geotechnical and environmental consultants

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Phase I Desk Study

Land at the former Sipson Garden Centre, Sipson Road, Sipson, West Drayton, UB7 0HW

Lewdown Holdings Ltd c/o Bidwells

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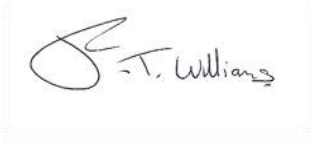
v.1.01			
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EXECUTIVE SUMMARY	
PROPOSED DEVELOPMENT	At the time of reporting, October 2023, the proposed development was understood to comprise the redevelopment of the site to provide a vehicle service building (Use Class B2), two-storey office building and use of site for maintenance of airside support vehicles with ancillary external storage of vehicles.
GEOLOGY AND HYDROGEOLOGY	The British Geological Survey Solid and Drift Geology Map for the West Drayton area (Windsor Sheet No. 269) revealed that the site was underlain by superficial Langley Silt Member over Lynch Hill Gravel Member underlain by bedrock deposits of the London Clay Formation. Infilled Ground was recorded ~20m west and ~45m east. A study of the aquifer maps on the DEFRA website revealed the site was underlain Unproductive Strata of the Langley Silt Member underlain by a Principal Aquifer comprising the superficial Lynch Hill Gravel Member, underlain by Unproductive Strata comprising bedrock deposits of the London Clay Formation. Examination of the Environment Agency records showed that the site did not fall within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater. No surface water features were present within a 250m radius of the site. The nearest surface water feature was an unnamed pond associated with the Henry Streeter landfill/quarry located ~260m east of the site. The Grand Union Canal was recorded ~1.70km north of the site, flowing in an easterly direction. From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at moderate depths within the Lynch Hill Gravel Member. Some amounts of groundwater however may be present at shallower depths within Made ground, parts of the Langley Silt Member or at depth within silty/sandy pockets of the London Clay Formation. It was considered that groundwater was flowing in a southerly direction in line with local topography.
POTENTIAL SOURCES OF CONTAMINATION	Full details can be seen in sections 6.3 and 6.4 of this report. Onsite - The Desk study has revealed the following potential sources of contamination onsite: • Potential for Made Ground (associated with historical construction/demolition onsite) • ACM • Former garden centre/nursery • Tank Offsite - The Desk study has revealed the following potential sources of contamination within the site's environs: • Potential ground-gas generating features
RECOMMENDATIONS / PHASE II OBJECTIVES	Please see Section 7.

1. INTRODUCTION

1.1. General

Ground and Water Limited were instructed by Lewdown Holdings Ltd c/o Bidwells on the 5th October 2023 to conduct a Phase I Desk Study on the site at Land at the former Sipson Garden Centre, Sipson Road, Sipson, West Drayton, UB7 0HW. The scope of the investigation was detailed within the fee proposal GW-2291, dated the 22nd September 2023.

1.2. Aims of the Investigation

This Phase 1 Desk Study was undertaken to advise the client on risk factors pertaining to the site with special reference to former and present day potential contaminative uses and their impact on sensitive receptors, these being human health, controlled waters, buildings, building materials and services.

This Phase I Desk Study comprises a Tier 1 Preliminary Risk Assessment, under Land Contamination Risk Management (LCRM).

1.3. Conditions and Limitations

This report has been prepared based on the terms, conditions and limitations outlined within Appendix A.

1.4. Technical Glossary

Generic technical terms and their description can be viewed within the glossary provided within Appendix B.

2. SITE SETTING

2.1. Site Location

The site comprised a ~30,200m^2 irregular-shaped plot of land, along the eastern side of Sipson Road (A4048). The site was located in the north Sipson, within the London Borough of Hillingdon.

The Easting Northing for the centre of the site was approximately 507278, 178192. A site location plan is given within Figure 1.

2.2. Site Description

A Site Walkover was undertaken on the 6th October 2023. A description of the site, as noted during the Site Walkover, is tabulated below. Photographs can be seen in Appendix C.

Site Description Sheet	
Use of site	At the time of the site walkover, 6th October 2023, the site was used for vehicle storage/parking across the majority of the site. Evidence of the former use of the site as a garden centre with greenhouses in the centre of the site now being used for storage of IBCs containing Adblue, vehicle/quad bikes/motor bikes, building materials and timber.
Site topography	The site was noted to be reasonably flat.
Area topography	The surrounding area was noted to be reasonably flat.
Structures onsite	Structures including 2no. greenhouses used for storage, a timber barn and portacabin offices. A number of storage containers and a bunded diesel tank were also noted within the centre of the site.
Structures off-site	A hotel was noted to the north of the site, a pub to the northeast and residential developments to the south.
Use of surrounding ground	A hotel was situated to the north of the site, the M4 running north to south was located to the east whilst the surrounding area to the south and west comprised fields and residential developments.
Boundary features	Northern Boundary: Fencing with vegetation and trees with Hotel and car park beyond. Eastern Boundary: Fencing with the M4 beyond running north to south parallel with the eastern boundary. Southern Boundary: Open boundary to soft-landscaping which expands to the south. Western Boundary: Fencing and open gate onto Sipson Road.
Site covering	The site was covered centrally with a mixture of tarmac hardstanding and concrete with type 1 gravel. The hardstanding across the site was noted to be in a reasonable condition with some staning noted and cracking/ruts. The hardstanding in the centre of the site was surrounded to the west, south and east by soft-landscaping.
Contamination sources onsite	A 58,000 litre diesel tank with 2no. pumps was situated within the centre of the site and staining was noted on the ground surrounding the pumps. 3no. smaller diesel tanks were also noted within this area as well as a tank and IBCs containing AdBlue. The timber barn was noted to have presumed asbestos roofing. Parking and washing of vehicles on site.
Contamination sources off-site	No contamination sources noted off-site.
Vegetation onsite	8 - 10m mature to semi-mature trees in the soft landscaped area within the southwestern corner of the site. Vegetation and 5-8m trees along the northern boundary of the site.
Vegetation off-site	~0.75 - 1.50m high hedges immediately to the south along the northern and western boundaries of the site.
Services	Drainage within the tarmac car park within the northwestern section of the site. Flood lights positioned across the site.

2.3. Proposed Development

At the time of reporting, October 2023, the proposed development was understood to comprise the redevelopment of the site to provide a vehicle service building (Use Class B2), two-storey office building and use of site for maintenance of airside support vehicles with ancillary external storage of vehicles. The proposed development plan can be seen within Figure 2.

2.4. Geology

The British Geological Survey Solid and Drift Geology Map for the West Drayton area (Windsor Sheet No. 269) revealed that the site was underlain by superficial Langley Silt Member over Lynch Hill Gravel Member underlain by bedrock deposits of the London Clay Formation. Infilled Ground was recorded ~20m west and ~45m east.

Superficial deposits (Drift) are the youngest geological deposits formed during the most recent period of geological time. They rest on older deposits or rocks referred to as bedrock (Solid), which are the main mass forming the Earth. Bedrock is present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Infilled Ground

Infilled Ground is shown in areas where material is known to have been deposited by man upon the natural ground surface. The main categories are spoil from mineral extraction, building and demolition rubble and waste in raised landfill sites.

Langley Silt Member

The Langley Silt Member, formerly known as Brickearth, comprises a geologically recent deposit of brown structureless sandy clay of limited thickness that usually overlies River Terrace Gravels in the area of the site. Its original name is derived from its former use in the manufacture of bricks.

Lynch Hill Gravel

The rivers of the south-east of England, including the River Thames and its tributaries, have been subject to at least three changes of level since Pleistocene times. One result has been the formation of a complex series of River Terrace Gravels. These terraces represent ancient floodplain deposits that became isolated as the river cut downwards to lower levels. The composition of the River Terrace Gravels varies greatly, depending on the source material available in the river's catchment. Deposits generally consist of sands and gravels of roughly bedded flint or chert commonly in a matrix of silts and clays. The Lynch Hill Gravel Member ranges in thickness between 1.00 – 12.00m, with an average thickness of 7.00m, and rests unconformably on bedrock geology.

London Clay Formation

The London Clay Formation comprises stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals of Gypsum (Selenite) are often found within the weathered part of the London Clay Formation, and precautions against sulphate attack to concrete are sometimes required. The lowest part of the formation is a sandy bed with black rounded gravel and occasional layers of sandstone and is known as the Basement Bed.

A BGS borehole (TQ07NE337) located in the north-west of the site revealed a 0.30m capping of Topsoil over a very stiff brown and light orange brown very silty CLAY with rare fine sand (noted to be alluvial clay but more likely to be representative of the Langley Silt Member) to a depth of 2.50m bgl. This was noted to overlie dense light brown/brown and grey brown angular to sub-rounded, fine to coarse, flint GRAVEL with fine to medium sand (likely to be representative of the Lynch Hill Gravel Member) to a depth of 6.40m bgl with rare flint cobbles noted between 4.00 – 6.40m bgl. Then the London Clay Formation comprising stiff brown mottled orange brown CLAY to the base of the borehole at 30.50m bgl. The soils were noted to become silty with shell fragments and pyrite noted with depth. No groundwater was noted.

2.5. Hydrogeology and Hydrology

A study of the aquifer maps on the DEFRA website revealed the site was underlain **Unproductive Strata** of the Langley Silt Member underlain by a **Principal Aquifer** comprising the superficial Lynch Hill Gravel Member, underlain by **Unproductive Strata** comprising bedrock deposits of the London Clay Formation.

Examination of the Environment Agency records showed that the site **did not** fall within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater.

No surface water features were present within a 250m radius of the site. The nearest surface water feature was an unnamed pond associated with the Henry Streeter landfill/quarry located ~260m east of the site. The Grand Union Canal was recorded ~1.70km north of the site, flowing in an easterly direction.

From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at moderate depths within the Lynch Hill Gravel Member. Some amounts of groundwater however may be present at shallower depths within Made ground, parts of the Langley Silt Member or at depth within silty/sandy pockets of the London Clay Formation. It was considered that groundwater was flowing in a southerly direction in line with local topography.

Examination of the Environment Agency records showed that the site was located within a Flood Zone 1, i.e. an area with a very low probability of flooding.

2.6. Radon

A review of the freely available UK Health Security Agency radon database, UK Radon, indicated that the site was located within a 1km grid square, where the maximum radon potential of <1% was recorded. Basic radon protection measures are required in areas where more than 3% of houses are at or above the Action Level.

The site was in an area where a risk assessment was not required.

2.7. Internet Search (Site Setting)

2.7.1. Available Unexploded Ordnance (UXO) Map Review

A review of the data available on www.zeticauxo.com/ revealed the site was located within the London high-risk area associated with unexploded ordnance (UXO). The London area is further separated into 25No. categories based on bombing densities, where green is indicated for areas having

<10 bombs dropped per km^2 and red is indicated for areas having >150 bombs dropped per km^2. The site is situated within the green area, at the lower end of the spectrum.

2.7.2. Historical Landfill Tool Review

A review of the data available on www.groundsure.io/ revealed that a large former Quarry known as Holloway Lane Quarry was recorded adjacent to the west. The Quarry was infilled between 1983 and 1994. Where the quarry extended to the north of Holloway Lane (~200m north-west of the site) the quarry was infilled between 1963 and 1970. From ~30m east of the site there were various names of landfill operated by Henry Streeter (Sand & Ballast) Limited. The landfills were recorded as taking non-biodegradable waste with licenses issued from 1998 and 2001, taking other wastes with license issued from 1993 and inert waste with license issued from 2004. There are no records for the end dates of the licenses.

3. HISTORICAL REVIEW

3.1. Historical Map Review

The object of this search was to report on the history of the site and its environs from available County Series and Ordnance Survey Maps dating from the mid to late 19th Century to the present day and downloaded from Groundsure. In the following sections dealing with individual maps, only features considered to have a potential contaminative impact on the site and usually within a notional 250 metre radius of the site boundaries are discussed. Any distances quoted for features remote from the site have been scaled from the maps and are only approximate. The north point and approximate extent of the site are indicated on each figure. The historical maps referred to are given within Appendix D. The implications of the map search are discussed later within this report.

Environmental Significance of Data from Historical Maps		
Maps Dated Between	**Site**	**Environs**
1866 – 1895	The site comprised a part of an undeveloped open plot of land, likely agricultural land/fields. With a row of trees through the centre and south-west.	The site environs generally comprised undeveloped agricultural land/fields to the north and west with orchards to the east and south. Residential development was recorded from 120m south-west extending southwards. A pond was identified ~210m south/south-west.
1895 – 1914	The entire site was covered by orchards associated with Sipson Farm to the south.	Adjacent to the south-west extending southwards was a nursery with associated pumps and glass houses associated with Sipson Farm. The pond to the south/south-west was no longer identified.
1914 – 1965	The south of the site was no longer covered by an orchard and an agricultural type building was identified in the south-west. By 1935, a track was recorded connected the building with Sipson Farm.	The orchards had reduced in size to cover the east and south-west only, with new buildings located ~80m east likely associated with the nursery.
1965 – 1974	The building had reduced in size.	The M4 was constructed adjacent to the eastern boundary, running north to south with a roundabout and associated earthworks recorded ~200m north-west. The orchards were no longer identified. The buildings to the east were recorded as Well Garden Farm with associated piggery. The buildings adjacent to the south-west, originally with pumps to the rear, had been replaced by semi-detached housing. Sipson Nursery was identified ~170m north-west.
1974 – 1983	An additional building was noted north of the existing building within the central portion of the site.	The Pose House (hotel) was identified ~50m north with associated electricity substation ~55m north. The piggeries associated with Well Garden Farm were identified as kennels. Some of the buildings associated with Sipson Farm ~100m south were replaced with square-shaped glass houses
1983 - 1987	A glass house was noted in the central north of the site.	The buildings associated with Sipson Farm ~50 – 200m south-west were replaced by residential buildings.
1987 – 2001	No significant changes recorded.	Large gravel pits associated with Well Garden Farm were recorded ~250m north-east and ~300m east of the site. A bus depot was recorded ~250m north-west.
2001 - 2010	No significant changes recorded.	Some of the gravel pits were no longer recorded (likely infilled) and some were shown as ponds/lakes with the closest pond/lake ~70m north-east.

