

APPENDIX 14.1 - PRIOR'S FARM PHASE 1 REPORT



**Phase I
Geo-Environmental Site Assessment**

**Land at South Wokingham, Old Wokingham Road,
Wokingham, RG40 3BQ**

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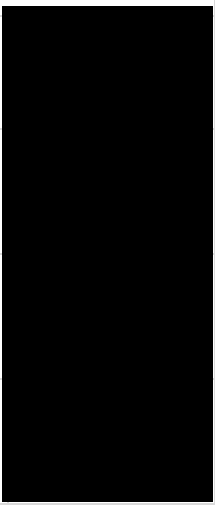
August 2022

Omnia ref: A11866/1.1

ISO Accredited Certification (UKAS)



QUALITY ASSURANCE

Project Number: A11866						
August 2022						
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Executive Summary	
Site Address	Land at South Wokingham, Old Wokingham Road, Wokingham, RG40 3BQ
National Grid Reference	483348, 167234
Site Area	57.45 ha
Current Site Use	During the site walkover the site was largely configured as open fields. Three (3no.) watercourses associated with Emm Brook were located on site, the southernmost stream contained flowing water (west to east). There was a small area of hardstanding/yard space within Area 1, which was not inspected during the site walkover. Hambridge Farm was located within Area 2, which comprised a large farmyard with three (3no.) barns, agricultural fields and a residential dwelling. Boundaries of the site largely comprised mature deciduous trees and dense hedgerows.
Site History	Historically, there has been little development on the site and has mostly comprised open fields since earliest mapping in 1871. Hambridge Farm was depicted on mapping from 1871 and has had several different configurations throughout the years, including containing an orchard. Development in the southernmost parcel of land was indicated in 2001 with a single structure. This has been extended from 2010.
Geology & Hydrogeology	<u>Geology</u> BGS records indicate that the superficial deposits on site comprise Alluvium (western edge of the northern parcel of land, and southern slither of the southern parcel of land); Head Deposits (central portion of the northern parcel of land); and River Terrace Deposits (northern and south-eastern extent of the northern parcel of land). The Alluvium and River Terrace Deposits are classified as Secondary A Aquifers, whilst the Head Deposits are classified as a Secondary Undifferentiated Aquifer. The bedrock on site comprises the London Clay Formation site wide, and the Bagshot Sand Formation within the southern parcel of land, and the southern slither of the northern parcel of land. The Bagshot Sand Formation is a Secondary A Aquifer, and the London Clay Formation is unproductive. <u>Hydrogeology</u> The site is not located within a Source Protection Zone. There are no active or historical water abstraction licences located within 250m of the site.
Hydrology & Flooding	There are three (3no.) inland watercourses located on the site, associated with the Emm Brook. A surface water body catchment was recorded on site as the River Emm Brook. The Emm Brook was noted as having a chemical and ecological ratings of 'fail' and 'moderate' respectively, with an overall rating of 'moderate' measured in 2019 by the Environment Agency. In areas where the superficial deposits (Head, Alluvium and River Terrace Deposits) are recorded to be present, the risk of groundwater flooding is designated as low. Where there is an absence of superficial deposits, the risk of groundwater flooding is negligible.
Landfill Sites & Ground Gases	The Groundsure Report identified no records of historic landfill sites or historic waste treatment sites, nor any active or recently closed licensed waste sites within 250m of the subject site. A historical ground working and pond located south of the site are assumed to be infilled, which presents a source for potential ground gas generation.

