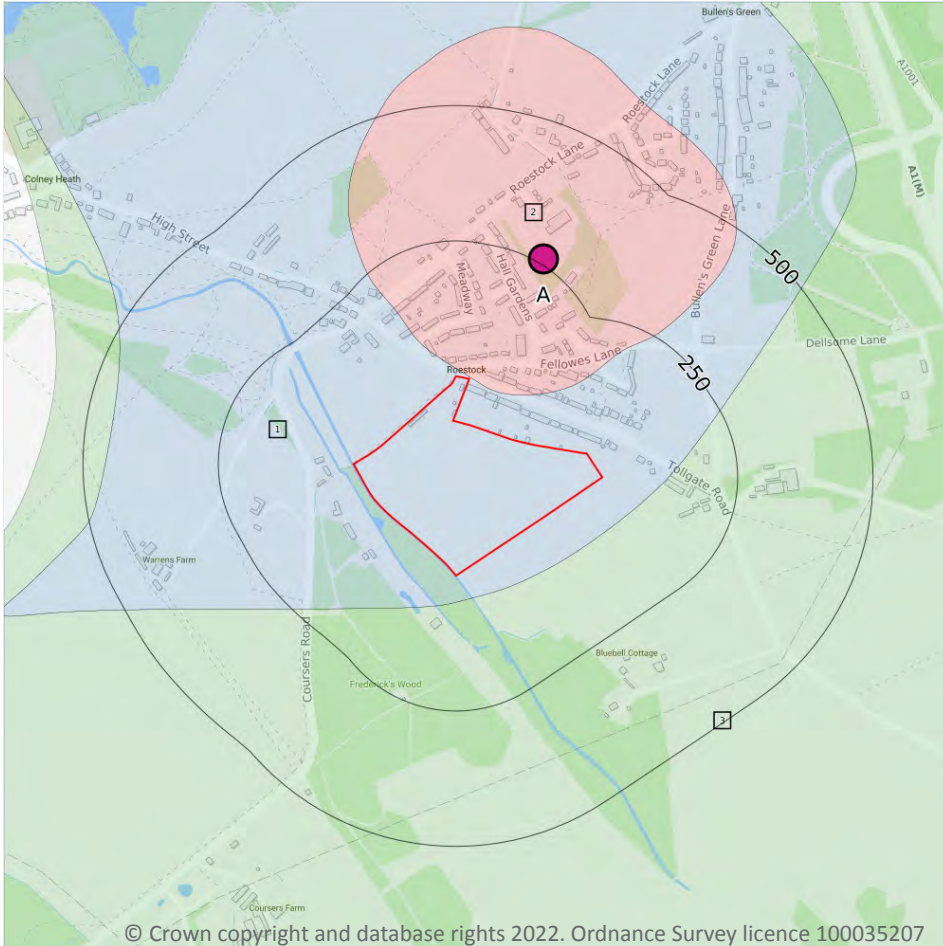
<b>Records on site</b>	<b>2</b>
------------------------	----------

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

ID	Summary	Additional information
A	Known fissure flow in area	Vale of St Albans fissure flow
B	Known fissure flow in area	Vale of St Albans fissure flow

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

## Abstractions and Source Protection Zones



### 5.6 Groundwater abstractions

Records within 2000m

15

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

Features are displayed on the Abstractions and Source Protection Zones map on **page 43**

ID	Location	Details	
A	261m NE	Status: Active Licence No: 28/39/28/0226 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: ROESTOCK PUMPING STATION Data Type: Point Name: Affinity Water Limited Easting: 521000 Northing: 205900	Annual Volume (m <sup>3</sup> ): 6,459,092 Max Daily Volume (m <sup>3</sup> ): 17,820.69 Original Application No: - Original Start Date: 14/11/1966 Expiry Date: - Issue No: 102 Version Start Date: 14/11/2012 Version End Date: -
-	868m W	Status: Active Licence No: 28/39/28/0226 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: TYTTENHANGER PUMPING STATION Data Type: Point Name: Affinity Water Limited Easting: 519800 Northing: 205700	Annual Volume (m <sup>3</sup> ): 6,459,092 Max Daily Volume (m <sup>3</sup> ): 17,820.69 Original Application No: - Original Start Date: 14/11/1966 Expiry Date: - Issue No: 102 Version Start Date: 14/11/2012 Version End Date: -
-	1029m NW	Status: Historical Licence No: 28/39/28/0073 Details: Mineral Washing Direct Source: THAMES GROUNDWATER Point: WET PIT AT COLNEY HEATH, HERTFORDSHIRE Data Type: Point Name: LAFARGE REDLAND AGGREGATES LIMITED Easting: 520100 Northing: 206400	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Original Application No: - Original Start Date: 04/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/06/1998 Version End Date: -
-	1065m NW	Status: Historical Licence No: 28/39/28/0073 Details: Mineral Washing Direct Source: THAMES GROUNDWATER Point: WET PIT AT COLNEY HEATH, HERTFORDSHIRE Data Type: Point Name: LAFARGE AGGREGATES LIMITED Easting: 520110 Northing: 206460	Annual Volume (m <sup>3</sup> ): 350496.6 Max Daily Volume (m <sup>3</sup> ): 1168.32 Original Application No: - Original Start Date: 04/04/1966 Expiry Date: - Issue No: 101 Version Start Date: 01/11/2001 Version End Date: -
-	1065m NW	Status: Historical Licence No: 28/39/28/0073 Details: Mineral Washing Direct Source: THAMES GROUNDWATER Point: COLNEY HEATH, HERTFORDSHIRE-WET PIT Data Type: Point Name: LAFARGE AGGREGATES LIMITED Easting: 520110 Northing: 206460	Annual Volume (m <sup>3</sup> ): 350497 Max Daily Volume (m <sup>3</sup> ): 1168.32 Original Application No: - Original Start Date: 04/04/1966 Expiry Date: - Issue No: 102 Version Start Date: 13/11/2003 Version End Date: -



ID	Location	Details	
-	1291m SW	Status: Historical Licence No: 28/39/28/0608 Details: Mineral Washing Direct Source: THAMES GROUNDWATER Point: TYTTENHANGER QUARRY, COLNEY HEATH - BOREHOLE Data Type: Point Name: LAFARGE AGGREGATES LIMITED Easting: 519550 Northing: 204840	Annual Volume (m <sup>3</sup> ): 350496 Max Daily Volume (m <sup>3</sup> ): 1168 Original Application No: - Original Start Date: 16/08/2007 Expiry Date: 31/03/2014 Issue No: 2 Version Start Date: 26/09/2013 Version End Date: -
-	1291m SW	Status: Historical Licence No: 28/39/28/0608/R01 Details: Mineral Washing Direct Source: THAMES GROUNDWATER Point: TYTTENHANGER QUARRY, COLNEY HEATH - BOREHOLE Data Type: Point Name: Tarmac Aggregates Limited Easting: 519550 Northing: 204840	Annual Volume (m <sup>3</sup> ): 350,496 Max Daily Volume (m <sup>3</sup> ): 1,168 Original Application No: - Original Start Date: 01/04/2014 Expiry Date: 31/03/2026 Issue No: 2 Version Start Date: 26/10/2015 Version End Date: -
-	1291m SW	Status: Active Licence No: 28/39/28/0608/R01 Details: Transfer Between Sources (Post Water Act 2003) Direct Source: THAMES GROUNDWATER Point: TYTTENHANGER QUARRY, COLNEY HEATH - BOREHOLE Data Type: Point Name: Tarmac Aggregates Limited Easting: 519550 Northing: 204840	Annual Volume (m <sup>3</sup> ): 150,000 Max Daily Volume (m <sup>3</sup> ): 1,168 Original Application No: - Original Start Date: 01/04/2014 Expiry Date: 31/03/2026 Issue No: 3 Version Start Date: 03/03/2020 Version End Date: -
-	1513m S	Status: Historical Licence No: 28/39/28/0422 Details: Spray Irrigation - Direct Direct Source: THAMES GROUNDWATER Point: BOREHOLE AT COURSERS FARM, COLNEY HEATH Data Type: Point Name: BOWMANS FARMS LTD Easting: 520300 Northing: 203900	Annual Volume (m <sup>3</sup> ): 40914 Max Daily Volume (m <sup>3</sup> ): 364 Original Application No: - Original Start Date: 24/03/1976 Expiry Date: - Issue No: 100 Version Start Date: 29/09/1998 Version End Date: -





ID	Location	Details	
-	1765m SE	Status: Active Licence No: 28/39/28/0160 Details: General Farming & Domestic Direct Source: THAMES GROUNDWATER Point: BOREHOLE AT NORTH MYMMS PARK Data Type: Point Name: EXEC OF MAJOR GEN SIR G BURNS Easting: 521900 Northing: 203900	Annual Volume (m <sup>3</sup> ): 9,138 Max Daily Volume (m <sup>3</sup> ): 97.70 Original Application No: - Original Start Date: 05/09/1966 Expiry Date: - Issue No: 101 Version Start Date: 05/05/1997 Version End Date: -
-	1765m SE	Status: Active Licence No: 28/39/28/0160 Details: Spray Irrigation - Direct Direct Source: THAMES GROUNDWATER Point: BOREHOLE AT NORTH MYMMS PARK Data Type: Point Name: EXEC OF MAJOR GEN SIR G BURNS Easting: 521900 Northing: 203900	Annual Volume (m <sup>3</sup> ): 9,138 Max Daily Volume (m <sup>3</sup> ): 97.70 Original Application No: - Original Start Date: 05/09/1966 Expiry Date: - Issue No: 101 Version Start Date: 05/05/1997 Version End Date: -
-	1765m SE	Status: Active Licence No: 28/39/28/0160 Details: Spray Irrigation - Spray Irrigation Definition Order Direct Source: THAMES GROUNDWATER Point: BOREHOLE AT NORTH MYMMS PARK Data Type: Point Name: EXEC OF MAJOR GEN SIR G BURNS Easting: 521900 Northing: 203900	Annual Volume (m <sup>3</sup> ): 9,138 Max Daily Volume (m <sup>3</sup> ): 97.70 Original Application No: - Original Start Date: 05/09/1966 Expiry Date: - Issue No: 101 Version Start Date: 05/05/1997 Version End Date: -
-	1800m W	Status: Historical Licence No: 28/39/28/0552 Details: General Farming & Domestic Direct Source: THAMES GROUNDWATER Point: POINT 'A' AT BARLEY MOW LANE, TYTTENHANGER GREEN, ST. ALBANS Data Type: Point Name: GRAND CHINA PROPERTIES LIMITED Easting: 518920 Northing: 206020	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Original Application No: - Original Start Date: 22/10/1998 Expiry Date: - Issue No: 101 Version Start Date: 09/01/2002 Version End Date: -
-	1814m W	Status: Historical Licence No: 28/39/28/0552 Details: General Farming & Domestic Direct Source: THAMES GROUNDWATER Point: BOREHOLE AT BARLEY MOW LANE, TYTTENHANGER Data Type: Point Name: DE ROUFFIGNAC Easting: 518900 Northing: 206000	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Original Application No: - Original Start Date: 22/10/1998 Expiry Date: - Issue No: 100 Version Start Date: 28/11/1998 Version End Date: -



ID	Location	Details	
-	1866m SW	Status: Active Licence No: 28/39/28/0424 Details: Spray Irrigation - Direct Direct Source: THAMES GROUNDWATER Point: BOREHOLE AT BOWMANSGREEN FARM, LONDON COLNEY Data Type: Point Name: BOWMANS FARMS LTD Easting: 520100 Northing: 203600	Annual Volume (m <sup>3</sup> ): 119,000 Max Daily Volume (m <sup>3</sup> ): 964 Original Application No: - Original Start Date: 16/06/1976 Expiry Date: - Issue No: 102 Version Start Date: 09/12/2013 Version End Date: -

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

## 5.7 Surface water abstractions

<b>Records within 2000m</b>	<b>0</b>
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Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

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

## 5.8 Potable abstractions

<b>Records within 2000m</b>	<b>2</b>
-----------------------------	----------

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

Features are displayed on the Abstractions and Source Protection Zones map on **page 43**

ID	Location	Details	
A	261m NE	Status: Active Licence No: 28/39/28/0226 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: ROESTOCK PUMPING STATION Data Type: Point Name: Affinity Water Limited Easting: 521000 Northing: 205900	Annual Volume (m <sup>3</sup> ): 6,459,092 Max Daily Volume (m <sup>3</sup> ): 17,820.69 Original Application No: - Original Start Date: 14/11/1966 Expiry Date: - Issue No: 102 Version Start Date: 14/11/2012 Version End Date: -

ID	Location	Details	
-	868m W	Status: Active Licence No: 28/39/28/0226 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: TYTTENHANGER PUMPING STATION Data Type: Point Name: Affinity Water Limited Easting: 519800 Northing: 205700	Annual Volume (m <sup>3</sup> ): 6,459,092 Max Daily Volume (m <sup>3</sup> ): 17,820.69 Original Application No: - Original Start Date: 14/11/1966 Expiry Date: - Issue No: 102 Version Start Date: 14/11/2012 Version End Date: -

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

## 5.9 Source Protection Zones

<b>Records within 500m</b>	<b>3</b>
----------------------------	----------

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

Features are displayed on the Abstractions and Source Protection Zones map on **page 43**

ID	Location	Type	Description
1	On site	2	Outer catchment
2	4m NE	1	Inner catchment
3	48m S	3	Total catchment

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

## 5.10 Source Protection Zones (confined aquifer)

<b>Records within 500m</b>	<b>0</b>
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Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

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

## 6 Hydrology



- Site Outline
- Search buffers in metres (m)
- Water Network (OS MasterMap)
- Surface water features (wider than 5m)
- Surface water features (narrower than 5m)
- ⋯ WFD River, canal and surface water transfer water bodies
- WFD Lake water bodies
- WFD Transitional and coastal water bodies
- WFD Surface water body catchments boundaries
- WFD Groundwater body boundaries

### 6.1 Water Network (OS MasterMap)

Records within 250m

20

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

Features are displayed on the Hydrology map on **page 49**

ID	Location	Type of water feature	Ground level	Permanence	Name
B	1m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Colne



ID	Location	Type of water feature	Ground level	Permanence	Name
B	19m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
7	89m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
A	127m S	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
A	129m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
A	129m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Colne
A	130m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
A	140m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
A	140m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
A	164m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Colne
A	164m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Colne
C	188m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	188m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
8	190m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Colne



ID	Location	Type of water feature	Ground level	Permanence	Name
C	210m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	212m NW	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
C	229m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	232m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Colne
C	233m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Colne
C	246m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Colne

*This data is sourced from the Ordnance Survey.*

## 6.2 Surface water features

**Records within 250m**

**11**

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

Features are displayed on the Hydrology map on **page 49**

*This data is sourced from the Ordnance Survey.*

## 6.3 WFD Surface water body catchments

**Records on site**

**1**

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

Features are displayed on the Hydrology map on **page 49**



ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
2	On site	River	Colne (upper east arm including Mimshall Brook)	GB106039029850	Colne	Colne

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

## 6.4 WFD Surface water bodies

<b>Records identified</b>	<b>1</b>
---------------------------	----------

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

Features are displayed on the Hydrology map on **page 49**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
3	0m SW	River	Colne (upper east arm including Mimshall Brook)	<a href="#">GB106039029850</a>	Bad	Fail	Bad	2019

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

## 6.5 WFD Groundwater bodies

<b>Records on site</b>	<b>1</b>
------------------------	----------

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

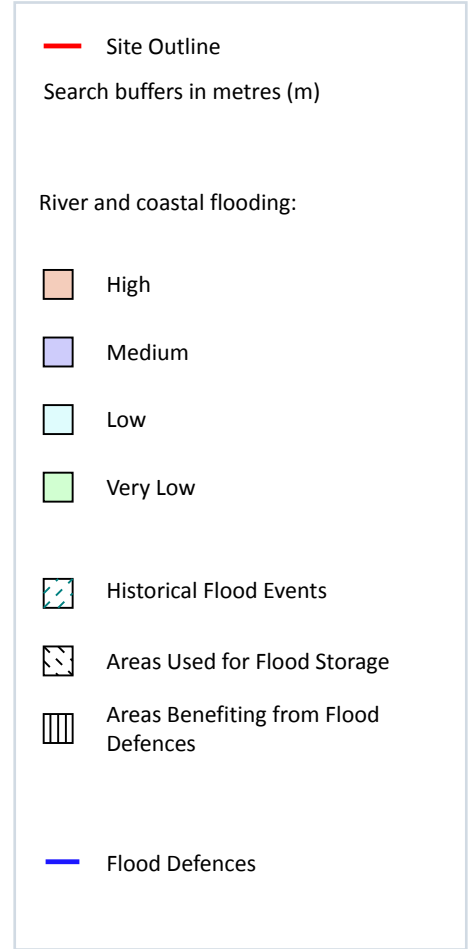
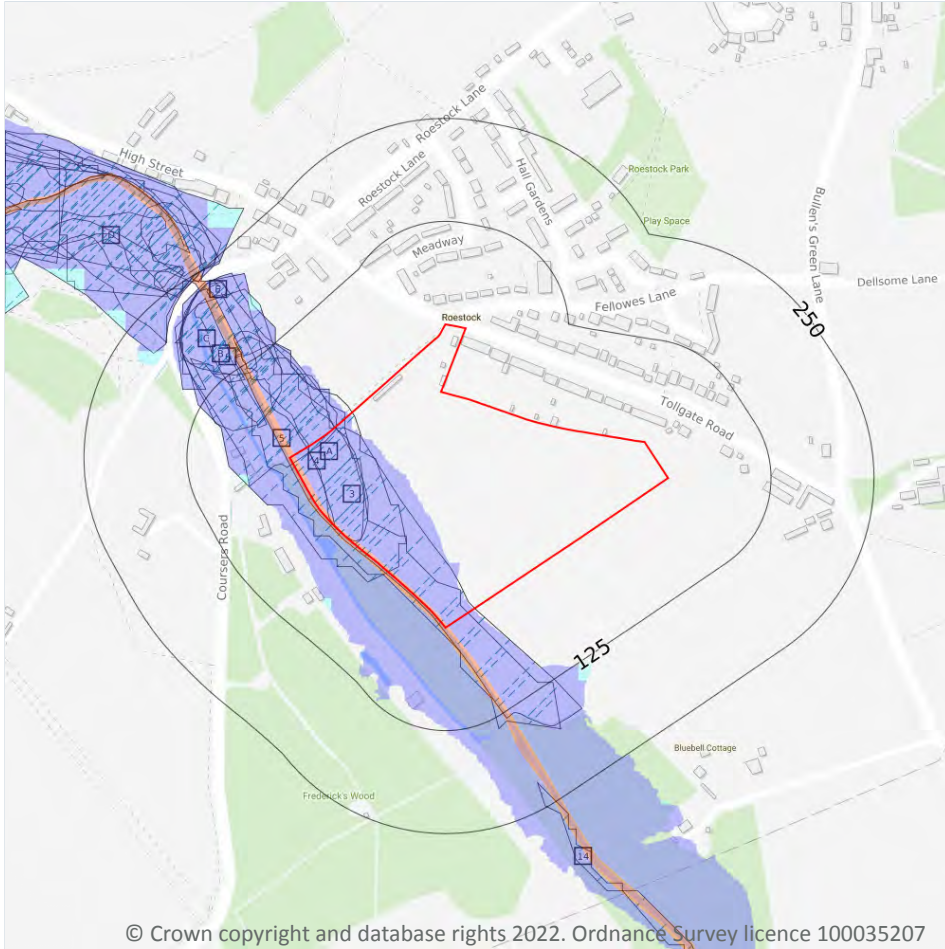
Features are displayed on the Hydrology map on **page 49**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
1	On site	Mid-Chilterns Chalk	<a href="#">GB40601G601200</a>	Poor	Poor	Poor	2019

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



## 7 River and coastal flooding



### 7.1 Risk of flooding from rivers and the sea

#### Records within 50m

3

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

Features are displayed on the River and coastal flooding map on **page 53**



Distance	Flood risk category
<b>On site</b>	<b>High</b>
0 - 50m	High

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

## 7.2 Historical Flood Events

Records within 250m

19

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

Features are displayed on the River and coastal flooding map on **page 53**

ID	Location	Event name	Date of flood	Flood source	Flood cause	Type of flood
3	On site	Ea06februarywinter2009	2009-02-09 2009-02-10	Ordinary watercourse	Channel capacity exceeded (no raised defences)	Fluvial
4	On site	06julysummer1987	1987-01-01 1987-12-12	Main river	Channel capacity exceeded (no raised defences)	Fluvial
5	On site	06septemberautumn1992	1992-01-01 1992-12-12	Main river	Channel capacity exceeded (no raised defences)	Fluvial
6	On site	06octoberautumn2000	2000-10-01 2000-11-30	Main river	Channel capacity exceeded (no raised defences)	Fluvial
A	On site	Ea06junesummer2012	2012-06-12 2012-06-12	Main river	Channel capacity exceeded (no raised defences)	Fluvial
A	On site	Ea06januarywinter2011	2011-01-18 2011-01-18	Main river	Channel capacity exceeded (no raised defences)	Fluvial
B	50m NW	Ea06januarywinter2011	2011-01-18 2011-01-18	Main river	Channel capacity exceeded (no raised defences)	Fluvial
B	56m NW	Ea06aprilspring2012	2012-04-29 2012-04-29	Main river	Channel capacity exceeded (no raised defences)	Fluvial
C	109m NW	Ea06februarywinter2009	2009-02-09 2009-02-10	Main river	Channel capacity exceeded (no raised defences)	Fluvial
C	113m NW	Ea06februarywinter2009	2009-02-09 2009-02-10	Main river	Channel capacity exceeded (no raised defences)	Fluvial



ID	Location	Event name	Date of flood	Flood source	Flood cause	Type of flood
D	205m NW	Ea06februarywinter2009	2009-02-09 2009-02-10	Main river	Channel capacity exceeded (no raised defences)	Fluvial
D	205m NW	Ea06aprilspring2012	2012-04-29 2012-04-29	Main river	Channel capacity exceeded (no raised defences)	Fluvial
E	209m NW	Ea06januarywinter2011	2011-01-18 2011-01-18	Main river	Channel capacity exceeded (no raised defences)	Fluvial
E	216m NW	Ea06junesummer2012	2012-06-12 2012-06-12	Main river	Channel capacity exceeded (no raised defences)	Fluvial
14	219m SE	06julysummer1987	1987-01-01 1987-12-12	Main river	Channel capacity exceeded (no raised defences)	Fluvial
D	238m NW	Ea06februarywinter2009	2009-02-09 2009-02-10	Main river	Channel capacity exceeded (no raised defences)	Fluvial
D	239m NW	06julysummer1987	1987-01-01 1987-12-12	Main river	Channel capacity exceeded (no raised defences)	Fluvial
D	241m NW	06septemberautumn1992	1992-01-01 1992-12-12	Main river	Channel capacity exceeded (no raised defences)	Fluvial
D	249m NW	Ea06januarywinter2011	2011-01-18 2011-01-18	Main river	Channel capacity exceeded (no raised defences)	Fluvial

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

### 7.3 Flood Defences

**Records within 250m**

**0**

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

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

### 7.4 Areas Benefiting from Flood Defences

**Records within 250m**

**0**

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

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



## 7.5 Flood Storage Areas

Records within 250m

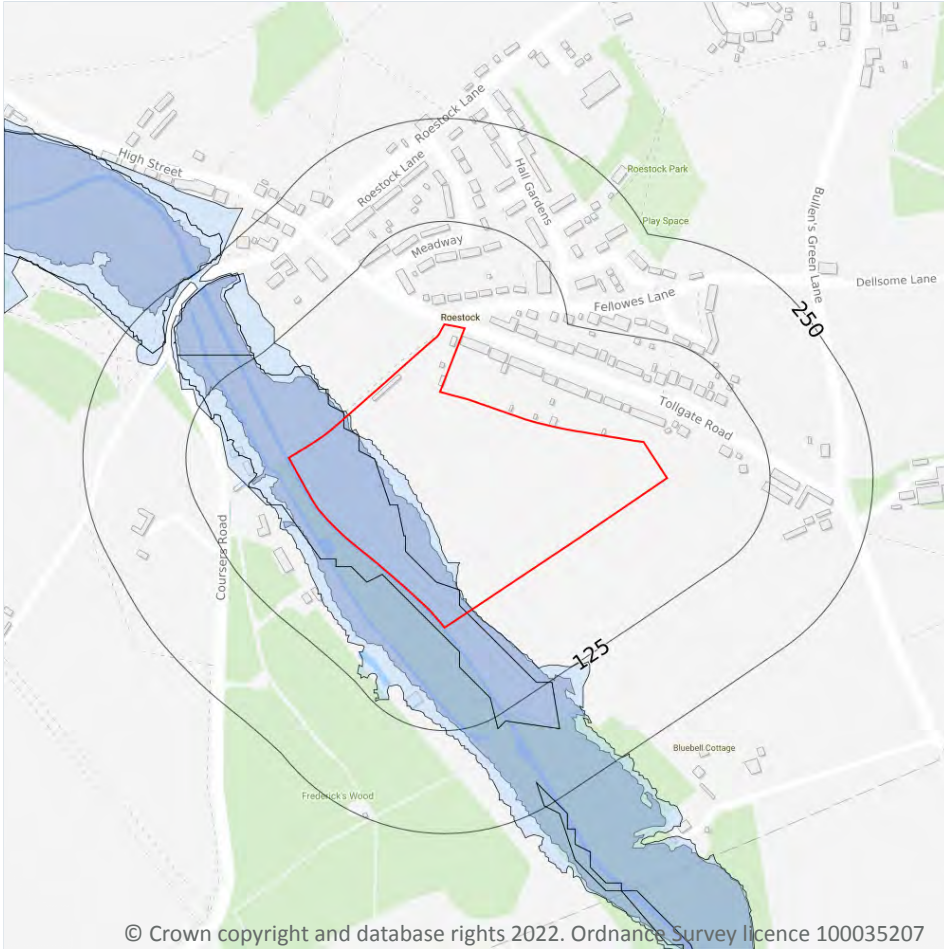
0

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

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



## River and coastal flooding - Flood Zones



- Site Outline
- Search buffers in metres (m)
- Flood zone 2
- Flood zone 3

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### 7.6 Flood Zone 2

Records within 50m

1

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

Features are displayed on the River and coastal flooding map on **page 53**

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

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

## 7.7 Flood Zone 3

Records within 50m

1

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

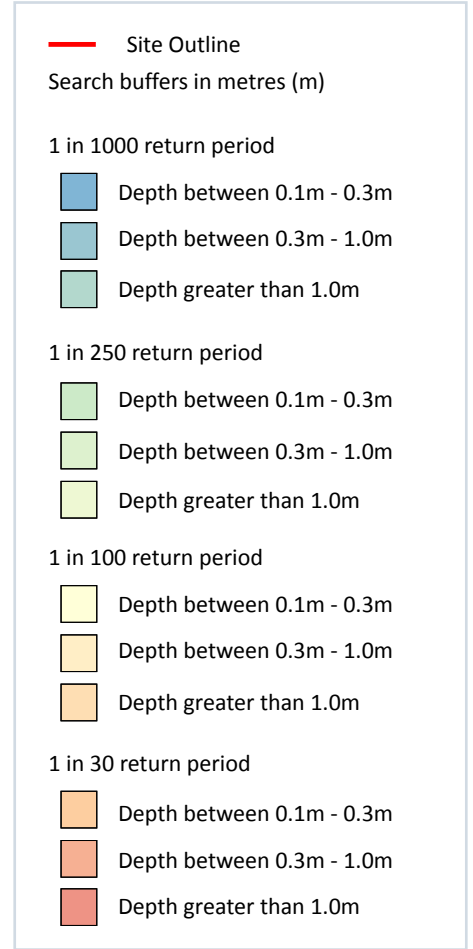
Features are displayed on the River and coastal flooding map on **page 53**