2010 – 2023	The most southern building was no longer recorded.	The glass houses associated with Sipson Farm were no longer identified. By 2023, the ponds/lakes to the east had changed shape and likely more gravel pits were infilled and the closest pond/lake recorded ~70m east.

3.2. Historical Aerial Photography Review

The object of this search was to report on the history of the site and its immediate environs from available Aerial Photography dating from the mid-20th Century to the present day and downloaded from Google Earth and Groundsure. Any distances quoted for features remote from the site have been scaled from the photography and are only approximate.

At the time of the earliest aerial photography, 1945, the site appears to be occupied by agricultural land. By 1999, the site appears to be occupied by a garden centre with car park in the west, garden centre building in the center including glass houses and building south of this, hardstanding with plants etc east of the building and then the most eastern portion of the site is laid to grass with sporadic trees. A circular feature was noted adjacent to the south of the central building, thought plausible to be a tank. The southern portion of the site appears to be used for storage of materials. By 2012, the site appears to no longer be in use with all materials and glass houses removed. By 2022, the site appears to be in use for storage of multiple lorries/vehicles.

4. ENVIRONMENTAL AND GEOLOGICAL INSIGHT

4.1. Groundsure Datasheets

Groundsure Environmental and Geological Datasheets were obtained for the site. Unless the data indicates a significant risk, only information within a 250m buffer zone has been included. The GroundSure Datasheets are also presented in Appendix E and a summary is given below and overleaf(s).

Environmental Insight	
Source	Nearest Distance from Site/Dated/Type
Past Land Use	
Historical industrial land uses	10 off-site records within a 250m radius: 1 x gravel pit 14m north-west (1868), 1 x nursery 52m north-east (1964), 1 x cuttings 94m south-east (1970 – 1987), 1 x gravel pit 149m north-east (1987), 1 x nursery 152m north-west (1970), 1 x bus depot 153m north-west (1987), 2 x nursery 202 – 208m east (1934 – 1959), 2 x nursery 241 – 245m east (1935 – 1959).
Historical Tank Database	4x records within a 250m radius: 4 x records of tanks 139m east (1999), 180m south (1914 – 1935) and 180 – 196m east (1999).
Historical Energy Features Database	4x off-site records within a 250m radius: 4x records of electricity substations 30 – 32m north (1978 – 1995), 246m south (1992).
Waste and Landfill	
Active or recent landfill	6x records within a 500m radius: 1 x closed landfill, formerly taking non-biodegradable waste operated by Henry Street (sand & ballast) limited 48m east, 1 x under pollution prevention and control landfill taking other wastes operated by Henry Street (sand & ballast) limited 52m north-east, 1 x modified inert landfill operated by Henry Street (sand & ballast) limited 114m east, 1 x modified taking non-biodegradable waste operated by Henry Street (sand & ballast) limited 252m south-east, 1 x formerly taking non-biodegradable waste operated by Henry Street (sand & ballast) limited 323m east, 1 x current landfill operated by SUEZ Recycling and Recovery UK Limited 327m south.
Historical landfill (EA/NRW records)	4x records within a 500m radius: 1 x 8m west inert, industrial, commercial and household landfill operational between 1983 – 1994, 1 x 151m north-west commercial and household landfill operational between 1963 – 1970, 1 x 155m north inert, industrial, commercial and household landfill operational between 1951 – 1967, 1 x 498m south-east inert, industrial, commercial and household landfill operational from 1997 with no last recorded date.
Historical waste sites	2x records within a 500m radius: 2 x Holloway Lane Quarry 440m west for historical planning applications relating to waste reclamation and recycling centre.

Licensed waste sites	24x records within a 500m radius: 2x Site Name: Henry Street Wall Garden Farm, landfill taking non-biodegradable waste from 1998, 172m east, 1 x Site Name: North of Sipson Lane (Henry Streeter) landfill taking other wastes from 1993, 198m east, 2 x Sipson Lane landfill (Henry Streeter) taking inert waste from 2001 326m south-east, 2 x Sipson Lane landfill (Henry Streeter) taking non-biodegradable waste from 2001 326m south-east, 4 x 2 x Little Harlington Field landfill (Henry Streeter) taking inert waste from 1992 327m south-east, 2 x north of Sipson Lane landfill (Henry Streeter) taking other wastes from 1993 371m east, 3 x Harmondsworth Lane landfill (Sita Products & Services Ltd) taking household, commercial and industrial waste from 1995 399m west, 2 x Sipson South 2 Extension landfill taking non-biodegradable waste from 2001 404m south-east, 3 x Holloway Lane Material Recycling Facility operational from 2002 410m west, 3 x Holloway Lane Material Recycling Facility operational from 2002 440m west,
Current Industrial Land Use	
Recent Industrial Land Uses	10x records within a 250m radius: 1 x electricity substation 38m north, 1 x vehicle, hire and rental 107m north, 1 x tank 147m east, 1 x tank 186m east, 1 x Heathrow Coach Centre CCH Aviation Logistics) 189m north-west, 1 x bus depot 200m north-west, 1 x tank 203m east, 1 x telephone mast 206m south, 1 x gantry 217m south-east, 1 x electricity substation 243m south.
Licensed pollutant release (Part A(2)/B)	2x records within a 250m radius: 1 x London Concrete Sibson for use of bulk cement 185m east, 1 x RMC South East for use of bulk cement 198m east.
Licensed Discharges to controlled waters	3x records within a 250m radius: 1 x Wall Garden Farm for discharge of sewage between 1988 – 2006 205m south-east, 2 x Sipson Lane for sewage discharges at a pumping station between 1989 – 2015 234m south.
Pollution Incidents (EA/NRW)	1x record within a 250m radius: 1 x ammonia/amine odour in 2003 with minor effect on air and no impact on water of land.
Hydrogeology	
Superficial Aquifer	2 records on-site: 1 x Unproductive Strata, 1 x Principal Aquifer.
Bedrock Aquifer	1 record onsite: 1x Unproductive Strata.
Groundwater Vulnerability	2 records onsite: 1x Unproductive superficial aquifer – flow type: mixed, leaching class: intermediate. 1x Principal superficial aquifer – medium vulnerability, leaching class: high. 1x Unproductive bedrock aquifer – flow type: mixed, leaching class: intermediate.
Groundwater Vulnerability - local information	Principal superficial aquifer in river terrace gravels with only a thin cover of low permeability silts and/or alluvium (shown as unproductive)
Groundwater Abstractions	1x record within a 250m radius:

	1 x active point abstraction for mineral washing 180m south-east.
Hydrology	
Surface Water Features	7x record within a 250m radius: All relating to ponds to the east and one ~245m north-west.
WFD Surface Water Body Catchments	1 record on-site: 1x River Crane catchment.
WFD Groundwater Bodies	1 record on-site: 1x Lower Thames Gravels.
Environmental Designations	
Green Belt	London Green Belt on-site.
Visual and Cultural Designations	
Areas of Outstanding Natural Beauty (AONB)	None within a 250m radius.
National Parks	None within a 250m radius.
Registered Parks and Gardens	None within a 250m radius.
Agricultural Designations	
Agricultural Land Classification	1 x record on-site: 1x Grade 1.
Habitat Designation	
Priority Habitat Inventory	5x records within a 250m radius: 1 x deciduous woodland 94m north-west, 2 x No main habitat but additional habitats present 131 - 170m south-west, 2 x traditional orchard 145 – 154m south-west.

Geological Insight	
Source	Nearest Distance from Site/ Type
Artificial and Made Ground (1:10,000 Scale)	19x records within a 500m radius: 1 x Made Ground 12m west, 1 x Infilled Ground 43m west, 1 x Infilled Ground 61m east, 1 x Worked Ground 82m south-east, 1 x Infilled Ground 156m north-west, 1 x Made Ground 213m north, 1 x Worked Ground 213m east, 1 x Made Ground 220m north-east, 1 x Made Ground 223m south, 1 x Made Ground 225m south-east, 1 x Made Ground 243m north-west, 1 x Made Ground 254m north-east, 1 x Infilled Ground 334m north, 1 x Made Ground 346m south-east, 1 x Made Ground 361m south-west, 1 x Infilled Ground 369m south-west, 1 x Worked Ground 387m west, 1 x Worked Ground 440m south-west, 1 x Infilled Ground 458m north.
Superficial Geology (1:10,000 Scale)	2x on-site records: 1x Langley Silt Member (Silt), 1x Taplow Gravel Formation (Sand and Gravel).
Bedrock Geology (1:10,000 Scale)	1 on-site record: 1x London Clay Formation (Clay).
Artificial ground and permeability (1:50,000 scale)	7x records within a 500m radius: 1 x Infilled Ground 43m west, 1 x Infilled Ground 62m east, 1 x Infilled Ground 156m north-west, 1 x Worked Ground 213m east,

	1 x Infilled Ground 334m north, 1 x Infilled Ground 369m south-west, 1 x Worked Ground 388m west.
Superficial Geology and Permeability (1:50,000 scale)	2 on-site records: 1x Langley Silt Member (LSM). Flow Type: Mixed, Maximum Permeability: Low, Minimum Permeability: Very Low. 1 x Taplow Gravel Member (TGM). Flow Type: intergranular, Maximum Permeability: Very High, Minimum Permeability: High.
Bedrock Geology and Permeability (1:50,000 scale)	1 record onsite: 1x London Clay Formation. Flow Type – Mixed, Maximum Permeability – Moderate, Minimum Permeability – Very Low.
Boreholes	
BGS recorded boreholes	1 on-site and 13 within a 250m radius.
Natural Hazard Findings	
Shrink-Swell Clay	Negligible (LSM) to Very Low (TGM) hazard onsite.
Running Sands	Negligible (LSM) to Very Low (TGM) hazard onsite.
Compressible Deposits	Negligible (LSM) to Moderate (TGM) hazard onsite.
Collapsible Deposits	Very Low (TGM) to Low (LSM) hazard onsite.
Landslides	Very Low hazard onsite.
Ground Dissolution of Soluble Rocks	Negligible hazard onsite.
Mining, Ground Working and Natural Cavities	
Records of BritPits	17x records within a 500m radius: 1 x Sipson Lane Quarry 98m east (sand and gravel extraction – ceased), 1 x Well Garden Farm Quarry 158m south-east (sand and gravel extraction – ceased), 1 x Sipson Lane Quarry 173m east (sand and gravel extraction – active), 1 x Sipson Lane Quarry 197m north-east (sand and gravel extraction – ceased), 1 x Holloway Lane Quarry 223m west (sand and gravel extraction – ceased), 1 x Sipson Lane Quarry 272m east (sand and gravel extraction – ceased), 1 x Sipson Lane Quarry 311m east (sand and gravel extraction – ceased), 1 x Sipson Lane Quarry 320m south-east (sand and gravel extraction – inactive), 1 x Holloway Lane Quarry 404m south-west (sand and gravel extraction – ceased), 1 x Sipson Lane Quarry 431m south-east (sand and gravel extraction – inactive), 1 x Sipson Lane Quarry 436m east (sand and gravel extraction – ceased), 1 x Sipson Lane Quarry 448m south-east (sand and gravel extraction – inactive), 1 x Holloway Lane Quarry 448m west (sand and gravel extraction – ceased), 1 x Sipson Lane Quarry 475m east (sand and gravel extraction – ceased), 1 x Harmondsworth Lane Quarry 484m south-west (sand and gravel extraction – ceased), 1 x Holloway Lane Quarry 496m west (sand and gravel extraction – ceased), 1 x Holloway Lane Quarry 498m west (sand and gravel extraction – ceased).
Records of Surface Ground Workings	8x records within a 250m radius: 1 x gravel out 14m north-west (1868), 3 x cuttings 94m south-east (1970 – 1987), 1 x gravel pit 149m north-east (1987), 2 x pond 247 – 248m east (1987).
Records of Historical Mineral Planning Areas	7x records within a 500m radius: 1 x Holloway Lane sand and gravel surface mineral working 43m west, 1 x Sipson Lane sand and gravel surface mineral working 44m north-east, 1 x Holloway Lane sand and gravel surface mineral working 147m north-west, 1 x Sipson Lane sand and gravel surface mineral working 213m east, 1 x Harmondsworth Lane sand and gravel surface mineral working 321m south-west, 1 x West Drayton sand and gravel surface mineral working 466m north-east, 1 x West Drayton sand and gravel surface mineral working 474m north.
Researched mining	5x records within a 500m radius: 5 x stone 43m west, 62m east, 156m north-west, 369m south-west and 433m south-west.
Radon	
Is the property in a Radon Affected Area as defined by the Health Protection Agency	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

(HPA) and if so what percentage of homes are above the Action Level?	
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.
Estimated Background Soil Chemistry	
Records of BGS Estimated Urban Soils Chemistry	14x records within a 250m radius: On-site (x8), 3m north (x2), 12m north-east, 22m north-west, 34m south-east and 37m south-east: Arsenic: 12 - 13mg/kg (2.1 – 2.3mg/kg bioaccessible) Lead 117 - 152mg/kg (80 - 104mg/kg bioaccessible) Cadmium: 0.7 – 1.1mg/kg Chromium: 83 - 88mg/kg Copper: 40 – 49mg/kg Nickel: 21 - 23mg/kg
Railway Infrastructure and Projects	
Records of Railway Tunnels	2 x records within a 250m radius: 2 x railway tunnel 166 – 241m east.
Records of Historical Railway and Tunnel Features	3 x records within a 250m radius: 3 x tunnel 170 – 188m east/south-east (1999).
Records of Railways	2 x records within a 250m radius: 2 x Heathrow Link Line 169 – 188m east.
Crossrail 1	2 x records within a 250m radius: 2 x tunnel alignment 168 – 184m east.