Radon	The site lies within an area where less than 1% of the properties are above the Action Level. At these levels BRE publication BR211 indicates that no special radon protective measures are required in the construction of new extensions or dwellings.
Conclusions	
The Conceptual Site Model has identified the presence of a series of potentially active pollution linkages associated with the historical use of the site and immediately adjacent sites which are considered to have the potential to present a significant risk to identified receptors. Whilst the potentially active pollution linkages are present, they are considered unlikely to present a significant barrier to development. However, this should be established and assessed further through follow-on intrusive ground investigation and assessment	
Recommendations	
It is recommended that an asbestos survey is undertaken in accordance with the Control of Asbestos Regulations (2012) prior to the commencement of any refurbishment or demolition works within Area 1. Before moving or disposing of the PACM sheeting and tiles within Area 2 these should also be inspected. It is understood that Condition 5 of the granted planning application for the development specifies that ‘no development, including demolition and site works, shall begin until there has been submitted to and agreed in writing by the Authority a site investigation report documenting the ground conditions of the site and incorporating chemical and gas analysis identified as appropriate by the desktop study.’ It is therefore recommended that an intrusive site investigation should be undertaken to investigate the potential pollution linkages identified by the Conceptual Site Model and determine the potential risks posed to the identified receptors. If areas of the site are inaccessible during site investigation works prior to demolition, further investigation will be necessary in those areas post-demolition. The site investigation should include chemical and geotechnical testing of soil samples for a suite of determinants representative of the potential sources of impact identified within the CSM. Upon return of chemical testing results a Tier 1 Risk Assessment should be undertaken to determine whether the encountered soils have the potential to present a significant risk to the identified receptors. This would then enable mitigation measures to be formulated, if required.	

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1 INTRODUCTION

1.1 Background

Omnia have been commissioned by Lightwood Strategic to undertake a Phase I Geo-Environmental Site Assessment at the site of Land at South Wokingham, Old Wokingham Road, Wokingham, RG40 3BQ, in order to assist with an outline planning application. A site location plan is presented as Figure 1.0 within Appendix III.

1.2 Proposed Development

It is understood that Lightwood Strategic are proposing to develop the current open land in South Wokingham for a residential scheme, comprising approximately 700-800 dwellings with associated gardens, access roads, communal open space and parking.

At this stage, detailed proposed development plans for the site are not available, however an outline sketch plan is presented as Figure 2.0 (Appendix III).

1.3 Objectives

The objectives of the Phase I Geo-Environmental Site Assessment are to:

- Undertake a site walkover and inspection, including interviews with site representatives if available;
- Review historical plans, site investigations, geology, hydrogeology, site sensitivity, floodplain issues, mining records and any local authority information available in order to complete a Desk Study in line with the Environment Agency (EA) document *Land Contamination Risk Management (LCRM)*;
- Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to off-site receptors; and,
- Provide a factual and interpretative report relating to the site and provide recommendations on any potential development issues with consideration of residential and environmental receptors.

1.4 Sources of Information

Background information was sought from the following sources:

- Groundsure Environmental Database Search (GS-8946633);
- Historical Ordnance Survey Mapping (1871–2022);
- The British Geological Survey (BGS) map for the site (Sheet 269, Windsor, Solid and Drift Edition at a scale of 1:50,000, 1999);
- Environment Agency flood designations, aquifer designations and groundwater source protection zones (<https://magic.defra.gov.uk/MagicMap.aspx>) [Accessed: 2022/08/05];
- Zetica UXO Risk Maps (<https://zeticauxo.com/downloads-and-resources/risk-maps/>) [Accessed: 2022/08/05]

1.5 Limitations

The limitations of this report are presented in Appendix I.

1.6 Confidentiality

Omnia has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Omnia; a charge may be levied against such approval.

2 SITE SETTING

2.1 Site Details

Table 2-1 Site Details

Site Address	Land at South Wokingham, Old Wokingham Road, Wokingham, RG40 3BQ
National Grid Reference	483348, 167234
Site Area	57.45 ha

All acronyms used within this report are defined in the Glossary presented in Appendix II.

A site location plan is presented as Figure 1.0 (Appendix III).

2.2 Current Site Use

2.2.1 Site Description

The area of investigation was located approximately 3.0km southeast of Wokingham town centre and was irregular in shape, covering an area of 57.45 ha. There were multiple access points onto the site from Old Wokingham Road and Easthampstead Road, which are discussed in detail below. For ease, the site has been split into three (3no.) Areas, Area 1, Area 2 and Area 3 as depicted in Figure 3.1. Figures 3.1-3.3 within Appendix III and the Photographs within Appendix IV should be viewed in conjunction with this site walkover.

2.2.1.1 Area 1

Area 1 comprises the southernmost area of the site and was located immediately south of Easthampstead Road. Vehicular access into Area 1 was via a metal gate off Easthampstead Road and located in the northeastern part of Area 1.

At the time of the site walkover, Area 1 largely comprised corn fields which contained crops approximately 1.0 to 1.5m in height (Photograph 1). Along the southern boundary was a stream, which flowed in an east to west direction at a medium speed. The stream was bordered by trees and dense bushes and was approximately 1.5m wide at its widest point (Photograph 2).