Location	Type
On site	Zone 3 - (Fluvial Models)

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



## 8 Surface water flooding



### 8.1 Surface water flooding

Highest risk on site

**1 in 30 year, Greater than 1.0m**

Highest risk within 50m

**1 in 30 year, Greater than 1.0m**

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

Features are displayed on the Surface water flooding map on **page 59**

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

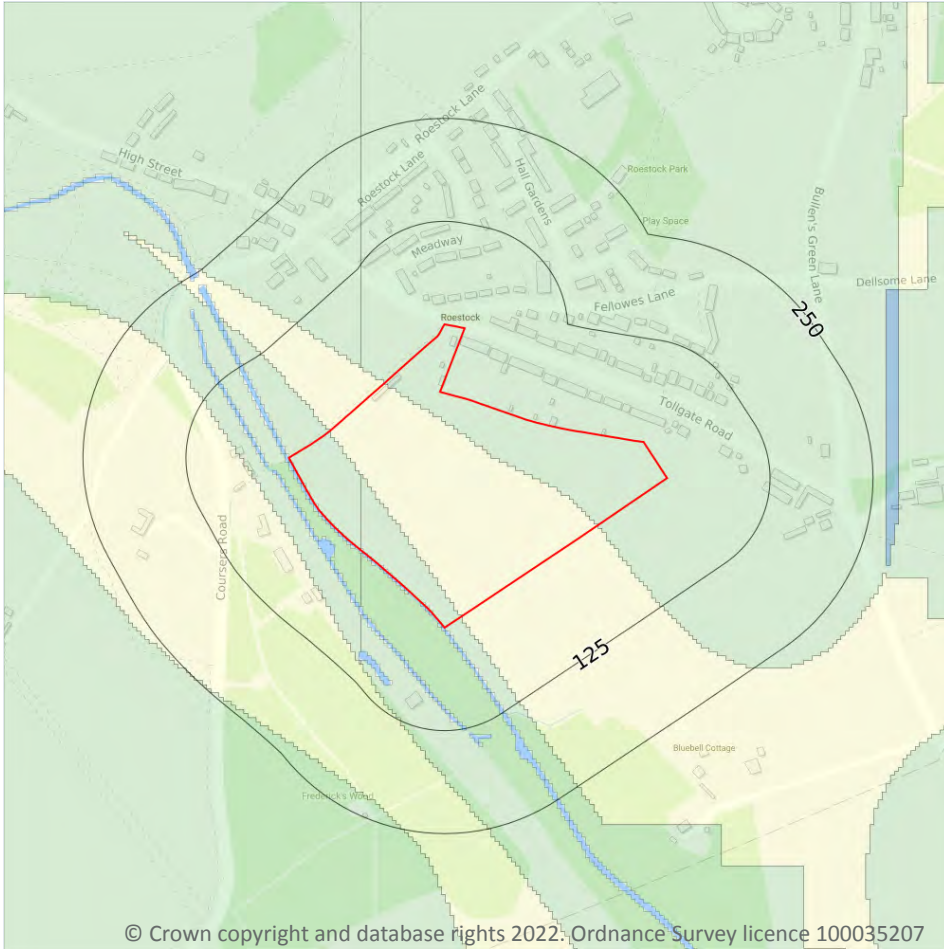
a site. The table below shows the maximum flood depths for a range of return periods for the site.

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

*This data is sourced from Ambiental Risk Analytics.*



## 9 Groundwater flooding



### 9.1 Groundwater flooding

**Highest risk on site**

**Moderate**

**Highest risk within 50m**

**Moderate**

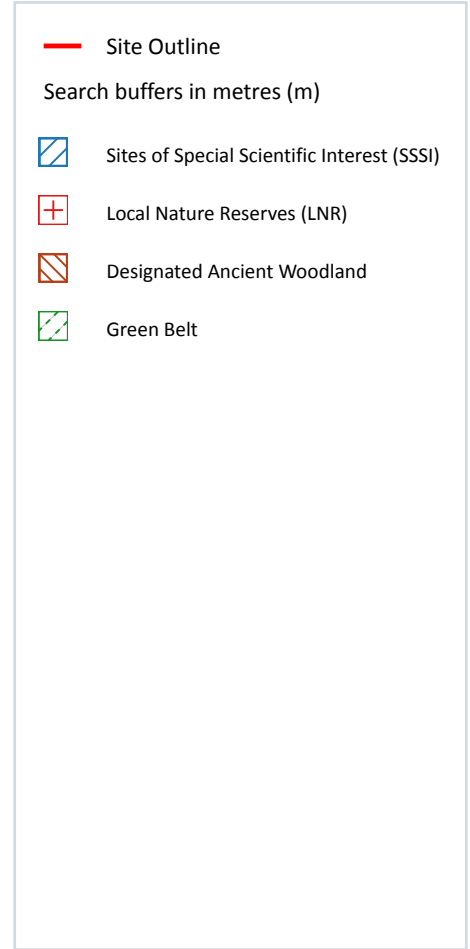
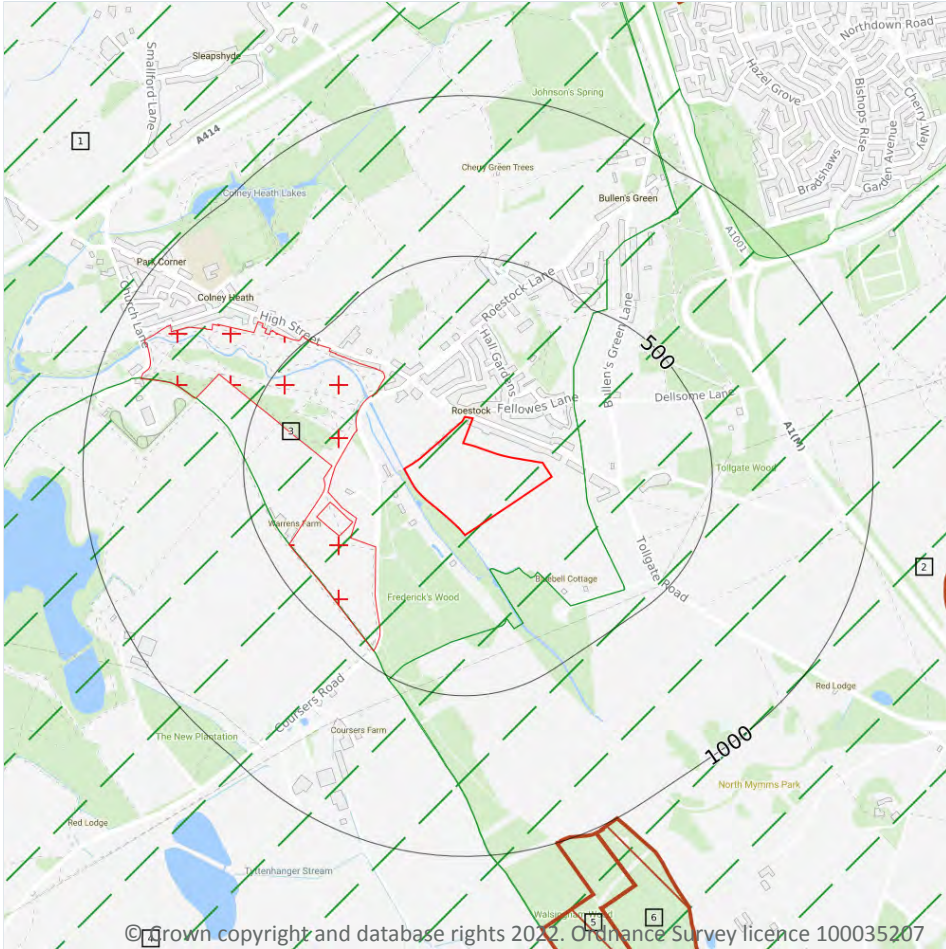
Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks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

Features are displayed on the Groundwater flooding map on **page 61**

*This data is sourced from Ambiantal Risk Analytics.*



## 10 Environmental designations



### 10.1 Sites of Special Scientific Interest (SSSI)

#### Records within 2000m

1

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

Features are displayed on the Environmental designations map on **page 62**

ID	Location	Name	Data source
-	1991m SE	Water End Swallow Holes	Natural England

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

## 10.2 Conserved wetland sites (Ramsar sites)

**Records within 2000m**

**0**

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

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

## 10.3 Special Areas of Conservation (SAC)

**Records within 2000m**

**0**

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

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

## 10.4 Special Protection Areas (SPA)

**Records within 2000m**

**0**

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

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

## 10.5 National Nature Reserves (NNR)

**Records within 2000m**

**0**

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

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



## 10.6 Local Nature Reserves (LNR)

### Records within 2000m

1

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

Features are displayed on the Environmental designations map on **page 62**

ID	Location	Name	Data source
3	189m NW	Colney Heath	Natural England

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

## 10.7 Designated Ancient Woodland

### Records within 2000m

7

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

Features are displayed on the Environmental designations map on **page 62**

ID	Location	Name	Woodland Type
5	995m S	Cobs Ash/cangsley Grove	Ancient Replanted Woodland
6	1001m SE	Cobs Ash/cangsley Grove	Ancient & Semi-Natural Woodland
7	1250m E	Bush Wood	Ancient & Semi-Natural Woodland
8	1445m NE	Hazel Grove	Ancient & Semi-Natural Woodland
-	1612m S	Cobs Ash/cangsley Grove	Ancient & Semi-Natural Woodland
-	1883m SE	Cobs Ash/cangsley Grove	Ancient & Semi-Natural Woodland
-	1902m SE	Cobs Ash/cangsley Grove	Ancient Replanted Woodland

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



## 10.8 Biosphere Reserves

Records within 2000m

0

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

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

## 10.9 Forest Parks

Records within 2000m

0

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

*This data is sourced from the Forestry Commission.*

## 10.10 Marine Conservation Zones

Records within 2000m

0

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

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

## 10.11 Green Belt

Records within 2000m

3

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

Features are displayed on the Environmental designations map on **page 62**

ID	Location	Name	Local Authority name
1	On site	London	St Albans
2	102m E	London	Welwyn Hatfield
4	412m SW	London	Hertsmere

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



## 10.12 Proposed Ramsar sites

Records within 2000m

0

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

*This data is sourced from Natural England.*

## 10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m

0

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

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

## 10.14 Potential Special Protection Areas (pSPA)

Records within 2000m

0

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

*This data is sourced from Natural England.*

## 10.15 Nitrate Sensitive Areas

Records within 2000m

0

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

*This data is sourced from Natural England.*



## 10.16 Nitrate Vulnerable Zones

Records within 2000m

2

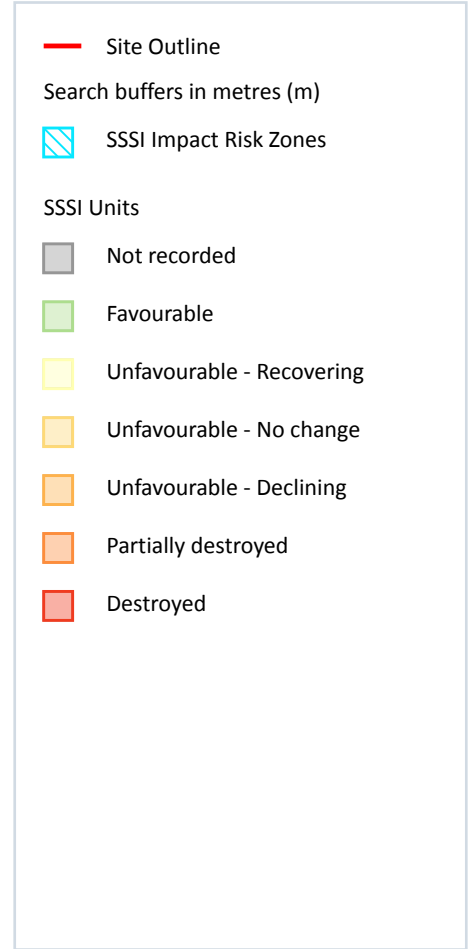
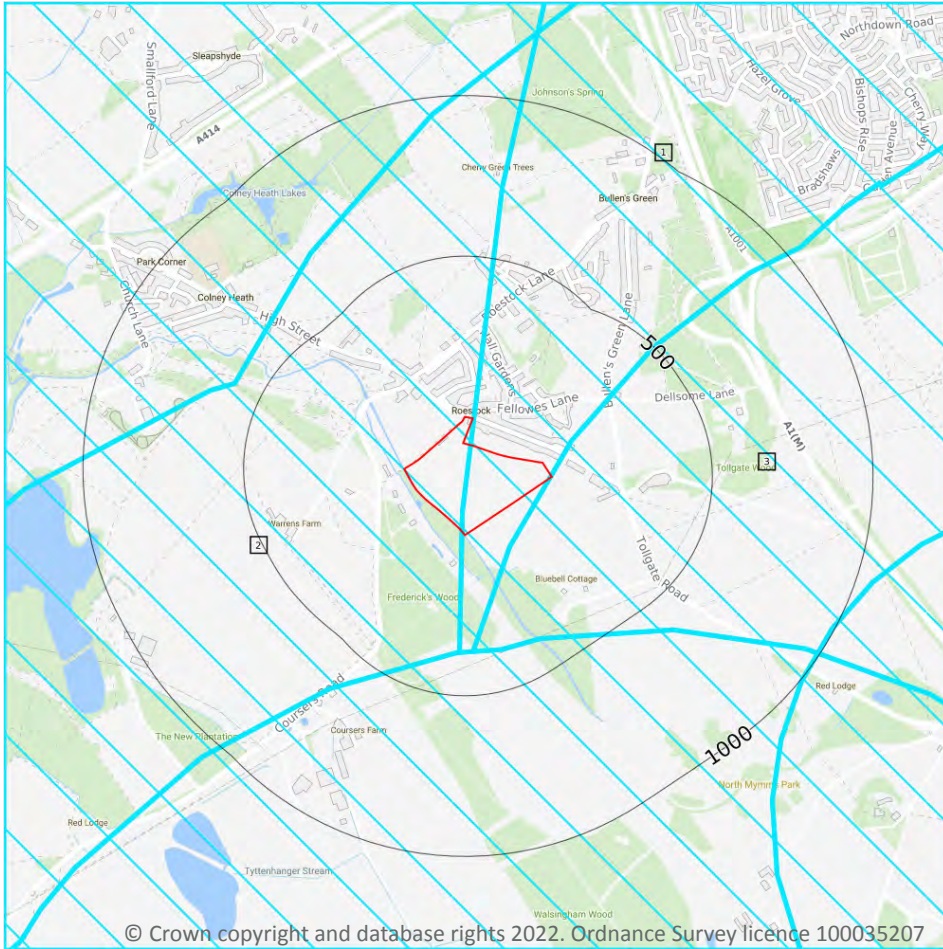
Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
239m S	North Mymms	Groundwater	92	Existing
1384m N	LEE NVZ	Surface Water	443	Existing

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



## SSSI Impact Zones and Units



### 10.17 SSSI Impact Risk Zones

Records on site

3

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

Features are displayed on the SSSI Impact Zones and Units map on **page 68**

ID	Location	Type of developments requiring consultation
1	On site	<p>Infrastructure - Airports, helipads and other aviation proposals.</p> <p>Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, review of minerals permissions (romp), extensions, variations to conditions etc. oil &amp; gas exploration/extraction.</p> <p>Air pollution - Livestock &amp; poultry units with floorspace &gt; 500m<sup>2</sup>, slurry lagoons &amp; digestate stores &gt; 750m<sup>2</sup>, manure stores &gt; 3500t.</p> <p>Combustion - General combustion processes &gt;50mw energy input. incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.</p>
2	On site	<p>Infrastructure - Airports, helipads and other aviation proposals.</p> <p>Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, review of minerals permissions (romp), extensions, variations to conditions etc. oil &amp; gas exploration/extraction.</p> <p>Air pollution - Livestock &amp; poultry units with floorspace &gt; 500m<sup>2</sup>, slurry lagoons &amp; digestate stores &gt; 750m<sup>2</sup>, manure stores &gt; 3500t.</p>
3	On site	<p>Infrastructure - Pipelines, pylons and overhead cables. any transport proposal including road, rail and by water (excluding routine maintenance). airports, helipads and other aviation proposals.</p> <p>Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, review of minerals permissions (romp), extensions, variations to conditions etc. oil &amp; gas exploration/extraction.</p> <p>Air pollution - Livestock &amp; poultry units with floorspace &gt; 500m<sup>2</sup>, slurry lagoons &amp; digestate stores &gt; 750m<sup>2</sup>, manure stores &gt; 3500t.</p> <p>Combustion - General combustion processes &gt;50mw energy input. incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.</p> <p>Waste - Landfill. incl: inert landfill, non-hazardous landfill, hazardous landfill.</p> <p>Water supply - Large infrastructure such as warehousing / industry where total net additional gross internal floorspace following development is 1,000m<sup>2</sup> or more.</p>

*This data is sourced from Natural England.*

## 10.18 SSSI Units

### Records within 2000m

1

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

Features are displayed on the SSSI Impact Zones and Units map on **page 68**

ID: -

Location: 1991m SE

SSSI name: Water End Swallow Holes

Unit name: Mimmshall Brook And Swallow Hole Basin

Broad habitat: Earth Heritage

Condition: Favourable

Reportable features:



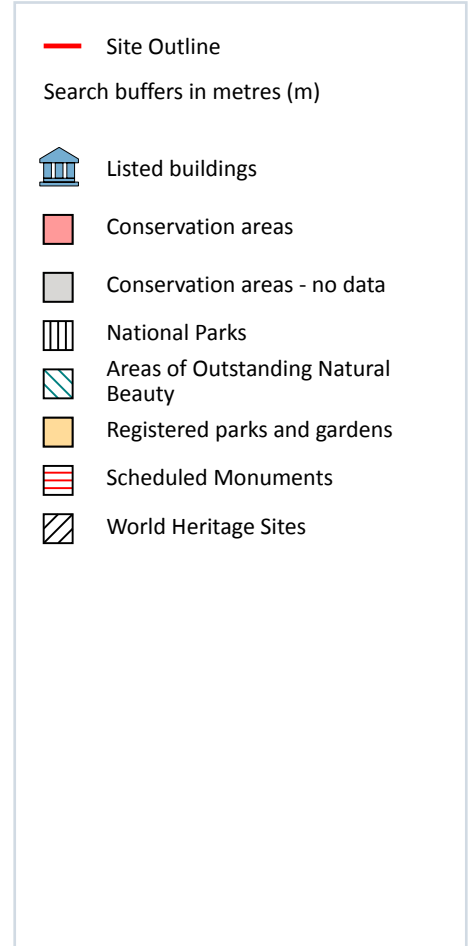


Feature name	Feature condition	Date of assessment
IA - Fluvial Geomorphology	Not Recorded	01/01/1900
IK - Karst	Not Recorded	01/01/1900

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



## 11 Visual and cultural designations



### 11.1 World Heritage Sites

Records within 250m

0

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

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

## 11.2 Area of Outstanding Natural Beauty

Records within 250m

0

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

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

## 11.3 National Parks

Records within 250m

0

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

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

## 11.4 Listed Buildings

Records within 250m

5

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

Features are displayed on the Visual and cultural designations map on **page 71**

ID	Location	Name	Grade	Reference Number	Listed date
A	184m NW	Colney Heath Farmhouse And Attached Barn, Colney Heath, St. Albans, Hertfordshire, AL4	II	1103019	27/09/1984
1	191m W	Mill At Mill House, Colney Heath, St. Albans, Hertfordshire, AL4	II	1296524	27/09/1984
A	194m NW	Barn On North Side Of Farmyard At Colney Heath Farm, Colney Heath, St. Albans, Hertfordshire, AL4	II	1103020	27/09/1984

ID	Location	Name	Grade	Reference Number	Listed date
A	209m NW	London Coal Duty Marker Adjoining South Corner Of Garden To Queens Head Public House, Colney Heath, St. Albans, Hertfordshire, AL4	II	1103021	27/09/1984
A	217m NW	Queen's Head Public House, Colney Heath, St. Albans, Hertfordshire, AL4	II	1172848	27/09/1984

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

## 11.5 Conservation Areas

**Records within 250m**

**0**

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

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

## 11.6 Scheduled Ancient Monuments

**Records within 250m**

**0**

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

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

## 11.7 Registered Parks and Gardens

**Records within 250m**

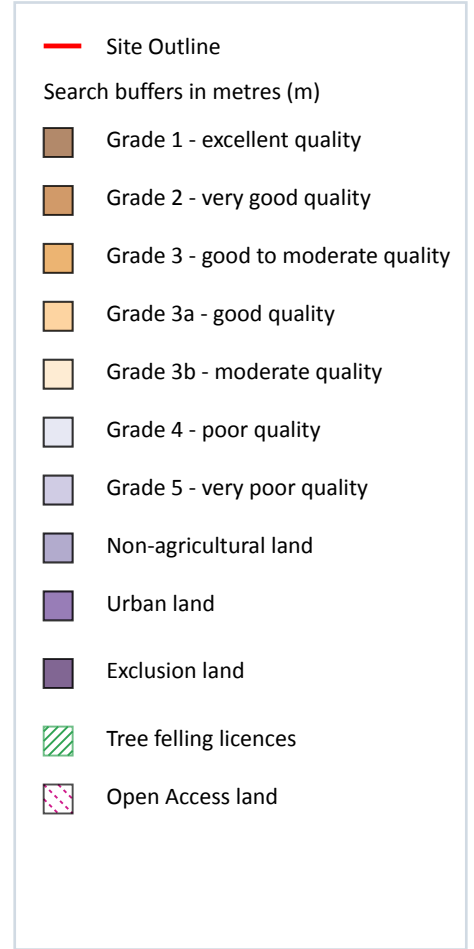
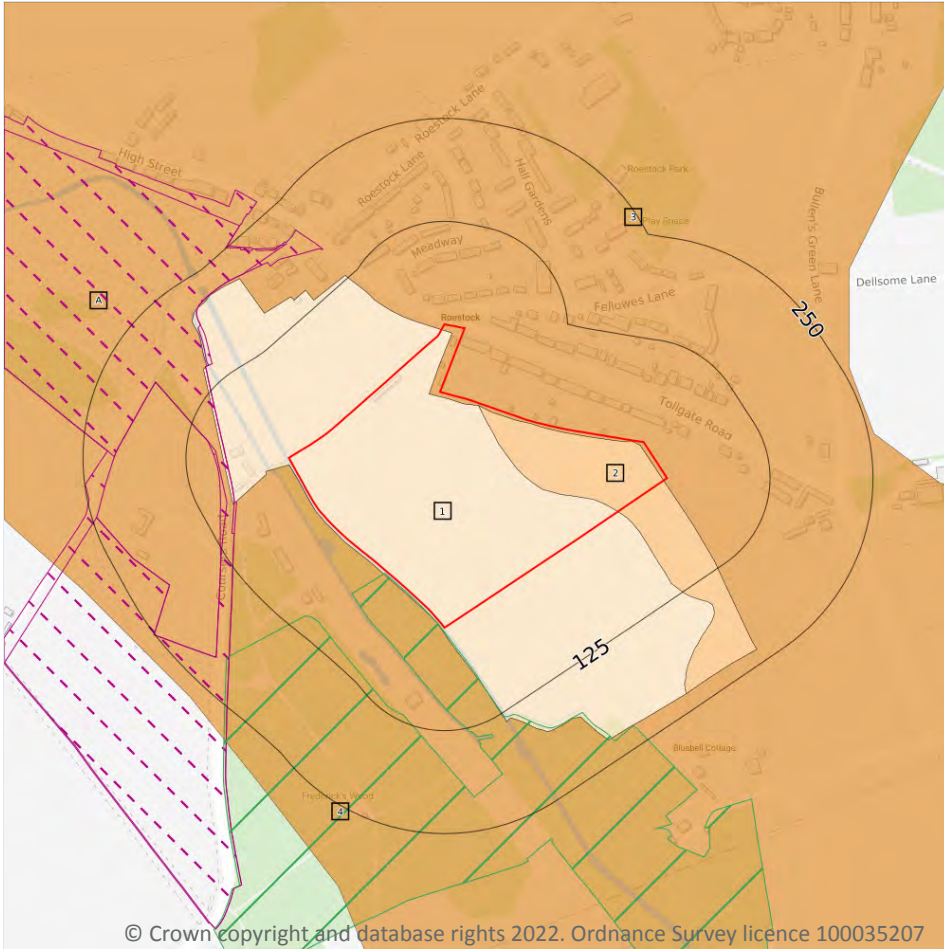
**0**

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

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



## 12 Agricultural designations



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### 12.1 Agricultural Land Classification

Records within 250m

3

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

Features are displayed on the Agricultural designations map on **page 74**

ID	Location	Classification	Description
1	On site	Grade 3b	Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

ID	Location	Classification	Description
2	On site	Grade 3a	Good quality agricultural land. Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.
3	On site	Grade 3	Good to moderate quality agricultural land. Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

This data is sourced from Natural England.

## 12.2 Open Access Land

Records within 250m

2

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

Features are displayed on the Agricultural designations map on **page 74**

ID	Location	Name	Classification	Other relevant legislation
A	75m W	Colney Heath Common	Section 4 Conclusive Registered Common Land	-
A	75m W	Colney Heath Common	Section 15 Land	S.193 - I deed

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

## 12.3 Tree Felling Licences

Records within 250m

1

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

Features are displayed on the Agricultural designations map on **page 74**

ID	Location	Description	Reference	Application date
4	3m SW	Selective Fell/Thin (Unconditional)	017/461/13-14	26/02/2014

This data is sourced from the Forestry Commission.