5. ONLINE REVIEW AND HISTORICAL INVESTIGATIONS

5.1. Online Council Planning Database

A review of the Hillingdon Borough Council Planning Database revealed that two planning applications had been filed for the former Sipson Garden Centre. Those pertinent to the site development area are tabulated below.

Planning Applications for the site		
Application No./Date	**Proposed**	Decision
67666/APP/2019/1245 27/05/2020	Reinstatement of Garden Centre (Use Class A1) with replacement buildings, outdoor sales areas, hard-standing, associated car parking and landscaping	Approved
67666/APP/2021/2977 13/05/2022	Proposed use of site for specialist vehicle storage area for a temporary period of 2 years.	Refused

5.2. Internet Search

An article written for the Hillingdon & Uxbridge Times by Hannah Raven records the Sipson Garden Centre formerly located on site closed in October 2011.

5.3. Previous Site Investigations

No previous site investigations were known of or available at the time of reporting.

6. PRELIMINARY RISK ASSESSMENT

6.1. Contaminant Source-Pathway-Receptor Model

In the UK, the assessment of risk from contamination follows the source-pathway-receptor (SPR) approach. For a risk to be present there must be a source of contamination, a receptor or receptors, and a pathway for contaminants to migrate or be absorbed. If one of these three elements are absent, it is considered that there is no risk of harm. If, however, there is a linkage between any given source and any given receptor, then a risk-based approach is used to assess the significance or impact of the pollutant linkage.

This Phase 1 Desk Study has been used to identify potential on-site and off-site sources of contamination, which are summarised in this section of the report. Additional potential sources of contamination identified within the Desk Study have been discounted based on the absence of a realistic SPR linkage (i.e. the distance from the site or the nature or age of any potential contamination sources).

In line with the requirements of BS 21365:2020, *Soil Quality – Conceptual site models for potentially contaminated sites*, the Conceptual Site Model (CSM) can be described in text, tabulated or presented as a figure. A tabulated CSM is provided in Section 6.6 of this report, where each component is discussed in the following sections.

6.2. Potential On-site Sources of Contaminants

This Desk Study revealed that at the time of the earliest historical mapping (1866) the site comprised a part of an undeveloped open plot of land, likely agricultural land/fields. With a row of trees through the centre and south-west. By 1895, the entire site was covered by orchards associated with Sipson Farm to the south. By 1914, the south of the site was no longer covered by an orchard and an agricultural type building was identified in the south-west. By 1935, a track was recorded connected the building with Sipson Farm. By 1965, the building had reduced in size. By 1974, an additional building was noted north of the existing building within the central portion of the site. By 1983, a glass house was noted in the central north of the site. By 2010, the most southern building was no longer recorded. At the time of the earliest aerial photography, 1945, the site appears to be occupied by agricultural land. By 1999, the site appears to be occupied by a garden centre with car park in the west, garden centre building in the center including glass houses and building south of this, hardstanding with plants etc east of the building and then the most eastern portion of the site is laid to grass with sporadic trees. A circular feature was noted adjacent to the south of the central building, thought plausible to be a tank. The southern portion of the site appears to be used for storage of materials. By 2012, the site appears to no longer be in use with all materials and glass houses removed. By 2022, the site appears to be in use for storage of multiple lorries/vehicles.

The Phase 1 Desk Study revealed the following on-site sources of contamination:

- The site has undergone various phases of construction/demolition and various degrees of earthworks relating to the former use as an orchard and as a result various thicknesses of Made Ground resulting from these activities are likely to be encountered.

Contaminants of concern associated with Made Ground deposits include; metals, Petroleum Hydrocarbons (TPHs), Polycyclic aromatic hydrocarbons (PAHs), asbestos, sulphates, and ground gases.

- The site was formerly used as Sipson Garden Centre and prior to that as an orchard.

  Pesticides/herbicides may have been used on a regular basis during the site's use as an orchard/garden centre. Heavy metals and semi-metals may also have been used. Isolated leaks from farm machinery and storage containers may have resulted in fuel/lubrication oil contamination. Therefore, it was considered likely that there may be remnants of these chemicals left in the near surface soils.

- A bunded diesel tank was also noted within the centre of the site on aerial photography and during the site walkover.

  Above ground storage tanks, may have contained oil/fuel hydrocarbons. Spillages/leakages may have occurred over time and affected the soils and groundwater underlying the site.

  If hydrocarbons are present within the soils underlying the site and are slowly attenuating over time, the anaerobic biological breakdown of hydrocarbons can produce harmful ground gases such as methane and carbon dioxide which could affect the site.

6.3. Potential Off-site Sources of Contaminants

The Phase 1 Desk Study revealed the following potential off-site sources of contamination:

- There are various records of infilled land/Made Ground/Worked Ground/Landfills in the surrounding area.

  Putrescible material may have been used to backfill the feature which in turn could be decaying to produce ground-gases.

  Decomposition of organic matter and waste material in landfill sites is likely to occur, which could generate harmful ground-gases such as methane and carbon dioxide. Dependent on the nature of the soils underlying and surrounding the landfill site, ground-gases could migrate laterally through permeable strata and affect the site. Contaminants of concern associated with the landfill and infill material may also include metals, Petroleum Hydrocarbons (TPHs), Polycyclic aromatic hydrocarbons (PAHs), asbestos, sulphates, volatile organic compounds (VOCs) and PFAS.

  Due to the close proximity of the landfill features further risk assessment is required to investigate the risk they pose to the site. It should be noted that should a reasonable thickness of the Langley Silt Member be present across the site, this will limit migration of these contaminants. However, should this not be encountered during the site investigation ground-gas monitoring and testing for the contaminants of concern is recommended.

- Nurseries off-site, ~50m north-east at closest.

Pesticides/herbicides may have been used on a regular basis during the site's use as an orchard/garden centre. Heavy metals and semi-metals may also have been used. Isolated leaks from farm machinery and storage containers may have resulted in fuel/lubrication oil contamination. Given the distance from the site and the likely presence of Langley Silt Member which will reduce migration, it is considered unlikely these contaminants will have migrated to site. However, due to the possible pesticide use on the site itself these contaminants will be tested for as part of the site investigation anyway.

- Electricity substations 38m north and 243m south.

  High-voltage electricity sub-stations may be a potential source for PCBs. PCB oils and other cable/transformer oils, together with a series of waxes are commonly used in mainly high voltage applications. PCBs are generally toxic; however, newer forms of non-toxic oils and waxes have replaced the use of PCBs. All cable oils are extremely viscous and adhere strongly to soil particles and do not tend to migrate far from the point of leakage or spillage, therefore it was concluded that the potential risk of encountering PCBs on the site was negligible.

- Bus depot 153 - 200m north-west, vehicle, hire and rental 107m north, Heathrow Coach Centre CCH Aviation Logistics) 189m north-west.

  Potential sources of contamination associated with a garage include: lubricant oils; brake fluids (constitute mainly of polymerised glycols and ethers. solvents (chlorinated hydrocarbons, carbon tetrachloride, paraffin and proprietary degreasing compounds, gasoline, diesel, paraffin (Department of the Environment Industry Profile, Road vehicle fuelling, service and repair: garages and filling stations 1996).

  Due to the distance from site and the likely presence of Langley Silt Member which will reduce migration, it is considered unlikely that these contaminants will have migrated on-site and this source of contamination can be discounted.

- Tanks recorded at 147m east, 186m east and 203m east.

  Above ground storage tanks, may have contained oil/fuel hydrocarbons. Spillages/leakages may have occurred over time and affected the soils and groundwater underlying the site.

  If hydrocarbons are present within the soils underlying the site and are slowly attenuating over time, the anaerobic biological breakdown of hydrocarbons can produce harmful ground gases such as methane and carbon dioxide which could affect the site.

  Due to the distance from site and the likely presence of Langley Silt Member which will reduce migration, it is considered unlikely that these contaminants will have migrated on-site and this source of contamination can be discounted.

6.4. Potential Receptors

At the time of reporting, October 2023, the proposed development was understood to comprise the redevelopment of the site to provide a vehicle service building (Use Class B2), two-storey office building and use of site for maintenance of airside support vehicles with ancillary external storage of vehicles. The proposed development plan can be seen within Figure 2.

Based on the proposed development, the potential receptors are presented below and comprise:

Human Health

- End users of the site (Site Users/Future site visitors);
- Construction workers during redevelopment;
- Site operatives during maintenance works; and
- Neighbours and members of the public.

Flora and Fauna

- Vegetation within soft landscaped areas.

Building Materials and Services

- Buildings;
- Buried concrete;
- Confined spaces; and
- Underground services (Water Pipes).

Controlled Waters

- Principal Aquifer (Lynch Hill Gravel Member).

6.5. Contaminant Absorption Pathways

The potential pathways for contaminant absorption between the identified sources and the identified receptors are as follows:

Human Health:

- Direct ingestion of soil and soil derived dust;
- Dermal contact of soil and soil derived dust;
- Inhalation of dust (indoors and outdoors) with elevated concentration of determinands;
- Direct ingestion of groundwater;
- Inhalation of volatile vapour (indoors and outdoors);
- Inhalation of ground gases.; and
- Explosion.

Flora and Fauna

- Direct uptake of groundwater; and
- Direct uptake of contaminants in the soil.

Building Materials and Services

- Direct contact;
- Explosion.

Controlled Waters

- Vertical and lateral migration in permeable strata horizons;
- Via anthropogenic pathways (infilled ground and service runs);
- Surface water Runoff.

6.6. Tabulated Conceptual Site Model

The tabulated Conceptual Site Model developed as part of this Desk Study is outlined overleaf. For ease of reference and understanding, the risks have been classified within this risk assessment against four possible levels / categories, summarised in the table below. **For ease, all sources of contamination that have been discounted in section 6.3 have not been included in the CSM, the site is considered suitable for the proposed end-use and there is no plausible risk in relation to these SPR linkages.**

Risk Categories used in the Tabulated CSM	
Negligible	Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is no plausible risk. Therefore, there is no need to further assess this potential source of contamination.
Low Risk	Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is not considered to be an unacceptable risk to receptors. However, it is considered that further investigation to confirm this is recommended.
Moderate Risk	Regarding this potential SPR linkage, the site may not be suitable for the proposed end-use in its current condition and there may be an unacceptable risk to receptors. Further investigation is required to confirm this.
High Risk	Regarding this potential SPR linkage, the site is probably or certainly not suitable for proposed end-use and there is likely to be an unacceptable risk to receptors. Contaminants probably or certainly present and urgent action required in the short term.

Tabulated Conceptual Site Model – Pollutant Linkage Summary (On-Site Sources)			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from construction/ demolition activities: • Asbestos, • PAHs, • TPHs, • Sulphates, and • Metals.	• Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Inhalation of dust (indoors and outdoors) with elevated concentration of determinands • Ingestion of home-grown produce, and soils attached • Direct ingestion of groundwater • Inhalation of volatile vapour (indoors and outdoors)	**Human Health** • End Users (Site Users/Future site visitors) • Construction workers during development • Site operatives during maintenance works • Neighbours and public	**Moderate**
	• Direct uptake of groundwater • Direct uptake of determinands in the soil	**Flora and Fauna** • Vegetation within soft landscaped areas	**Moderate**
	• Anthropogenic (man-made) pathways • Vertical and lateral migration in permeable strata • Surface water runoff	**Controlled Waters** • Principal Aquifer (Lynch HIll Gravel Member)	**Low**
Former use as Sipson Garden Centre and prior to that as an orchard: • Pesticides, • TPHs, and • Metals.	• Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Inhalation of dust (indoors and outdoors) with elevated concentration of determinands • Ingestion of home-grown produce, and soils attached • Direct ingestion of groundwater • Inhalation of volatile vapour (indoors and outdoors)	**Human Health** • End Users (Site Users/Future site visitors) • Construction workers during development • Site operatives during maintenance works Neighbours and public	**Moderate**
	• Direct uptake of groundwater • Direct uptake of determinands in the soil	**Flora and Fauna** Vegetation within soft landscaped areas	**Moderate**
	• Anthropogenic (man-made) pathways • Vertical and lateral migration in permeable strata • Surface water runoff	**Controlled Waters** Principal Aquifer (Lynch HIll Gravel Member)	**Low**
A bunded diesel tank; • TPHs, and • VOCs/SVOCs.	• Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Inhalation of dust (indoors and outdoors) with elevated concentration of determinands • Ingestion of home-grown produce, and soils attached • Direct ingestion of groundwater • Inhalation of volatile vapour (indoors and outdoors)	**Human Health** • End Users (Site Users/Future site visitors) • Construction workers during development • Site operatives during maintenance works • Neighbours and public	**Moderate**
	• Direct uptake of groundwater • Direct uptake of determinands in the soil	**Flora and Fauna** Vegetation within soft landscaped areas	**Moderate**
	• Anthropogenic (man-made) pathways • Vertical and lateral migration in permeable strata	**Controlled Waters** Principal Aquifer (Lynch HIll Gravel Member)	**Low**