An access track ran west from the access gate towards a private yard and paddock area (Photograph 3). The area to the northeast of the access track comprised a small parcel of land, which contained a boat, trailer, sporadic pieces of farming machinery and a bathtub (Photograph 4).

At the time of the site walkover, access into the private yard area was not possible. From a limited view, this area contained three (3no.) cars, a caravan, a chicken coop, stabling for horses and several single storey structures. A detailed inspection was not carried out.

Two (2no.) public footpaths run within Area 1, the first from the central southern area to the northeastern corner, and the second from midway up the western boundary, running east to west then turn north- south joining Easthampstead Road.

The topography of this area was generally flat, however a slight downwards gradient from north to south was observed in the direction of the stream.

The eastern and western boundaries were denoted by mixed mature deciduous trees and hedgerows. The southern boundary was indicated by occasional barbed wire fencing with the stream beyond. The northern boundary was denoted by mature deciduous trees with Easthampstead Road beyond.

2.2.1.2 Area 2

Area 2 was located north of Easthampstead Road and comprised Hambridge Farm, which consisted of a main farmyard area situated centrally, and surrounding agricultural fields. Access into Area 2 was off Easthampstead Road to the south, via secure electronic gates. Immediately to the west of the access point, was a wooden-clad single storey residential structure with associated gardens and parking (Photograph 6). A detailed inspection of this area was not undertaken.

Animal Enclosures

Two (2no.) areas as shown in Figure 3.3 contained animal enclosures, which were active and used for pigs and chickens (Photograph 7).

Barns

Three (3no.) barns were located centrally within Area 2, detailed below.

Barn 1 (Figure 3.3) was constructed out of a steel frame, with metal sheet roofing and a concrete floor. The barn appeared to be in good visual condition within no obvious Potential Asbestos Containing Materials (PACM) noted within its construction. Internally the barn was used for storage of building materials and various farm and household items (Photographs 7-8). Of note were two (2no.) 25L metal jerry cans (no labels but assumed to contain fuel), a plastic 25L container of 'Concentrate degreaser/parts washer fluid' and two (2no.) Calor Gas propane 19kg containers. A small area of this barn (approximately 1/3 of the barn size) was fenced off and contained hay, which was assumed to house animals.

Barns 2 and 3 (Figure 3.3) were partially open barns, both constructed out of steel frames with wooden panelling, metal roofing and a concrete floor (Photograph 9-10). Both barns appeared to be in good visual condition within no obvious Potential Asbestos Containing Materials (PACM) noted within their construction. The barns were both used to store various machines, including mini-diggers, tractors and farming machinery. No spillages or visual signs of vehicle leakages were noted during the walkover from the machines and vehicles.

A fourth barn was in production at the time of the walkover, with the metal frame constructed (Photograph 11).

Stockpiles

There were four (4no.) stockpiles situated within the northern extent of the farmyard area (Figure 3.3).

Stockpile 1 was approximately 4.0 x 15.0 x 10.0m (h x l x w) in size, which appeared to contain concrete and brick crush, and concrete slabs (Photograph 12).

Stockpile 2 was approximately 3.0 x 10.0 x 8.0m (h x l x w) in size, which contained logs and tree stumps (Photograph 13).

Stockpile 3 was approximately 3.0 x 5.0 x 4.0m (h x l x w) in size, which contained logs and tree stumps (Photograph 14).

Stockpile 4 was approximately 4.0 x 6.0 x 6.0m (h x l x w) in size, which contained a mixture of materials and waste including hay, wood, wooden panelling, cardboard, plastic bags with unknown contents and vegetation (Photograph 15).

Tanks

Two (2no.) Above ground Storage Tanks (ASTs) were situated within the farmyard area. Tank 1 was an approximately 2,000L capacity self-bunded 'Balmoral Tanks' green plastic bunded fuel tank, situated east of Barn 3 (Photograph 16). A faint fuel-like odour was noted when in close proximity, and a small dark grey stain (approximately 0.30m diameter) was noted on the ground on the northern side of the tank. It was not confirmed whether this odour and stain were related to the tank.

