

Phase 1 Preliminary Risk Assessment

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Rob Jones

Marshfield Barn, New Inn Road, Hinxworth, Hertfordshire, SG7 5HB

Report by Mr Louis Turner BSc (Hons)

Supervised by Mr Joseph Turner

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1. Introduction

The following document is a Phase 1 Preliminary Risk Assessment carried out by Oakshire Environmental, and includes details of the site, environmental setting, contaminant linkages and an evaluation of risk.

1.1 Project Overview

The client's proposed project involves the conversion of an existing agricultural barn to provide one 2-bed dwelling at Marshfield Barn, New Inn Road, Hinxworth, Hertfordshire, SG7 5HB. Oakshire Environmental has carried out a Phase 1 Preliminary Risk Assessment, as described below.

1.2 Purpose of Investigation

The objectives of the Phase 1 Preliminary Risk Assessment were to:

- Develop a detailed assessment of the site.
- Identify potential contamination sources, receptors and pathways at the site.
- Assess the level of potential contamination risk.
- Determine the requirement or scope of further investigations.

1.3 Scope of Work

- Brief introductory information has been noted to provide context to the report and include an Introduction, Project Overview, Scope of Work and Limitations.
- To develop a detailed assessment of the site, desk studies have been carried out to collate information obtained from sources including the British Geological Society, Environment Agency and Ordnance Survey on planning and site history, ground conditions and environmental setting.
- This information has been used to identify potential contamination sources, receptors and pathways at the site, as part of an initial Conceptual Site Model.
- To assess the level of potential contamination risk, a Conceptual Site Model has been produced to categorise the potential severity of the impact of the contaminant linkage on the receptor and the probability of the contaminant linkage being present.
- Following the assessment of contaminant linkages, an evaluation of contamination risk has been conducted to determine the requirement and scope of further investigations.
- Supporting appendix include photographs, maps, and plans of the site.

1.4 Limitations

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This report excludes consideration of potential hazards arising from any activities at the site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities. Oakshire Environmental does not warrant or guarantee that the site is free of hazardous or potentially hazardous materials or conditions. It should be noted that this report has been produced for environmental purposes only.

2. Site

The following section provides a description of the site, location and proposed development, in addition to, planning and site history, utilising information obtained from the client and publicly available sources.

2.1 Site Description and Location

The site is located off New Inn Road in Hinxworth and is approximately 0.3ha. The site is comprised of a single storey, open fronted barn constructed with brick walls, timber cladding and a metal sheet roof with a bare earth floor. The barn has been used for the storage of arable agricultural machinery and has become redundant due to its size. The remainder of the site forms part of an arable agricultural field. No visible evidence of contamination has been identified at the site.

The site is bordered by agricultural fields to the north, a residential dwelling and agricultural barns to the east, Hillam Road to the south and residential dwellings to the west. The surrounding area is predominantly agricultural with some isolated residential dwellings and villages.

National Grid Reference: SE 54699 29149

2.2 Proposed Development

The proposed development involves the conversion of the barn to a single dwelling along with the creation of amenity space to the north west including paths, planting and a lawn and parking at the south west boundary. The remainder of the site will be redeveloped to an orchard and/or wildflower meadow.

2.3 Relevant Planning History

A search of North Herts Council's planning website identified the following relevant applications at and near the site.

Table 1: Planning applications at or near the site

Application No.	Year	Address	Proposal	Decision	Details
81/01127/1	1981	South Wing Hinxworth Place (10m south west of the site)	Erection of detached double garage/summerhouse and garden shed	Conditional Permission	No documents available
82/00736/1	1982	South Wing Hinxworth Place (10m south west of the site)	Erection of two storey building for use as garage, garden store and games room	Conditional Permission	No documents available
87/01473/1	1987	Hinxworth Place (10m south west of the site)	Alterations, conversion and extension of barn to facilitate its use as an elderly persons flat with car port and first floor drawing studio following demolition of existing extension	Conditional Permission	No documents available
90/01547/1	1990	Hinxworth Place (10m south west of the site)	Conversion of existing barn into self-contained dwelling; erection of two detached double garages to serve new dwelling and existing south wing of Hinxworth place	Conditional Permission	No documents available
00/01566/1HH	2000	Pulters Farm (10m north west of the site)	Alterations to existing roof, two storey side extension, front entrance porch, rear conservatory and detached double garage/store	Conditional Permission	No documents available
02/00157/1	2002	Pulters Farm (10m north west of the site)	Conversion, adaptation and extension of barn to create 2x4 bedroom dwellings, car parking and associated works	Conditional Permission	No documents available
04/00924/1	2004	Pulters Farm (10m north west of the site)	Two detached triple garages	Conditional Permission	No documents available
05/01173/1HH	2005	Hinxworth Place (10m south west of the site)	Erection of single storey detached building for use as a studio	Conditional Permission	No documents available

2.4 Site History

A detailed assessment of historical Ordnance Survey maps and associated data has highlighted the below on-site and off-site, current and historical land uses.

Table 2: Description of the site and surrounding area over time, according to historical maps

Year	Site Description	Surrounding Area
1877 - 1882	Site comprises part of two fields No development on the site	Surrounding land is predominantly agricultural fields Adjacent buildings labelled as 'Hinxworth Place' which is a 15 th century manor house Orchard 10m south west Ponds 10m and 160m north west and 60m south
1898	Small building at the east of the site	Small buildings to the north west and west removed
1924	Small building at the east removed	Additional buildings to the west removed
1938 - 1948	Barn at the south east of the site	Unchanged
1968	Small external yard area to the south of the barn	Orchard to the south west no longer shown Building 60m west removed and new buildings constructed 50m and 100m west Group of buildings to the west now labelled as Pulter's Farm New track 70m west
1993		Unchanged
2000	Aerial photo shows a barn at the south east with no other features on the site The remainder of the site is covered by grass and vegetation	Arable field bordering the site to the north east and south east Rough tracks bordering the site to the north west and south west Wooded areas adjacent to the site to the north west and south Buildings 20m and 60m west removed Buildings 10m south west and 30m west are barns while buildings 40m and 60m south west and 100m west are residential with adjacent garages/outbuildings New woodland established 40m north west
2006		Barn 30m west redeveloped to dwellings along with the construction of new garages/outbuildings and the development of driveways and gardens New pond developed 70m north west
2008		New dwelling constructed 20m south west
2020		Unchanged

3. Environmental Setting

The following section provides information on the environmental setting of the site, utilising data from the British Geological Survey (BGS), the Department for Environment, Food and Rural Affairs (DEFRA), the Coal Authority and Public Health England (PHE).

Table 3: Summary of the site’s environmental setting

Environmental Factor		Details	
Hydrogeology	Aquifer Designation	Superficial	Secondary (undifferentiated)
		Bedrock	Principal
	Groundwater Vulnerability	Superficial	Medium to High
		Bedrock	High
	Source Protection Zones and Abstractions		Site does not lie within a Source Protection Zone, Drinking Water Protected Area or Drinking Water Safeguard Zone
Hydrology	Water Network		Ponds 10m, 70m and 160m north west and 60m south (assumed to be spring fed)
Geology	Artificial Ground		None within 500m of the site
	Superficial Deposits		Lowestoft Formation - chalky till, characterised by its chalk and flint content, with outwash sands and gravels, silts and clays
	Bedrock Geology		West Melbury Marly Chalk Formation - soft, marly chalk and hard grey limestone
	Superficial Permeability		Moderate to High
	Bedrock Permeability		High
	Borehole Records		Well record 470m west of the site noted that the well is situated on Boulder Clay over Chalk Marl and is approximately 4.9m deep (groundwater level was not noted)
Workings	Mining and Ground Workings		None within 500m of the site
Radon	PHE UKradon		1-3% probability of being above action level
Waste and Landfill	Historical Landfill		None within 1km of the site
	Permitted Waste Sites		None within 1km of the site

4. Initial Conceptual Site Model

The following section outlines potential contamination sources, pathways and receptors, utilising information gathered in the previous sections, to develop an initial conceptual site model.

4.1 Potential Contamination Sources

Information collated through detailed desk studies has identified the following potential sources of contamination.

Agricultural Activity

The site has been used for the storage of arable agricultural machinery since around 1938. There is no hardstanding on the barn floor or on adjacent land suggesting a potential risk to underlying soil from spillages and leakages of hydrocarbons from agricultural machinery, however, this is not likely to be significant and is likely to be localised. Volatile contaminants are not likely to be present given that the barn has not recently been used and there is no evidence of contamination in the vicinity of the barn.

The remainder of the site has been used for arable farming which may have included the use of pesticides and fertilisers leading to elevated concentrations of heavy metals, Semi-Volatile Organic Compounds (SVOCs) and Volatile Organic Compounds (VOCs). The site is within an area with an Agricultural Land Classification of Grade 2 which means that the land is very good quality, therefore, it is not considered likely that chemicals would have been applied to arable crops. Furthermore, SVOCs and VOCs are unlikely to remain in soils for extended periods, given their volatility.