	• Surface water runoff		
Aggressive ground conditions with Made Ground and natural ground, including groundwater: • Sulphates, • PAH/TPH.	• Direct contact with aggressive ground conditions	**Building Materials and Services** • Buried Concrete • Underground services (water pipes)	**Moderate**
Ground gases generated by Made Ground: • Methane, • Carbon Dioxide, • Hydrogen Sulphide, and • Carbon Monoxide.	• Migration through anthropogenic & natural pathways • Inhalation of Asphyxiating gases • Explosion (methane only)	**Human Health** • End Users (Site Users/Future site visitors) • Construction workers during development (especially in confined spaces) • Site operatives during maintenance works in confined spaces • Neighbours and public	**Low**
	• Migration through anthropogenic & natural pathways • Explosion (methane only)	**Building Materials and Services** • Buildings • Confined spaces • Underground services	**Low**

Tabulated Conceptual Site Model – Pollutant Linkage Summary (Off-Site Sources)			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from nearby landfills/infilled land: • Asbestos, • PAHs, • TPHs, • PFAS, • VOCs, • Sulphates, and • Metals.	• Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Inhalation of dust (indoors and outdoors) with elevated concentration of determinands • Direct ingestion of groundwater • Inhalation of volatile vapour (indoors and outdoors)	**Human Health** • End Users (Site Users/Future site visitors) • Construction workers during development • Site operatives during maintenance works	**Moderate**
	• Direct uptake of groundwater	**Flora and Fauna** • Vegetation within soft landscaped areas	**Low**
Aggressive ground conditions associated with impacted groundwater; • Sulphates, • PAH/TPH.	• Direct contact with aggressive ground conditions	**Building Materials and Services** • Buried Concrete • Underground services (water pipes)	**Moderate**
Ground gases generated by nearby landfills/Made Ground: • Methane, • Carbon Dioxide, • Hydrogen Sulphide, and • Carbon Monoxide.	• Migration through anthropogenic & natural pathways • Inhalation of Asphyxiating gases • Explosion (methane only)	**Human Health** • End Users (Site Users/Future site visitors) • Construction workers during development (especially in confined spaces) • Site operatives during maintenance works in confined spaces	**Moderate**
	• Migration through anthropogenic & natural pathways • Explosion (methane only)	**Building Materials and Services** • Buildings • Confined spaces • Underground services	**Low**

7. RECOMMENDATIONS AND PHASE II OBJECTIVES

This section of the report will present recommendations for the further investigation of each plausible pollutant linkage identified by the Conceptual Site Model.

It is recommended that an intrusive ground investigation is undertaken at the site to evaluate the risk that contaminants of concern within the soils and groundwater may affect end-users. This should determine the underlying ground and groundwater conditions and include an assessment of the level of contamination to enable the quantification of the ground-related risks associated with the proposed redevelopment.

Consideration should be given to the testing of soil samples recovered from exploratory holes for chemical laboratory testing. The testing should be for a broad range of contaminants in accordance with DEFRA / CLEA methodologies and include the contaminants of concern identified within the Conceptual Site Model.

7.1. Soils

It is possible that asbestos and asbestos containing materials will be incorporated within any Made Ground. An asbestos management strategy should be implemented to ensure that any asbestos uncovered during the investigation does not pose a risk to members of the public that use the site.

On the basis of the Phase 1 Site Assessment the following contaminants of concern have been identified and should be included in the chemical analysis suite for the ground investigation:

- Asbestos.
- Semi-metals and heavy metals;
- Poly-cyclic aromatic hydrocarbons (PAHs);
- Speciated TPH including full aliphatic/aromatic split;
- Pesticides;
- Volatile organic compounds – BTEX Used as marker compounds; and
- Sulphates.

Should the Langley Silt Member not be encountered in a reasonable thickness across this site the following should also be tested for:

- PFAS;
- Volatile organic compounds; and
- Semi-Volatile organic compounds.

The list above does not imply that these determinands are present on-site or that they are likely to cause contamination issues at the site. The ground investigation will be used to prove the presence or absence of these contaminants. The sampling and testing strategy must be in line with current standards. Given the site has undergone various phases of building and demolition, random sampling should be adopted across the site, with the exception of some TPHs which should be taken adjacent to the existing tank. Targeted sampling of proposed soft landscaped areas may be deemed

appropriate. Results should be assessed against suitable assessment criteria to be protective of human health as well as vegetation.

Sub-surface concrete may be damaged due to being in contact with aggressive ground conditions. Sampling should be undertaken where the proposed foundations will be in contact with Made Ground and/or natural ground and tested for aggressive ground conditions (sulphates/pH). Classification should then be undertaken of the ground conditions in accordance with Building Research Establishment Special Digest 1, 2005, 'Concrete in Aggressive Ground'.

7.2. Services

The CSM has identified a moderate risk for aggressive ground conditions that may affect water supply pipes as part of the development. Consideration should be given to the targeted sampling (0.75 – 1.50m bgl) and scheduling for contaminants of concern: TPH, Naphthalene, Phenols, BTEX, VOCs and SVOCs.

7.3. Groundwater

If analytical results show elevated concentrations of contaminants of concern in the soil samples then there might be a requirement to assess the potential risks of leachability of contaminants migrating into the Principal Aquifer groundwater underlying the site. This might mean leachate testing on soils samples is required or groundwater sampling and testing.

Should the Langley Silt Member not be encountered in a reasonable thickness across this site then groundwater sampling and testing should be undertaken from boreholes installed at the site. The analysis suite should comprise:

- Semi-metals and heavy metals;
- Poly-cyclic aromatic hydrocarbons (PAHs);
- Speciated TPH including full aliphatic/aromatic split;
- PFOS/PFOA; and
- Volatile/semi-volatile organic compounds.

Analysis should be compared to suitable assessment criteria for both Controlled Waters and Human Health, where appropriate.

7.4. Ground-gas

The CSM has identified a low risk from ground gases at the site as a result of limited Made Ground on-site or within the site's environs. Analysis of soil samples should include Total Organic Carbon (TOC) testing in order to enable a pragmatic ground gas risk assessment to be undertaken at the site. This approach will only quantify the risk associated with on-site sources.

Should the Langley Silt Member not be encountered in a reasonable thickness across this site then, ground gas monitoring should be undertaken within monitoring wells installed as part of the investigation due to the close proximity of landfills/infilled land. At this stage of investigation, in accordance with BS8576:2013, it is anticipated that a minimum of twelve spot monitoring visits will be required within the ground gas risk assessment.

7.5. Vapours

The CSM has identified limited sources and associated contaminants that may pose a risk through the vapour pathway. As an initial screening to confirm BTEX compounds and MTBE will be tested in the soils. Should any visual or olfactory evidence of contamination be encountered on-site PID readings will be taken from the soil sample.

However, should the Langley Silt Member not be encountered in a reasonable thickness across this site then, the investigation should comprise a multiple line of evidence approach, comprising the analysis of soil samples taken from appropriate horizons, groundwater samples should be taken, where appropriate, and analysed for appropriate for determinands. During the monitoring of the standpipes, a PID should be used in order to identify whether a total VOC concentration is present. Should the PID identify anything over 10ppm, analysis by canister should be undertaken.

7.6. Geotechnical Review

7.6.1. General

The BGS have identified the following natural hazards on-site and within a 50m buffer.

Natural Hazards	
Shrink-Swell Clay	Negligible (LSM) to Very Low (TGM) hazard onsite.
Running Sands	Negligible (LSM) to Very Low (TGM) hazard onsite.
Compressible Deposits	Negligible (LSM) to Moderate (TGM) hazard onsite.
Collapsible Deposits	Very Low (TGM) to Low (LSM) hazard onsite.
Landslides	Very Low hazard onsite.
Ground Dissolution of Soluble Rocks	Negligible hazard onsite.

No pits/quarrying or mining features were identified on-site, however a significant number of quarries/pits/surface mineral workings were noted within the site's close environs from the historical mapping/datasheets. These were associated with sand and gravel extraction and later infilled and landfills created.

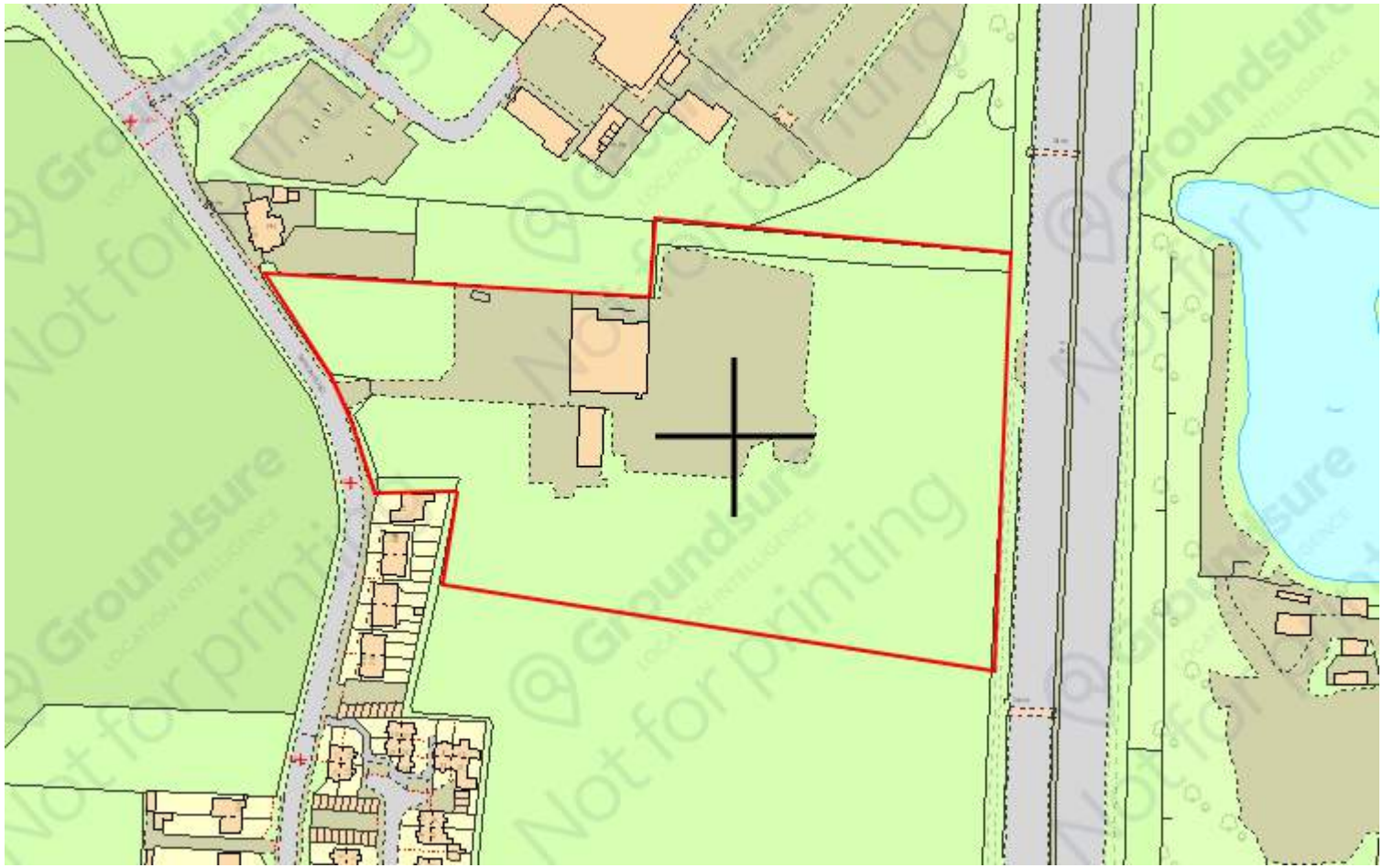
When designing foundations, the potential presence of aggressive ground conditions should be taken into consideration. Further investigation may be required in accordance with the guidance established in BRE Special Digest 1 (SD1) (2005) 'Concrete in aggressive ground'. The BGS do not record any details regarding the potential for aggressive ground conditions within shallow units identified at the site.

It is recommended that as part of the site-specific ground investigation on-site, geotechnical testing is undertaken to determine the underlying ground conditions and to evaluate any geotechnical related risks associated with the proposed redevelopment of the site.

The Groundsure datasheets have indicated that the superficial Langley Silt Member and bedrock London Clay Formation is likely to have a very low to low permeability and may not be suitable for surface water disposal. The interbedded Lynch Hill Gravel Member was recorded to have a high to very high permeability and therefore would be suitable for surface water disposal. These will be subject to on-site testing.

FIGURES

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**



Site Boundary

Not to Scale

Land at the former Sipson Garden Centre, Sipson Road, West Drayton, UB7 0HW	
Lewdown Holdings Ltd c/o Bidwells	**October 2023**
Figure 1 – Site Location Plan	**GWPR5638**

Not to Scale

Land at the former Sipson Garden Centre, Sipson Road, West Drayton, UB7 0HW	
Lewdown Holdings Ltd c/o Bidwells	**October 2023**
Figure 2 – Proposed Development Plan	**GWPR5638**

APPENDIX A: Conditions and Limitations

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The report has been prepared on the basis of information, data and materials which were available at the time of writing. Accordingly, any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report ("you" or "the Recipient") are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Any Recipient must take into account any other factors apart from the Report of which they and their experts and advisers are or should be aware. The information, data, conclusions, opinions and judgements set out in the report may relate to certain contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground

conditions have been sampled or monitored in recorded locations and tests for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist.

The conclusions and recommendations relate to Land at the former Sipson Garden Centre, Sipson Road, West Drayton, UB7 0HW.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

APPENDIX B: Technical Glossary

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
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TECHNICAL GLOSSARY

The list of possible definitions within the report may be seen below. Please note that some definitions may not be relevant to this report.