Tank 2 was a green 2,500L self-bunded 'Titan diesel storage and dispensing tank (Model FM2500)' located centrally within the main farmyard area, west of the animal enclosures (Photograph 17). Labelling on the tank suggested that the tank contained Kerosene. Scattered on the floor next to this tank were a range of un-labelled plastic containers and drums ranging from approximately 10L to 50L in size, along with re-fuelling equipment and nozzles. One container labelled was a 20L plastic container of Hydraulic Oil.

In addition, an orange, 2,000L portable fuel bowser (Western Bunded Refueller) was situated next to Tank 2 (Photograph 18). No visual or olfactory evidence of spillages or leaks surrounding Tank 2, or the portable bowser were noted during the walkover.

Farmyard Area

Three (3no.) metal shipping containers were situated within the farmyard area. Access into two of these was not possible, however the third (situated northeast of Tank 2) was comprised as a dis-used site office in a poor state of repair (Photograph 19). The internal wooden roofing and insulation had fallen into the main space of the container, and there was visual evidence of damp.

A 6-yard skip was located south of Stockpile 4, which appeared to be used for mixed waste. A visual inspection showed the skip contained wood, plastic, various pieces of metal and building materials (Photograph 20).

The farmyard area west of Barns 2 and 3 was used for wrapped, baled hay storage (Photograph 21).

The remainder of the central farmyard area contained vehicles and farmyard machinery, building materials and equipment, as well as general household items scattered across the ground. This

included excavators, farming machinery, trailers, crates of bricks and concrete blocks, wooden pallets, a caravan and animal feed (Photographs 22-24).

Within the northeast extent of Area 2 was a section of overgrown bushes and weeds. This area contained further materials storage of bricks, wooden pallets and plant pots. Also within this section was a trailer, which appeared to contain coregulated cement sheeting and tiling (Photograph 25). Although a close inspection was not possible due to the dense vegetation and weeds surrounding the trailer, the materials appeared to be Potential Asbestos Containing Material (PACM).

The remainder of Area 2 contained recently harvested agricultural fields (Photographs 26-27).

The northern and eastern boundaries of the site were depicted by the Emm brook (Figure 3.2). Due to the dense bushes and vegetation surrounding the brook, visual inspection was not possible. No sound of flowing water was noted. Anecdotal evidence from the owner of Hambridge Farm states that the surrounding fields get very wet and waterlogged in the winter months.

The southern and western boundaries were denoted by mixed deciduous trees and various low-lying vegetation, with Easthampstead Road beyond.

The topography of Area 2 was generally flat, however a downward gradient from the east and southeast towards to the northwest was noted.

2.2.1.3 Area 3

Area 3 comprises the largest of the three (3no.) areas and covered approximately 42ha accounting for the majority of the area north of Easthampstead Road. At the time of the site walkover, Area 3 comprised three (3no.) open fields recently cultivated and a fourth field within the western extent, divided up into smaller paddocks for horses (Photographs 28-29).

Two (2no.) streams associated with Emm Brook were located within Area 3 (which also bordered Area 2), as shown within Figure 3.1. The first ran from the northeast through the centre towards Area 1 (Photograph 30). This contained very minimal (<10cm) water or was dry during the site walkover.

The second ran from the east to the west. Due to the dense bushes, brambles and weeds bordering the stream, it was not possible to see the dimensions of the stream or water level. No sound of flowing water was noted.

Within the northeast corner of the northern-most field of Area 3 was a pile of plastic tubing adjacent to the stream (Photograph 31). This was approximately 4.00 x 4.00 x 0.30m in size.

Access into Area 3 for the site walkover was via a metal gate off Old Wokingham Road to the east.

The northern-most field in Area 3 had a gentle downward gradient from north to south towards the streams. The eastern field sloped downwards to the southwest towards the cross point of the streams. The southern field sloped gently northwest towards the streams.

The boundaries of Area 3 were all denoted by mixed mature deciduous trees and dense hedgerows.

2.2.2 Hazardous Materials Storage

Two (2no.) tanks were situated within the farmyard area. Tank 1 was an approximately 2,000L capacity 'Balmoral Tanks' green plastic self-bunded fuel tank, situated east of Barn 3 (Photograph 16). A faint fuel-like odour was noted when in close proximity, and a small dark grey stain (approximately 0.30m diameter) was noted on the ground on the northern side of the tank. It was not confirmed whether this odour and stain were related to the tank.