There is no hardstanding on the site, however, the rough tracks bordering the site to the south west and north west may contain made ground with elevated concentrations of heavy metals and PAHs. Given that these areas will continue to be used as roads and will be resurfaced with a new gravel finish, they are not considered to pose an elevated risk to residential end users.

Given the high permeability of the underlying soil, groundwater is also considered to be at risk from contamination.

4.2 Potential Contamination Receptors

Given the proposed use of the site, the following receptors are considered:

- Residential end users
- Controlled waters

4.3 Potential Contamination Pathways

Based on the expected on-site receptors, relevant pathways for the above receptors include:

- Ingestion/inhalation of contaminated soil dust
- Dermal contact with contaminated soil
- Inhalation of soil vapours
- Ingestion of homegrown produce
- Permeation into drinking water pipes
- Leaching through soil
- Surface runoff

Pathways between off-site sources and off-site receptors is beyond the scope of this assessment.

4.4 Risk Assessment Methodology

The potential level of risk posed by a particular source is determined by assessing the potential severity of the impact of the contaminant linkage on the receptor, if it is assumed to be present, and the probability of the contaminant linkage being present.

Severities are categorised from Minor to Severe and probabilities are categorised from Unlikely to High Likelihood to give a potential level of risk output.

Table 4: Risk Matrix

Probability	Severity of Consequence			
	Severe	Medium	Mild	Minor
High Likelihood	Very High Risk	High Risk	Moderate Risk	Low / Moderate Risk
Likely	High Risk	Moderate Risk	Low / Moderate Risk	Low Risk
Low Likelihood	Moderate Risk	Low / Moderate Risk	Low Risk	Very Low Risk
Unlikely	Low / Moderate Risk	Low Risk	Very Low Risk	Very Low Risk

Very High Risk

There is a high probability that severe harm could arise to a designated receptor from an identified source; or there is evidence that severe harm to a designated receptor is currently happening.

High Risk

Harm is likely to arise to a designated receptor from an identified source.

Moderate Risk

It is possible that harm could arise to a designated receptor from an identified source. It is 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.

Low Risk

It is possible that harm could arise to a designated receptor from an identified source, however, it is likely that this harm, if realised, would normally be mild.

Very Low Risk

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.

4.5 Conceptual Site Model

The information in this section has been compiled to produce an initial conceptual site model outlining the potential sources, pathways and receptors to consider at the site. The level of risk was categorised by considering the severity and probability, as outlined in the previous section.

Table 5: Conceptual site model

Sources	Pathways	Receptors	Severity	Probability	Potential Level of Risk	
Agricultural Activity	Ingestion/inhalation of contaminated soil dust Dermal contact with contaminated soil Inhalation of soil vapours Ingestion of homegrown produce Permeation into drinking water pipes	Residential end users	Medium	Unlikely	Low	The risk to underlying soil from spillages and leakages of hydrocarbons from agricultural machinery is not likely to be significant and is likely to be localised. Volatile contaminants are not likely to be present given that the barn has not recently been used and there is no evidence of contamination in the vicinity of the barn. The site is within an area with an Agricultural Land Classification of Grade 2 which means that the land is very good quality, therefore, it is not considered likely that chemicals would have been applied to arable crops. Furthermore, volatile contaminants applied to arable land are unlikely to remain in soils for extended periods.
	Leaching through soil Surface runoff	Controlled waters	Medium	Unlikely	Low	Given the high permeability of the underlying soil, groundwater is potentially at risk from contamination and surface runoff from the site may also have impacted the nearby ponds, however, the impact on groundwater and surface water is not likely to be significant given that contamination is likely to be localised.

5. Conclusions

5.1 Risk Evaluation

The initial conceptual site model identified the following potential contaminant linkages present at the site and the following conclusions have been drawn:

- There is a **low risk** to residential end users from the ingestion/inhalation of contaminated soil dust, dermal contact with contaminated soil, inhalation of soil vapours, ingestion of homegrown produce and permeation into drinking water pipes from agricultural activity on the site.
- There is a **low risk** to controlled waters from the leaching and surface runoff of contaminants from agricultural activity on the site.

Based on the findings of this Phase 1 Preliminary Risk Assessment, the risk to residential end users and controlled waters is considered to be low.

5.2 Further Investigation

Based on the above conclusions, further investigation or remediation is not considered necessary. It is important to note that this conclusion is based on the proposed development plan.

If visible or olfactory evidence of contamination is identified during excavations at the site, work should cease in order to allow further investigation to be carried out. In addition, to ensure regulatory compliance, Waste Classification & Waste Acceptance Criteria (WAC) testing of excavated material from the site may be required prior to off-site disposal.

6. References

British Geological Society. *GeoIndex*. [online] Available at: <mapapps2.bgs.ac.uk/geoindex>.

Coal Authority. *Interactive Map Viewer*. [online] Available at: <mapapps2.bgs.ac.uk/coalauthority>.

Department for Environment, Food & Rural Affairs (DEFRA). *Magic Map Application*. [online] Available at: <magic.defra.gov.uk>.

Environment Agency, 2021. *Land contamination risk management (LCRM)*. [online] Available at: <gov.uk/government/publications/land-contamination-risk-management-lcrm>.

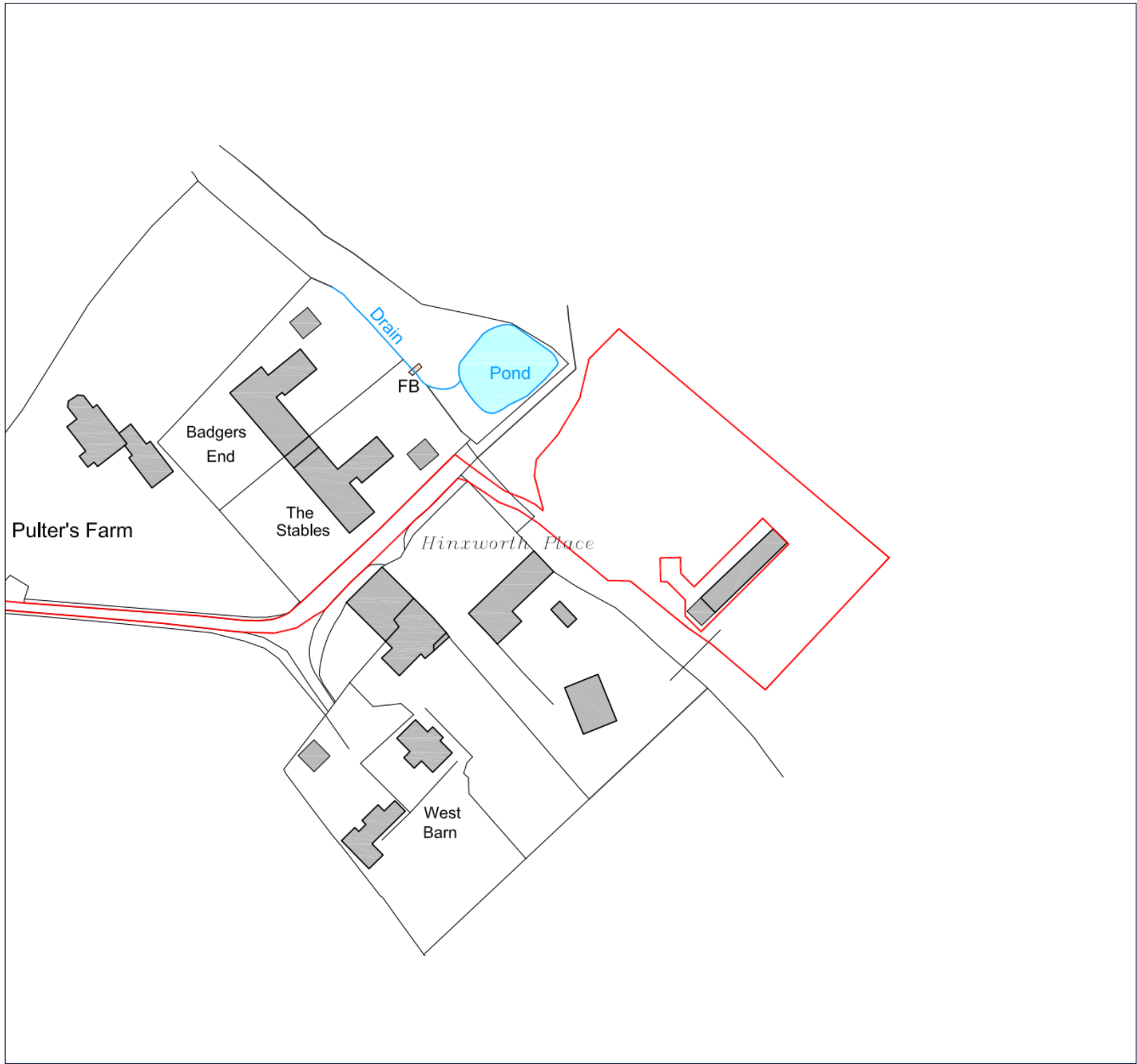
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North Herts Council. *Search Planning Applications*. [online] Available at: <north-herts.gov.uk>.