HYDROGEOLOGY:

A **Principal Aquifer** is a layer of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary (A) Aquifers consist of deposits with 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.

Secondary (B) Aquifers consist of deposits with predominantly lower permeability layers with may stoke and yield limited amounts of groundwater due to localised features such as fissures, think permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

Secondary Aquifers (Undifferentiated) are assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both a minor aquifer and non-aquifer in different locations due to the variable characteristics of the rock type.

Unproductive Strata are rock layers with low permeability that have negligible significance for water supply or river base flow. These were formerly classified as non-aquifers.

FLOOD ZONES:

Environment Agency Flood Zone 2, defined as; land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.

Environment Agency Flood Zone 3 shows the extent of a river flood with a 1 in 100 (1%0 or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year.

Environment Agency Flood Zone 3 area that benefits from flood defences, defined as; land and property in this flood zone would have a high probability of flooding without the local flood defences. These protect the area against a river flood with a 1% chance of happening each year, or a flood from the sea with a 0.5% chance of happening each year.

GROUNDWATER SOURCE PROTECTION ZONES (SPZS):

Inner Zone (SPZ1): This zone is 50 day travel time of pollutant to source with a 50 metres default minimum radius.

Outer Zone (SPZ2): This zone is 400 day travel time of pollutant to source. This has a 250 or 500 metres minimum radius around the source depending on the amount of water taken.

Total Catchment (SPZ3): This is the area around a supply source within which all the groundwater ends up at the abstraction point. This is the point from where the water is taken. This could extend some distance from the source point.

Zone of Special Interest (SPZ4): This zone is where local conditions require additional protection.

IN-SITU STRENGTH GEOTECHNICAL TESTING:

Windowless Sample and/or Cable Percussion and/or Rotary Boreholes provide samples of the ground for assessment but they do not give any engineering data. The standard penetration test (SPT) is an in-situ dynamic penetration test designed to provide information on the geotechnical engineering properties of soil. The test uses a thick-walled sample tube, with an outside diameter of 50mm and an inside diameter of 35mm, and a length of around 650mm. This is driven into the ground at the bottom of a borehole by blows from a slide hammer with a weight of 63.5kg falling through a distance of 760mm. The sample tube is driven 150mm into the ground and then the number of blows needed for the tube to penetrate each 75mm up to a depth of 450mm is recorded. The sum of the number of blows is termed the "standard penetration resistance" or the "N-value".

Dynamic Probing involves the driving of a metal cone into the ground via a series of steel rods. These rods are driven from the surface by a hammer system that lifts and drops a 63.5kg (SHDP) hammer onto the top of the rods through a set height, thus ensuring a consistent energy input. The number of hammer blows that are required to drive the cone down by each 100mm increment are recorded. These blow counts then provide a comparative assessment from which correlations have been published, based on dynamic energy, which permits engineering parameters to be generated. (The Dynamic Probe 'Super Heavy' (SHDP) Tests were conducted in accordance with BS 1377; 1990; Part 9, Clause 3.2).

APPENDIX C: Site Photographs

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

Photograph 1: Access to site via Sipson Road. View looking northwest.

Photograph 2: Tarmac car park. View looking west.

Photograph 3: Greenhouses used for general storage. View looking east.

Photograph 4: Storage of furniture, vehicles,and building materials . View looking south.

Land at Former Sipson Garden Centre, Sipson Road, West Drayton, UB7 0HW	
Lewdown Holdings Ltd c/o Bidwells	**October 2023**
Appendix C: Photoplates	**GWPR5638**

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Photograph 5: Storage of timber and Adblue within IBCs. View looking south.

Photograph 6: Storage containers. View looking south.

Photograph 7: Diesel tank. View looking south.

Photograph 8: Bunded 58000l Diesel tank with pumps. View looking north.

Land at Former Sipson Garden Centre, Sipson Road, West Drayton, UB7 0HW	
Lewdown Holdings Ltd c/o Bidwells	**October 2023**
Appendix C: Photoplates	**GWPR5638**

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Photograph 9: Soft-landscaped areas used for vehicle parking. View looking south.

Photograph 10: Vehicle parking and wash. View looking west.

Photograph 11: Vehicle parking. View looking east/southeast.

Photograph 12: Soft-landscaped areas partially used for vehicle parking. View looking east.

Land at Former Sipson Garden Centre, Sipson Road, West Drayton, UB7 0HW

Lewdown Holdings Ltd c/o Bidwells	**October 2023**
Appendix C: Photoplates	**GWPR5638**

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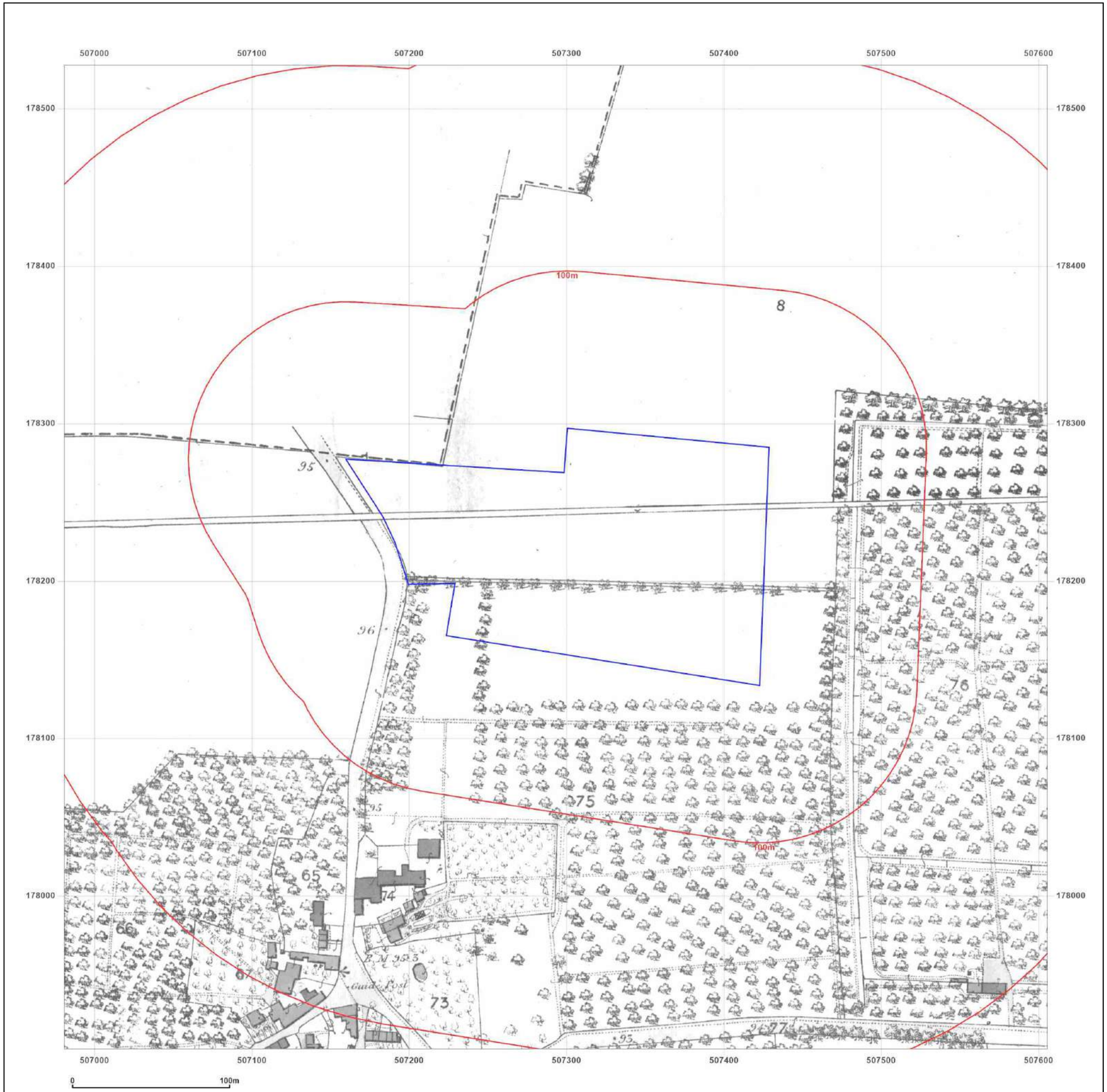
APPENDIX D:
Historical Maps

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001



Groundsure INSIGHTS

Site Details:

SHELTER 17M FROM THE PLOUGH, 239 SIPSON ROAD ON A408, SIPSON ROAD, SIPSON, WEST DRAYTON, UB7 0HW

Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: County Series
Map date: **1866**
Scale: 1:2,500
Printed at: 1:2,500

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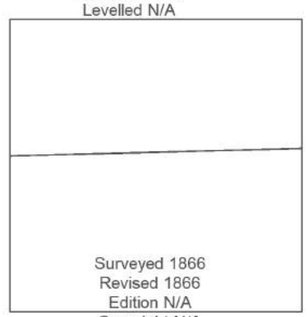
Surveyed 1866
Revised 1866
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1866
Revised 1866
Edition N/A
Copyright N/A
Levelled N/A

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Map legend available at:
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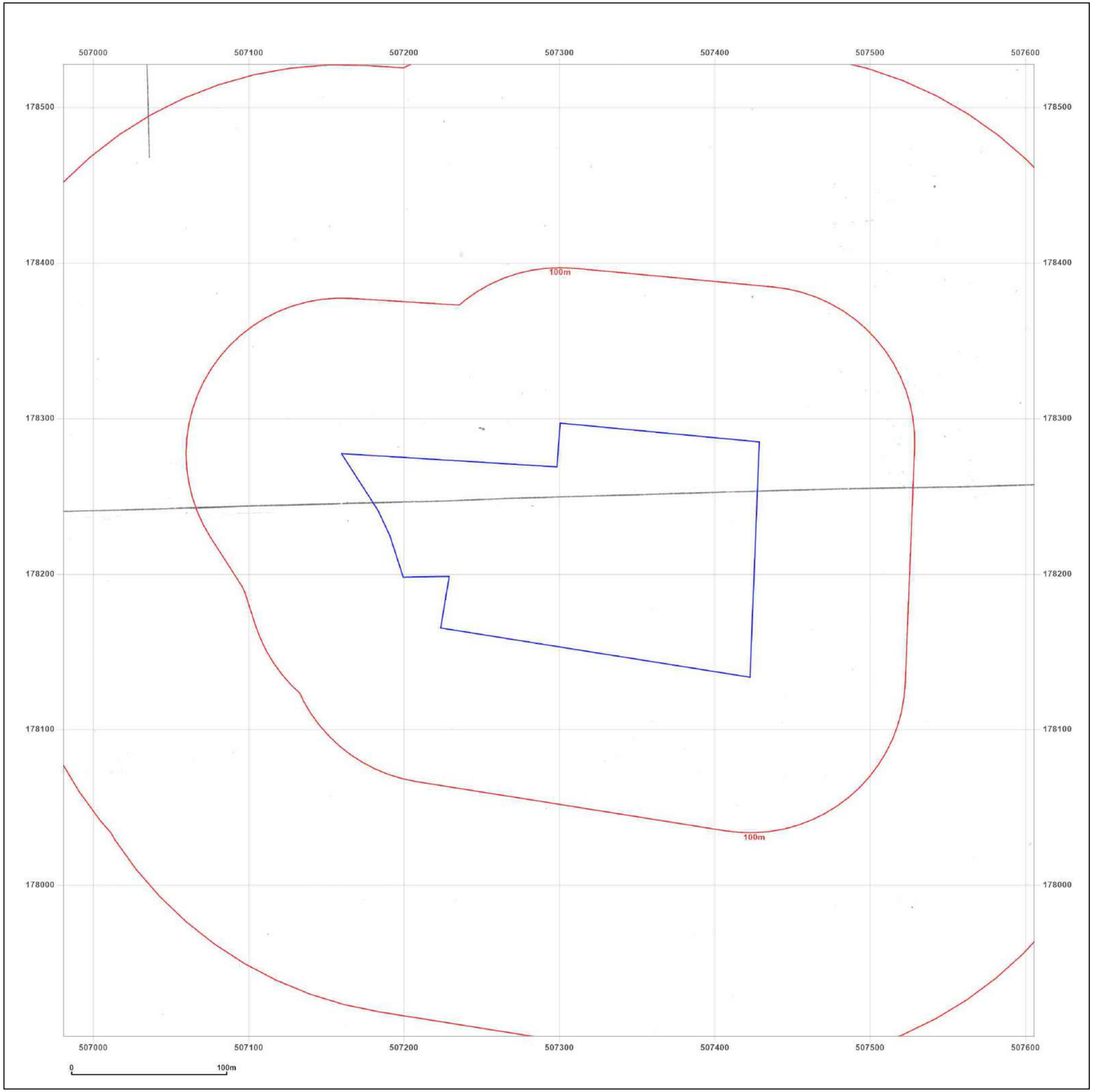

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Site Details:

SHELTER 17M FROM THE PLOUGH, 239 SIPSON ROAD ON A408, SIPSON ROAD, SIPSON, WEST DRAYTON, UB7 0HW

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Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: County Series
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Printed at: 1:2,500

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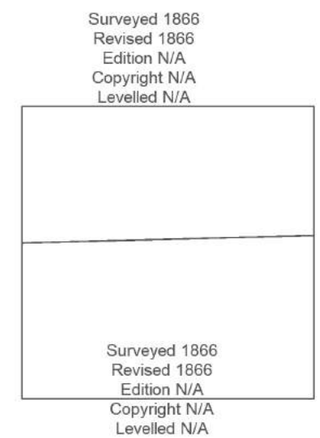