Tank 2 was a green plastic self-bunded 2,500L 'Titan diesel storage and dispensing tank (Model FM2500)' located centrally within the main farmyard area, west of the animal enclosures (Photograph 17). Labelling on the tank suggests that the contents was Kerosene. Scattered on the floor next to this tank were a range of un-labelled plastic containers and drums ranging from approximately 10L to 50L in size, along with re-fuelling equipment and nozzles. One container labelled was a 20L plastic container of Hydraulic Oil.

In addition, an orange, 2,000L portable fuel bowser (Western Bunded Refueller) was situated next to Tank 2 (Photograph 18). No visual or olfactory evidence of spillages or leaks surrounding Tank 2, or the portable fuel bowser were noted during the walkover.

Within Barn 1 in Area 2 were two (2no.) 25L metal jerry cans (no labels but assumed to contain fuel), a plastic 25L container of 'Concentrate degreaser/parts washer fluid' and two (2no.) Calor Gas propane 19kg containers.

2.2.3 Potential Asbestos Containing Material (PACM)

An inspection of the yard area within Area 1 was not undertaken, however corrugated cement roofing sheets were observed from a distance, which are considered to have the potential to contain Asbestos. PACM corrugated sheeting and tiles were also identified within the northeastern corner of Area 2.

It is therefore recommended that an asbestos survey is undertaken in accordance with the Control of Asbestos Regulations (2012) prior to the commencement of any refurbishment or demolition works within Area 1. Before moving or disposing, the PACM sheeting and tiles within Area 2 should also be inspected.

2.2.4 Waste Storage

Area 2

There were four (4no.) stockpiles situated within the northern extent of the farmyard area (Figure 3.3).

Stockpile 1 was approximately 4.0 x 15.0 x 10.0m (h x l x w) in size, which appeared to contain concrete and brick crush, and concrete slabs. Stockpile 2 was approximately 3.0 x 10.0 x 8.0m (h x l x w) in size, which contained logs and tree stumps. Stockpile 3 was approximately 3.0 x 5.0 x 4.0m (h x l x w) in size, which contained logs and tree stumps. Stockpile 4 was approximately 4.0 x 6.0 x 6.0m (h x l x w) in size, which contained a mixture of materials and waste including hay, wood, wooden panelling, cardboard, plastic bags with unknown contents and vegetation.

A 6-yard skip was located south of Stockpile 4, which was used for mixed waste containing wood, plastic, metal waste and building materials.

Area 3

Within the northeast corner of the northern-most field of Area 3 was a pile of plastic tubing adjacent to the stream. This was approximately 4.00 x 4.00 x 0.30m in size.

2.2.5 Tree Species

Mixed mature deciduous trees, dense hedgerows and a range of weeds/long grasses were located around the border of the entire site and surrounding all watercourses. The species and ages of trees ranged across the site, and heights were between approximately 4.00 and 15.00m tall.

2.2.6 Potential Invasive Species

During the site walkover no obvious signs of potential invasive species were identified.

2.3 Surrounding Area

The site is situated within a partially rural, partially commercial area with sparse residential properties. The surrounding land uses are summarised in Table 2-2 below:

Table 2-2 Land Use

Direction	Land Use
North	Open fields, sparse residential properties, commercial offices
East	Open fields, Park View Farm, Downshire Golf Complex
South (Areas 1 and 2)	Stream, Open fields and Commercial beyond
South (Area 3)	Forest MOT and Service Centre, Prior Farm housing
West	Meadow Farm Livery Stables, Commercial, Home Grange School

3 SITE HISTORY

3.1 Site History

A review of historical land use pertinent to the site and within a 250m radius is summarised in Table 3-1.