Ordnance Survey. [online] Available at: <ordnancesurvey.co.uk>.

Oakshire Environmental. Available at: <oakshireenvironmental.co.uk>.



Appendix - Site Maps & Plans

Description

Site location plan

Sources

Pentangle Design Group

Key

Site boundary

North



Appendix - Site Maps & Plans	
Description	
Topographical survey	
Sources	
DB Surveys	
Key	
	Site boundary
	North

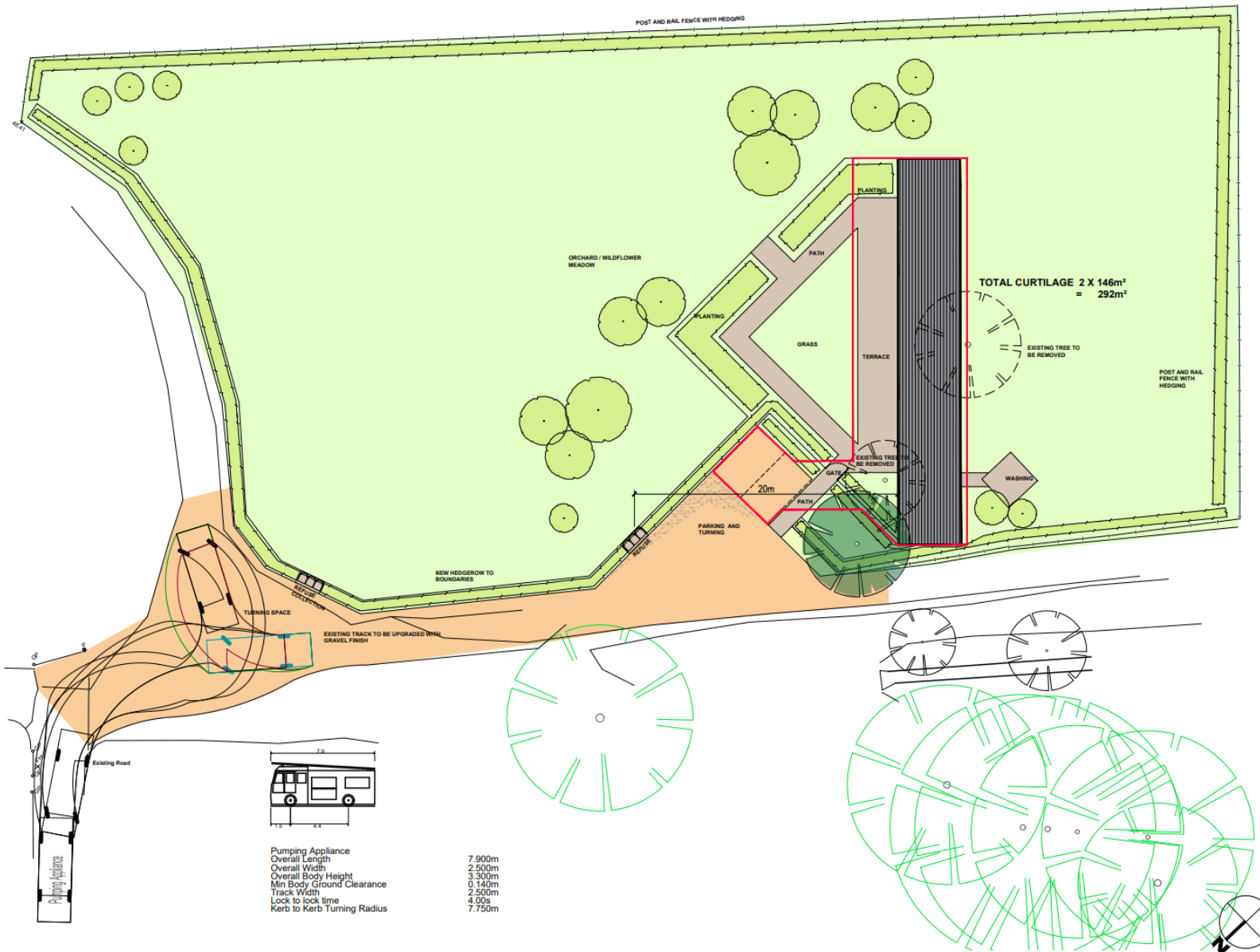
Appendix - Site Maps & Plans

Description

Proposed site

Sources

Pentangle Design Group





Appendix - Site Photos

Description

Photo of the existing barn at the south east of the site, facing east