## 12.4 Environmental Stewardship Schemes

Records within 250m

5

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

Location	Reference	Scheme	Start Date	End date
189m SW	AG00449688	Entry Level plus Higher Level Stewardship	01/10/2013	30/09/2023
199m N	AG00518772	Entry Level Stewardship	01/12/2013	30/11/2018
201m NW	AG00449688	Entry Level plus Higher Level Stewardship	01/10/2013	30/09/2023
216m NE	AG00518772	Entry Level Stewardship	01/12/2013	30/11/2018
242m NW	AG00449688	Entry Level plus Higher Level Stewardship	01/10/2013	30/09/2023

*This data is sourced from Natural England.*

## 12.5 Countryside Stewardship Schemes

Records within 250m

2

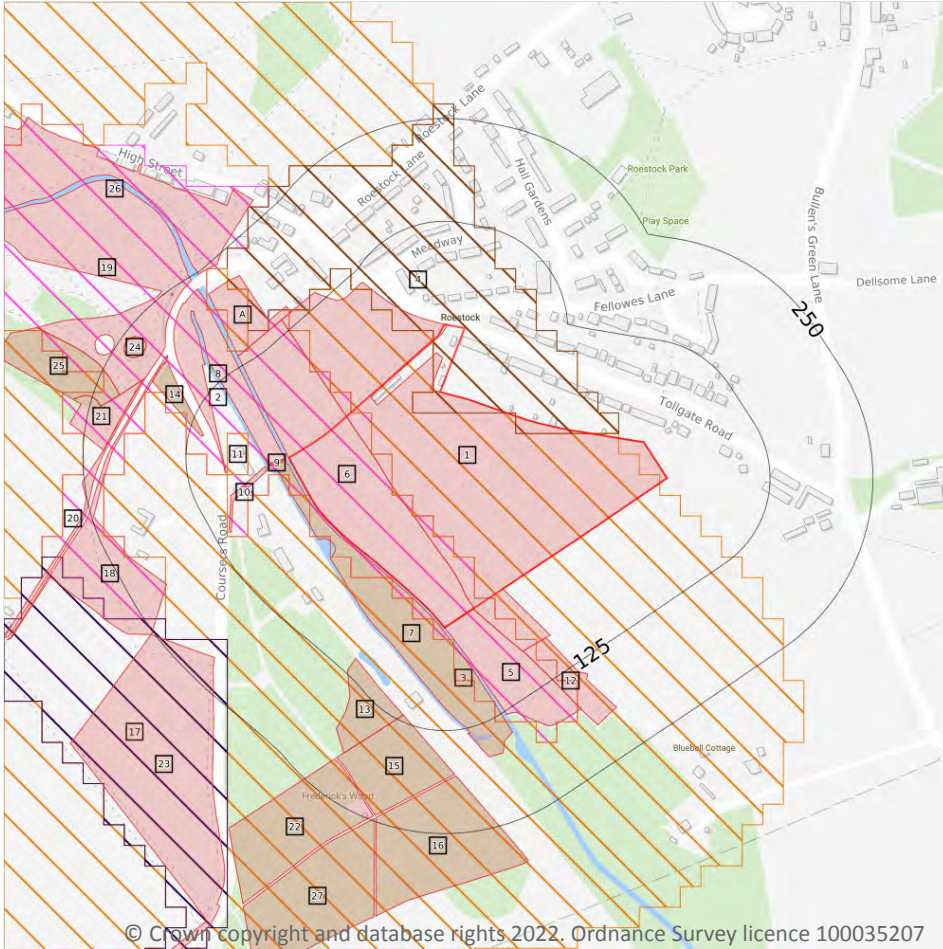
Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

Location	Reference	Scheme	Start Date	End Date
199m N	1064459	Countryside Stewardship (Middle Tier)	01/01/2021	31/12/2025
216m NE	1064459	Countryside Stewardship (Middle Tier)	01/01/2021	31/12/2025

*This data is sourced from Natural England.*



## 13 Habitat designations



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

### 13.1 Priority Habitat Inventory

Records within 250m

23

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

Features are displayed on the Habitat designations map on **page 77**

ID	Location	Main Habitat	Other habitats
1	On site	Coastal and floodplain grazing marsh	Main habitat: CFBGM (INV > 50%)
5	On site	Good quality semi-improved grassland	Main habitat: CFBGM (INV > 50%); GQSIG (INV > 50%)



ID	Location	Main Habitat	Other habitats
6	On site	Good quality semi-improved grassland	Main habitat: CFPGM (INV > 50%); GQSIG (INV > 50%)
7	3m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
8	5m W	Good quality semi-improved grassland	Main habitat: GQSIG (INV > 50%)
9	5m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%); GQSIG (INV > 50%)
10	30m SW	Good quality semi-improved grassland	Main habitat: GQSIG (INV > 50%)
12	76m SE	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
13	104m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
14	107m W	Good quality semi-improved grassland	Main habitat: GQSIG (INV > 50%)
15	117m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	138m NW	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
16	181m S	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
18	189m NW	Good quality semi-improved grassland	Main habitat: GQSIG (INV > 50%); LDAGR (FEP + HLS); Additional: LHEAT (FEP 50%)
19	199m NW	Good quality semi-improved grassland	Main habitat: GQSIG (INV > 50%); LMEAD (FEP + HLS); Additional: LDAGR (FEP 50%)
20	199m NW	Good quality semi-improved grassland	Main habitat: GQSIG (INV > 50%)
21	201m NW	Good quality semi-improved grassland	Main habitat: GQSIG (INV > 50%); LMEAD (FEP + HLS); Additional: LDAGR (FEP 50%)
22	208m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
23	215m SW	Lowland heathland	Main habitat: LHEAT (INV > 50%); GQSIG (INV > 50%); LDAGR (FEP + HLS)
24	218m NW	Good quality semi-improved grassland	Main habitat: GQSIG (INV > 50%); LMEAD (FEP + HLS); Additional: LDAGR (FEP 50%)
25	219m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%); GQSIG (INV > 50%); LMEAD (FEP + HLS); Additional: LDAGR (FEP 50%)
26	242m NW	Good quality semi-improved grassland	Main habitat: GQSIG (INV > 50%)
27	247m S	Deciduous woodland	Main habitat: DWOOD (INV > 50%)



*This data is sourced from Natural England.*

## 13.2 Habitat Networks

**Records within 250m**

**6**

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

Features are displayed on the Habitat designations map on **page 77**

ID	Location	Type	Habitat
2	On site	Associated Habitats	Other associated habitats
3	On site	Network Enhancement Zone 1	Not specified
4	On site	Network Enhancement Zone 2	Not specified
11	50m W	Network Enhancement Zone 1	Not specified
A	137m NW	Network Enhancement Zone 1	Not specified
17	189m SW	Primary Habitat	Lowland heathland

*This data is sourced from Natural England.*

## 13.3 Open Mosaic Habitat

**Records within 250m**

**0**

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

*This data is sourced from Natural England.*

## 13.4 Limestone Pavement Orders

**Records within 250m**

**0**

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

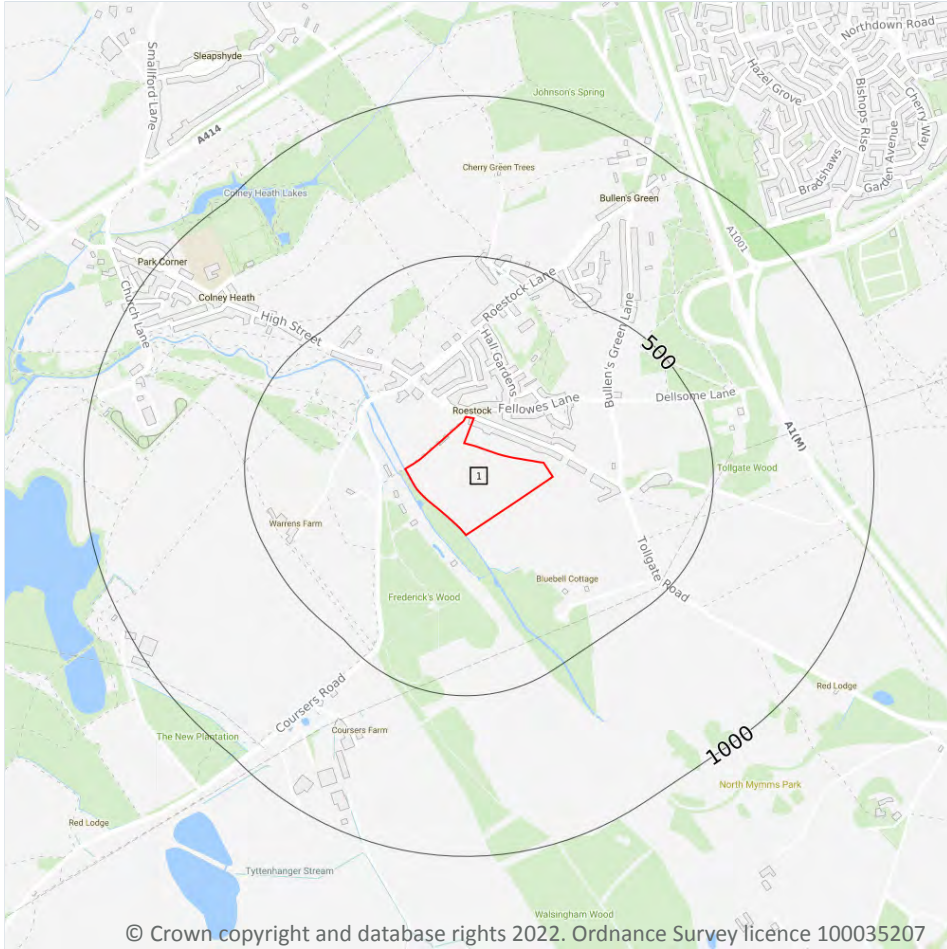


the UK Biodiversity Action Plan priority habitat in England.

*This data is sourced from Natural England.*



## 14 Geology 1:10,000 scale - Availability



**Site Outline**

Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

### 14.1 10k Availability

**Records within 500m**

**1**

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme. Features are displayed on the Geology 1:10,000 scale - Availability map on **page 81**

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

*This data is sourced from the British Geological Survey.*

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

### 14.2 Artificial and made ground (10k)

Records within 500m

0

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

*This data is sourced from the British Geological Survey.*



## Geology 1:10,000 scale - Superficial

### 14.3 Superficial geology (10k)

Records within 500m

0

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

*This data is sourced from the British Geological Survey.*

### 14.4 Landslip (10k)

Records within 500m

0

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

*This data is sourced from the British Geological Survey.*



## Geology 1:10,000 scale - Bedrock

### 14.5 Bedrock geology (10k)

Records within 500m

0

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

*This data is sourced from the British Geological Survey.*

### 14.6 Bedrock faults and other linear features (10k)

Records within 500m

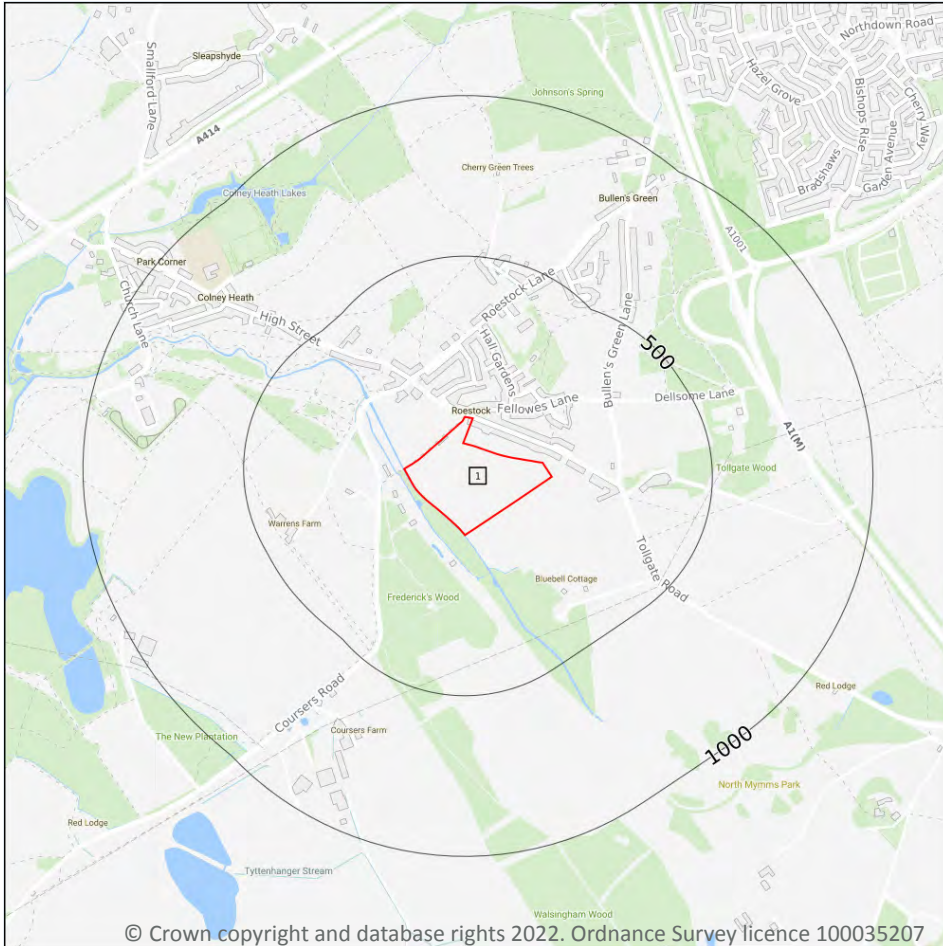
0

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

*This data is sourced from the British Geological Survey.*



## 15 Geology 1:50,000 scale - Availability



- Site Outline
- Search buffers in metres (m)
- Geological map tile

### 15.1 50k Availability

Records within 500m

1

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

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 85**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	Full	Full	No coverage	EW239_hertford_v4

*This data is sourced from the British Geological Survey.*





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

### 15.2 Artificial and made ground (50k)

Records within 500m

0

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

*This data is sourced from the British Geological Survey.*

### 15.3 Artificial ground permeability (50k)

Records within 50m

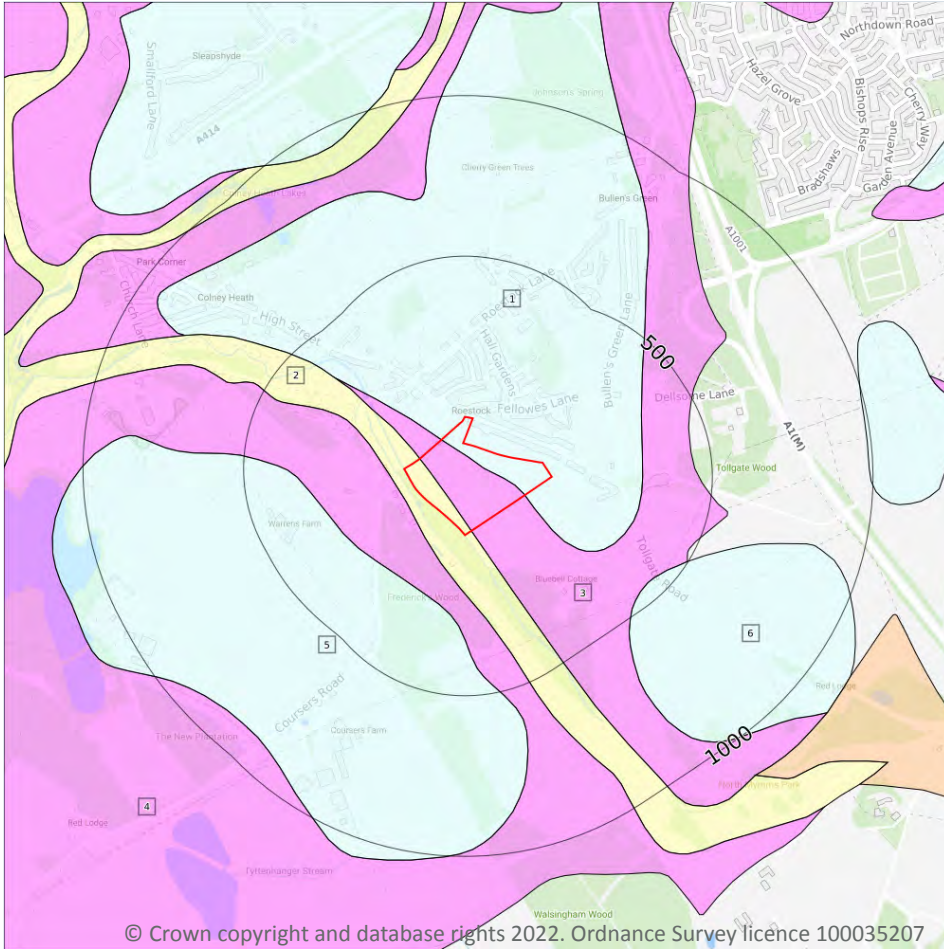
0

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

*This data is sourced from the British Geological Survey.*



## Geology 1:50,000 scale - Superficial



- Site Outline
- Search buffers in metres (m)
- Landslip (50k)
- Superficial geology (50k)  
Please see table for more details.

### 15.4 Superficial geology (50k)

Records within 500m

6

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

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 87**

ID	Location	LEX Code	Description	Rock description
1	On site	LOFT-DMTN	LOWESTOFT FORMATION	DIAMICTON
2	On site	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
3	On site	KGCA-XSV	KESGRAVE CATCHMENT SUBGROUP	SAND AND GRAVEL
4	46m SW	KGCA-XSV	KESGRAVE CATCHMENT SUBGROUP	SAND AND GRAVEL



ID	Location	LEX Code	Description	Rock description
5	222m SW	LOFT-DMTN	LOWESTOFT FORMATION	DIAMICTON
6	445m SE	LOFT-DMTN	LOWESTOFT FORMATION	DIAMICTON

*This data is sourced from the British Geological Survey.*

## 15.5 Superficial permeability (50k)

**Records within 50m**

**4**

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

Location	Flow type	Maximum permeability	Minimum permeability
<b>On site</b>	<b>Intergranular</b>	<b>High</b>	<b>Very Low</b>
<b>On site</b>	<b>Mixed</b>	<b>Moderate</b>	<b>Low</b>
<b>On site</b>	<b>Intergranular</b>	<b>Very High</b>	<b>High</b>
46m W	Intergranular	Very High	High

*This data is sourced from the British Geological Survey.*

## 15.6 Landslip (50k)

**Records within 500m**

**0**

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

*This data is sourced from the British Geological Survey.*

## 15.7 Landslip permeability (50k)

**Records within 50m**

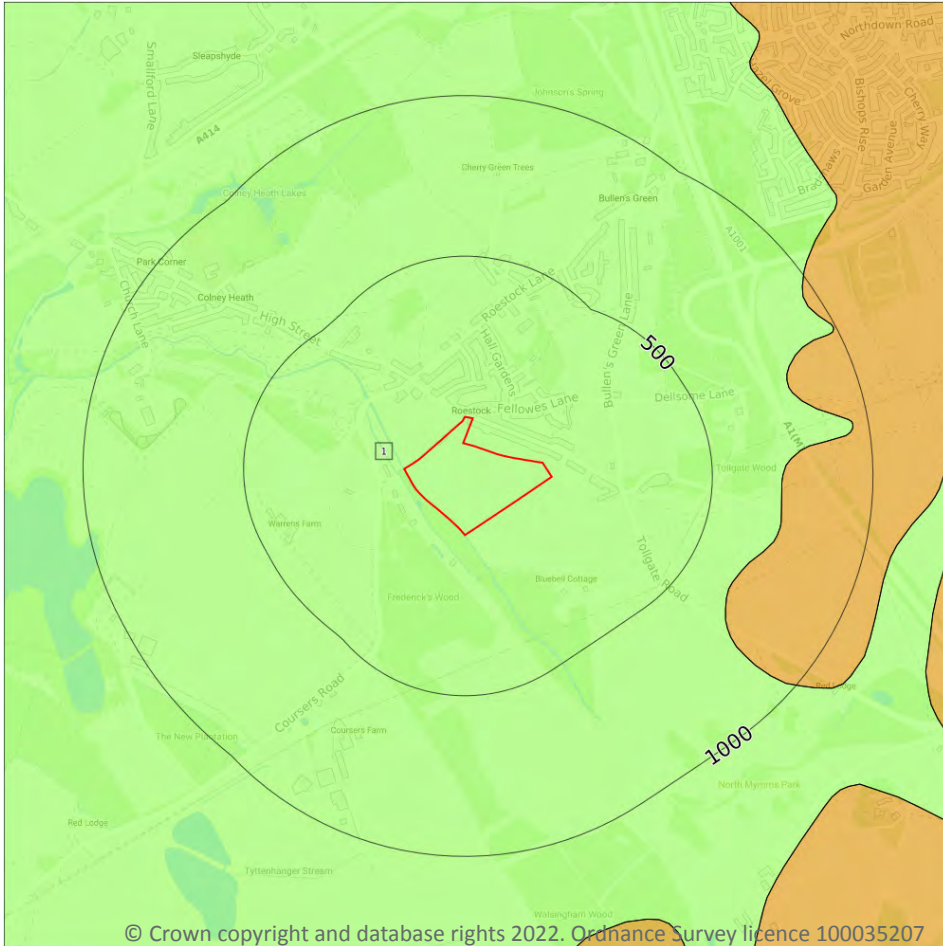
**0**

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

*This data is sourced from the British Geological Survey.*



## Geology 1:50,000 scale - Bedrock



**— Site Outline**

Search buffers in metres (m)

**..... Bedrock faults and other linear features (50k)**

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

### 15.8 Bedrock geology (50k)

**Records within 500m** **1**

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 89**

ID	Location	LEX Code	Description	Rock age
1	On site	LESE-CHLK	LEWES NODULAR CHALK FORMATION AND SEAFORD CHALK FORMATION (UNDIFFERENTIATED) - CHALK	TURONIAN

*This data is sourced from the British Geological Survey.*

## 15.9 Bedrock permeability (50k)

<b>Records within 50m</b>	<b>1</b>
---------------------------	----------

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

Location	Flow type	Maximum permeability	Minimum permeability
On site	Fracture	Very High	Very High

*This data is sourced from the British Geological Survey.*

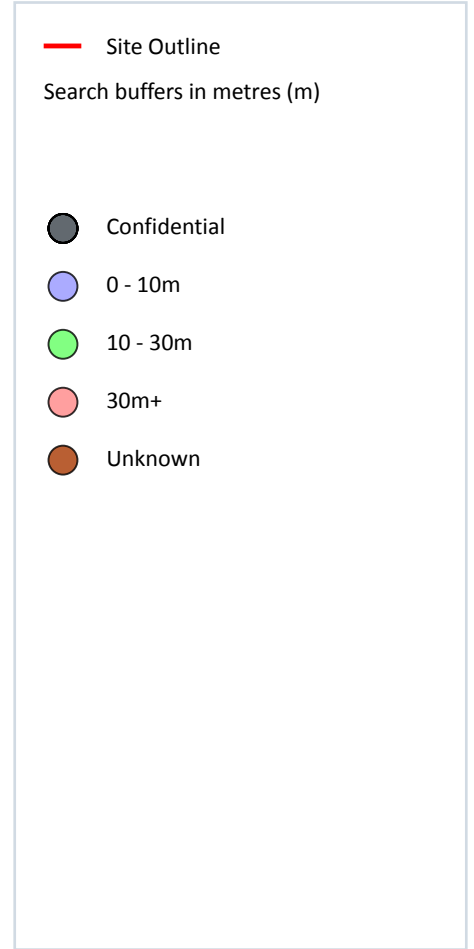
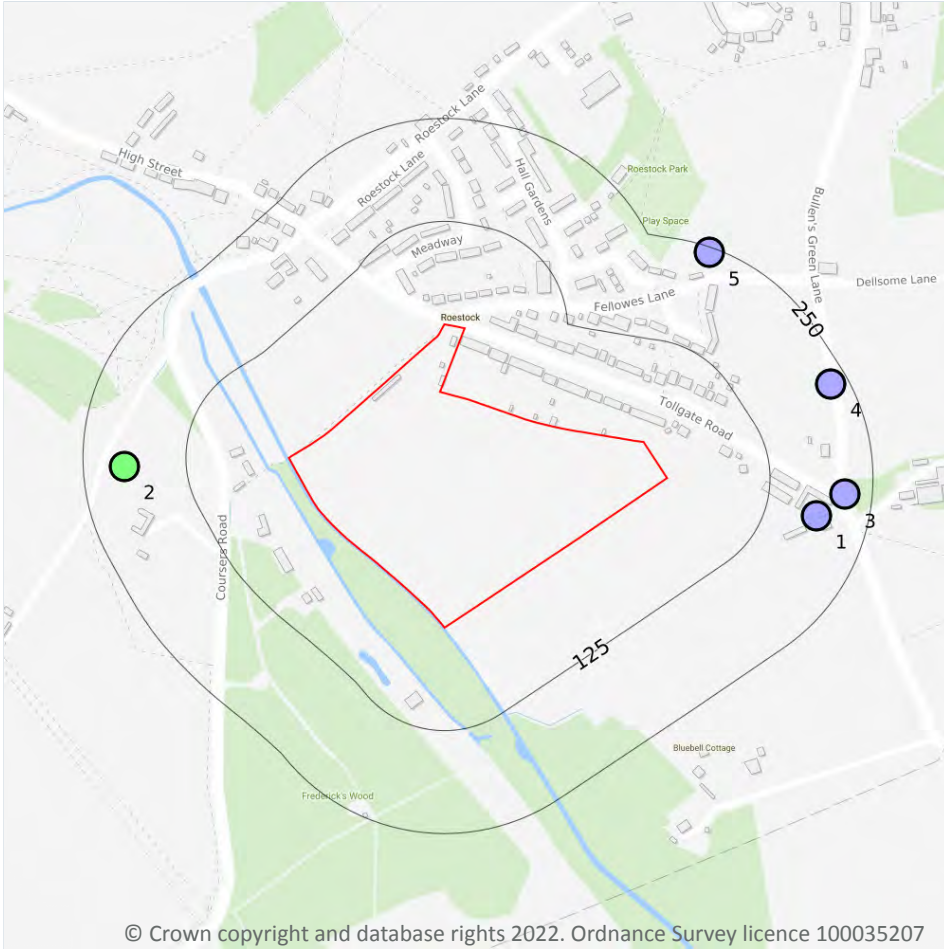
## 15.10 Bedrock faults and other linear features (50k)

<b>Records within 500m</b>	<b>0</b>
----------------------------	----------

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

*This data is sourced from the British Geological Survey.*

## 16 Boreholes



### 16.1 BGS Boreholes

#### Records within 250m

5

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

Features are displayed on the Boreholes map on **page 91**

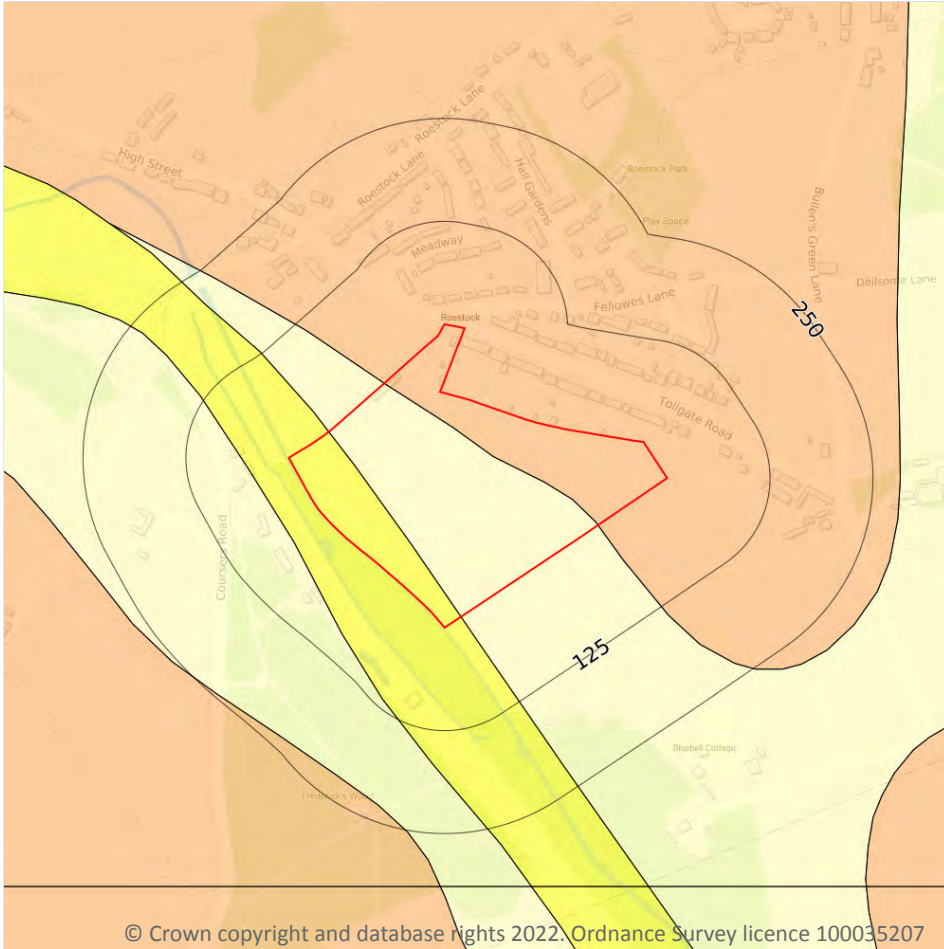
ID	Location	Grid reference	Name	Length	Confidential	Web link
1	187m E	521290 205450	TOLLGATE FARM	-2.0	N	<a href="#">532694</a>
2	200m W	520450 205510	COLNEY HEATH MILL COLNEY HEATH	21.0	N	<a href="#">532468</a>

ID	Location	Grid reference	Name	Length	Confidential	Web link
3	217m E	521325 205476	A1 ROESTOCK TO STANBOROUGH TP A1	1.55	N	<a href="#">532495</a>
4	230m NE	521308 205610	A1 ROESTOCK - STANBOROUGH S1	3.0	N	<a href="#">18058834</a>
5	244m N	521160 205770	TOLLGATE FARM	-2.0	N	<a href="#">532700</a>

*This data is sourced from the British Geological Survey.*



## 17 Natural ground subsidence - Shrink swell clays



### 17.1 Shrink swell clays

#### Records within 50m

4

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

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 93**

Location	Hazard rating	Details
On site	Negligible	Ground conditions predominantly non-plastic.
On site	Very low	Ground conditions predominantly low plasticity.
On site	Low	Ground conditions predominantly medium plasticity.