Table 3-1 Historical Land Use

Map Edition	Historical Land Use	
	On Site	Off Site
1871 (1:2,500)	The northern parcel of land is largely configured as undeveloped fields, with areas of deciduous woodland partitioning off these fields. Hambridge Farm is located to the south of this parcel of land. The farm contains three (3no.) structures, an area configured as an Orchard and a well. A watercourse is denoted to flow from east to west across the centre of this section of the site. The southern parcel of land is configured as open fields.	The areas immediately surrounding the site are predominantly configured as undeveloped land, with a presumed agricultural use, as well as clusters of woodland. Roads are located immediately to the south and west of the northern parcel of land. Immediately south of the southern parcel of land is an area denoted as rough pasture with coniferous trees. 'Ham Bridge' associated with the main road, is depicted approximately 5m west of the northern parcel of land. Rouses Farm is situated approximately 50m east of the southern parcel of land. Lock's Farm is situated approximately 125m north of the northern parcel of land, which comprises multiple structures, assumed water bodies and fields. Grebe Pond is situated on the edge of an embankment, approximately 230m southeast of the southern parcel of land.
1898 (1:10,560) 1899 (1:2,500)	Deciduous woodland is no longer denoted within the field boundaries. Two (2no.) footpaths are depicted on the site. Re-configuration on Hambridge Farm with demolition of two (2no.) previous structures and the addition of three further.	Reduced woodland surrounding the site. A road is now situated immediately east of the northern parcel of land. Grebe Pond is reduced in size. Tank located approximately 185m southeast.
1909-1910 (1:10,560) 1911-1912 (1:2,500)	Hambridge Farm is now Hambridge Cottage and this area comprises three (3no.) structures and an orchard.	A watercourse is denoted to flow from southeast to northwest approximately 10m south of the southern parcel of land. Grebe Pond is now labelled as 'Rouse's Pond' and contains vegetation. Lock's Farm is now labelled as 'Lock's House'.

Map Edition	Historical Land Use	
	On Site	Off Site
1932 (1:10,560) 1933 (1:2,500) 1938 (1:10,560)	Hambridge Cottage now only contains one (1no.) structure. A second watercourse is depicted in the northern parcel of land, trending north to south.	No significant changes noted.
1961 (1:10,560)	Field boundaries within the northern parcel of land has been altered. No further changes noted.	No significant changes noted.
1965-1967 (1:2,500)	Hambridge Cottage and associated orchard is no longer denoted on the mapping. Watercourse within the northern parcel of land that trends from north to south is depicted as a drainage ditch.	Drainage ditches immediately south of the southern parcel of land. These lead to a watercourse situated between 70 and 160m south of this parcel of land. Rouses Farm now labelled Sutton Court Farm. Drain depicted approximately 125m east of the northern parcel of land, running north to south. Piggery located approximately 210m northeast of the northern parcel of land.
1975-1980 (1:10,000)	Field boundaries within the northern parcel of land have been altered and reduced. Footpaths on both parcels of land no longer depicted. An assumed additional watercourse or drainage ditch is depicted centrally within the northern parcel of land.	Tank located 185m southeast is no longer identified Increased residential development to the north, east and south. No further significant changes noted.
1985-1990 (1:2,500) 1982-1987 (1:2,500) 1985-1990 (1:2,500) 1987 (1:2,500)	Partial mapping within the northern parcel of land. No significant changes noted within the southern parcel of land.	No significant changes noted
1988 (1:10,000)	No significant changes noted.	No significant changes noted.
1993 (1:2,500)	Partial mapping within the northwest corner of the northern parcel of land. No significant changes noted.	No significant changes noted.
2001 (1:10,000)	Structure located within the southern parcel of land. No further significant changes noted.	Prior's Farm with associated structures and a pond is depicted south of the northern parcel of land. Water body (assumed pond) is located approximately 10m east of the northern parcel of land.

Map Edition	Historical Land Use	
	On Site	Off Site
		Rouse's pond is no longer denoted on the mapping and assumed to be infilled.
2010 (1:10,000)	An additional two (2no.) structures located within the southern parcel of land.	No significant changes noted.
2022 (1:10,000)	The road between the two parcels of land is labelled as Easthampstead Road. An access track is now depicted on mapping coming off Easthampstead Road into the southern parcel of land.	Prior's Farm no longer labelled as such. Pond previously located in this area is no longer depicted and assumed to be infilled.

A selection of historical maps are presented in Appendix V.

3.2 Historical Tank Database

The Groundsure Report identified four (4no.) records of historical tanks within 250m of the study site. These are summarised below:

- 127-131m west – Unspecified Tank (1932-1961);
- 186m southeast – Unspecified Tank (1871) – *This is assumed to be the same tank as that identified in the 1898 (1:10,560 scale) mapping;*
- 187m north – Unspecified Tank (1871) – *Although not depicted on the historical mapping, this is assumed to be associated with Lock's Farm; and,*
- 234m southwest – Unspecified Tank (1997).