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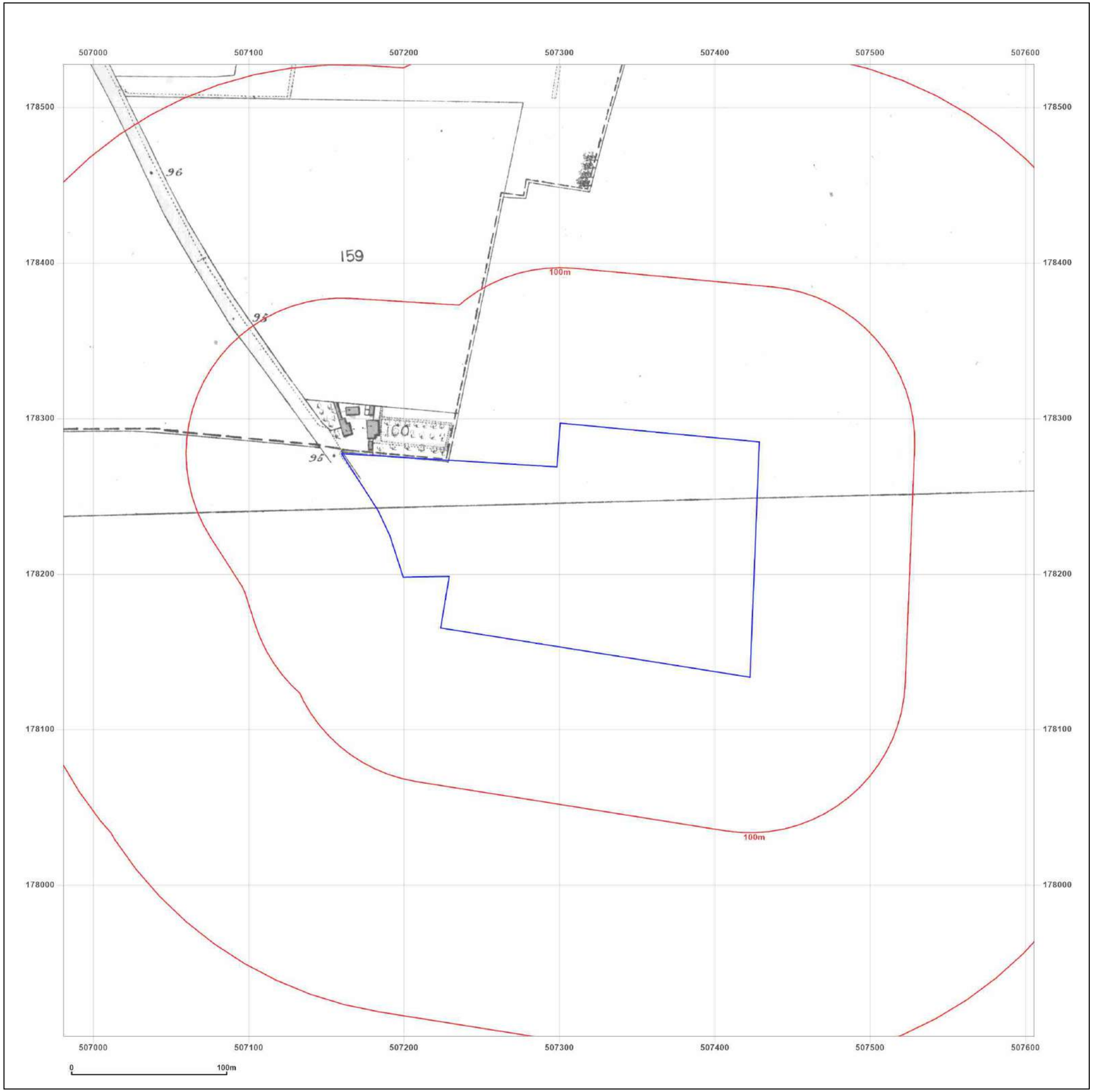

Groundsure INSIGHTS

Site Details:

SHELTER 17M FROM THE PLOUGH, 239 SIPSON ROAD ON A408, SIPSON ROAD, SIPSON, WEST DRAYTON, UB7 0HW

Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: County Series
Map date: **1867**
Scale: 1:2,500
Printed at: 1:2,500

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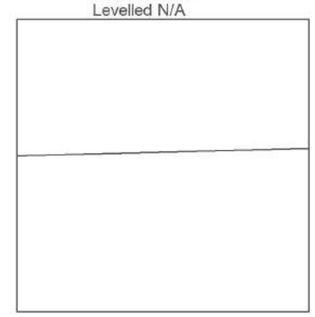
Surveyed 1867
Revised 1867
Edition N/A
Copyright N/A
Levelled N/A



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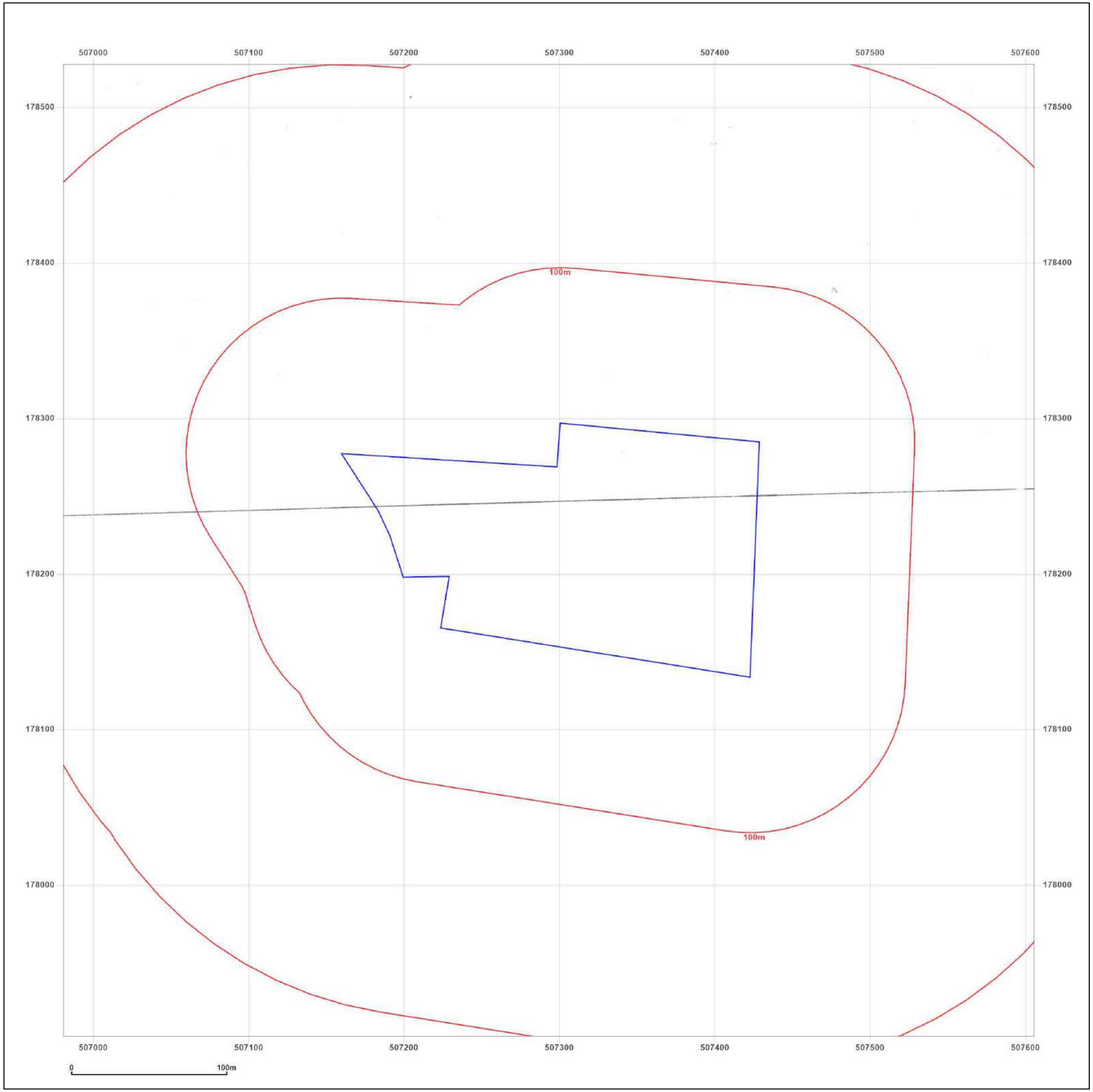

Groundsure INSIGHTS

Site Details:

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Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: County Series
Map date: **1867**
Scale: 1:2,500
Printed at: 1:2,500

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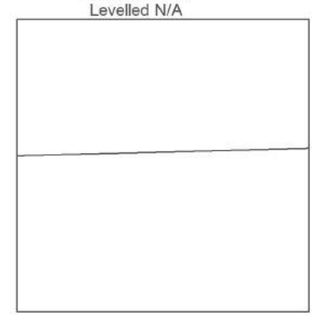
Surveyed 1867
Revised 1867
Edition N/A
Copyright N/A
Levelled N/A



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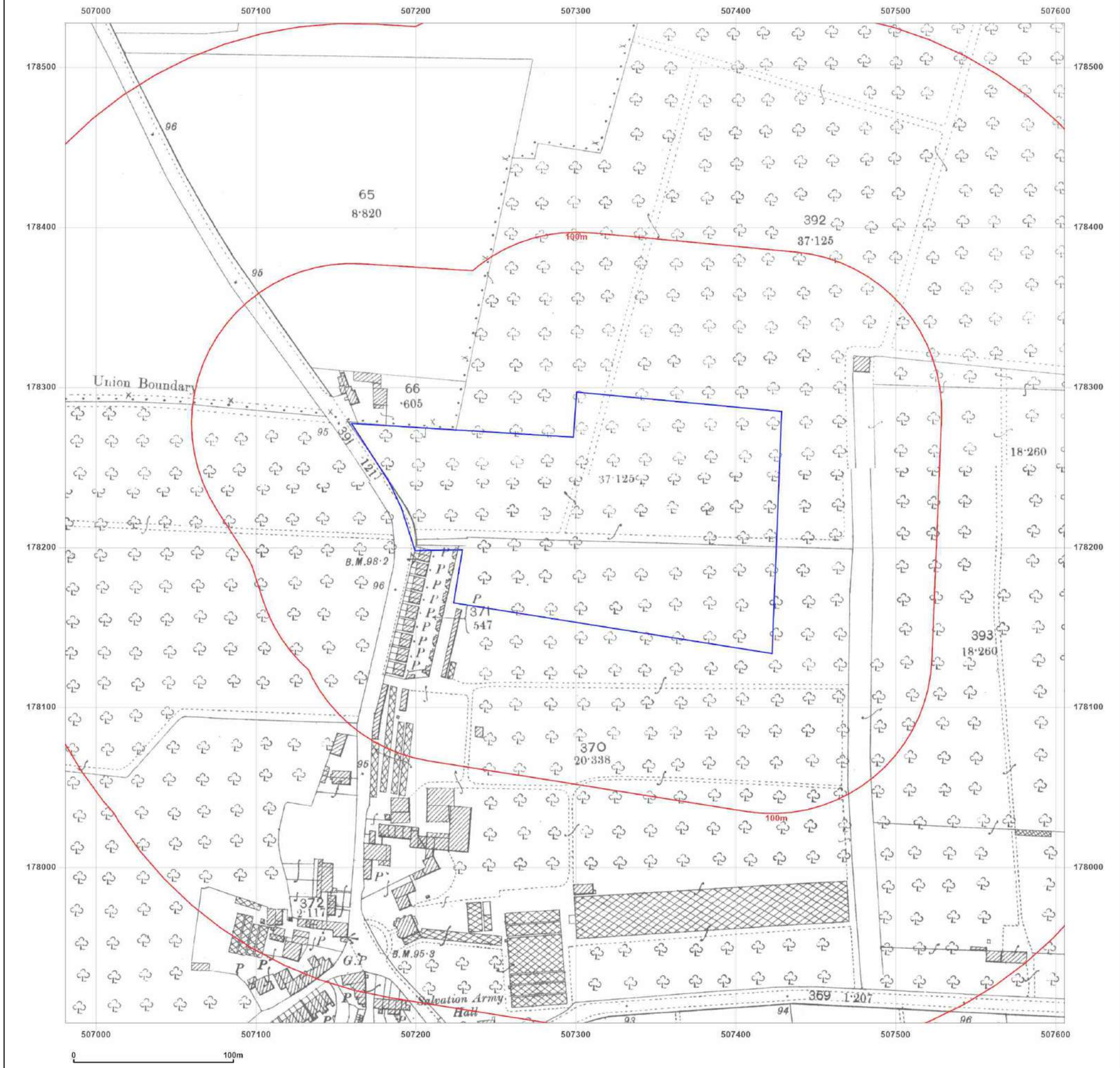

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Site Details:

SHELTER 17M FROM THE PLOUGH, 239 SIPSON ROAD ON A408, SIPSON ROAD, SIPSON, WEST DRAYTON, UB7 0HW

Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: County Series
Map date: **1895-1896**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1895
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1896
Revised 1896
Edition N/A
Copyright N/A
Levelled N/A