Sources

Syfret's Consulting



Appendix - Site Photos

Description

Photo of interior of barn building, facing north east

Sources

Syfret's Consulting



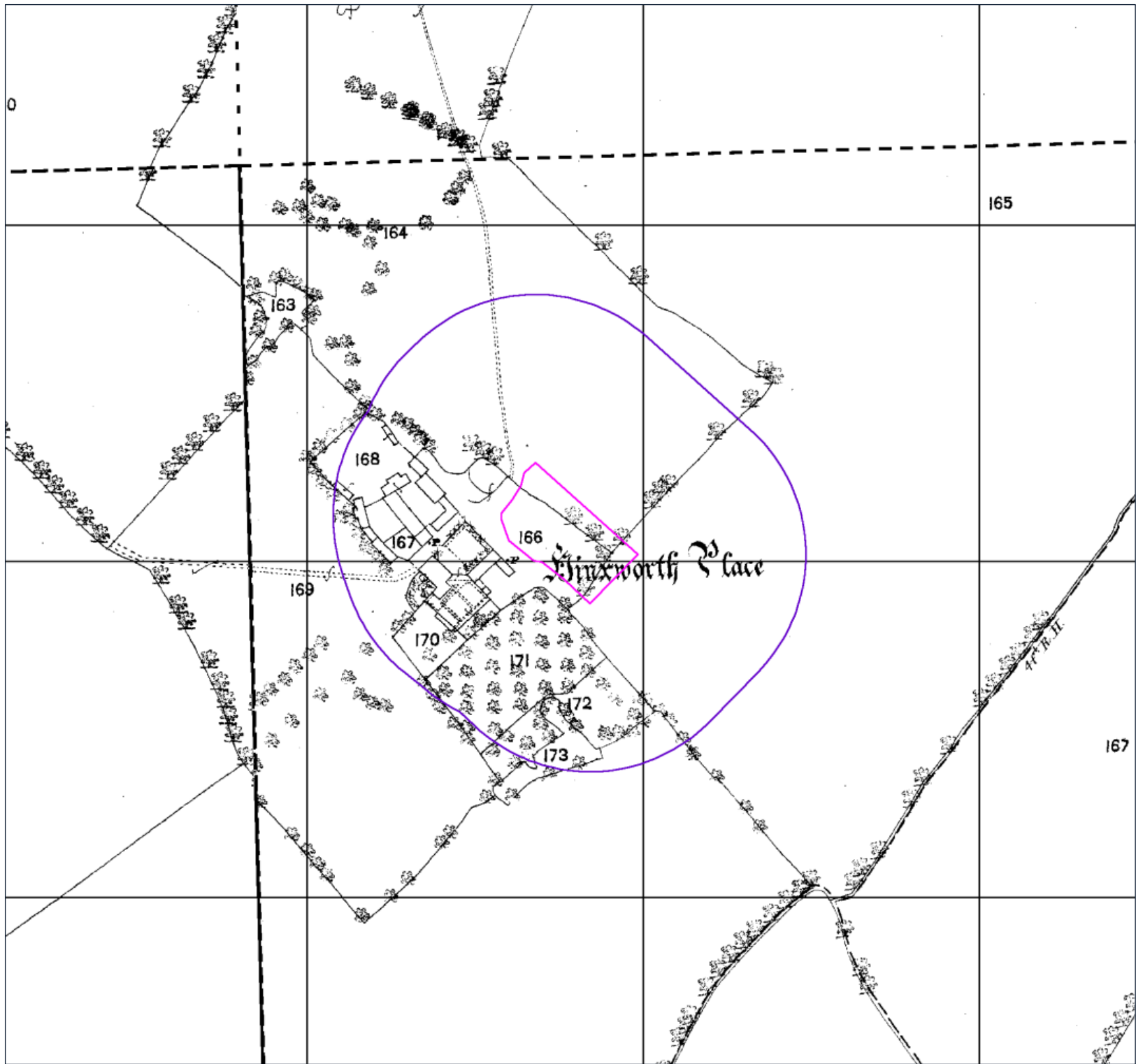
Appendix - Site Photos

Description

Photo of arable field at the north west of the site, facing south east

Sources

Planning Statement - 22/00547/PNQ



Appendix – Historical Maps

Description

Historical map dated 1877 - 1882

Scale: 1:2,500

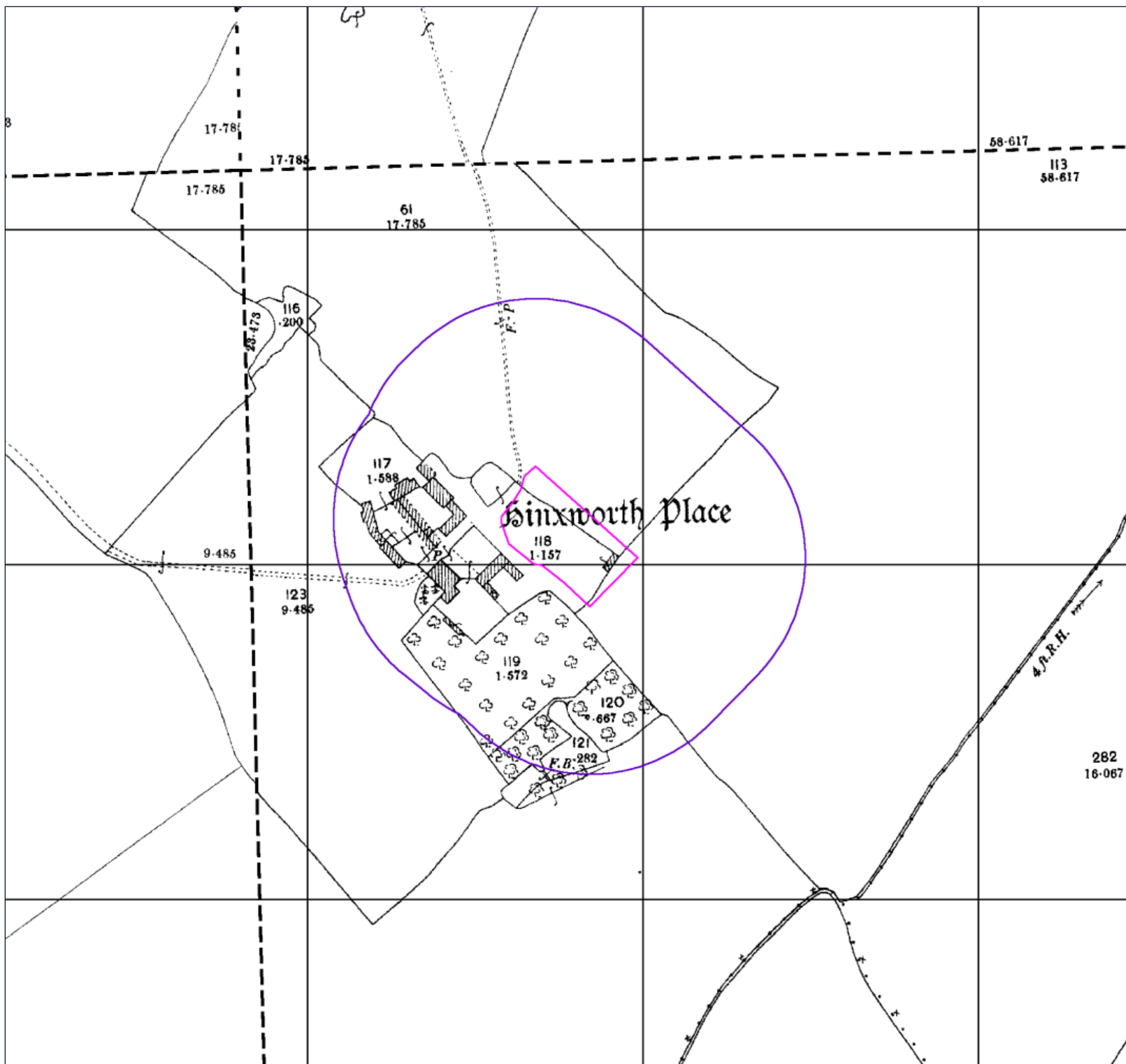
Sources

Landmark Information Group

Key

Site boundary

▲ North



Appendix – Historical Maps

Description