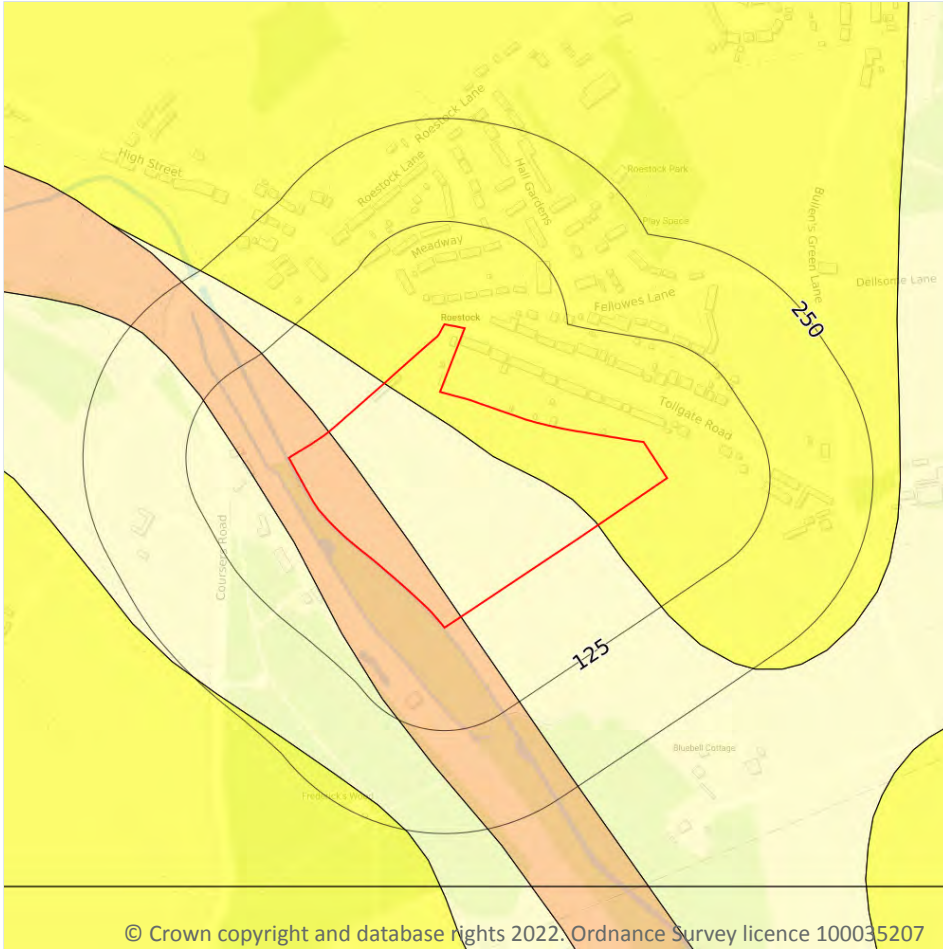


Location	Hazard rating	Details
46m SW	Negligible	Ground conditions predominantly non-plastic.

*This data is sourced from the British Geological Survey.*



## Natural ground subsidence - Running sands



### 17.2 Running sands

#### Records within 50m

4

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

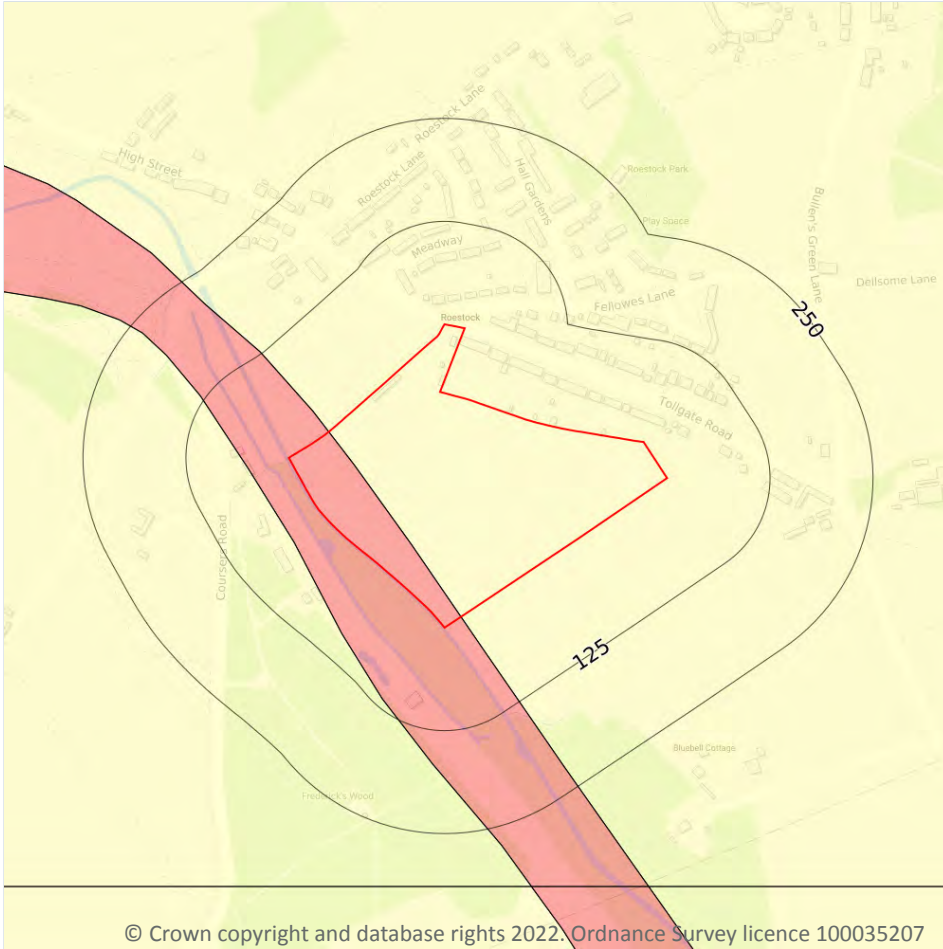
Features are displayed on the Natural ground subsidence - Running sands map on **page 95**

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

Location	Hazard rating	Details
On site	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.
On site	Low	Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.
46m SW	Negligible	Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.

*This data is sourced from the British Geological Survey.*

## Natural ground subsidence - Compressible deposits



### 17.3 Compressible deposits

Records within 50m

3

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

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 97**

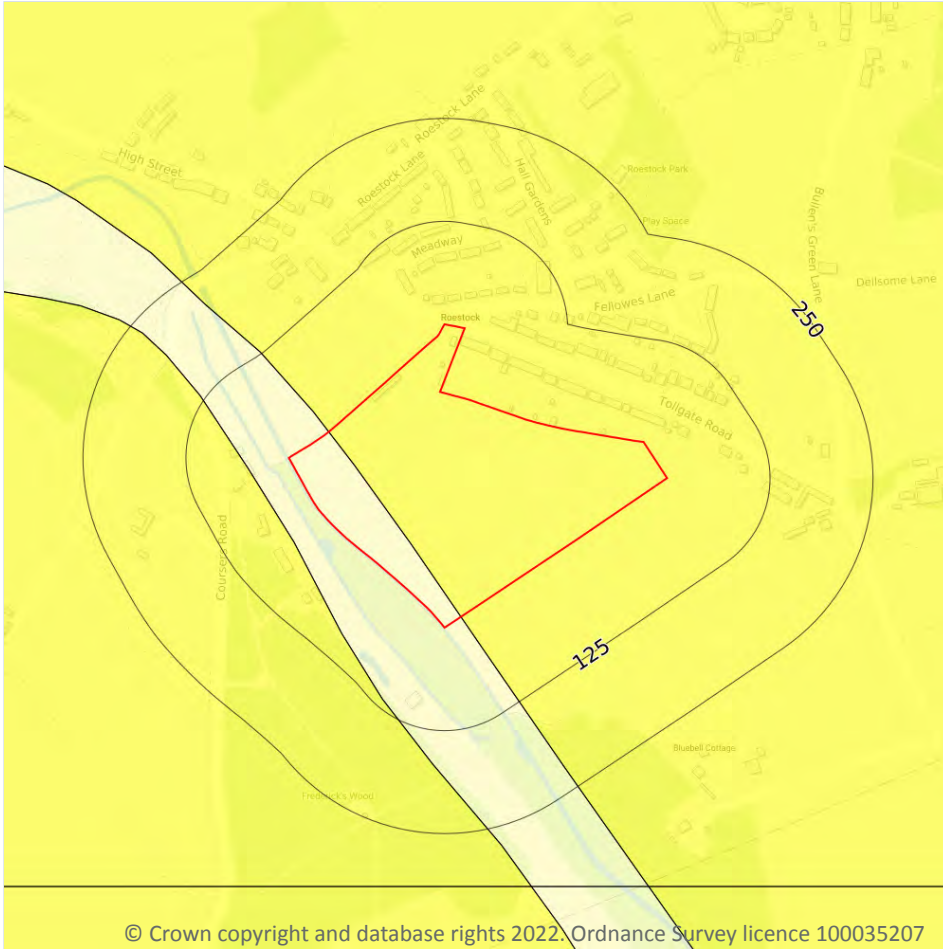
Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.
On site	Moderate	Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.

Location	Hazard rating	Details
46m SW	Negligible	Compressible strata are not thought to occur.

*This data is sourced from the British Geological Survey.*



## Natural ground subsidence - Collapsible deposits



### 17.4 Collapsible deposits

Records within 50m

3

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

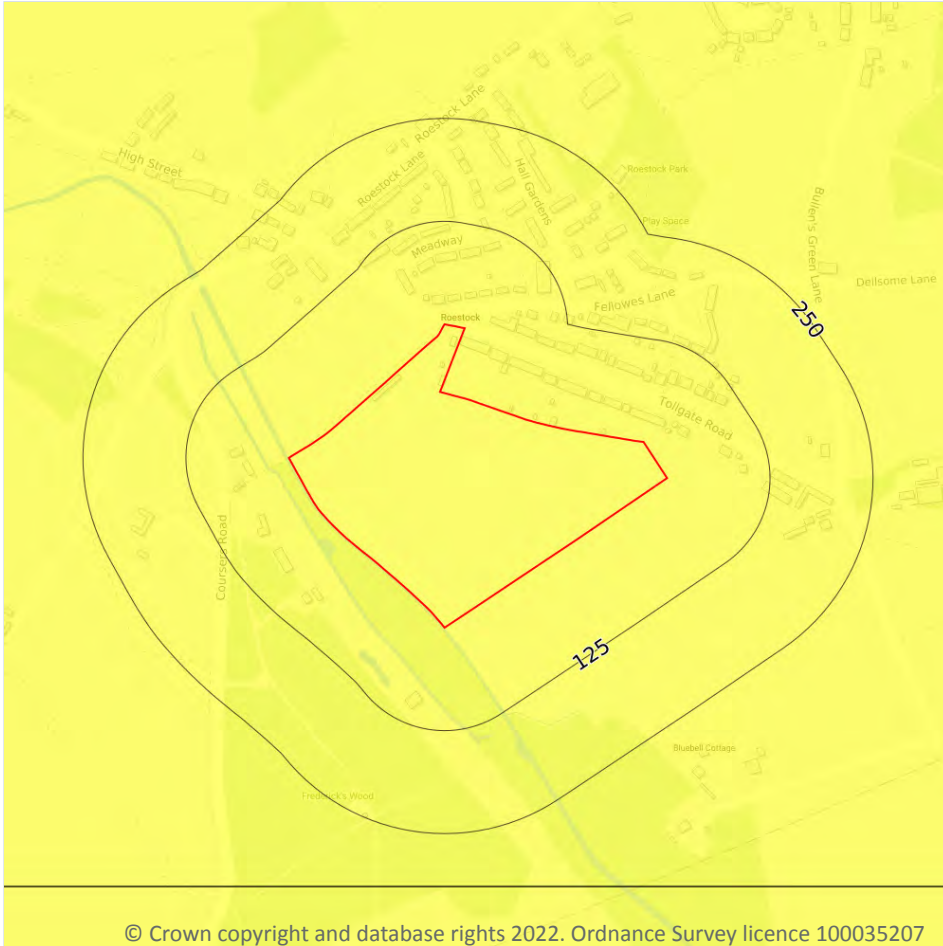
Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 99**

Location	Hazard rating	Details
On site	Negligible	Deposits with potential to collapse when loaded and saturated are believed not to be present.
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.
46m SW	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

*This data is sourced from the British Geological Survey.*



## Natural ground subsidence - Landslides



### 17.5 Landslides

#### Records within 50m

1

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

Features are displayed on the Natural ground subsidence - Landslides map on **page 101**

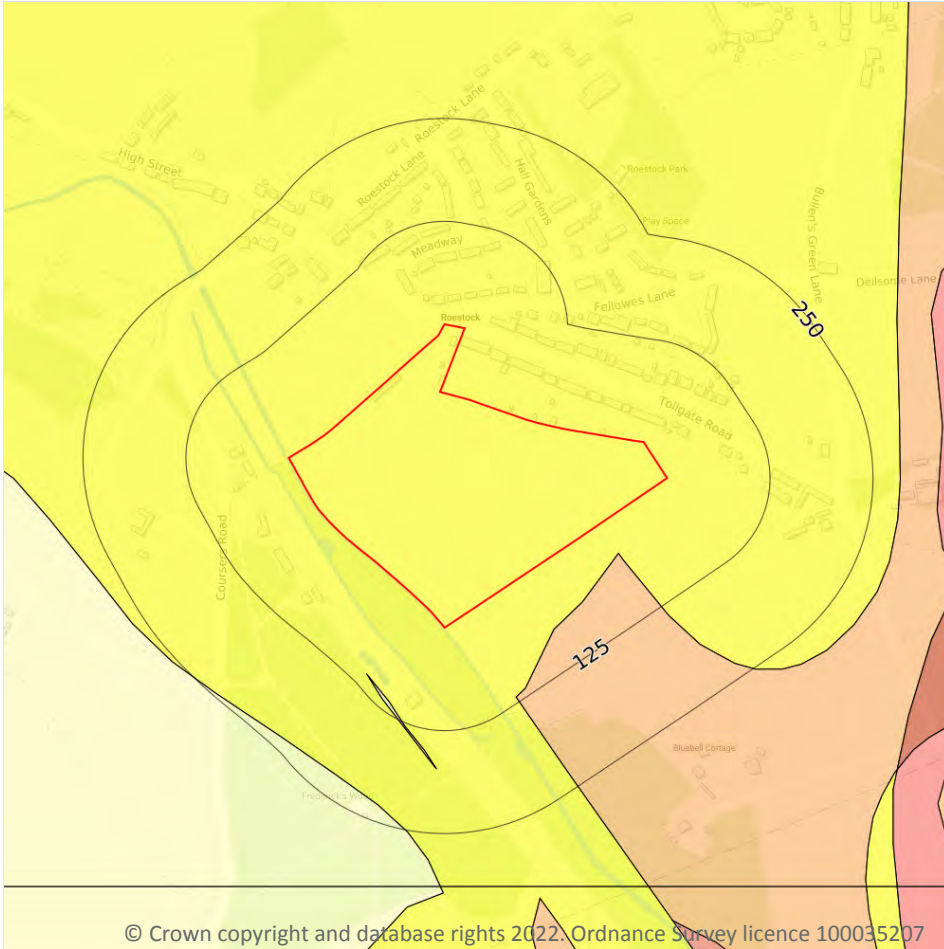
Location	Hazard rating	Details
On site	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

*This data is sourced from the British Geological Survey.*





## Natural ground subsidence - Ground dissolution of soluble rocks



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### 17.6 Ground dissolution of soluble rocks

Records within 50m

2

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

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 102**

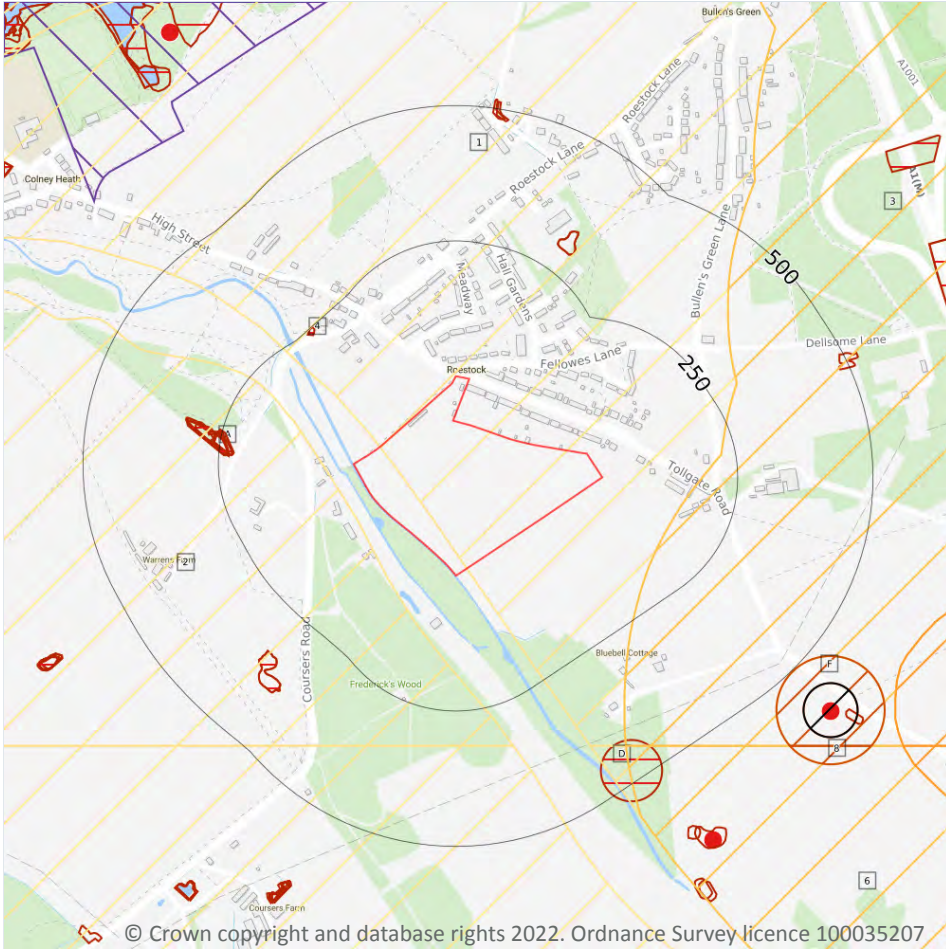
Location	Hazard rating	Details
On site	Very low	Soluble rocks are present within the ground. Few dissolution features are likely to be present. Potential for difficult ground conditions or localised subsidence are at a level where they need not be considered.

Location	Hazard rating	Details
42m SE	Low	Soluble rocks are present within the ground. Some dissolution features may be present. Potential for difficult ground conditions are at a level where they may be considered, localised subsidence need not be considered except in exceptional circumstances.

*This data is sourced from the British Geological Survey.*



## 18 Mining, ground workings and natural cavities



### 18.1 Natural cavities

Records within 500m

0

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

*This data is sourced from Stantec UK Ltd.*

## 18.2 BritPits

Records within 500m

0

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

*This data is sourced from the British Geological Survey.*

## 18.3 Surface ground workings

Records within 250m

9

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

Features are displayed on the Mining, ground workings and natural cavities map on **page 104**

ID	Location	Land Use	Year of mapping	Mapping scale
A	223m W	Unspecified Pit	1938	1:10560
A	223m W	Unspecified Pit	1937	1:10560
A	226m W	Unspecified Pit	1971	1:10560
A	231m W	Unspecified Pit	1879	1:10560
A	232m W	Unspecified Pit	1922	1:10560
A	232m W	Unspecified Pit	1896	1:10560
A	235m W	Unspecified Pit	1938	1:10560
A	235m W	Unspecified Pit	1938	1:10560
4	237m NW	Unspecified Pit	1879	1:10560

*This data is sourced from Ordnance Survey/Groundsure.*

## 18.4 Underground workings

Records within 1000m

0

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

*This data is sourced from Ordnance Survey/Groundsure.*



## 18.5 Historical Mineral Planning Areas

Records within 500m

0

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

*This data is sourced from the British Geological Survey.*

## 18.6 Non-coal mining

Records within 1000m

16

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

Features are displayed on the Mining, ground workings and natural cavities map on **page 104**

ID	Location	Name	Commodity	Class	Likelihood
1	On site	Not available	Chalk	A	<b>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</b>
2	46m SW	Not available	Chalk	A	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
3	152m SE	Not available	Chalk	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
5	314m S	Not available	Chalk	A	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
D	399m SE	Not available	Chalk	A	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
6	436m SE	Not available	Chalk	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered



ID	Location	Name	Commodity	Class	Likelihood
F	502m SE	Not available	Chalk	D	Underground mining is known or considered likely to have occurred within or close to the area. Potential for difficult ground conditions are at a level where they should be considered
F	552m SE	Not available	Chalk	E	Underground mining is known to have occurred within or very close to the area. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered
8	605m SE	Not available	Chalk	D	Underground mining is known or considered likely to have occurred within or close to the area. Potential for difficult ground conditions are at a level where they should be considered
-	650m W	Not available	Chalk	A	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
10	652m SE	Not available	Chalk	C	Small scale underground mining may have occurred; mine adits, shafts and tunnels may be present. Potential for localised difficult ground conditions are at a level where they should be considered
12	745m SE	Not available	Chalk	C	Small scale underground mining may have occurred; mine adits, shafts and tunnels may be present. Potential for localised difficult ground conditions are at a level where they should be considered
-	772m NW	Not available	Chalk	A	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
-	803m S	Not available	Chalk	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
-	824m SW	Not available	Chalk	A	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
20	938m NW	Not available	Chalk	A	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

*This data is sourced from the British Geological Survey.*



## 18.7 Mining cavities

Records within 1000m

0

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

*This data is sourced from Stantec UK Ltd.*

## 18.8 JPB mining areas

Records on site

0

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

*This data is sourced from Johnson Poole and Bloomer.*

## 18.9 Coal mining

Records on site

0

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

*This data is sourced from the Coal Authority.*

## 18.10 Brine areas

Records on site

0

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

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

## 18.11 Gypsum areas

Records on site

0

Generalised areas that may be affected by gypsum extraction.

*This data is sourced from British Gypsum.*



## 18.12 Tin mining

Records on site

0

Generalised areas that may be affected by historical tin mining.