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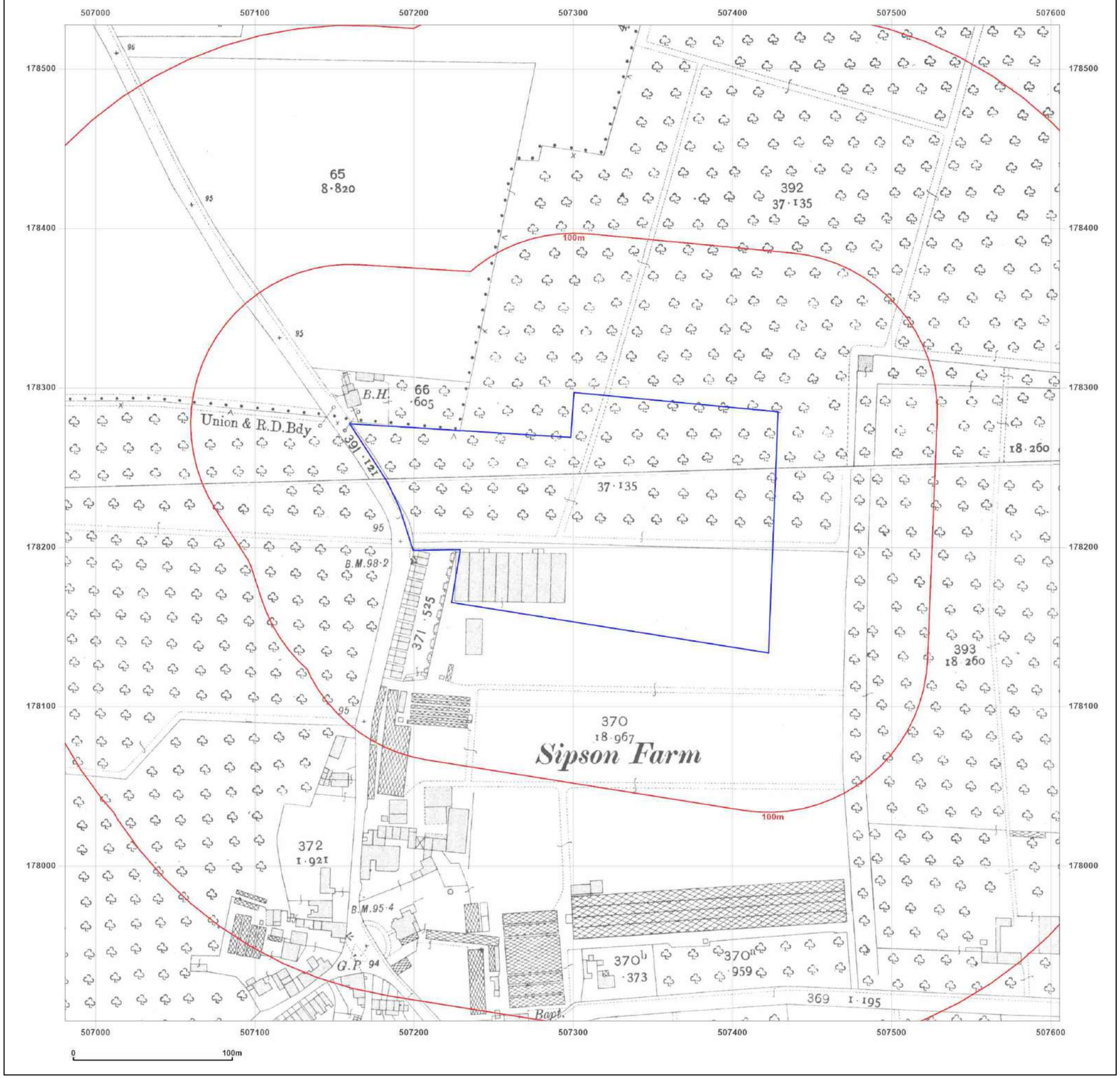

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Site Details:

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Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: County Series
Map date: **1914**
Scale: 1:2,500
Printed at: 1:2,500

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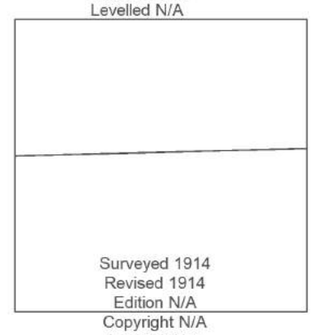
Surveyed 1914
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1914
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A

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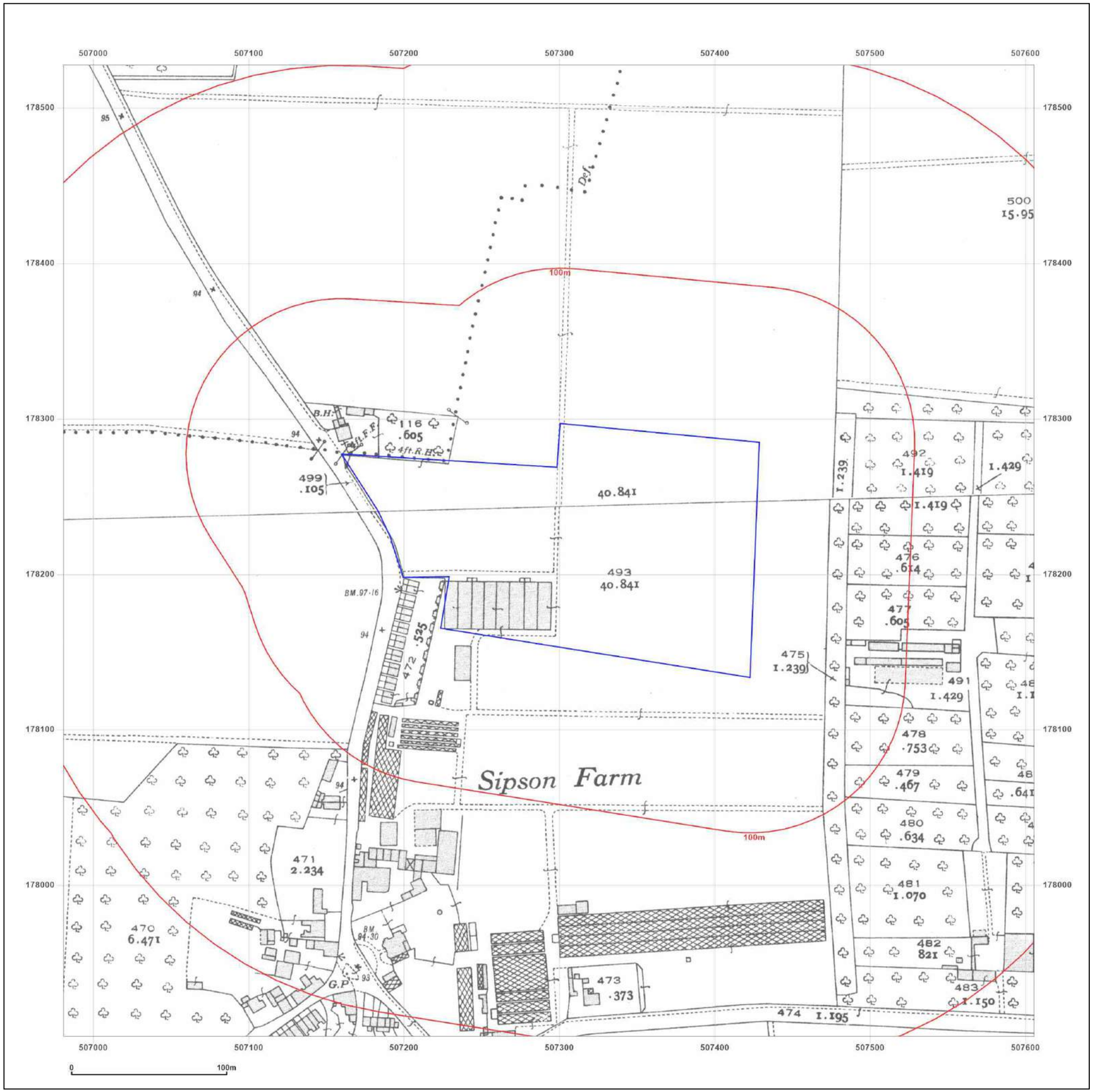

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Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: County Series
Map date: **1935**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1935
Revised 1935
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1935
Revised 1935
Edition N/A
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Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: National Grid
Map date: **1966**
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed 1965 Revised 1965 Edition N/A Copyright 1966 Levelled 1957	Surveyed 1965 Revised 1965 Edition N/A Copyright 1966 Levelled 1957
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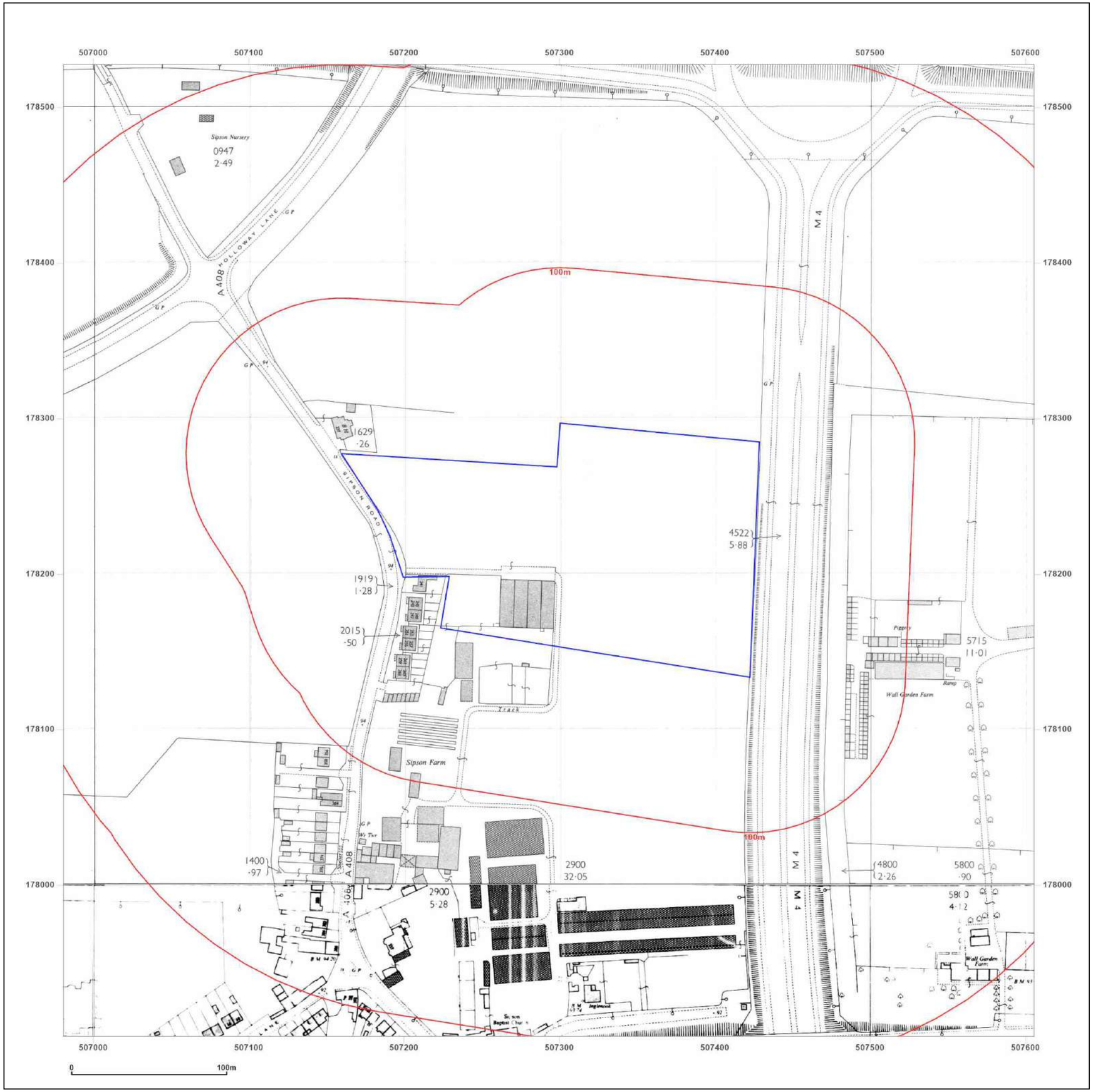

Groundsure INSIGHTS

Site Details:

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Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: National Grid
Map date: **1965-1967**
Scale: 1:2,500
Printed at: 1:2,500

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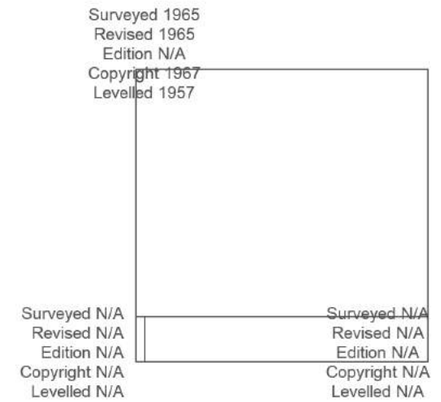

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Site Details:

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Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: National Grid
Map date: **1965-1967**
Scale: 1:2,500
Printed at: 1:2,500

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

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

Surveyed 1965
Revised 1965
Edition N/A
Copyright 1967
Levelled N/A

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Site Details:

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Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: National Grid

Map date: **1974**

Scale: 1:1,250

Printed at: 1:2,000

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

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

Surveyed N/A
Revised N/A
Edition N/A
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Groundsure INSIGHTS

Site Details:

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Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: National Grid

Map date: **1978**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1965
Revised 1977
Edition N/A
Copyright 1978
Levelled 1957