Historical map dated 1898

Scale: 1:2,500

Sources

Landmark Information Group

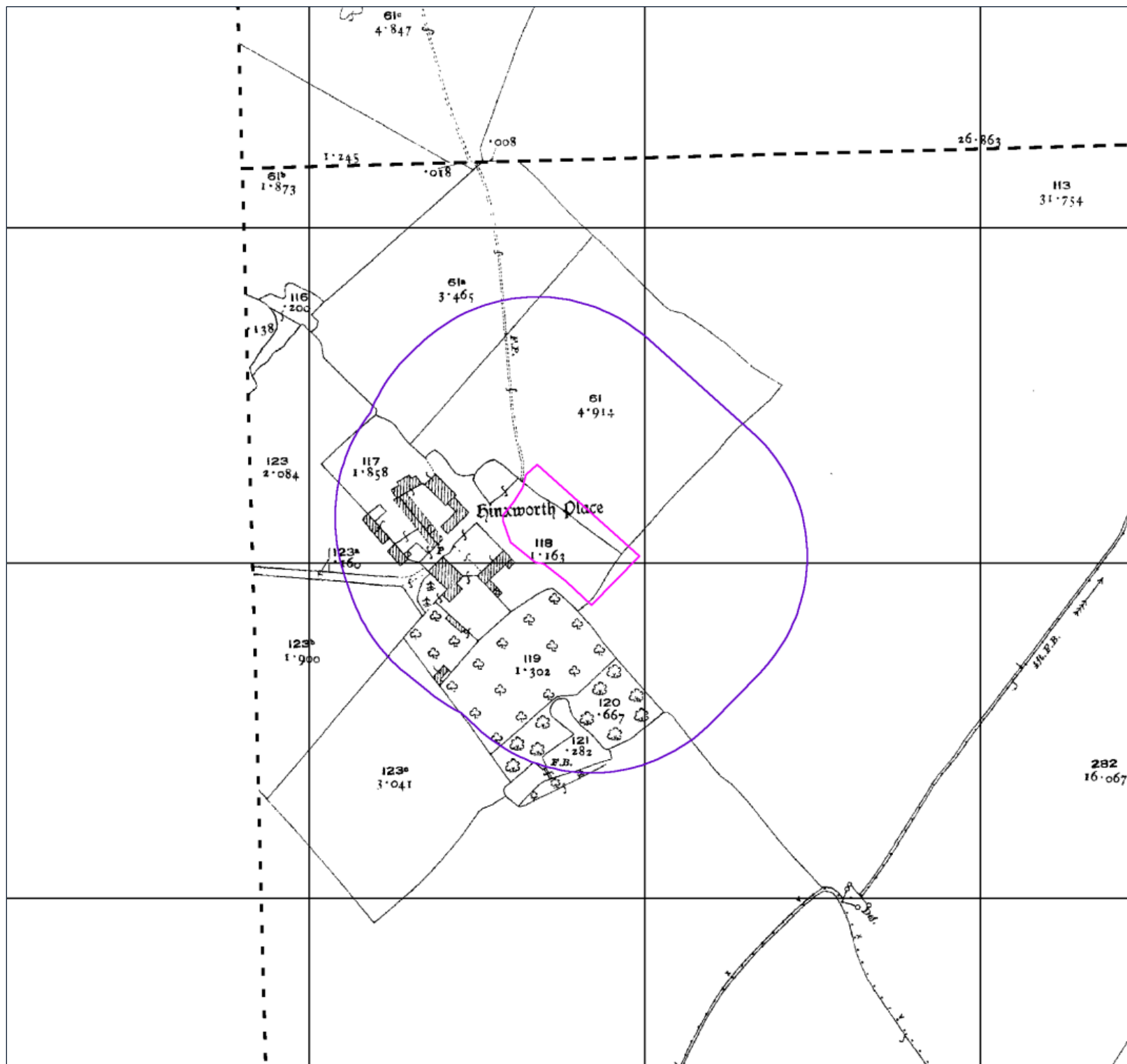
Key



Site boundary



North



Appendix – Historical Maps

Description

Historical map dated 1924

Scale: 1:2,500

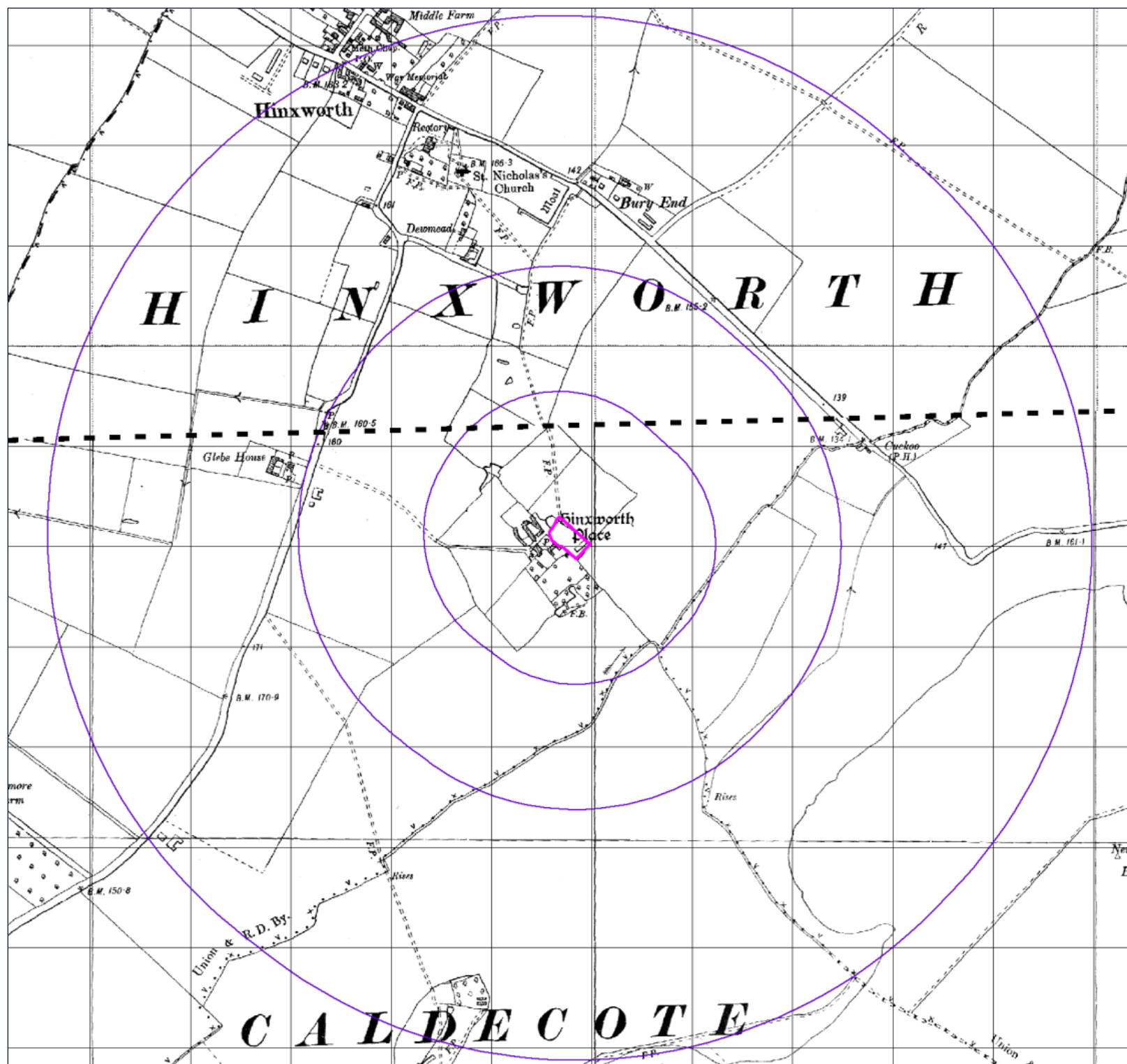
Sources

Landmark Information Group

Key

Site boundary

▲ North



Appendix – Historical Maps

Description

Historical map dated 1938 - 1948

Scale: 1:10,560

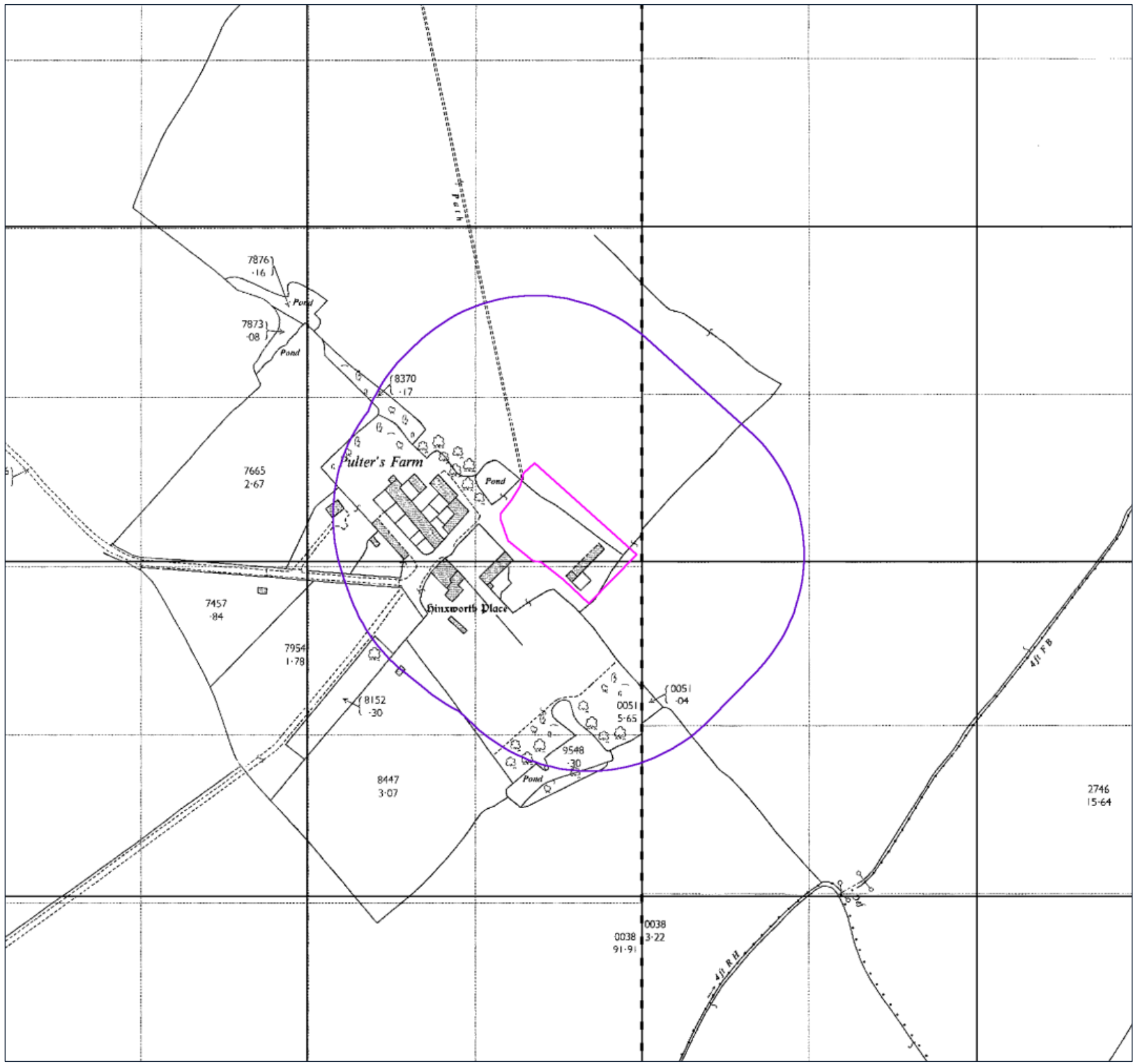
Sources

Landmark Information Group

Key

Site boundary

▲ North



Appendix – Historical Maps

Description

Historical map dated 1968