*This data is sourced from Groundsure.*

## 18.13 Clay mining

Records on site

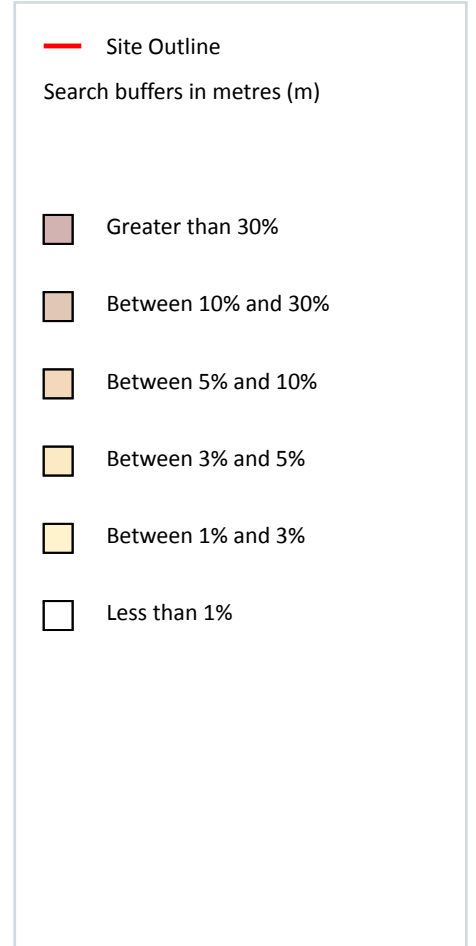
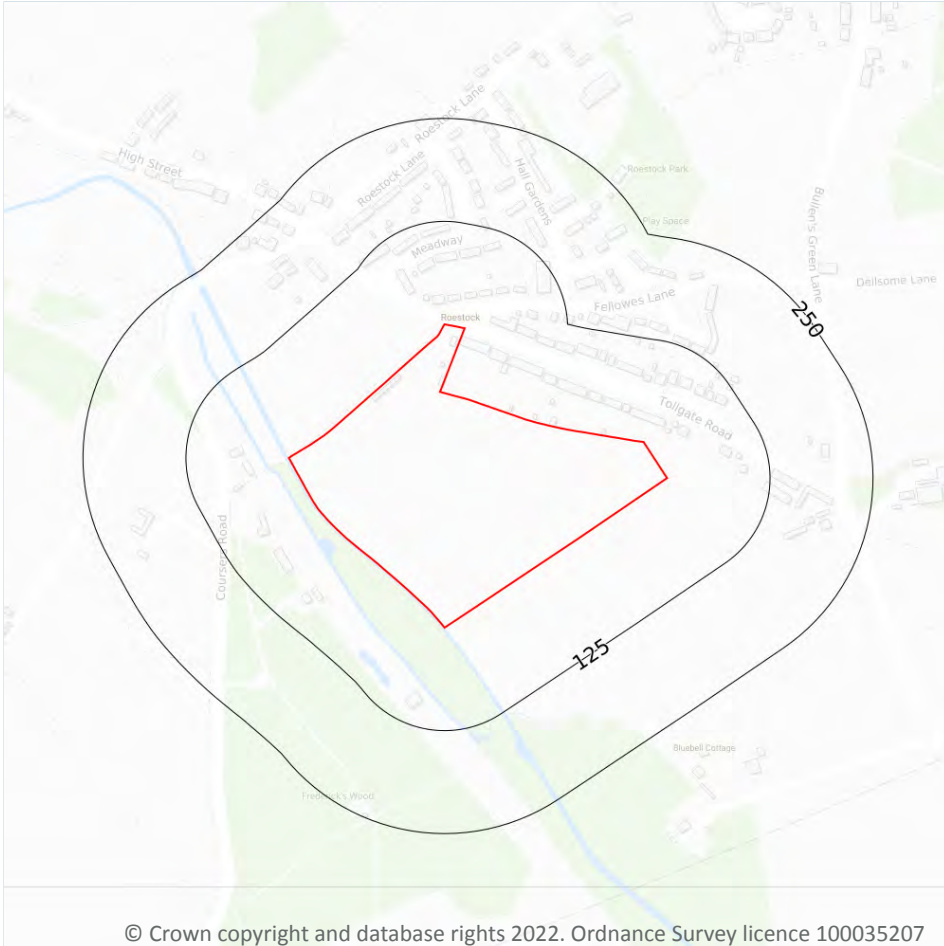
0

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

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



## 19 Radon



### 19.1 Radon

#### Records on site

1

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

Features are displayed on the Radon map on **page 110**

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

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

## 20 Soil chemistry

### 20.1 BGS Estimated Background Soil Chemistry

Records within 50m

14

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

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg



Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
46m SW	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
49m W	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

*This data is sourced from the British Geological Survey.*

## 20.2 BGS Estimated Urban Soil Chemistry

**Records within 50m**

**0**

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

*This data is sourced from the British Geological Survey.*

## 20.3 BGS Measured Urban Soil Chemistry

**Records within 50m**

**0**

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

*This data is sourced from the British Geological Survey.*



## 21 Railway infrastructure and projects

### 21.1 Underground railways (London)

Records within 250m

0

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

*This data is sourced from publicly available information by Groundsure.*

### 21.2 Underground railways (Non-London)

Records within 250m

0

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

*This data is sourced from publicly available information by Groundsure.*

### 21.3 Railway tunnels

Records within 250m

0

Railway tunnels taken from contemporary Ordnance Survey mapping.

*This data is sourced from the Ordnance Survey.*

### 21.4 Historical railway and tunnel features

Records within 250m

0

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

*This data is sourced from Ordnance Survey/Groundsure.*

### 21.5 Royal Mail tunnels

Records within 250m

0

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



*This data is sourced from Groundsure/the Postal Museum.*

## 21.6 Historical railways

**Records within 250m** **0**

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

*This data is sourced from OpenStreetMap.*

## 21.7 Railways

**Records within 250m** **0**

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

*This data is sourced from Ordnance Survey and OpenStreetMap.*

## 21.8 Crossrail 1

**Records within 500m** **0**

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

*This data is sourced from publicly available information by Groundsure.*

## 21.9 Crossrail 2

**Records within 500m** **0**

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

*This data is sourced from publicly available information by Groundsure.*

## 21.10 HS2

**Records within 500m** **0**

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



*This data is sourced from HS2 Ltd.*



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## Data providers

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**Grid Ref:** 520879, 205498

**Map Name:** County Series

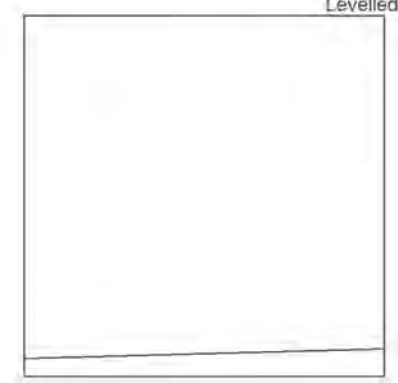
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 Edition 1883  
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 Levelled N/A

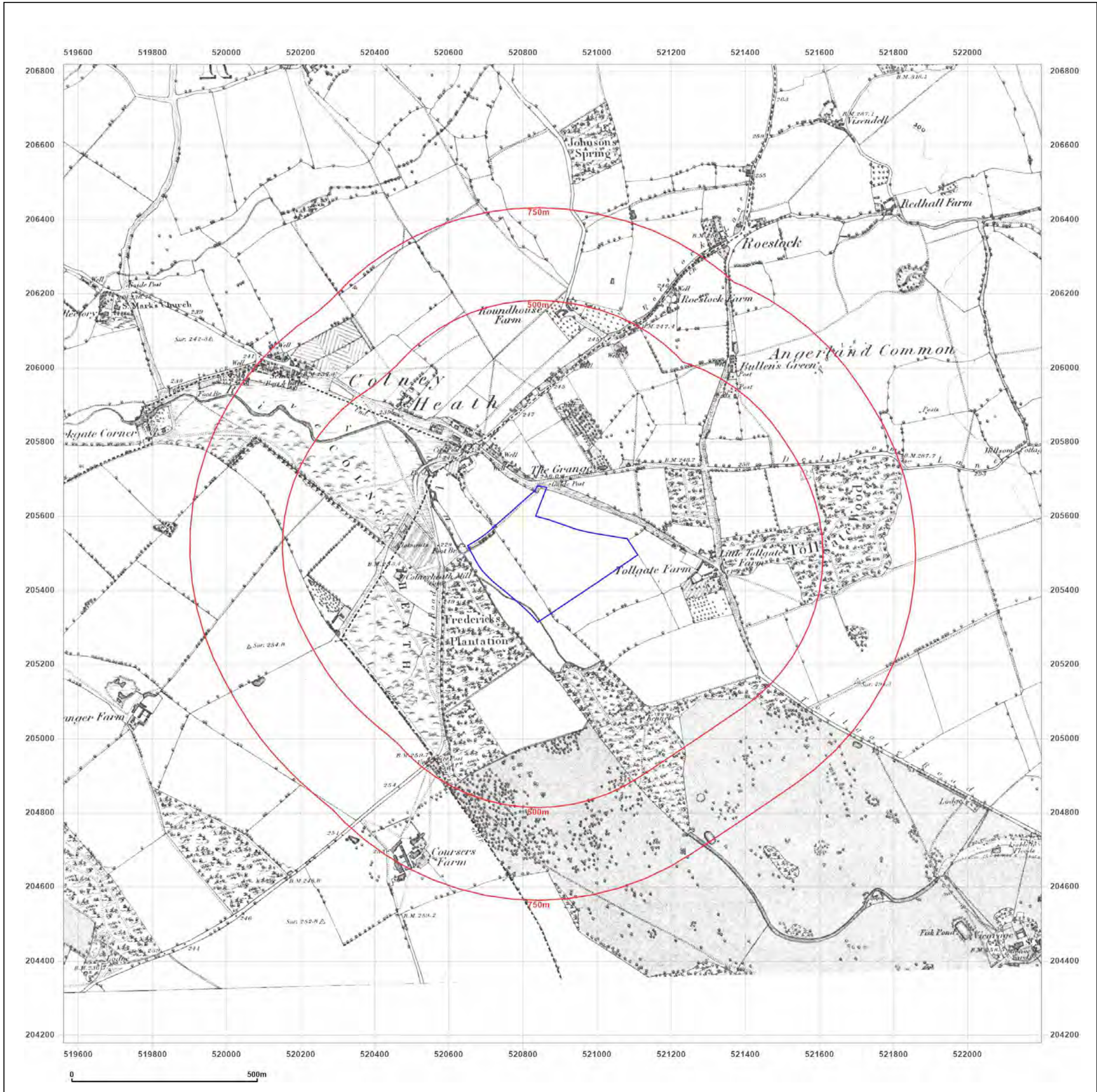


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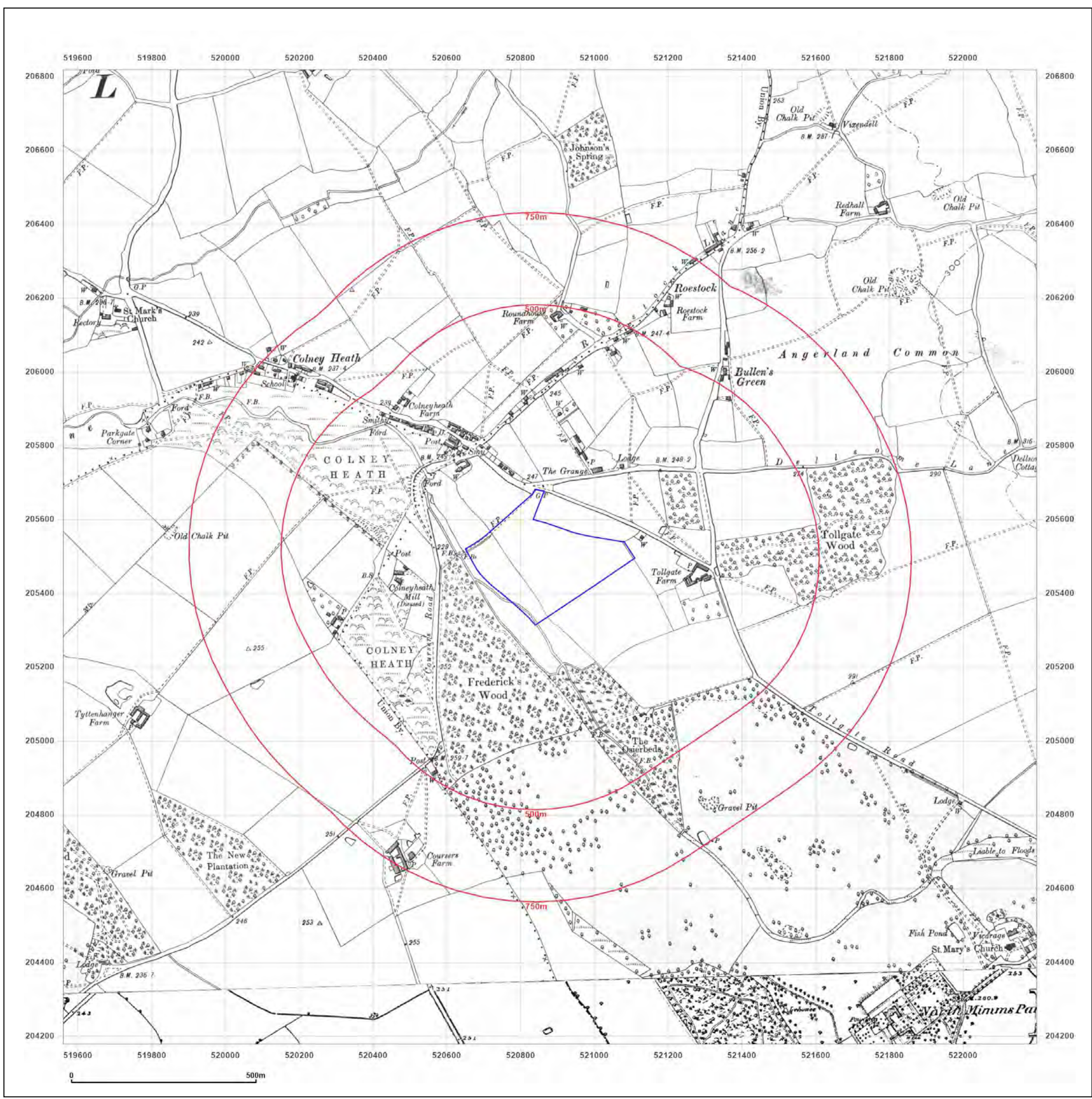


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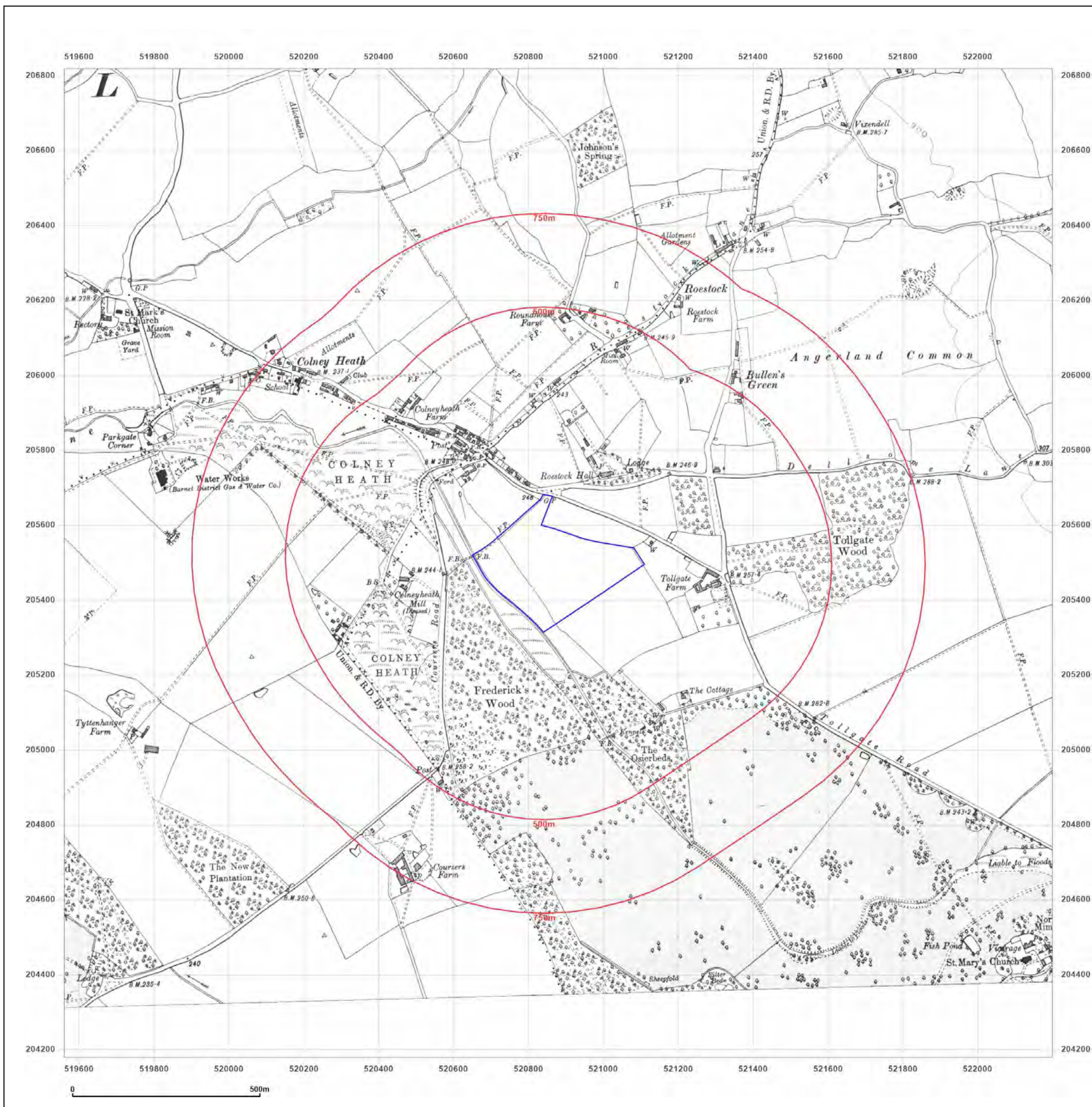


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Surveyed 1872  
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 Edition N/A  
 Copyright N/A  
 Levelled N/A

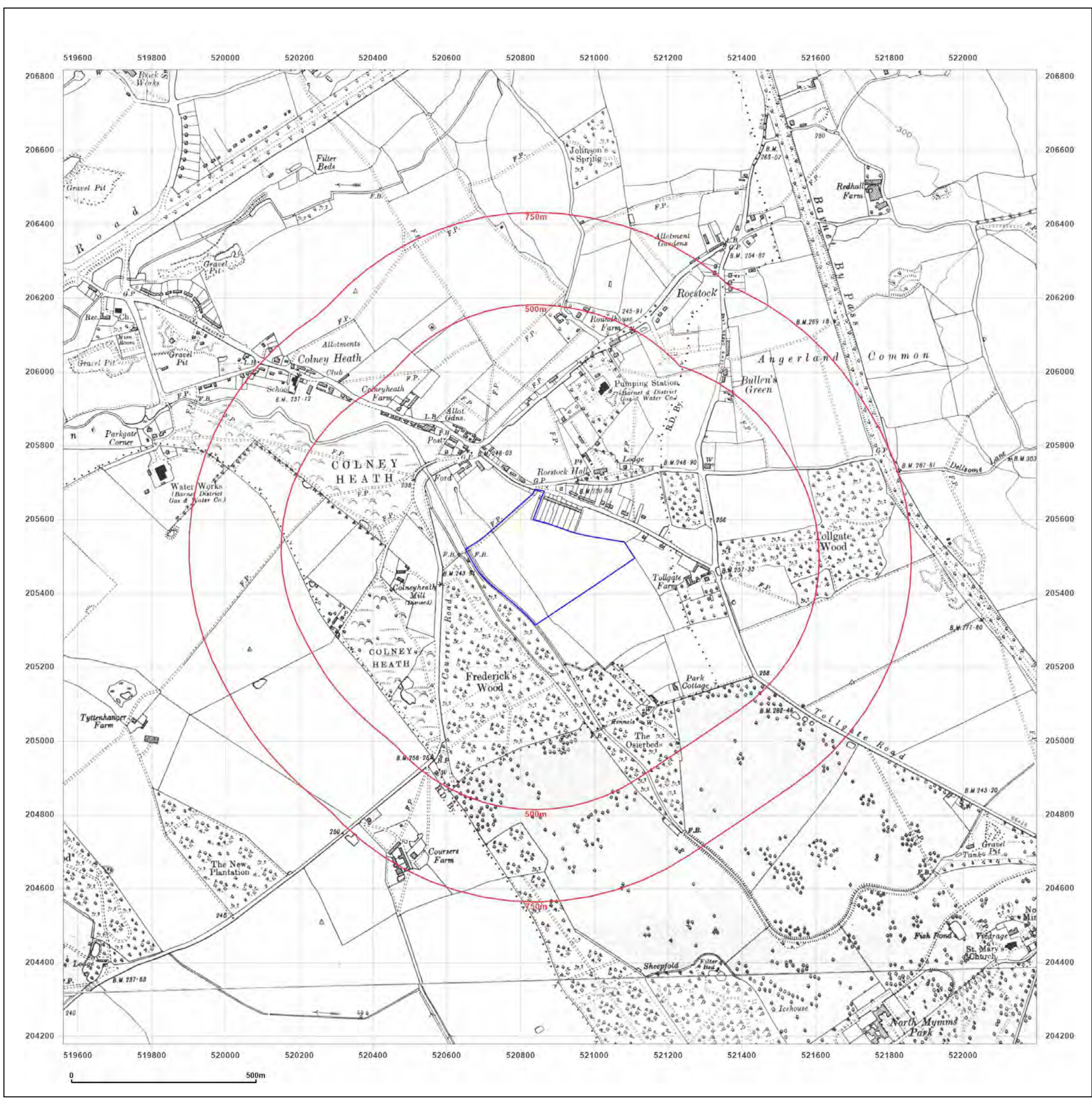


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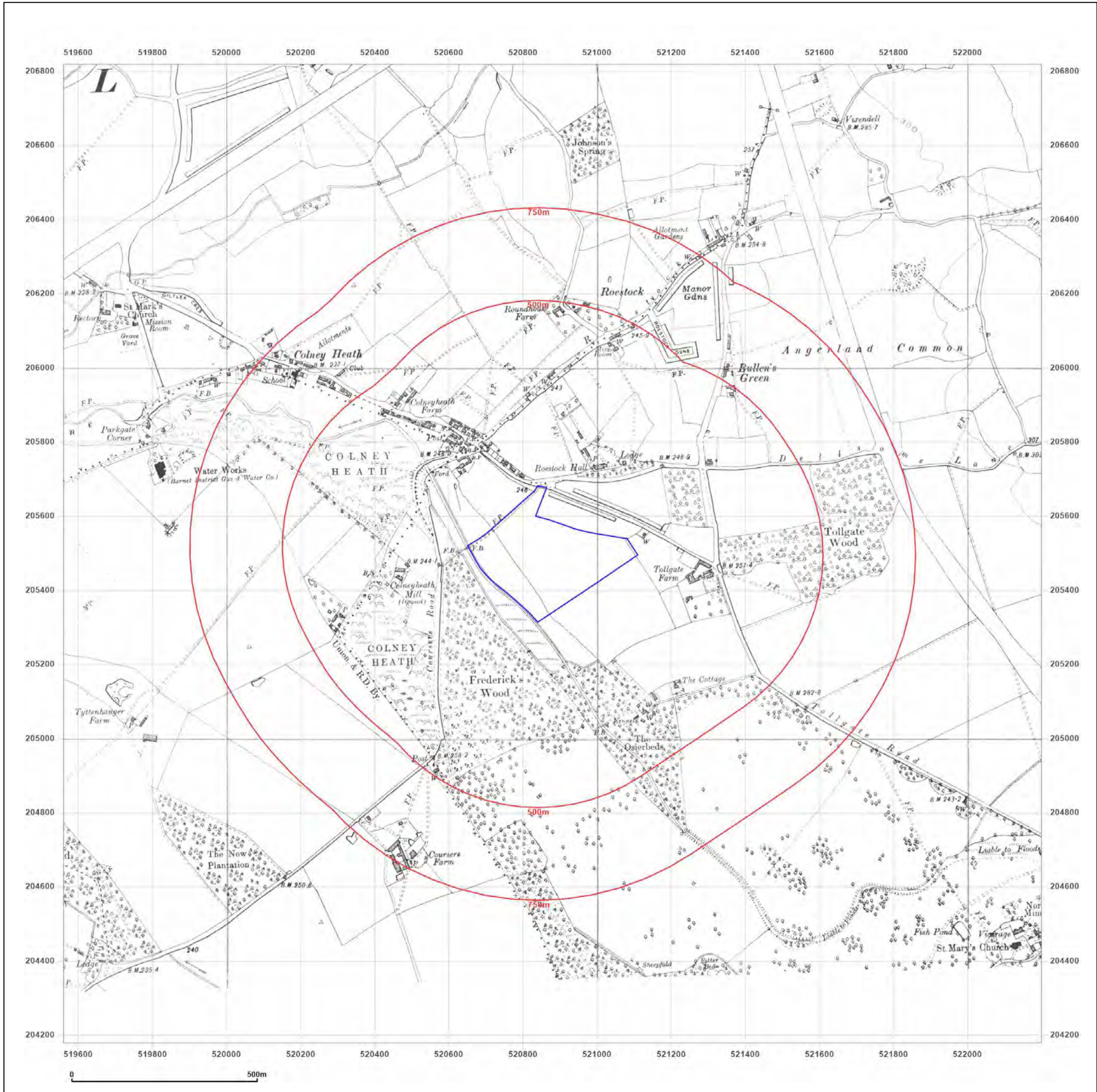