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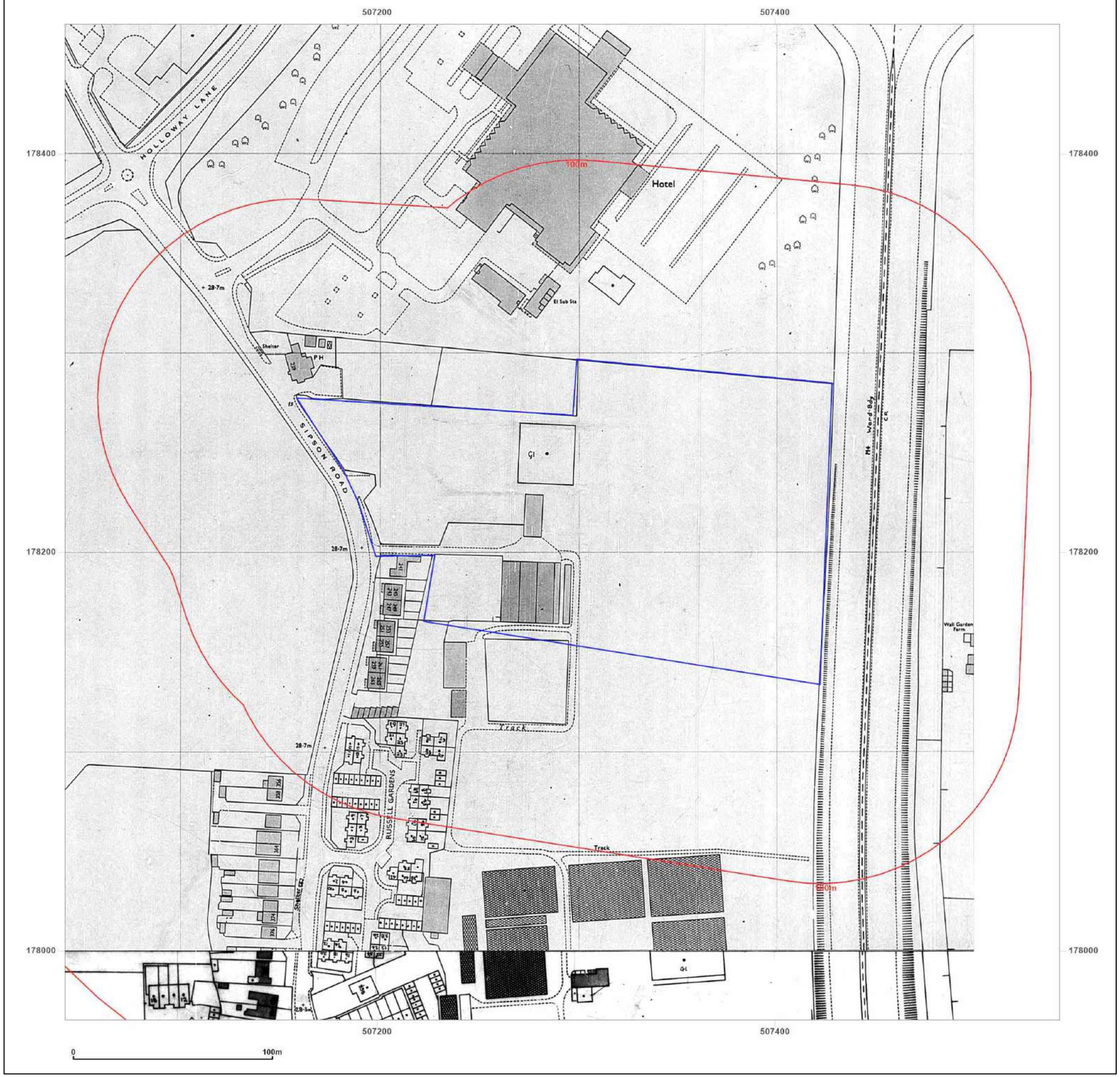

Groundsure INSIGHTS

Site Details:

SHELTER 17M FROM THE PLOUGH, 239 SIPSON ROAD ON A408, SIPSON ROAD, SIPSON, WEST DRAYTON, UB7 0HW

Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: National Grid

Map date: **1983-1988**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1957
Revised 1983
Edition N/A
Copyright 1983
Levelled 1957

Surveyed 1957
Revised 1988
Edition N/A
Copyright 1988
Levelled 1957

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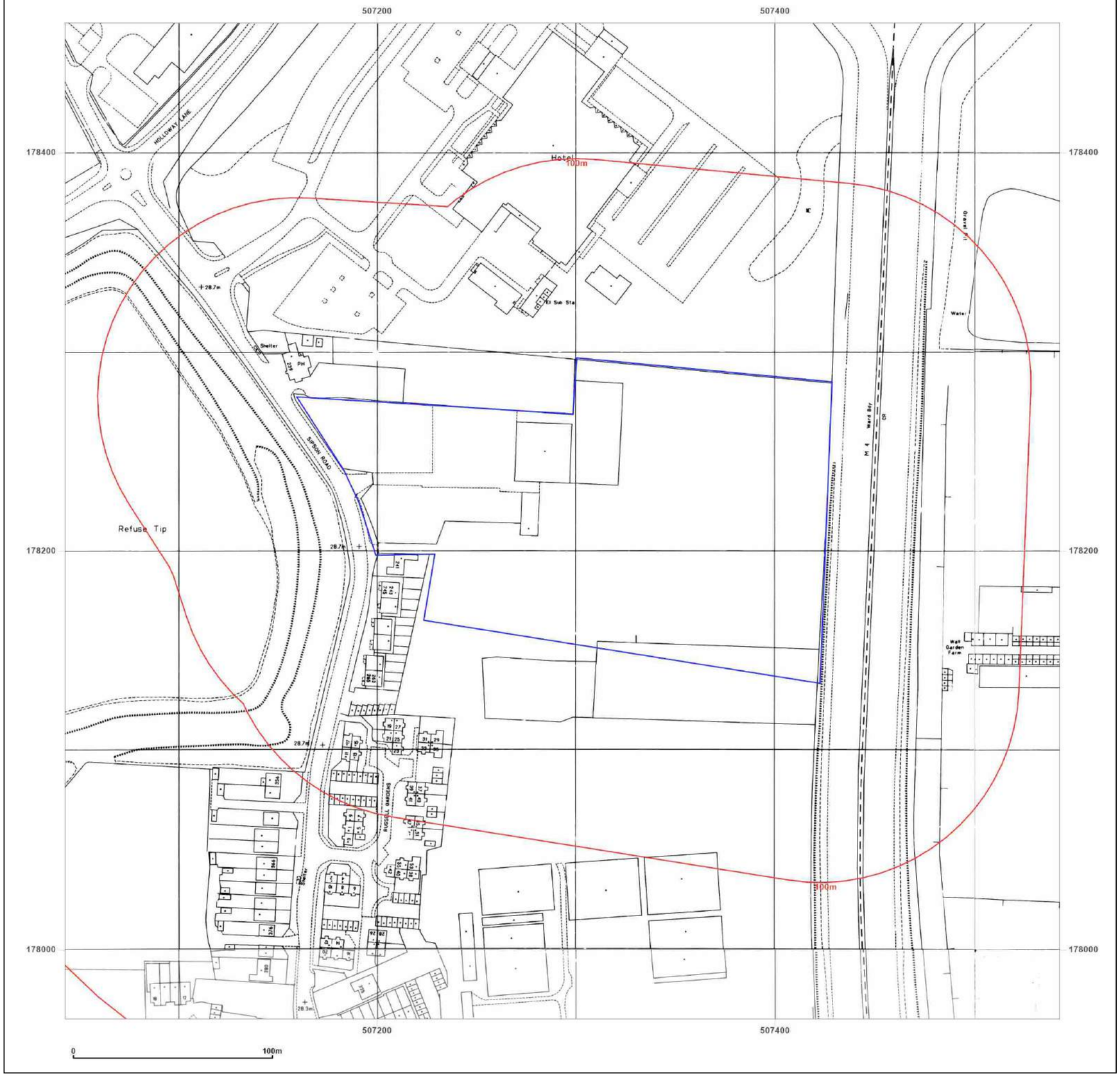

Groundsure INSIGHTS

Site Details:

SHELTER 17M FROM THE PLOUGH, 239 SIPSON ROAD ON A408, SIPSON ROAD, SIPSON, WEST DRAYTON, UB7 0HW

Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: National Grid

Map date: **1990-1992**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A Revised N/A Edition N/A Copyright 1992 Levelled N/A	Surveyed N/A Revised N/A Edition N/A Copyright 1992 Levelled N/A
Surveyed N/A Revised 1991 Edition N/A Copyright 1992 Levelled N/A	Surveyed 1957 Revised 1990 Edition N/A Copyright 1990 Levelled 1957

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Site Details:

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Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: National Grid

Map date: **1992-1995**

Scale: 1:1,250

Printed at: 1:2,000

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

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

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Site Details:

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Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: National Grid
Map date: **1995**
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed N/A
Revised 1991
Edition N/A
Copyright 1995
Levelled N/A

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Site Details:

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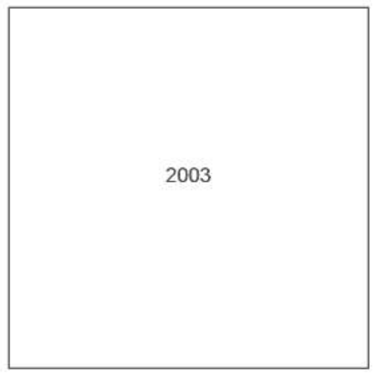
Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250



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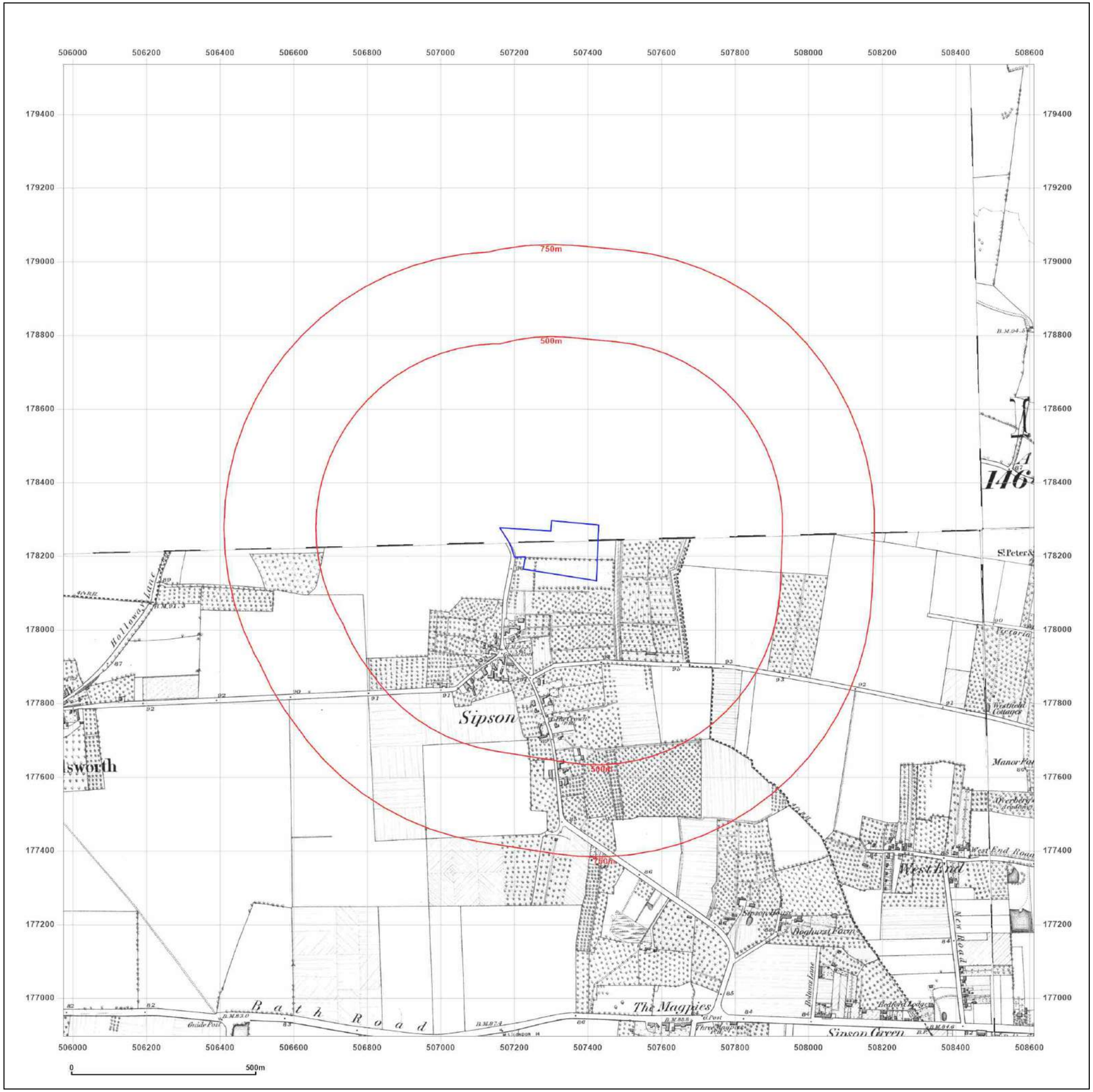

Groundsure INSIGHTS

Site Details:

SHELTER 17M FROM THE PLOUGH, 239 SIPSON ROAD ON A408, SIPSON ROAD, SIPSON, WEST DRAYTON, UB7 0HW

Client Ref: GWPR5637
Report Ref: GS-EBC-UKP-NQT-HVJ
Grid Ref: 507293, 178215

Map Name: County Series
Map date: **1865-1868**
Scale: 1:10,560
Printed at: 1:10,560

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Surveyed 1865
Revised 1865
Edition 1868
Copyright N/A
Levelled N/A

Surveyed 1865
Revised 1865
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1865
Revised 1865
Edition N/A
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