Scale: 1:2,500

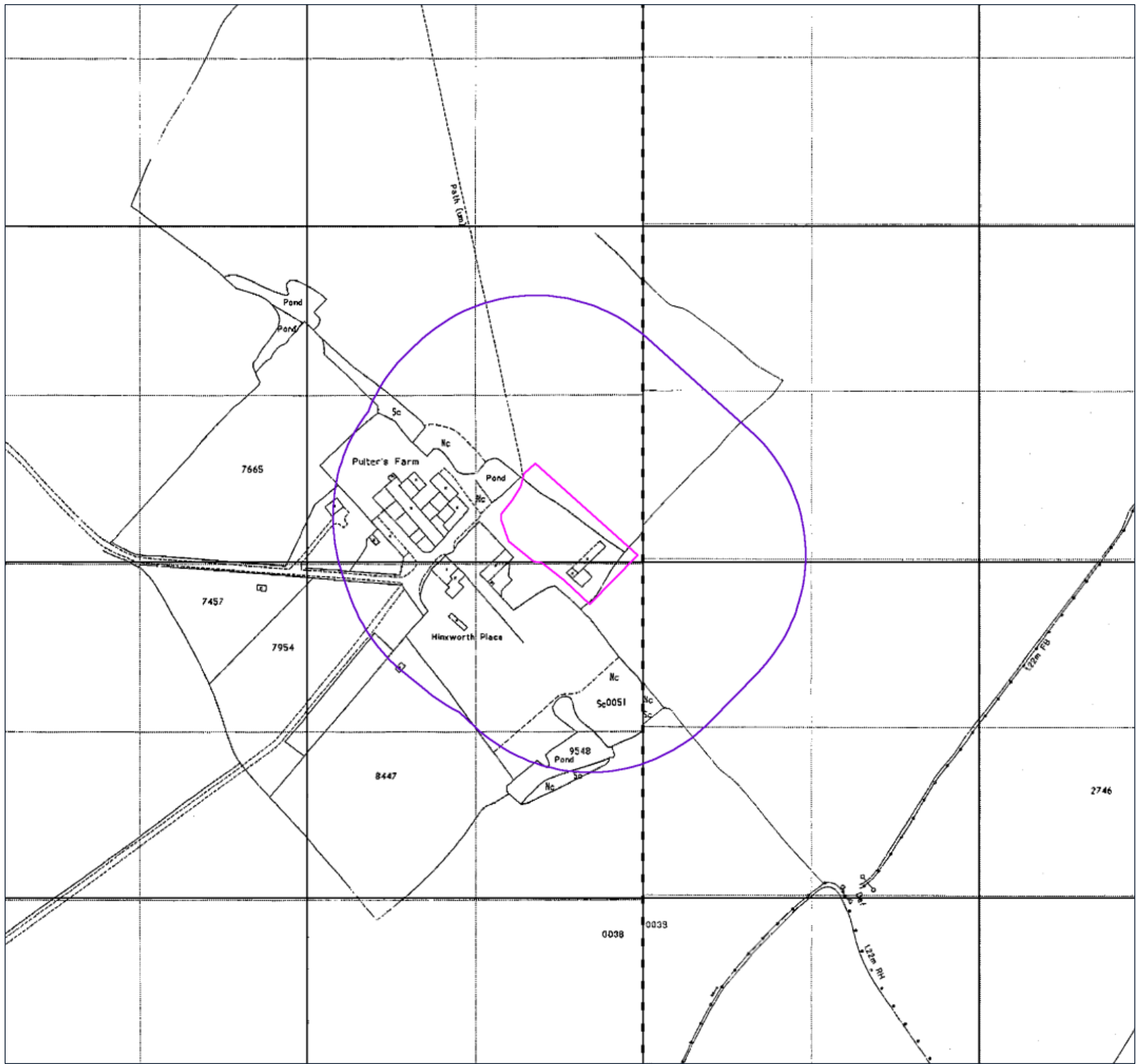
Sources

Landmark Information Group

Key

Site boundary

North



Appendix – Historical Maps

Description

Historical map dated 1993

Scale: 1:2,500

Sources

Landmark Information Group

Key

Site boundary

▲ North



Appendix – Historical Maps

Description

Aerial photograph dated 2000

Sources

Infoterra Ltd & Bluesky

Key

Site boundary

North



Appendix – Historical Maps

Description

Aerial photograph dated 2006

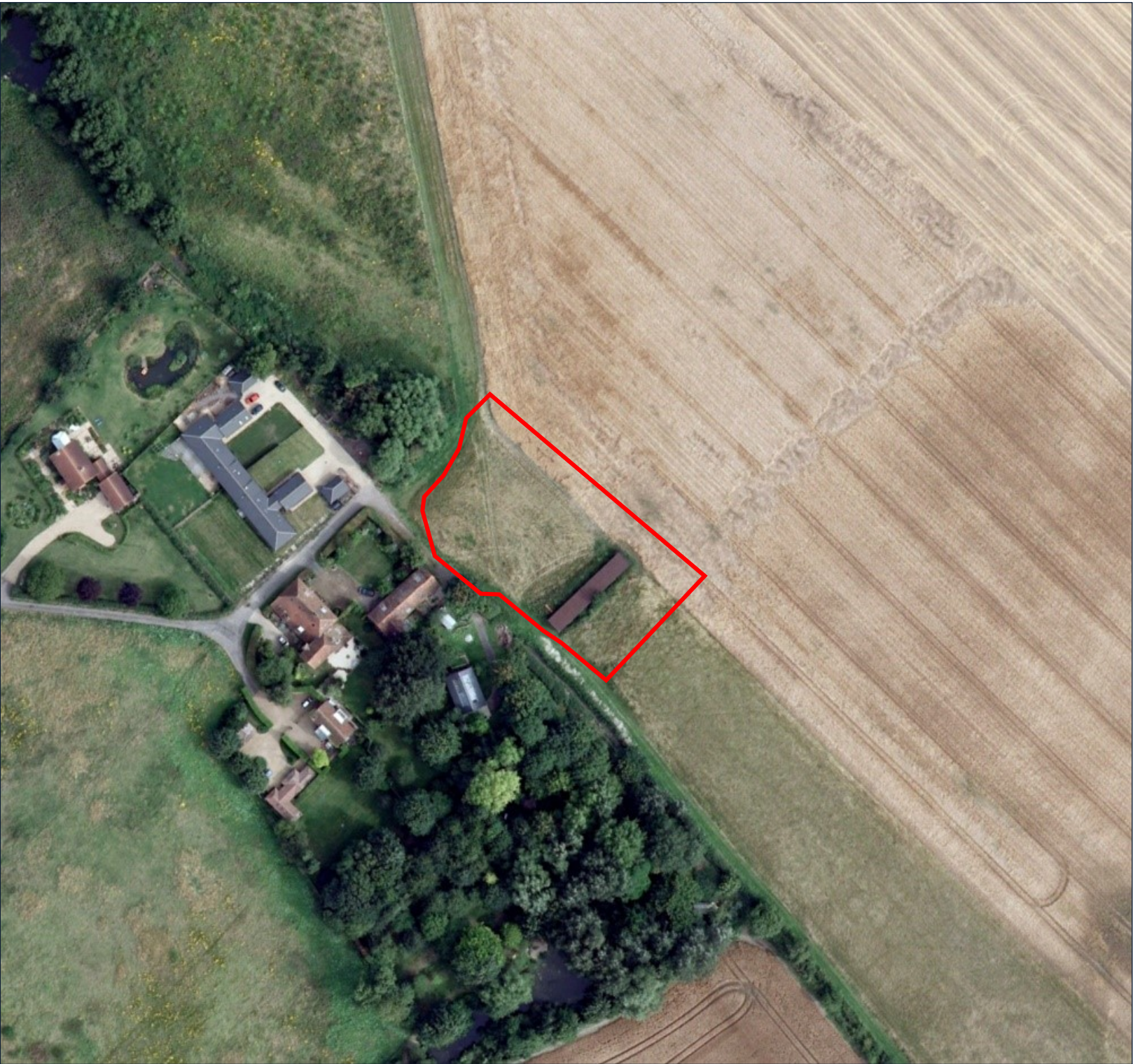
Sources

Getmapping plc

Key

Site boundary

North



Appendix – Historical Maps

Description