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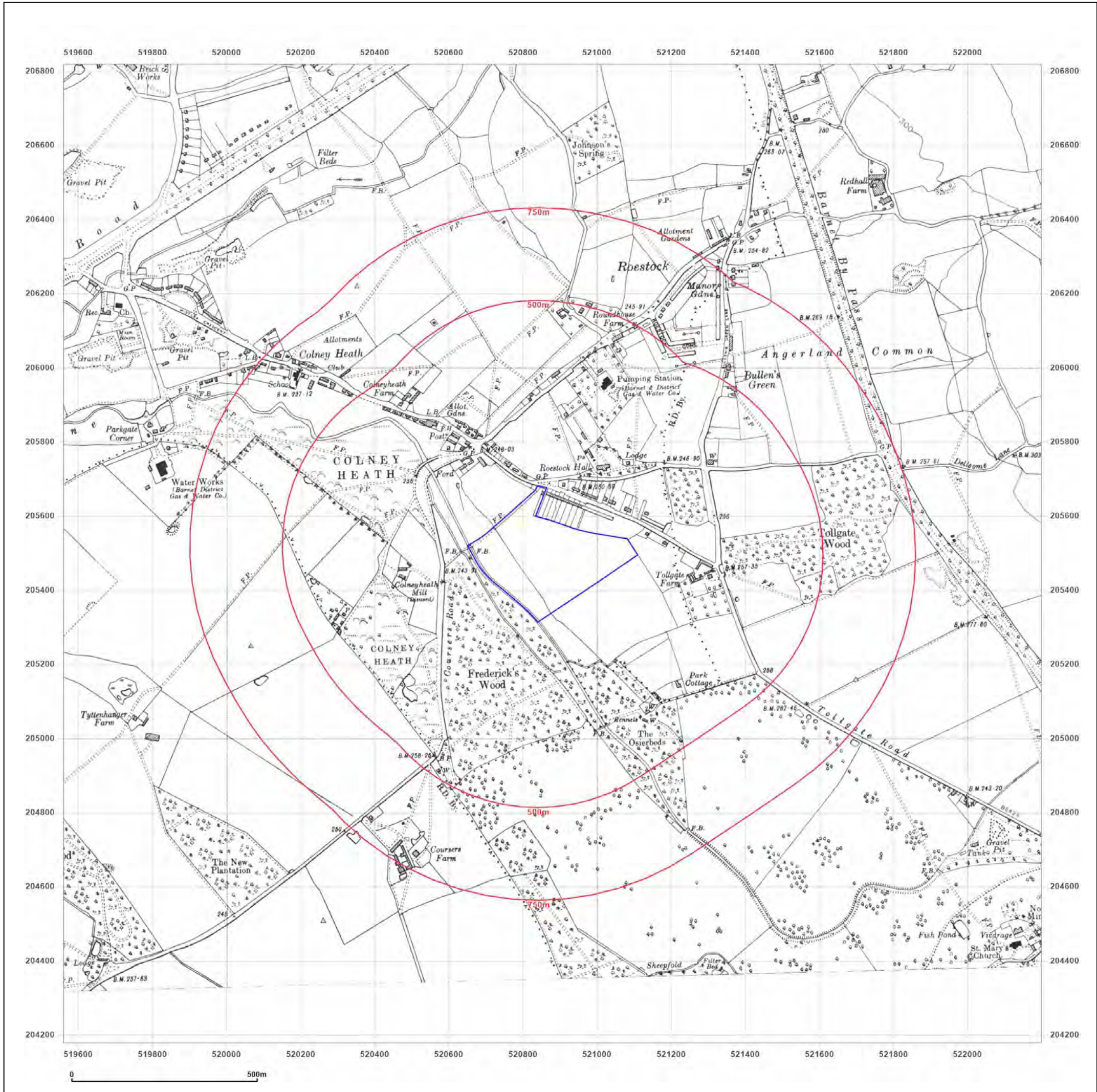


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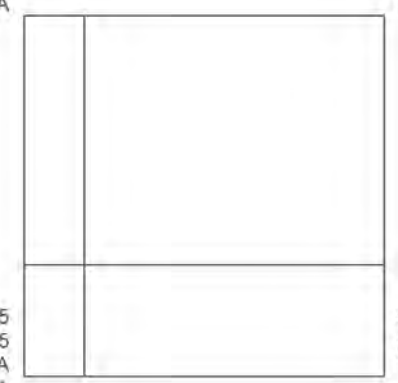
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Surveyed N/A Revised 1955 Edition 1960 Copyright 1960 Levelled N/A	Surveyed N/A Revised 1959 Edition N/A Copyright 1960 Levelled N/A
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Surveyed 1955 Revised 1955 Edition N/A Copyright N/A Levelled N/A	Surveyed N/A Revised 1959 Edition 1960 Copyright 1960 Levelled N/A
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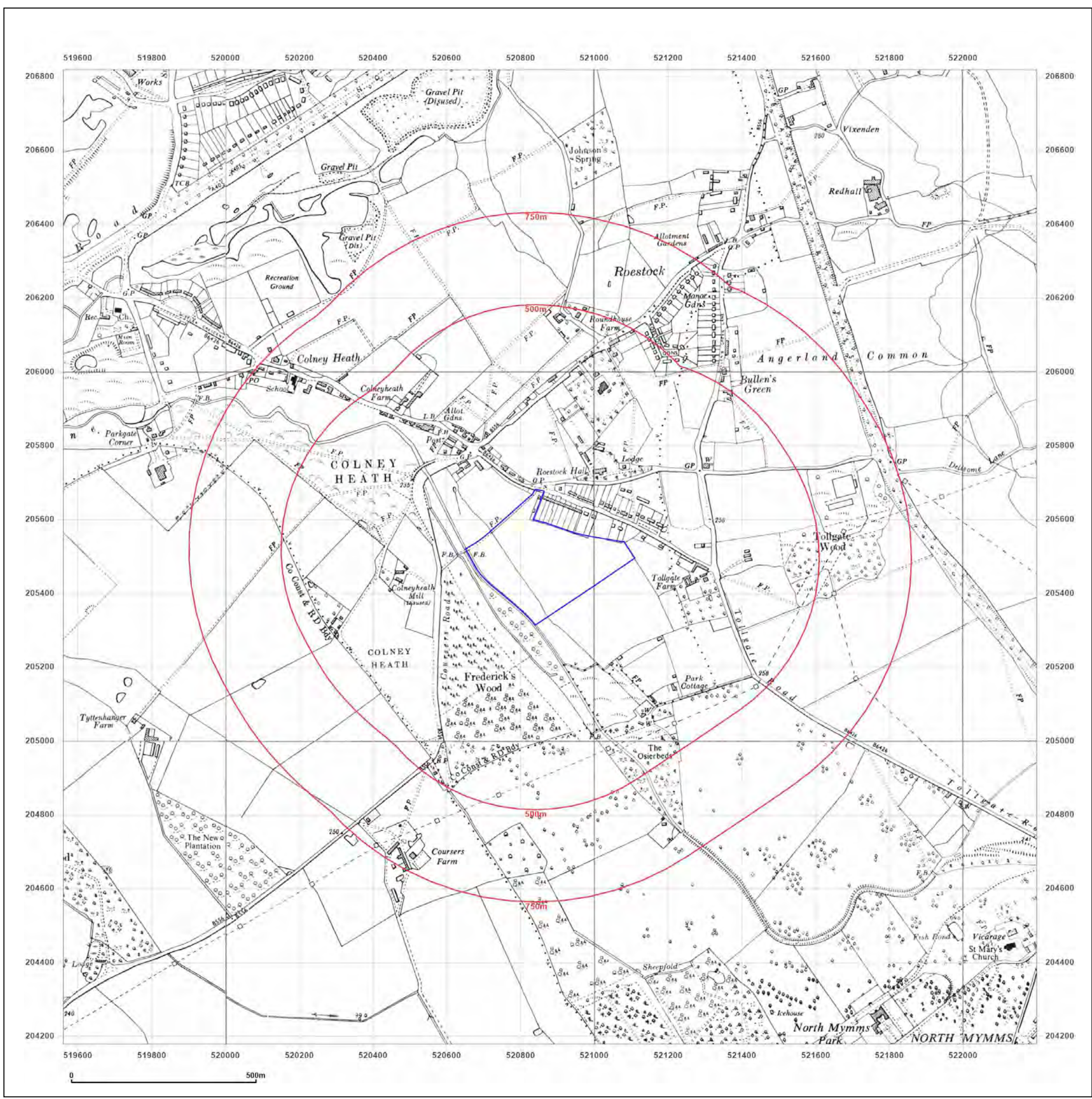


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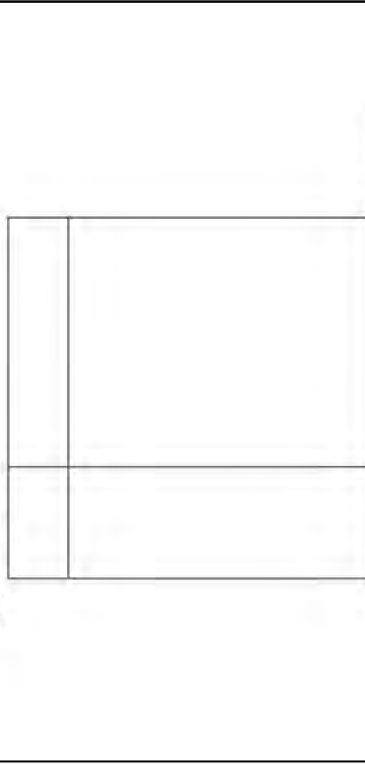
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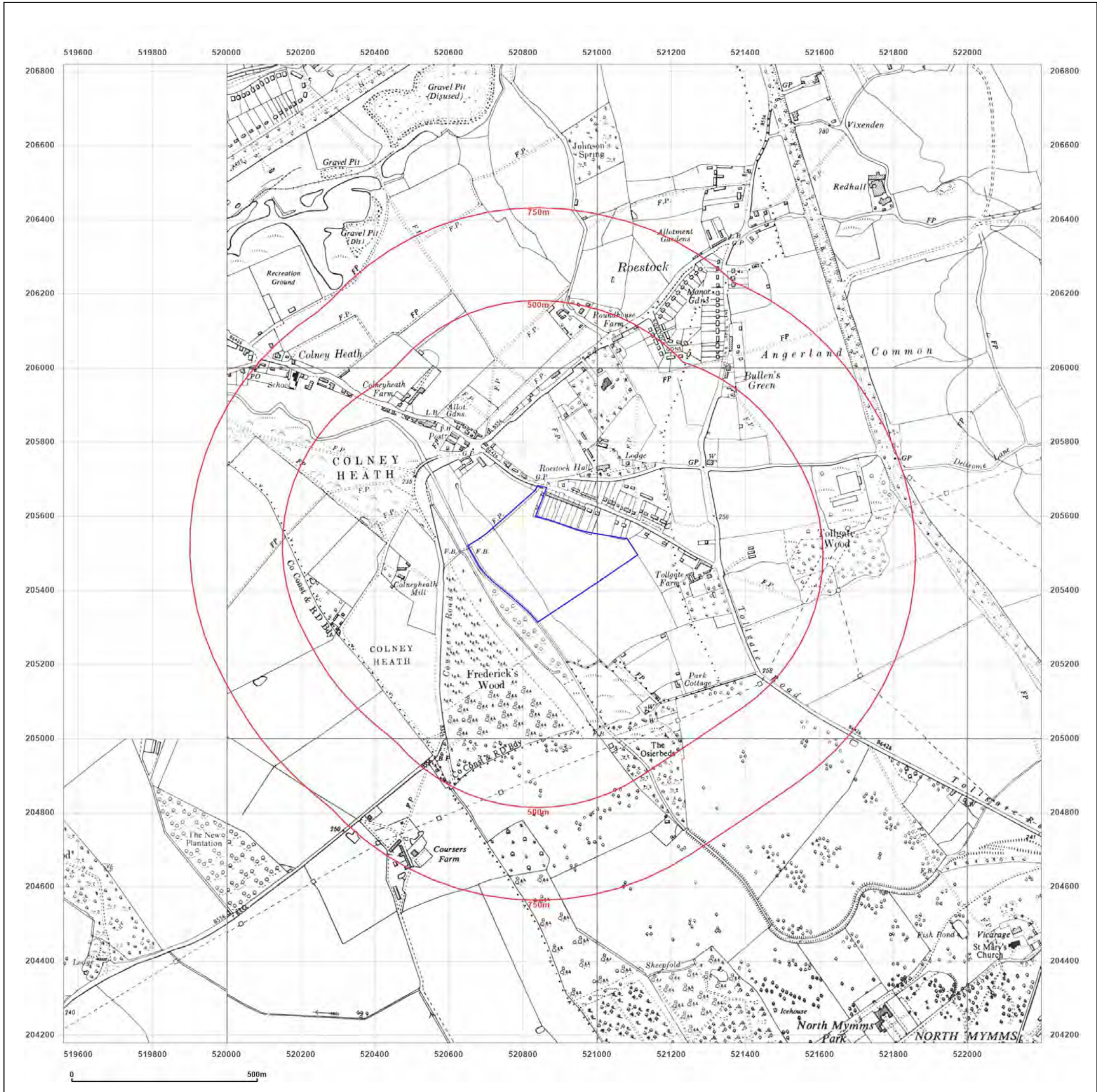
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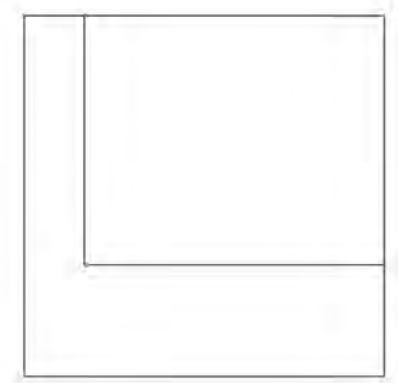
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 Revised 1971  
 Edition N/A  
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 Levelled N/A

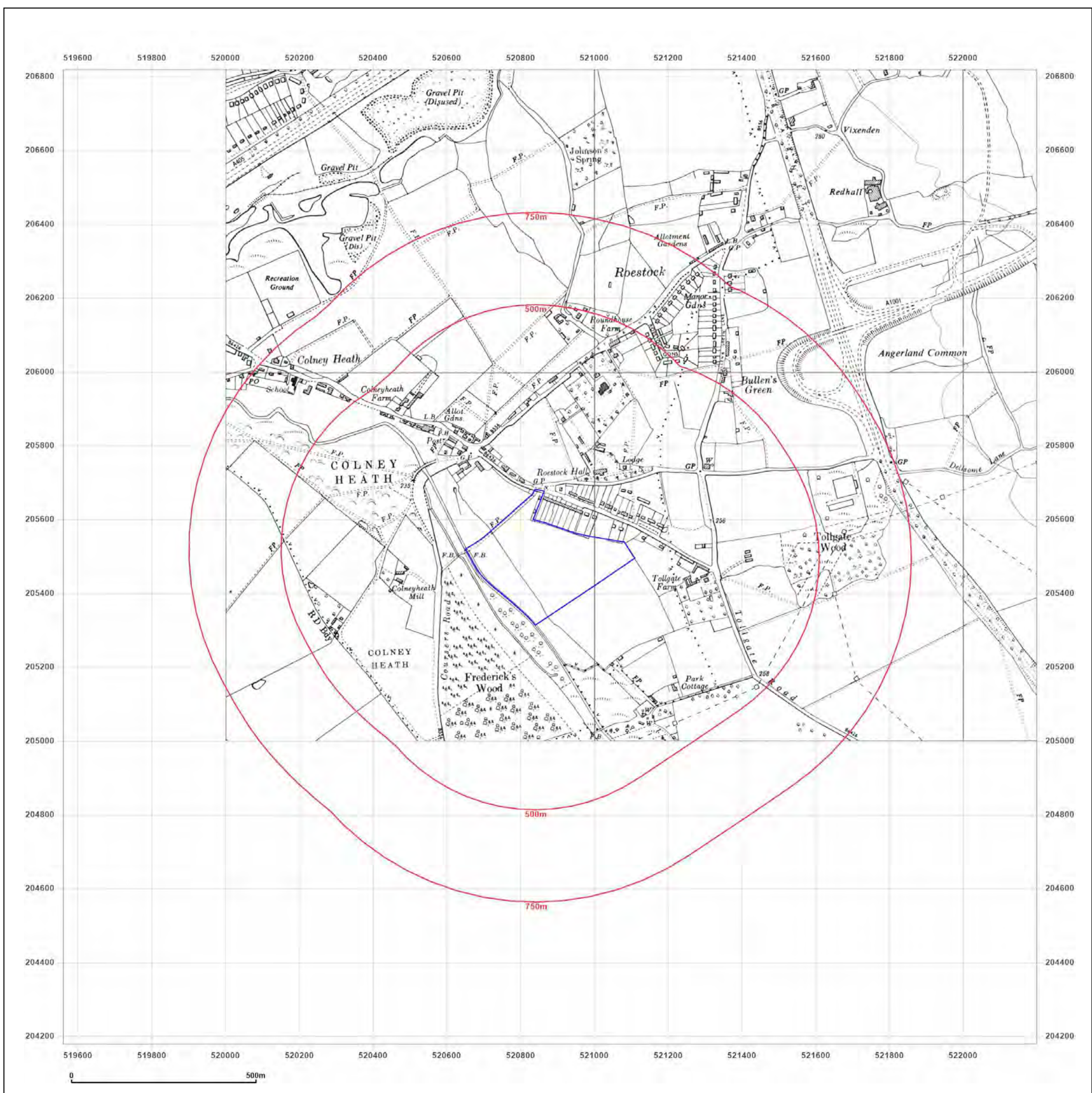


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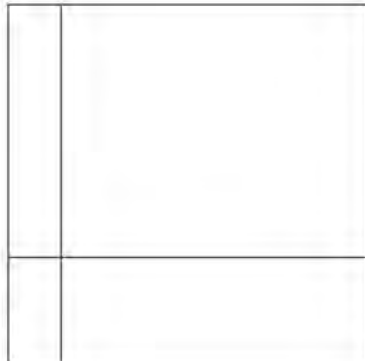
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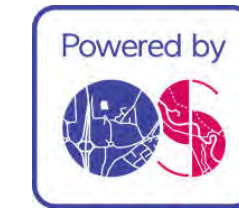
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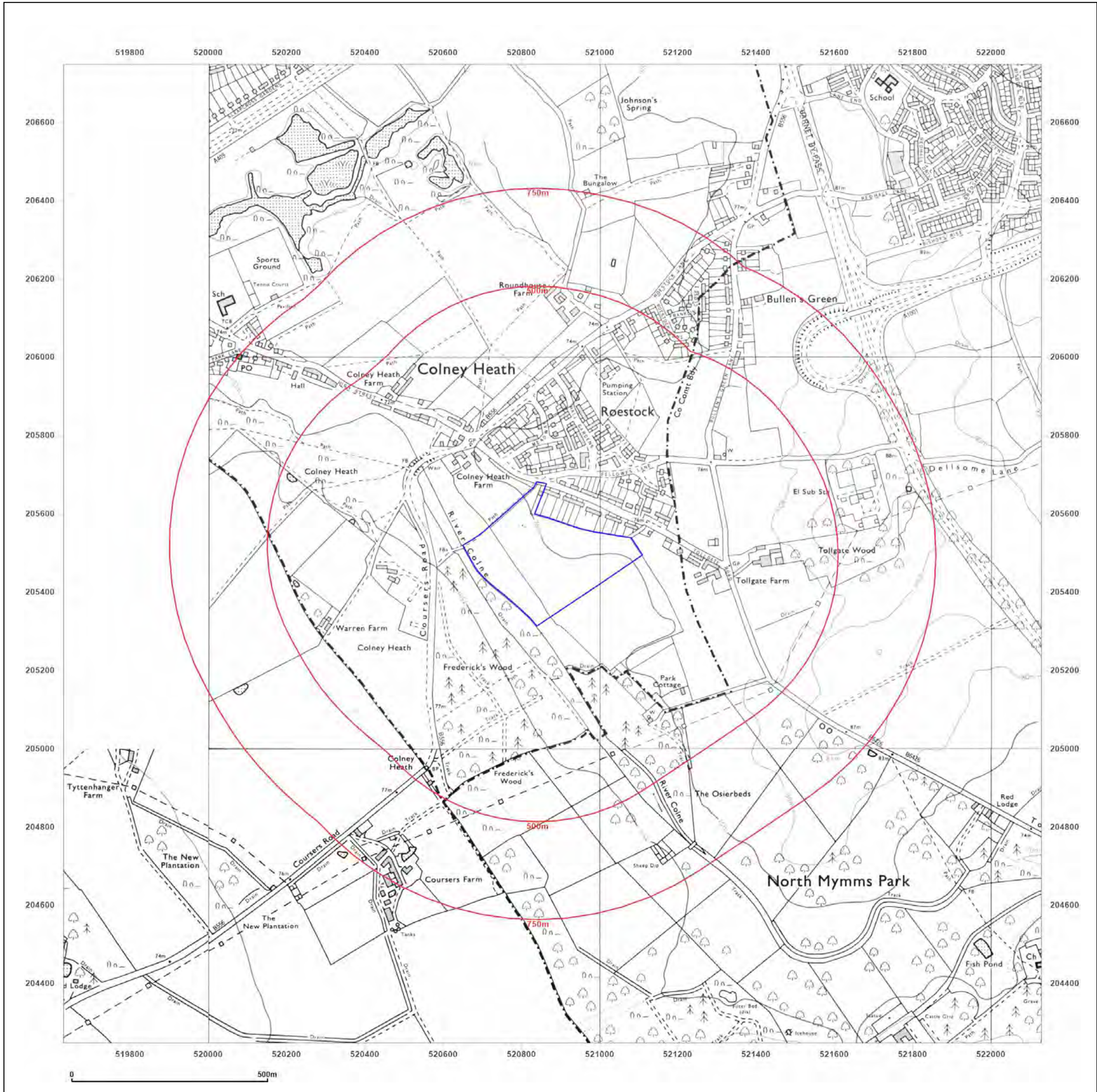


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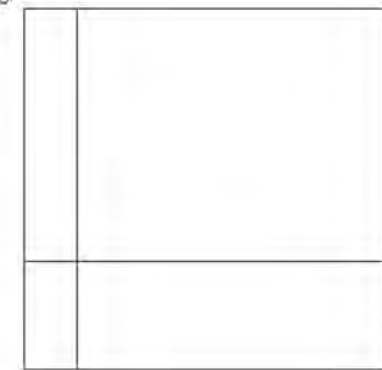
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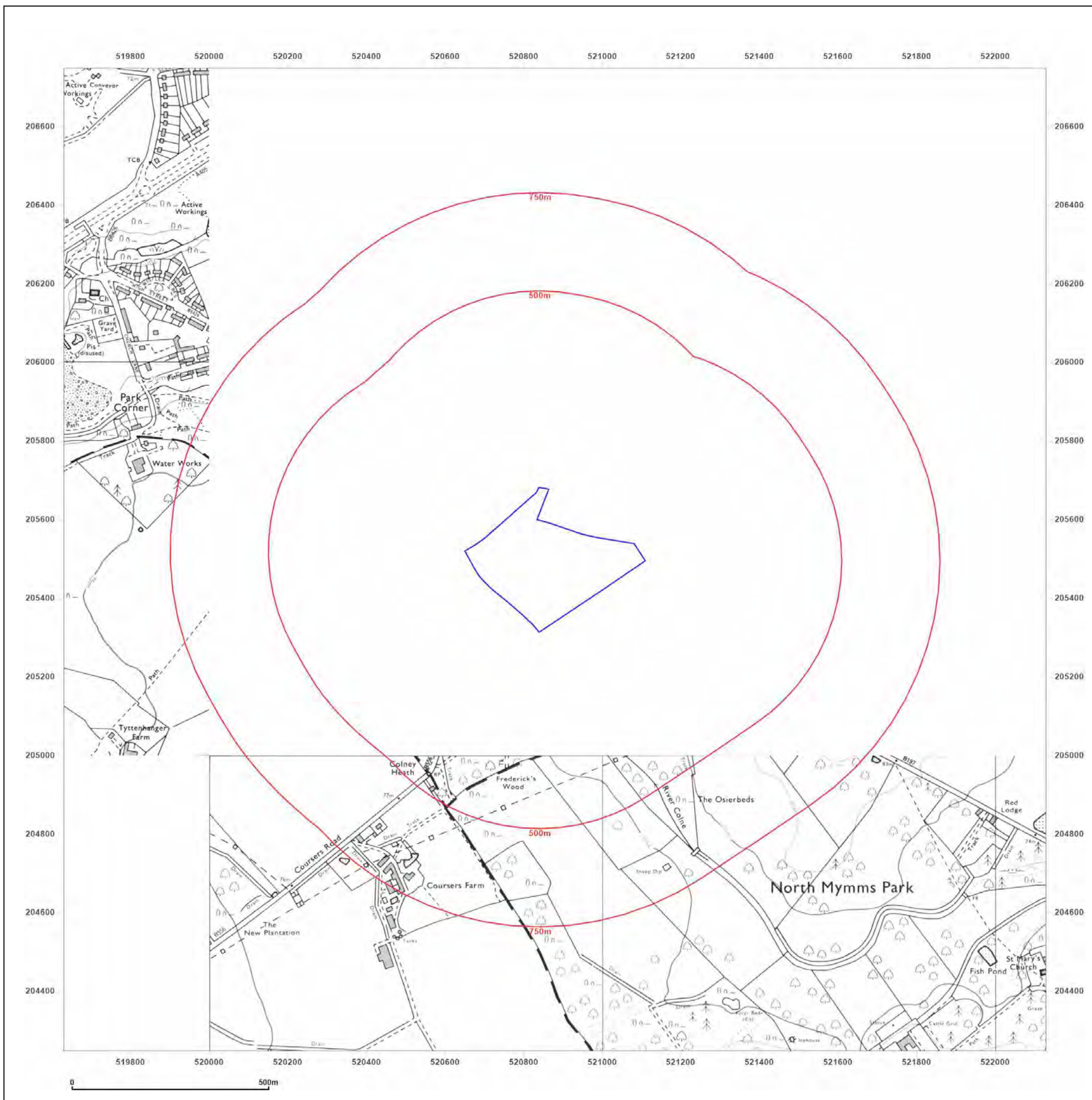


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**Map Name:** National Grid

**Map date:** 1983-1989

**Scale:** 1:10,000

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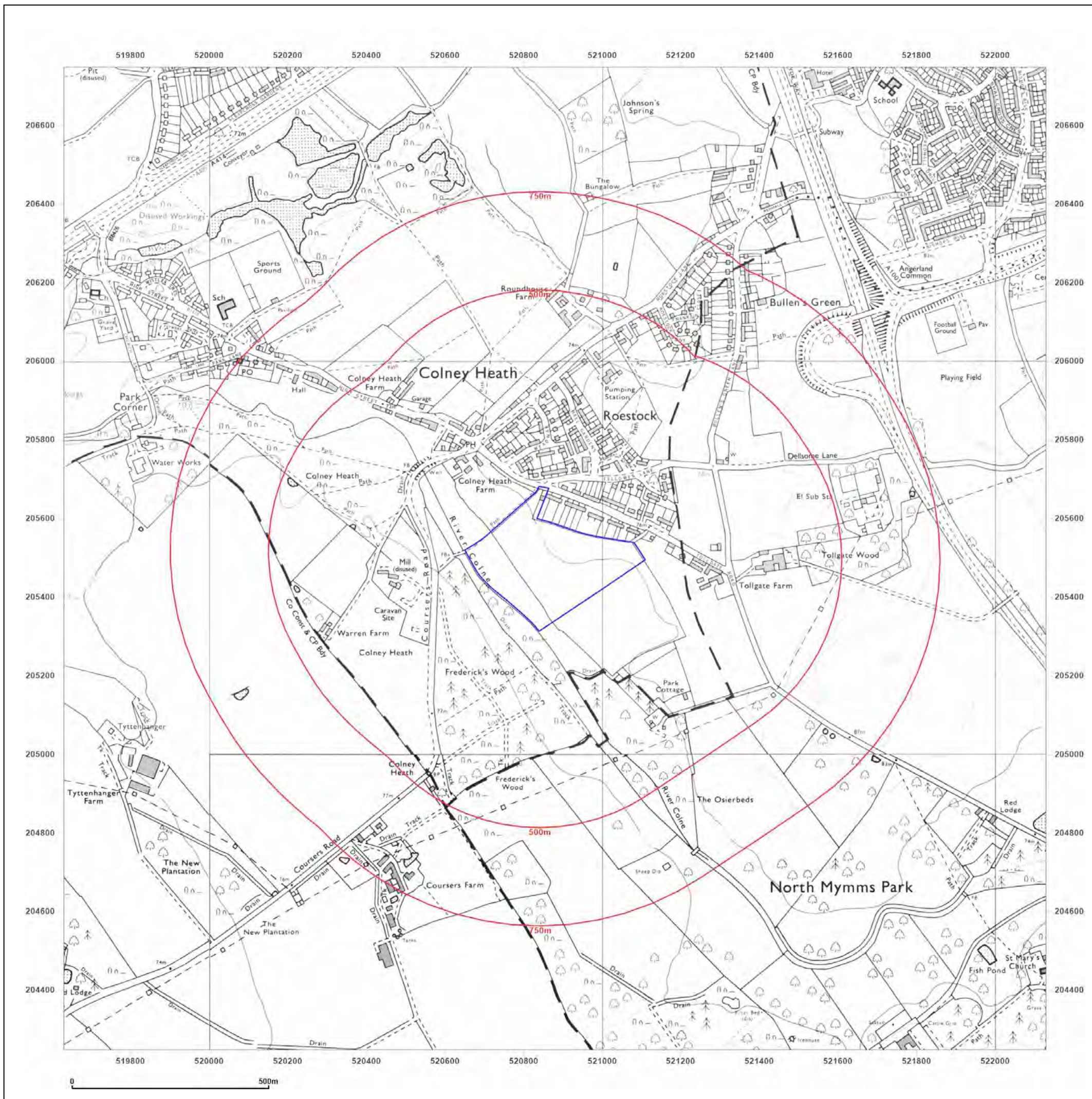


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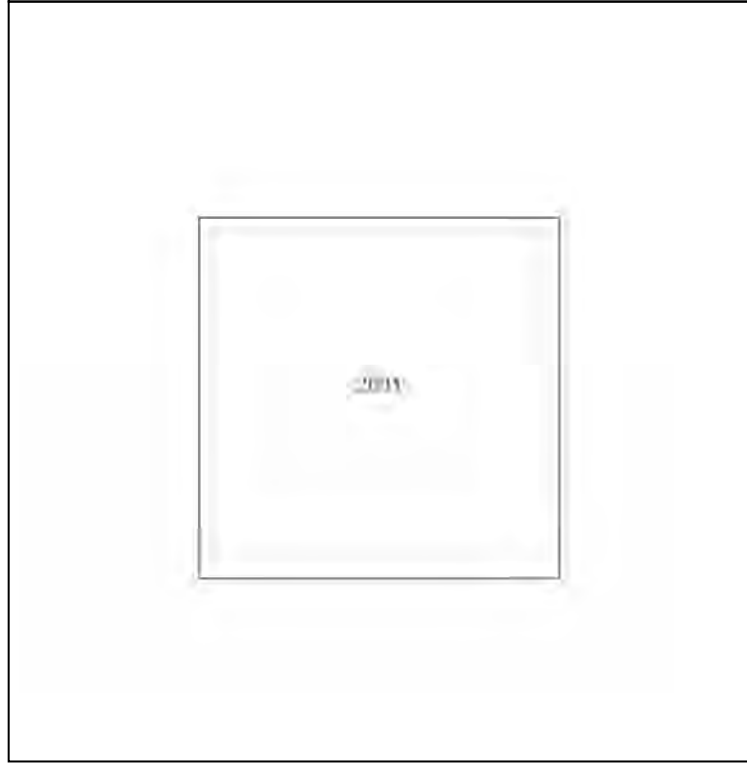
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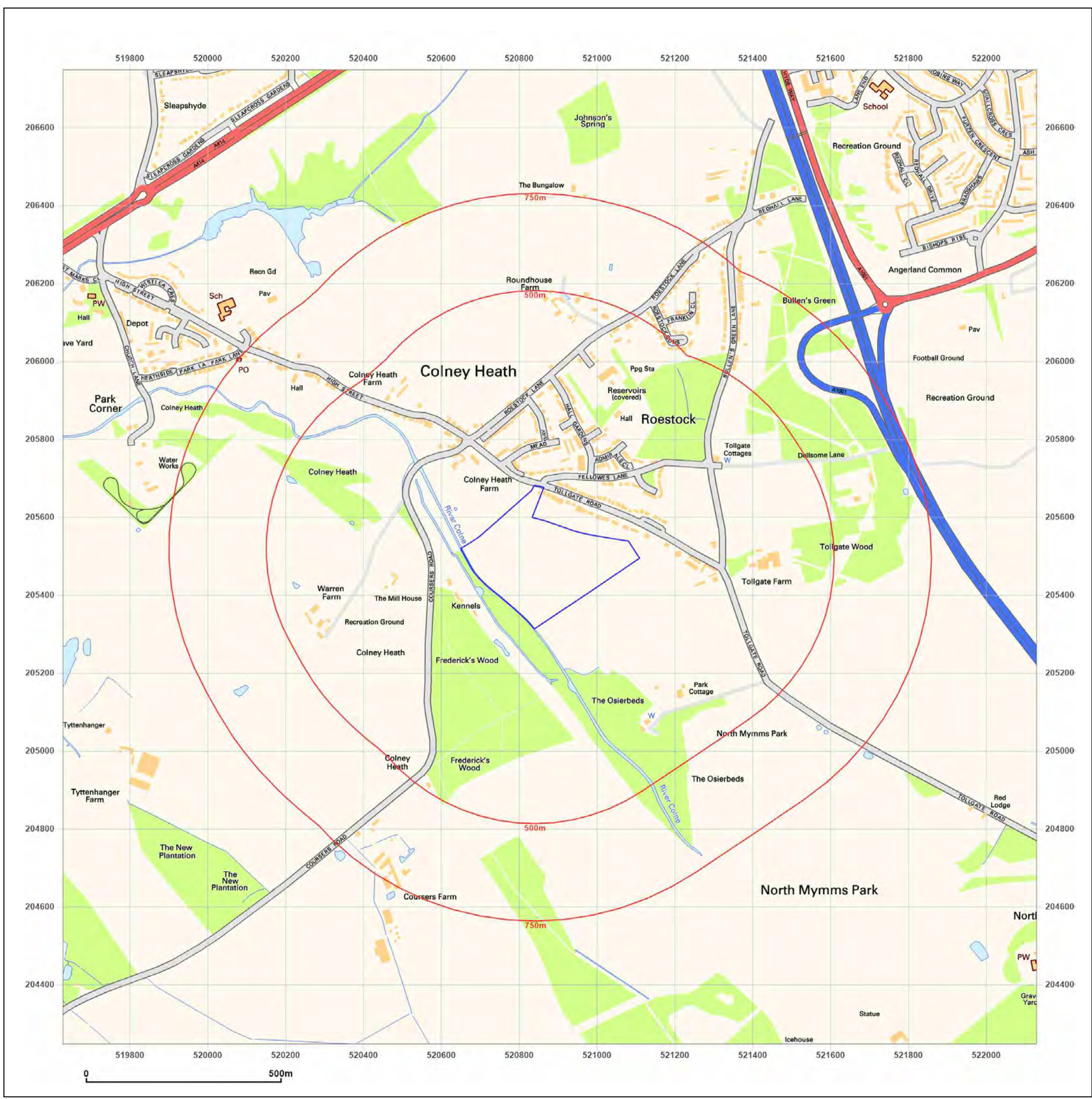


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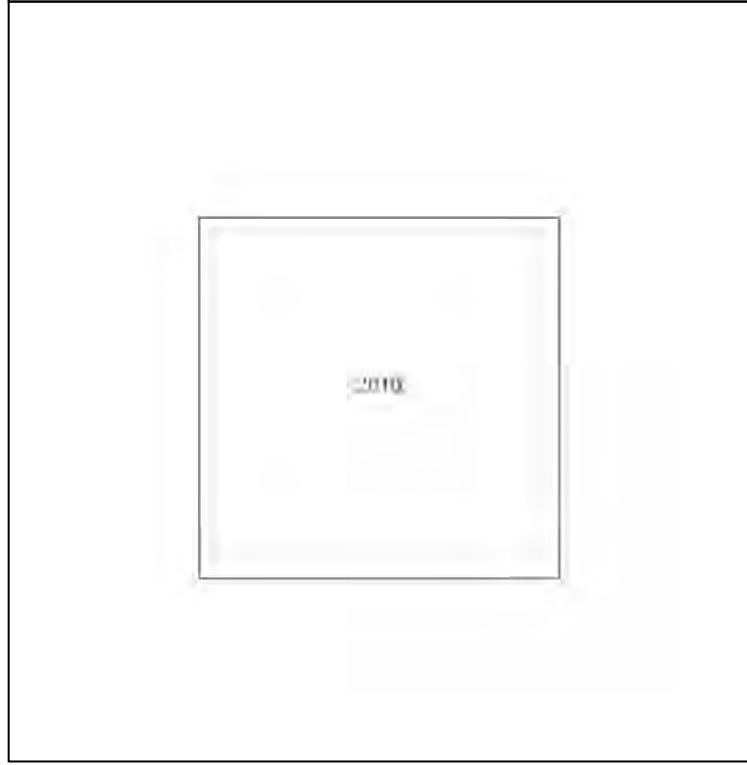
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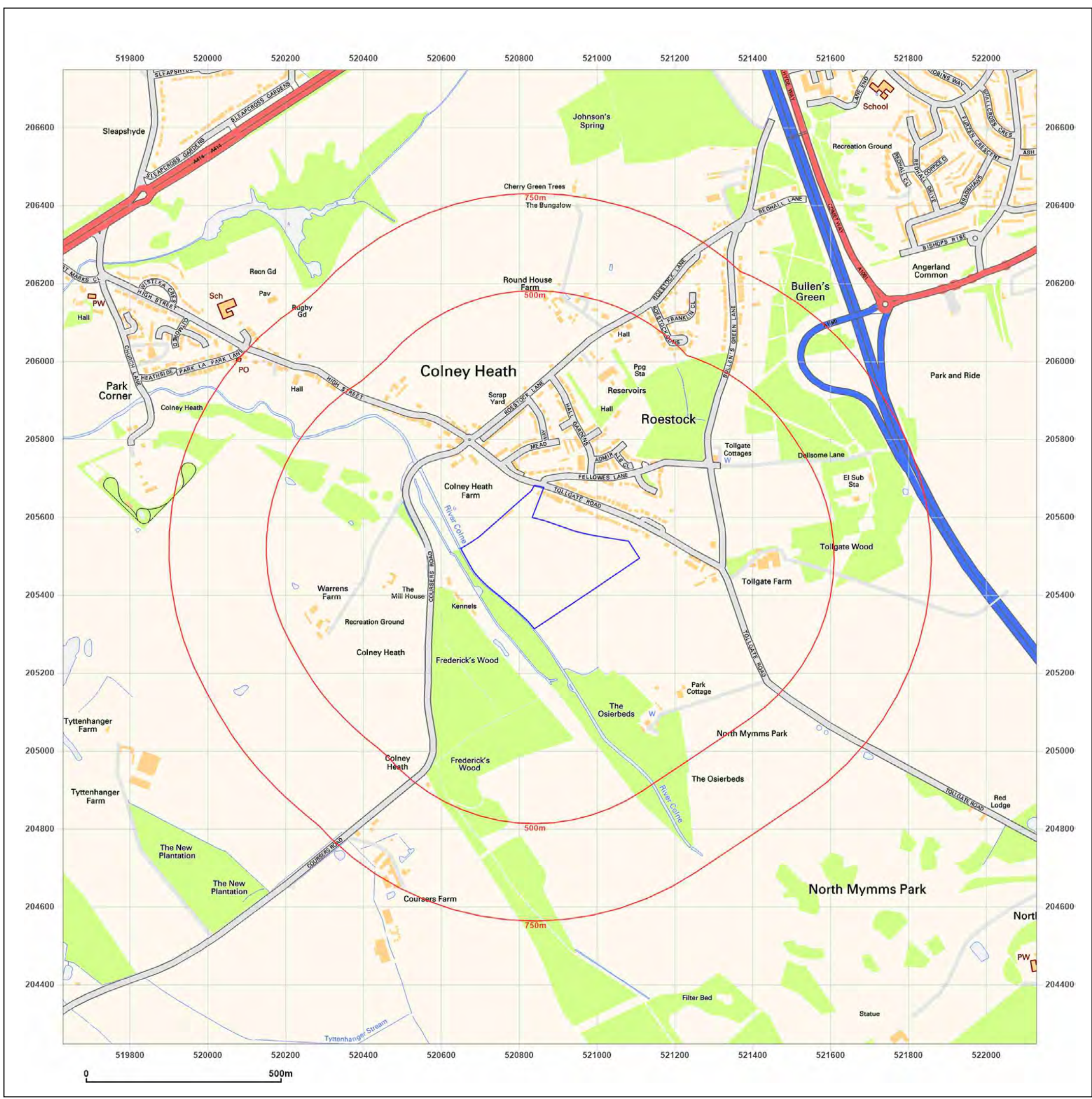


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 W: [www.groundsure.com](http://www.groundsure.com)

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Production date: 22 February 2022

Map legend available at:  
[www.groundsure.com/sites/default/files/groundsure\\_legend.pdf](http://www.groundsure.com/sites/default/files/groundsure_legend.pdf)



**Site Details:**

Colney Heath

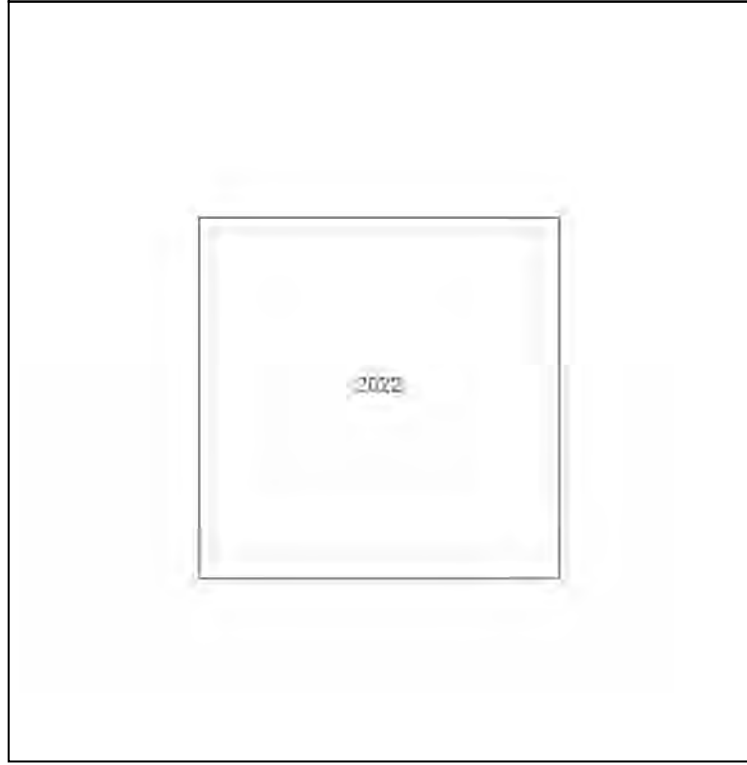
**Client Ref:** POEPL009405\_Colney\_Heath  
**Report Ref:** HMD-8538312  
**Grid Ref:** 520879, 205498

**Map Name:** National Grid

**Map date:** 2022

**Scale:** 1:10,000

**Printed at:** 1:10,000

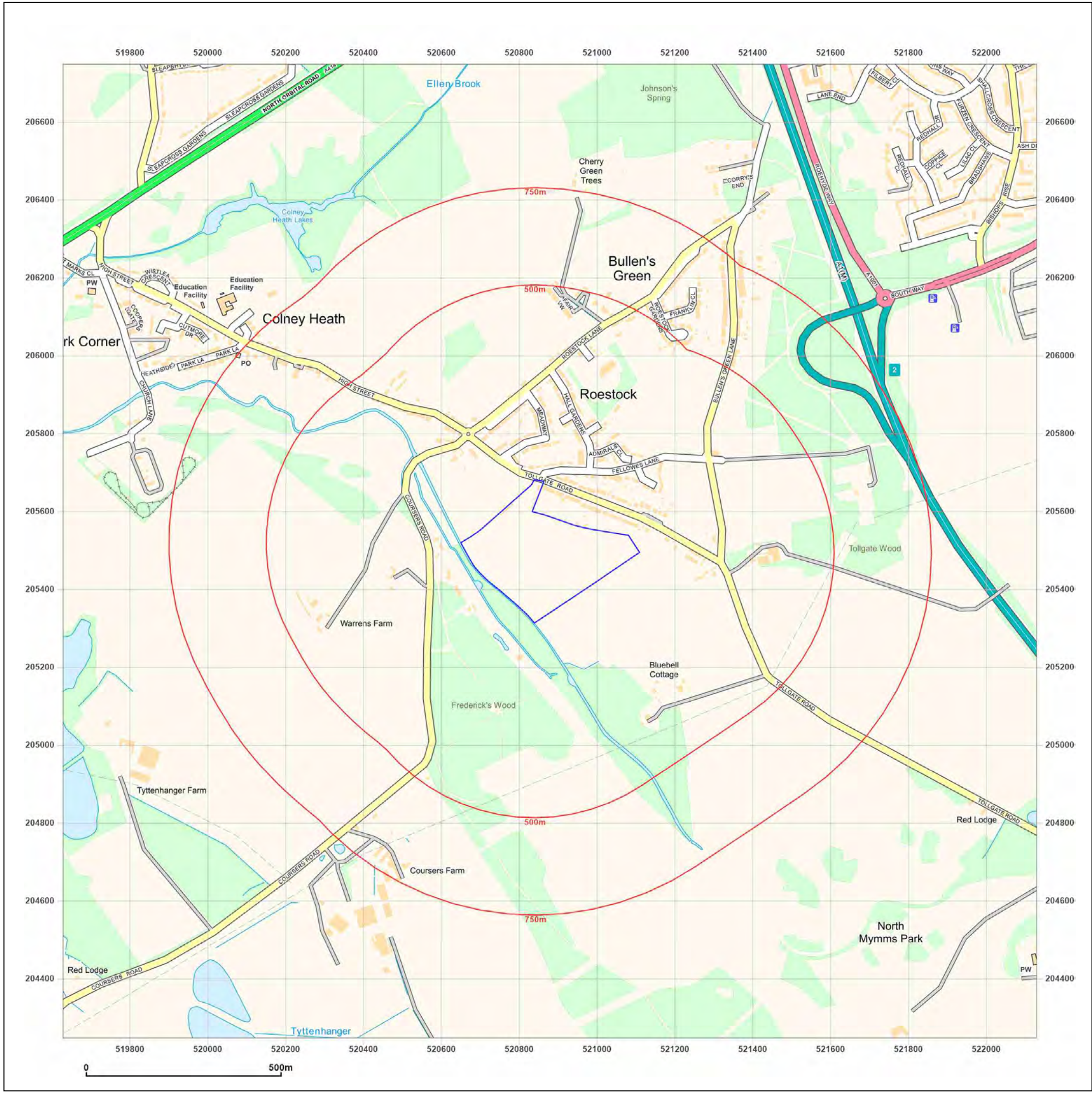


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Map legend available at:  
[www.groundsure.com/sites/default/files/groundsure\\_legend.pdf](http://www.groundsure.com/sites/default/files/groundsure_legend.pdf)



## **Appendix D    Regulatory Correspondence**

---

**Sent:** 22 March 2022 10:12

**Subject:** Environmental Information Regulation Response: Our Reference 000006127

Image removed by sender.



## **CORPORATE SERVICES**

**Our Ref: 000006127**

**Please ask for: FOI Coordinator**

**Direct Dial: (01727) 819209**

**e-mail address: [foi@stalbans.gov.uk](mailto:foi@stalbans.gov.uk)**

**Date: 22nd March 2022**

## **Environmental Information Regulations Request**

**Reference: 000006127**

I write with regard to your request for information sent by email to St Albans City & District Council. Your email was received by the Council on 22nd February 2022.

Your request falls under the Environmental Information Regulations. Under the Environmental Information Regulations, we are required to make environmental information available in so far as it is not exempt under any of the exceptions in Regulation 12.

### **You requested:**

I represent a firm of consultants who are carrying out a Phase 1 desk study on behalf of a developer of a site at Tollgate Road, Colney Heath that adjoins an historical landfill. Please can you supply information about this landfill, including; waste types accepted, dates of operation, any associated pollution incidents, prosecutions or enforcements, any other relevant information. We also require information held by the Council on any private water supplies on or within 500m of the site shown by the red line boundary on the attached plan.

### **Our response:**

We can confirm that we do hold the following information

Information available to the Council, in relation to the search site, confirms that the land at Colney Heath Farm is identified as a closed historic landfill area. Information available to the Council advises that the land was not licensed for tipping and waste input started in May 1993, there is no information available which confirms the type and extent of the fill material.

However, information available on the Council's Planning Portal confirms that on 13 September 1993 an application was submitted to the Council, on appeal against an enforcement notice, in relation to the regrading of land levels on land at Colney Heath Farm. This application does suggest that some works were undertaken which involved the bringing of material onto the site to change the levels. The application was reported to have been withdrawn on 18 January 1994 and unfortunately no further information is available in relation to this application or the works involved.

We can also confirm that we have no Private Water Supplies within 500m of the location indicated



If you are dissatisfied with this response the Commissioner's Office recommends that you first refer the matter to the Council. You can do this by writing to [foi@stalbans.gov.uk](mailto:foi@stalbans.gov.uk) asking for an internal review of my decision. If you wish the Council to undertake an internal review, then you must write to the Council within 40 working days of the date of this letter. The Council will not consider any requests received after this date unless there are exceptional circumstances for the delay.

You have a right to appeal to the Information Commissioner's Office at the following address: Wycliffe House, Water Lane, Wilmslow, Cheshire SK9 5AF. You must do this no later than two months after the Local Authority's last response to you.

Kind Regards

**FOI Coordinator**  
**Corporate Services**

#### **Do you have a 'MyStAlbans' District Account?**

To register, just go to [www.stalbans.gov.uk/mystalbansdistrictaccount](http://www.stalbans.gov.uk/mystalbansdistrictaccount) to access a personalised online account that gives you instant access to lots of useful council services, wherever you live in the District.

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Please be aware that emails sent to or received from St Albans City and District Council may be intercepted and read by the council.  
Interception will only occur to ensure compliance with council policies or procedures or regulatory obligations, to prevent or deter crime, or for the purposes of essential maintenance or support of the email system.

**Please note for the time being during the Covid-19 pandemic, the Council will accept service by email.**

The personal information you provide will be held in accordance with the General Data Protection Regulation (GDPR) and the Council's Data Protection Policy. You can find more information about how we will handle your personal information in our privacy notice: [Privacy Notice](#)

**Subject:** FW: HNL 253999 BC / JH -- RE: Freedom of Request for Information Request - Tollgate Road, Colney Heath 220223/NW12  
**Date:** 23 May 2022 12:48:01  
**Attachments:** [Gobions Wood OBH Data.csv](#)  
[North Mymms Park BH Data.csv](#)  
[Potterells Farm BH Data.csv](#)  
[Historic landfill site.xlsx](#)

---

**From:** NET Enquiries <[HNLenquiries@environment-agency.gov.uk](mailto:HNLenquiries@environment-agency.gov.uk)>

**Sent:** 23 March 2022 15:28

**Subject:** HNL 253999 BC / JH -- RE: Freedom of Request for Information Request - Tollgate Road, Colney Heath 220223/NW12

Dear Lawrence

Enquiry regarding: Groundwater level data - Tollgate Road, Colney Heath

Thank you for your enquiry which was received on 22 February 2022.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

**The following information is not available under the Open Government Licence but we may be able to license it to you under the Environment Agency Conditional Licence:** [Environment Agency Conditional Licence](#).

Please find attached a spreadsheet(s) of groundwater level data.

- **Groundwater level measurements (AfA075)** – detailed information about this dataset including conditions can be found on the [Register Licence Abstract](#) (you will need to download this spreadsheet to access the information about AfA075)

**The following conditions also apply to the above data:**

1. The location of observation boreholes must not be published to a resolution more detailed than 1km<sup>2</sup>

Please also find attached a spreadsheet of details we hold on the landfill site in the area. Please note this data is also available online - <https://data.gov.uk/dataset/17edf94f-6de3-4034-b66b-004ebd0dd010/historic-landfill-sites>. As an old historic landfill site we hold limited data. Please contact the local authority who are responsible for Contaminated land sites. (Hertfordshire County Council)

**The following conditions apply to the above data:**

1. Notwithstanding the fact that the standard wording of the Environment Agency Conditional Licence indicates that it is perpetual, this Licence has a limited duration of one year at the end of which it will terminate automatically without notice.
- 2.1. The Information contains some data that we believe is within the definition of “personal data” under the Data Protection Act 1998 but we consider that we will not be in breach of the Act if we disclose it to you with conditions set out in this condition and the condition above. This personal data comprises information relating to individuals, or to sites operated by an individual or partnership of individuals.
- 2.2 Under the Act a person who holds and uses or passes to others personal data is responsible for any compliance with the Act and so we have no option but to warn you that this means you have responsibility to check that you are compliant with the Act in respect of this personal data.

**However, you MUST first check the supporting information and the above link to determine if the conditions on use are suitable for your purposes. If they are not, this information is not provided with a license for use, and the data is provided for read right only.**

Groundwater level data can be found as open data here: <https://data.gov.uk/search?q=groundwater+levels> alternatively a public database is available from <https://www.bgs.ac.uk/information-hub/borehole-records/>

Please get in touch if you have any further queries. If you want us to review the information we have sent, please contact us again within two months from the date of this email.

Kind regards

James Hammett

Tel: 02030259058 / 07769 365347

[HNLenquiries@environment-agency.gov.uk](mailto:HNLenquiries@environment-agency.gov.uk)

Environment Agency, Herts and North London Office, Alchemy, Bessemer Road, Welwyn Garden City, Hertfordshire, AL7 1HE

Pronouns: he/his ([why is this here?](#))

Historic Landfill Dataset reference	Site name	Site address	WRC reference	Site reference	OS prefix	Easting	Northing	Environment Agency Area name	Date of first input	Inert waste deposited	History comments	Area (square metres)	Perimeter (metres)
EAHLD10033	Colney Heath Farm	Colney Heath, South Hatfield, Hertfordshire	1900/0112	3142	TL	520600	205600	North East TH	10 May 1993	Yes	Unlicensed	31407.1397	828.2846829

## **Appendix E    Zetica UXO Map**

# UNEXPLODED BOMB RISK MAP



## SITE LOCATION

Map Centre: 520879,205499



## LEGEND

- High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
- Low:** Areas indicated as having 15 bombs per 1000acre or less.