Aerial photograph dated 2008

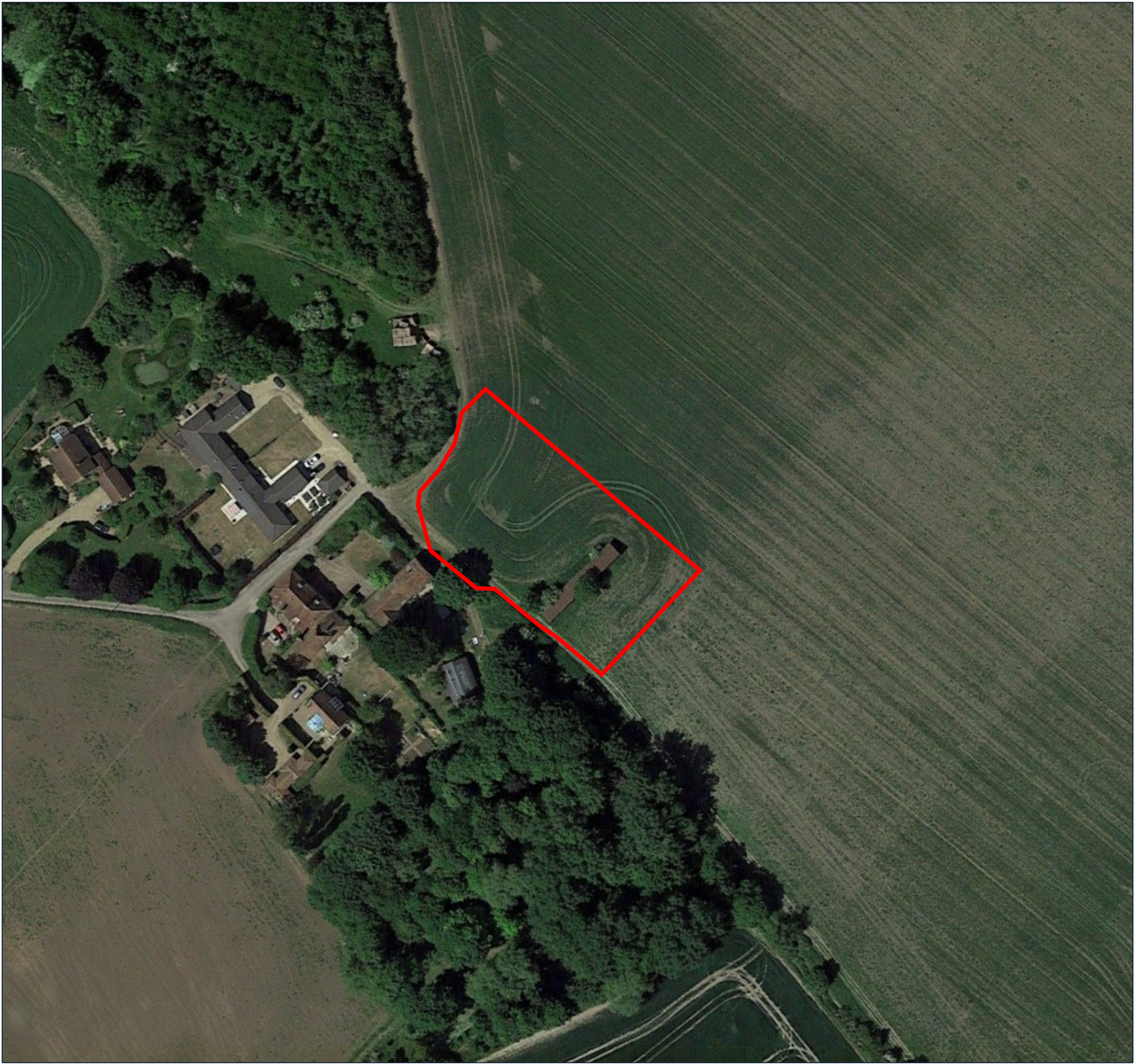
Sources

Infoterra Ltd & Bluesky

Key

Site boundary

North



Appendix – Historical Maps

Description

Aerial photograph dated 2020

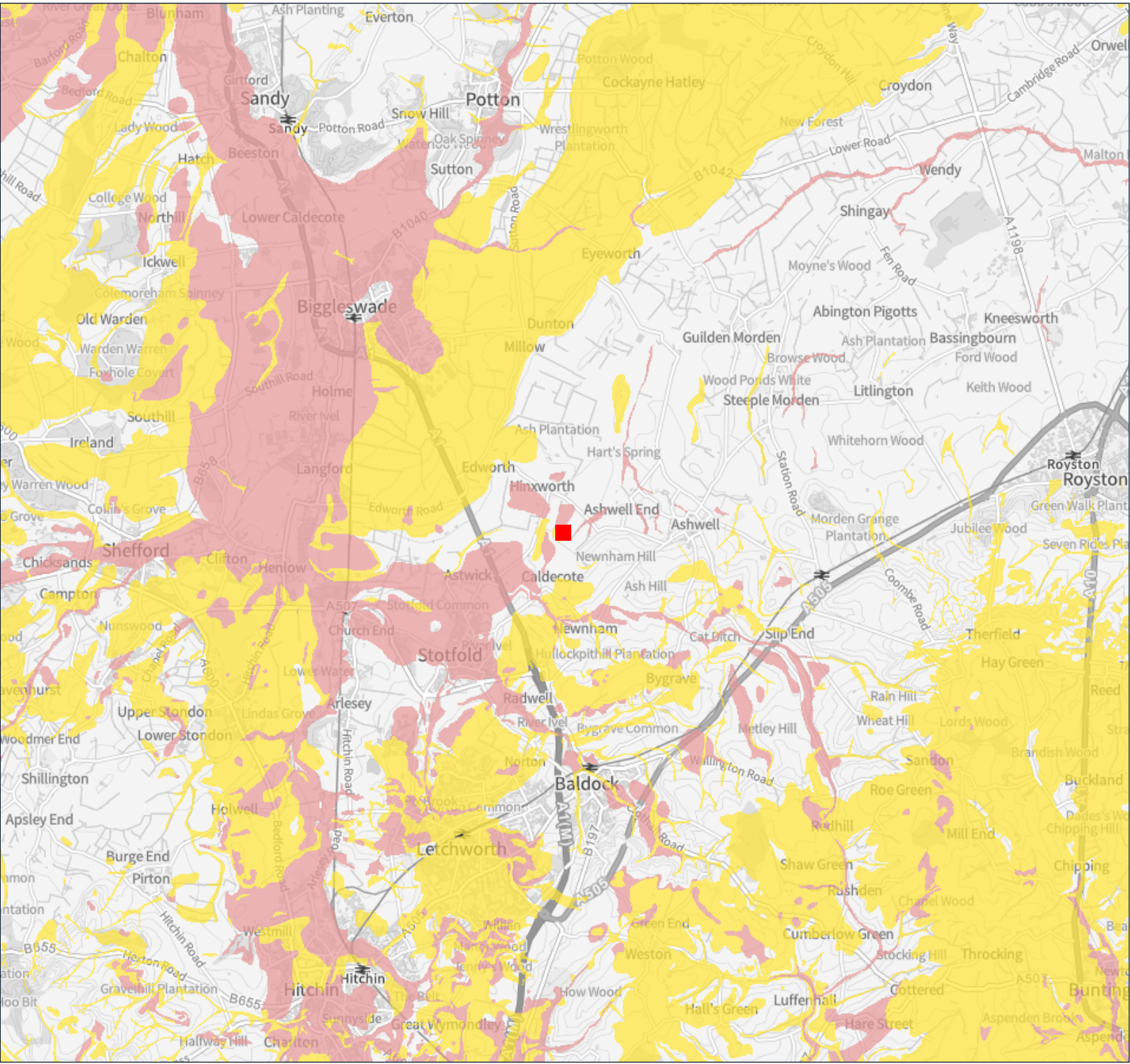
Sources

Google Earth

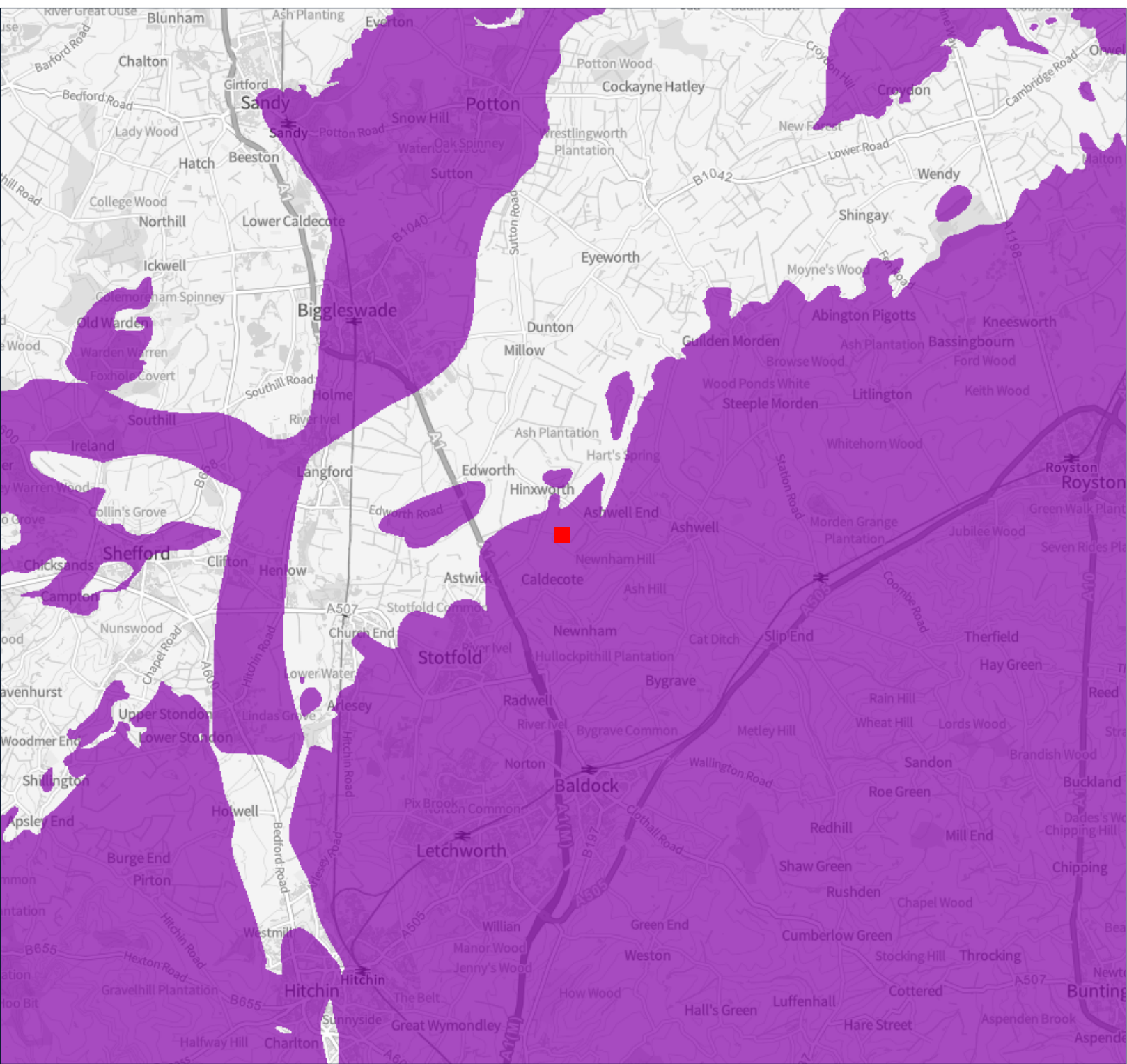
Key

Site boundary

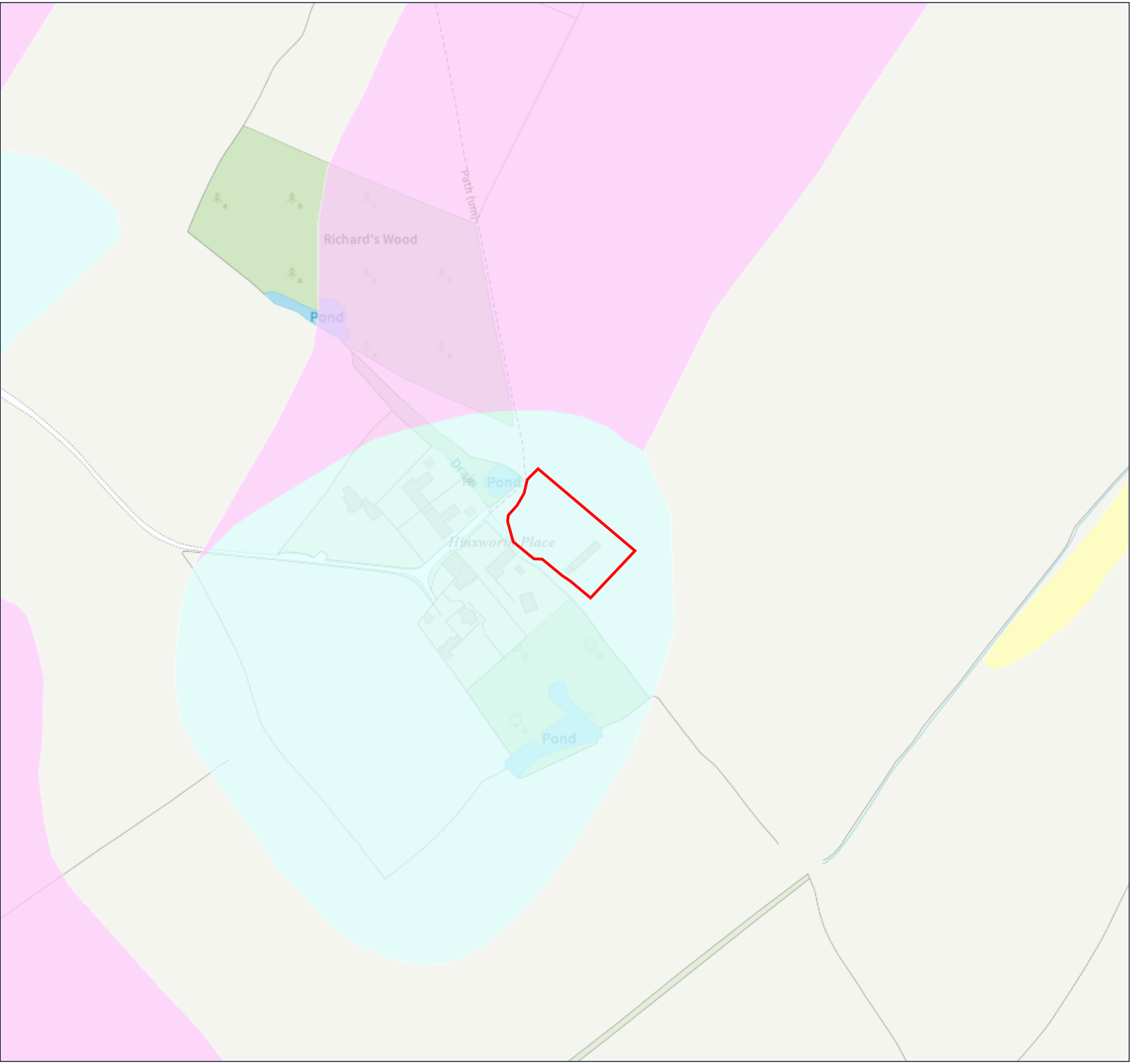
North



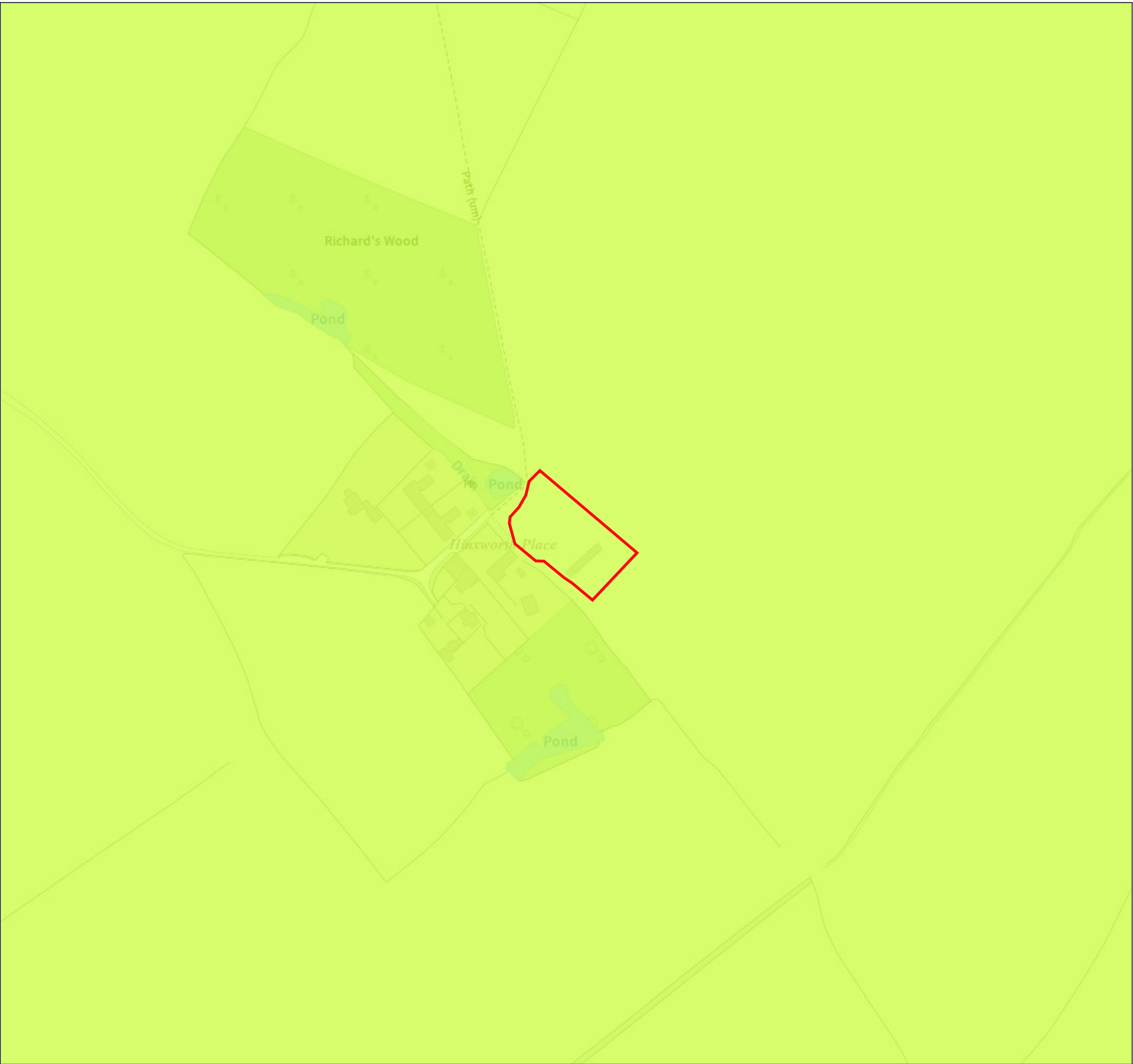
Appendix - Geological Maps	
Description	
BGS map showing superficial hydrogeology on site	
Sources	
DEFRA Magic Map British Geological Survey	
Key	
	Site location
	Principal
	Secondary A
	Secondary B
	Secondary Undifferentiated
	Unproductive
▲	North



Appendix - Geological Maps	
Description	
BGS map showing bedrock hydrogeology on site	
Sources	
DEFRA Magic Map British Geological Survey	
Key	
	Site location
	Principal
	Secondary A
	Secondary B
	Secondary Undifferentiated
	Unproductive
	North



Appendix - Geological Maps	
Description	
BGS map showing superficial deposits on site	
Sources	
British Geological Survey	
Key	
	Site boundary
▲	North



Appendix - Geological Maps

Description

BGS map showing bedrock geology on site

Sources

British Geological Survey

Key

Site boundary

▲ North