- military
- industry
- UXO find
- transport
- dock
- Luftwaffe targets
- utilities
- Bombing decoy
- other

### How to use your Unexploded Bomb (UXB) risk map?

The map indicates the potential for Unexploded Bombs (UXB) to be present as a result of World War Two (WWII) bombing.

You can incorporate the map into your preliminary risk assessment\* for potential Unexploded Ordnance (UXO) for a site. Using this map, you can make an informed decision as to whether more in-depth detailed risk assessment\* is necessary.

### What do I do if my site is in a moderate or high risk area?

Generally, we recommend that a detailed UXO desk study and risk assessment is undertaken for sites in a moderate or high UXB risk area.

Similarly, if your site is near to a designated Luftwaffe target or bombing decoy then additional detailed research is recommended.

More often than not, this further detailed research will conclude that the potential for a significant UXO hazard to be present on your site is actually low.

**Never plan site work or undertake a risk assessment using these maps alone. More detail is required, particularly where there may be a source of UXO from other military operations which are not reflected on these maps.**

### If my site is in a low risk area, do I need to do anything?

If both the map and other research confirms that there is a low potential for UXO to be present on your site then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

A low risk really means that there is no greater probability of encountering UXO than anywhere else in the UK.

If you are unsure whether other sources of UXO may be present, you can ask for one of our **pre-desk study assessments (PDSA)**

### If I have any questions, who do I contact?

tel: **+44 (0) 1993 886682**

email: **uxo@zetica.com**

web: **www.zeticauxo.com**

The information in this UXB risk map is derived from a number of sources and should be used in conjunction with the accompanying notes on our website: (<https://zeticauxo.com/downloads-and-resources/risk-maps/>)

Zetica cannot guarantee the accuracy or completeness of the information or data used and cannot accept any liability for any use of the maps. These maps can be used as part of a technical report or similar publication, subject to acknowledgment. The copyright remains with Zetica Ltd.

It is important to note that this map is not a UXO risk assessment and should not be reported as such when reproduced.


\*Preliminary and detailed UXO risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'.

## **Appendix F    Risk Assessment Tables**

Receptor	Receptor Sensitivity ('0' if not present)	Pathway	Present (Y=1, N=0)	EPH & Solvents	PAHs	Inorganics and Metals	Asbestos	Biocides	Permanent Gases	Consequence	Probability/Likelihood	Estimated Risk
Human Health - On-Site	5	Ingestion of fruit or vegetable leaf or roots	1	✓	✓	✓	x	✓	x	Mild	Unlikely	Very Low
		Ingestion of contaminated drinking water	1	✓	✓	x	x	✓	x	Mild	Unlikely	Very Low
		Ingestion of water / sediments when swimming	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
		Ingestion of soil/dust indoors	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
		Ingestion of soil/dust outdoors	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
		Inhalation of particles (dust / soil) indoor and outdoor	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
		Inhalation of vapours/gases – outdoor	1	✓	x	x	x	x	✓	Mild	Unlikely	Very Low
		Inhalation of vapours/gases - indoor	1	✓	x	x	x	x	✓	Mild	Unlikely	Very Low
		Dermal absorption via direct contact with soil	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
		Dermal absorption via waters (swimming / showering)	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
Human Health Off-Site	4	Ingestion of fruit or vegetable leaf or roots	0	✓	✓	✓	x	✓	x	N/A	N/A	N/A
		Ingestion of contaminated drinking water	1	✓	✓	x	x	✓	x	Minor	Unlikely	Very Low
		Ingestion of water / sediments when swimming	0	✓	✓	x	x	✓	x	N/A	N/A	N/A
		Ingestion of soil/dust indoors	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Ingestion of soil/dust outdoors	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Inhalation of particles (dust / soil) indoor and outdoor	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Inhalation of vapours – outdoor	1	✓	x	x	x	x	✓	Minor	Unlikely	Very Low
		Inhalation of vapours - indoor	1	✓	x	x	x	x	✓	Minor	Unlikely	Very Low
		Dermal absorption via direct contact with soil	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
		Dermal absorption via waters (swimming / showering)	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
Groundwater (Shallow)	4	Leaching	1	✓	✓	✓	x	✓	x	Minor	Unlikely	Very Low
		Migration via natural or anthropogenic	1	✓	✓	✓	x	✓	x	Minor	Unlikely	Very Low
Groundwater (Deep)	4	Leaching	1	✓	✓	✓	x	✓	x	Minor	Unlikely	Very Low
		Migration via natural or anthropogenic	1	✓	✓	✓	x	✓	x	Minor	Unlikely	Very Low
Surface Water	1	Direct runoff or discharges from pipes	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Indirect via recharge from groundwater (hydraulic flow)	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Deposition of wind blown dust	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
Property - Buildings On-site	1	Direct contact	1	✓	✓	✓	x	x	x	Minor	Unlikely	Very Low
		Explosion due to gas migration via natural / anthropogenic	1	✓	x	x	x	x	✓	Minor	Unlikely	Very Low
Property - Buildings Off-site	1	Direct contact	0	✓	✓	✓	x	x	x	N/A	N/A	N/A
		Explosion due to gas migration via natural / anthropogenic	1	✓	x	x	x	x	✓	Minor	Unlikely	Very Low
Ecological Systems	1	Direct deposition of particles / dust - wind blown or flood	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Indirect - through watering	1	✓	✓	✓	x	✓	x	Minor	Unlikely	Very Low
		Inhalation of gases/vapours or particulates/dust by animals	1	✓	✓	✓	✓	✓	✓	Minor	Unlikely	Very Low
		Ingestion of vegetation / water / soil by animals	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
Property - Animal/Crop - On-site	1	Direct (including deposition via wind or flood)	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Indirect (through watering)	1	✓	✓	✓	x	✓	x	Minor	Unlikely	Very Low
		Inhalation of gas / vapour / particulates / dust by animals	1	✓	✓	✓	✓	✓	✓	Minor	Unlikely	Very Low
		Ingestion of vegetation / water / soil by animals	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
Property - Animal/Crop - Off-site	1	Direct (including deposition via wind or flood)	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Indirect (through watering)	1	✓	✓	✓	x	✓	x	Minor	Unlikely	Very Low
		Inhalation of gas / vapour / particulates / dust by animals	1	✓	✓	✓	✓	✓	✓	Minor	Unlikely	Very Low
		Ingestion of vegetation / water / soil by animals	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low

Risk estimation establishes the magnitude and probability of the possible consequences (what degree of harm might result and how likely).  
The criteria for classifying probability and consequence are set out in Tables 4 and 5 of the Stantec methodology.  
Green text highlights one or more elements of the Pollutant Linkage are missing and therefore eliminated

EPH = Extractable hydrocarbons  
PAHs = Poly Aromatic Hydrocarbons  
Note For Metals there is an Inhalation pathway if Mercury is present  
Note for PAHs there are Inhalation and/or Solubility pathways for some eg Naphthalene


 Land at Tollgate Road,	Client Vistry	<b>Land at Tollgate Road, Colney Heath</b>		Date 17/05/2022
		<b>TABLE SUMMARISING POLLUTANT LINKAGES AND RISK ESTIMATION</b>		A3 Scale NTS Drawn By MRG Checked By LT
Caversham Bridge House, Waterman Place, Reading, RG1 8DN Tel 0118 950 0761 Fax 0118 959 7499		HAZARD CLASSIFICATION 1	THE POTENTIAL CONTAMINANTS OF CONCERN ARE :- <b>agricultural</b>	



Receptor	Receptor Sensitivity ('0' if not present)	Pathway	Present (Y=1, N=0)	EPH & Solvents	PAHs	Inorganics and Metals	Asbestos	Biocides	Permanent Gases	Consequence	Probability/Likelihood	Estimated Risk
Human Health - On-Site	5	Ingestion of fruit or vegetable leaf or roots	1	✓	✓	✓	x	✓	x	Medium	Unlikely	Low
		Ingestion of contaminated drinking water	1	✓	✓	x	x	✓	x	Medium	Unlikely	Low
		Ingestion of water / sediments when swimming	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
		Ingestion of soil/dust indoors	1	✓	✓	✓	✓	✓	x	Medium	Unlikely	Low
		Ingestion of soil/dust outdoors	1	✓	✓	✓	✓	✓	x	Medium	Unlikely	Low
		Inhalation of particles (dust / soil) indoor and outdoor	1	✓	✓	✓	✓	✓	x	Medium	Unlikely	Low
		Inhalation of vapours/gases – outdoor	1	✓	x	x	x	x	✓	Medium	Unlikely	Low
		Inhalation of vapours/gases - indoor	1	✓	x	x	x	x	✓	Medium	Unlikely	Low
		Dermal absorption via direct contact with soil	1	✓	✓	✓	✓	✓	x	Medium	Unlikely	Low
		Dermal absorption via waters (swimming / showering)	1	✓	✓	✓	✓	✓	x	Medium	Unlikely	Low
Human Health Off-Site	4	Ingestion of fruit or vegetable leaf or roots	0	✓	✓	✓	x	✓	x	N/A	N/A	N/A
		Ingestion of contaminated drinking water	1	✓	✓	x	x	✓	x	Mild	Unlikely	Very Low
		Ingestion of water / sediments when swimming	0	✓	✓	x	x	✓	x	N/A	N/A	N/A
		Ingestion of soil/dust indoors	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
		Ingestion of soil/dust outdoors	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
		Inhalation of particles (dust / soil) indoor and outdoor	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
		Inhalation of vapours – outdoor	1	✓	x	x	x	x	✓	Mild	Unlikely	Very Low
		Inhalation of vapours - indoor	1	✓	x	x	x	x	✓	Mild	Unlikely	Very Low
		Dermal absorption via direct contact with soil	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
		Dermal absorption via waters (swimming / showering)	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
Groundwater (Shallow)	4	Leaching	1	✓	✓	✓	x	✓	x	Mild	Unlikely	Very Low
		Migration via natural or anthropogenic	1	✓	✓	✓	x	✓	x	Mild	Unlikely	Very Low
Groundwater (Deep)	4	Leaching	1	✓	✓	✓	x	✓	x	Mild	Unlikely	Very Low
		Migration via natural or anthropogenic	1	✓	✓	✓	x	✓	x	Mild	Unlikely	Very Low
Surface Water	1	Direct runoff or discharges from pipes	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Indirect via recharge from groundwater (hydraulic flow)	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Deposition of wind blown dust	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
Property - Buildings On-site	1	Direct contact	1	✓	✓	✓	x	x	x	Minor	Unlikely	Very Low
		Explosion due to gas migration via natural / anthropogenic	1	✓	x	x	x	x	✓	Minor	Unlikely	Very Low
Property - Buildings Off-site	1	Direct contact	0	✓	✓	✓	x	x	x	N/A	N/A	N/A
		Explosion due to gas migration via natural / anthropogenic	1	✓	x	x	x	x	✓	Minor	Unlikely	Very Low
Ecological Systems	1	Direct deposition of particles / dust - wind blown or flood	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Indirect - through watering	1	✓	✓	✓	x	✓	x	Minor	Unlikely	Very Low
		Inhalation of gases/vapours or particulates/dust by animals	1	✓	✓	✓	✓	✓	✓	Minor	Unlikely	Very Low
		Ingestion of vegetation / water / soil by animals	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
Property - Animal/Crop - On-site	1	Direct (including deposition via wind or flood)	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Indirect (through watering)	1	✓	✓	✓	x	✓	x	Minor	Unlikely	Very Low
		Inhalation of gas / vapour / particulates / dust by animals	1	✓	✓	✓	✓	✓	✓	Minor	Unlikely	Very Low
		Ingestion of vegetation / water / soil by animals	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
Property - Animal/Crop - Off-site	1	Direct (including deposition via wind or flood)	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Indirect (through watering)	1	✓	✓	✓	x	✓	x	Minor	Unlikely	Very Low
		Inhalation of gas / vapour / particulates / dust by animals	1	✓	✓	✓	✓	✓	✓	Minor	Unlikely	Very Low
		Ingestion of vegetation / water / soil by animals	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low

Risk estimation establishes the magnitude and probability of the possible consequences (what degree of harm might result and how likely).  
The criteria for classifying probability and consequence are set out in Tables 4 and 5 of the Stantec methodology.  
Green text highlights one or more elements of the Pollutant Linkage are missing and therefore eliminated

EPH = Extractable hydrocarbons  
PAHs = Poly Aromatic Hydrocarbons  
Note For Metals there is an Inhalation pathway if Mercury is present  
Note for PAHs there are Inhalation and/or Solubility pathways for some eg Naphthalene

	Client	Vistry		Land at Tollgate Road, Colney Heath				Date	17/05/2022	
			<b>TABLE SUMMARISING POLLUTANT LINKAGES AND RISK ESTIMATION</b>				A3 Scale	NTS		
								Drawn By	MRG	
								Checked By	LT	
Caversham Bridge House, Waterman Place, Reading, RG1 8DN Tel 0118 950 0761 Fax 0118 959 7499		HAZARD CLASSIFICATION	2	THE POTENTIAL CONTAMINANTS OF CONCERN ARE :- TPHs, PAHs, heavy metals, ground gas and Asbestos						

## **Appendix G      Cavities Occurrence Assessment**

**Job Name:** Land at Tollgate Road, Colney Heath  
**Job No.:** 332510999  
**Report Ref:** 332510999/CDBS/CNE/HG/FBI  
**Date:** 3<sup>rd</sup> May 2022  
**Prepared By:** Florence Brett-Iqbal & Harry Gordon  
**Reviewed By:** Clive Edmonds  
**Subject:** Stantec Cavities Occurrence Assessment

## INTRODUCTION

Stantec have undertaken the following Cavities Occurrence Assessment for the site at Land at Tollgate Road, Colney Heath. The search of the Stantec Cavities Database has been carried out for the site detailed within the Site Location Plan provided (*Fig ref: 3925\_109\_A Red Line Location Plan - March 2021*), and the subsequent preliminary desk top assessment evaluates the potential for natural and non-coal mining cavities to be present within this boundary.

## NATURAL CAVITY RECORDS

A search of the Stantec Natural Cavities Database indicated that there is 1 natural cavity record within 1km of the site boundary, as shown in Table 1.

*Table 1: Stantec Natural Cavities Database records*

Approximate NGR	Approximate distance from site centre (m)	Recorded Location	Geology	Natural Cavity Details	Source
TL 2143 0451 TL 2155 0446 TL 2162 0454 TL 2175 0456 TL 2180 0464 TL 2190 0460	1000 (SE)	North Mimms Park, Colney Heath, Hertfordshire	<b>Superficial:</b> Alluvium Glacial Sand & Gravel  <b>Solid:</b> Chalk Group	5x Swallow Holes	Blezard, R.G., Bromley, R.G., Hancock, J.M., Hester, S.W., Hey, R.W. And Kirkaldy, J.F. (1967). No 30A: The London Region (North of the Thames). Geologists' Association Guides  Whitaker, W. (1872). The geology of the London Basin, Volume 4, Part 1. British Geological Survey Memoir (Sheets 220, 221, 240). HMSO, London.

## MINING CAVITY RECORDS

A search of the Stantec Mining Cavities Database indicated that there is 1 man-made mining cavity record within 1km of the site boundary, as shown in Table 2.

Table 2: Stantec Non-Coal Mining Cavities Database records

Approximate NGR	Approximate distance from site centre (m)	Recorded Location	Geology	Natural Cavity Details	Source
TL 2182 0625	1000 (NE)	Angerland Common, South Hatfield, Hatfield, Hertfordshire	<b>Superficial:</b> -  <b>Solid:</b> Chalk Group	Historical Chalk Quarry / Excavation - Potential Chalk Mining.	Peter Brett Associates

Subject to the following note, according to Stantec Cavities Databases, no records pertaining to natural or mining cavities appear to be present within the site footprint. We draw your attention to the fact that the absence of, or the presence of, existing records for the site should not be considered conclusive – the information provided is indicative only. For any decision on investment, construction or any other actions relating to the project, further investigations will be required to confirm ground conditions.

**CAVITY OCCURRENCE ASSESSMENT**

National Planning Policy Framework (NPPF 2021) Clause 183-184 requires an assessment for a site potentially at risk from ground instability. The aspects considered with regards to ground instability are related to natural hazards or former activities such as mining. Consideration is given below to the risk of these potential causes of instability arising from existing ground conditions across the site, as identified by the desk top data review.

**Geology**

With reference to online resources ([www.bgs.ac.uk](http://www.bgs.ac.uk)) and the British Geological Survey (BGS) Drift Geological map of Hertford (Sheet 239, 1:50,000, 1978), the published geology at the site comprises Lewes Nodular and Seaford Chalk Formations (undifferentiated), with overlying superficial deposits. The superficial deposits on site consist of the Lowestoft Formation (Diamicton) to the northeast of the site, to the southwest of this covering approximately half the site is the Kesgrave Catchment Subgroup (Sand and gravel). Furthermore, along the southwestern perimeter of the site, the above stratigraphic sequence is further overlain by Quaternary age Alluvium (Clay, silt, sand, and gravel), tracing the course of the River Colne.

The two glacial deposits present on site were deposited following transgression and regression of the Anglian Ice Sheet. The process often resulted in the deposition of a composite deposit of the Lowestoft Formation and the Kesgrave Catchment Subgroup. The dominant deposit in a given area would largely depend on either the rock substrate over which the glacier moved and eroded, or the nature of the rock debris being carried and shed by the glacier as it moved. At the site, the published geology indicates that both units are present instead of a single dominant unit, however it would be expected that lenticular inclusions of each unit would occur within the other stratigraphy.

A review was undertaken of the available BGS historical boreholes from the local area to gain a greater understanding of the geological setting at the site. The two records with most relevance to the site are detailed in Table 3 below:

Table 3: Relevant BGS Historical Borehole Records

Borehole ID	Location	Approximate Location	BGS Described Lithology	Depth from (m bgl)	Depth to (m bgl)
TL20NW14	TL 2045 0551 76.5m AOD	200m (W)	Made Ground	0.0	0.1
			Topsoil	0.1	0.8
			Boulder Clay	0.8	5.9
			Glacial Gravel	5.9	11.0
			Boulder Clay	11.0	13.0
			Glacial Gravel	13.0	20.0
			Upper Chalk	20.0	>21.0
TL20NW17	TL 2143 0517 78.6m AOD	450m (SE)	Topsoil	0.0	0.2
			Glacial Gravel	0.2	5.9
			Lake Deposits	5.9	6.5
			Boulder Clay	6.5	9.9
			Upper Chalk	9.9	>10.2

Understanding the relative level of the Chalk is of significance as it will determine the hazard for both natural and mining cavities to have developed. The boreholes detailed in Table 3 above were both completed at similar elevations, and similar to those observed across the site, however the depth to Chalk varies considerably. The ground conditions encountered in TL20NW14 are interpreted to have been impacted by glacial scouring resulting in an increased depth to the chalk interface, however the natural depth to chalk is anticipated to be at approximately 10m bgl. It should be noted that east of the site, elevation levels increase towards the A1M. Glacial deposits are absent, and the previously underlying Chalk becomes exposed. Given this elevation change and exposure of the Chalk, it is expected that the depth to the Chalk interface would become gradually shallower in the east of the site in comparison to the west of the site.

### Hydrogeology

According to online resources ([www.bgs.ac.uk](http://www.bgs.ac.uk)) the published British Geological Survey Sheet 14: Hydrogeological Map of the Area Between Cambridge and Maidenhead (1:100,000 – 1984) presents the conditions at the site showing the water table within the chalk aquifer to lie at approximately 60m AOD. With reference to Ordnance Survey Terrain 50 DTM data, viewed through the BGS GeoIndex, the ground level across the site ranges between 70-75m AOD. On this basis, the groundwater table within the Chalk is anticipated to be between 10-15m bgl. With the Chalk interpreted to be present at approximately 10m bgl, the groundwater is anticipated to be present at the Chalk interface in areas of lower elevation across the site, with up to 5m of unsaturated chalk present as elevation levels increase towards the north. Understanding the relative level of the groundwater in association with the Chalk interface is of significance as it will determine the hazard for both natural and mining cavities to have developed.

### Geomorphology

With reference to the Ordnance Survey Terrain 50 DTM data, the land levels across the site range between approximately 70-75m AOD, situated on a gentle southwestern slope towards the River Colne, which borders the site. Regionally the site is situated close to the source of the River Colne with hills present to the northeast and south. Surface water drainage is anticipated to be directed towards the

River Colne, with limited water percolating into the superficial deposits and under-draining into the Chalk.

The superficial deposits across the site were deposited following transgression and regression of the Anglian Period glacial ice sheet which extended as far south as the Vale of St Albans. The process resulted in the deposition of a composite deposit of the Lowestoft Formation (Diamicton), glaciogenic deposits overlying the Kesgrave fluvial deposits which are difficult to differentiate where glaciofluvial deposits are present. The dominant lithologies present within the drift deposit in an area largely depend on the rock substrate over which the glacier abraded and eroded, or the nature of the rock debris being carried and shed by the glacier as it moved. The Lowestoft Formation is primarily described as a chalky till.

The Chalk outcrop in this area has undergone a variety of erosional and depositional episodes, followed by tectonic uplift and initial sub-aerial erosion of the chalk surface. During the late Cretaceous/early Paleogene, the region experienced a series of marine transgressions that resulted in the deposition of the Paleogene deposits (Lambeth Group deposits). Subsequently, the area has been subjected to extensive fluvial and glaciofluvial erosion during the Anglian times and further periglacial weathering and erosion during the Devensian glacial period. Glacial and fluvial processes have eroded and largely removed the Paleogene cover deposits, resulting in thinned, patchy remnants of the Lambeth Group deposits, forming irregular outliers that mantle areas of higher topography 800m east of the site. Evidence of glacial erosion is present within the historical BGS boreholes reviewed above, whereby the depth to chalk decreases from 20.0m, 200m west of the site, to 9.9m bgl 450m east of the site.

During colder climatic glacial episodes when the ice cover increased, and water/sea levels fell, there were relatively short periods at the onset and finish of such conditions when water table levels fell widely below the Chalk surface level. During such times, downward percolation of groundwater occurred to initiate karstic weathering of the Chalk surface where favourable circumstances allowed. Such conditions might also have allowed more intense dissolution to occur more widely along bedding planes and fissures at times when cold groundwater was able to circulate through the chalk sequence. Colder groundwater has the capacity to hold more dissolved carbon dioxide, making it more acidic along with humic and fulvic acids generated by the periglacial tundra. This karstic activity was only possible during times when the ground (and groundwater) was not frozen, such as spring thaws, summer periods when ice wedges accumulate melt water, or where taliks (year-round unfrozen ground, often saturated with mineral salts, or below surface water bodies) are present and can create high hydraulic gradients and sustained pathways for groundwater to penetrate the permafrost, resulting in longer periods of karstic weathering and creation of more solution feature development than would normally be expected.

Each time as the climate warmed after glacial episodes, land drainage patterns were re-established. When water table conditions were favourable this allowed the infiltration of surface water, collecting upon cover deposits and discontinuous permafrost, to percolate downwards to initiate dissolution of the Chalk below particularly where periglacial structures create discontinuities in the deposits. As can be appreciated from the above events, there have been times when there were favourable conditions for solution feature development, and other times when conditions were probably not favourable, along with times when solution features were actively destroyed by erosion.

### **Cavities Occurrence Assessment – Natural Cavities**

In areas underlain by Chalk, the interface with cover deposits often forms a karstic horizon where solution features (sinkholes, swallow holes and solution pipes) are found. The most prominent karstic horizon is the Paleogene/Chalk interface. This interface has been removed by fluvial and glaciofluvial erosion at the site. Such processes have resulted in pronounced relative relief within the chalk surface, as is evidenced by the significant change in the depth to chalk level between the two boreholes analysed above. The area now comprises a substantial cover of Kesgrave Catchment Subgroup, and Lowestoft Formation above the chalk.

From this it is anticipated that there have been two phases of potential karst development at the site, the first associated with underdrainage from the original Paleogene cover, and the second where glacial activity scoured the chalk surface, creating solution pipes that were infilled by the glacial deposits and subsequently reactivated by further periods of underdrainage during the regression of the ice cover in the late Anglian times.

An assessment of the site has been undertaken regarding the potential for solution feature development in the geological, hydrogeological and geomorphological setting of the site. This has also taken into consideration the wider spatial factors pertaining to solution feature hazards, resulting in a hazard rating of **MODERATELY HIGH**, where the groundwater is proven to be deeper than the Chalk surface and subsequently allowing underdrainage to occur. However, this hazard rating reduces to **MODERATE** at lower elevations of the site where the groundwater is likely to be at the Chalk interface and subsequently reduces the potential for underdrainage.

### **Cavities Occurrence Assessment – Mining Cavities**

Historical chalk mining is well documented in Hertfordshire and was carried out for a range of purposes. The most common uses of mined chalk were for agricultural purposes to obtain lime to spread over clay soils to improve their drainage, lighten the soil texture for ploughing and improve crop yields.

The Stantec mining cavities database search indicated no features within the site boundary, the only known features are at the margin of the defined 1km search radius. A brief review of select historical Ordnance Survey (OS) maps dating back to 1885 found a number of chalk and gravel pits in the local area, however the closest of these mapped features was approximately 1km northeast of the site. This area is situated at a higher elevation where the Chalk bedrock is exposed, subsequently presenting a more favourable and economically viable position for Chalk extraction in comparison to the site.

It should be noted that whenever chalk mining took place in the past, it was always carried out in dry chalk above the water table. No instances are known of where dewatering was employed to create dry chalk for mining. Therefore, given that the maximum thickness of unsaturated chalk present across the site is approximately 5m, unfavourable conditions are present for chalk mining to have occurred at the site.

Therefore, on the basis of the site history, geology, hydrogeology and geomorphology, the potential for past chalk mining at the site is considered to be **LOW**.

### **RECOMMENDATIONS**

It would be prudent for foundation and drainage designers to make reference to CIRIA C574 (2002) "Engineering in chalk". If during site investigation or construction, abnormal ground conditions, such as

loose or very loose material or voiding are experienced, a geotechnical engineer should be consulted prior to continuing.

For any decision on investment, construction or any other actions relating to the project, further investigations will be required to confirm ground conditions.

We trust that the information presented will assist you, but if you have any queries then please do not hesitate to contact the writer. We will invoice for this work at the end of the month and our payment terms are strictly 28 days.

Yours sincerely,

p.p. *ME*Edmonds

**James Weddle**  
**Associate - Geohazards & Geotechnics**  
on behalf of Stantec UK Ltd

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