Due to the anticipated groundwater flow towards the Emm Brook, the tanks located 127-131m west, 186m southeast and 234m southwest are not considered to have the potential to pose a significant risk to future site users and have therefore not been considered further.

3.3 Historical Energy Features Database

The Groundsure Report did not identify any historical energy features within a 250m radius of the site.

3.4 Historic Garages and Petrol Stations

The Groundsure Report did not identify any historical petrol stations or historical garages within a 250m radius of the site.

3.5 Historic Industrial Land Uses

The Groundsure Report identified three (3no.) records of historical industrial land uses within 250m of the study site. Upon further review these relate to two (2no.) separate historical land uses.

The identified land uses are:

- 157m south – Unspecified Ground Workings (1no. record) – 1910; and,

- 168m south – Unspecified Heap (2no. records) – 1961-1988.

The heap is believed to be associated with the embankment first identified within the 1871 mapping. As this is a heap, is therefore above ground and not buried waste, the heap has not been considered further.

3.6 Planning History

A review of the online planning portal of Bracknell Forest Council identified no planning applications attributed directly to the site postcode. A review of planning applications within the vicinity detailed over ten (10no.) applications relating to minor amendments to properties or structures. Applications containing pertinent information are summarised below.

Planning Reference	12/00093/FUL
Address	Park View Farm Old Wokingham Road Wokingham Berkshire RG40 3BX
Date	09/03/2012
Proposal	Construction of two (2no.) three-bedroom lodges for holiday accommodation
Decision	Refused
Notes	Refused partially on the basis of the increase pressure on highways and transportation infrastructure.

Planning Reference	07/00023/FUL
Address	Park View Farm Old Wokingham Road Wokingham Berkshire RG40 3BX
Date	06/01/2007
Proposal	Erection of detached building containing swimming pool, plant and storerooms.
Decision	Refused
Notes	The proposed structure would form a disproportionate addition to the host dwelling, to the detriment of the character and appearance.

3.7 Unexploded Ordnance Risk Assessment

A review of publicly available information (provided by Zetica UXO) shows the site as having a 'low risk' associated with bombing density and bomb risk.

The site is consequently considered **Low Risk** with regards to unexploded ordnance.

4 ENVIRONMENTAL SETTING

4.1 Geology and Hydrogeology

British Geological Survey Map (Sheet 269, Windsor, Solid and Drift Edition at a scale of 1:50,000, 1999) indicates that the site is underlain by the following geological sequence:

Table 4-1 Geology

Geological Unit	Location of Geological Unit	Formation Name	Description	Aquifer Classification
Superficial	Western edge of the northern parcel of land, and southern slither of the southern parcel of land	Alluvium	Clay, Silt, Sand and Gravel	Secondary A
	Central portion of the northern parcel of land	Head Deposits	Clay, Silt, Sand and Gravel	Secondary Undifferentiated
	Northern and south-eastern extent of the northern parcel of land	River Terrace Deposits	Sand and Gravel	Secondary A
Bedrock	Southern parcel of land, and southern slither of northern parcel of land	Bagshot Sand Formation	Sand	Secondary A
	Site wide	London Clay Formation	Clay, Silt and Sand	Unproductive Strata

The Groundsure report records one (1no.) entry for Made Ground within the proposed site boundary. A review of the 1:10,000 scale artificial ground mapping within the Groundsure Report indicates that this record of Made Ground is located immediately south of the northern parcel of land and is assumed to be associated with the current car repair and service yard. This area of Made Ground is therefore considered to be off-site.

There are two (2no.) entries for Made Ground within 50m of the site, these are located 9m and 10m east of the site. The Made Ground entry located 10m east appears to be associated with a current waterbody. A review of historical mapping, contemporary mapping, LiDAR data and current land uses was undertaken to investigate the reason for the land located 9m east being classified as Made Ground, but yielded no obvious causes, it is therefore assumed that the BGS have records of earth works of some kind in this area.

Review of the environmental database indicates that the site is not located within a groundwater Source Protection Zone. There are no active or historical water abstractions located within 250m of the site. The closest abstraction is for surface water abstraction and is located 388m west, which is for trickle irrigation storage at Holme Grange Farm. There are no active or historical potable water abstractions located within 250m of the site.

Groundwater vulnerability data indicates that the site is underlain by Secondary A and Secondary Undifferentiated Aquifers, with medium to high vulnerabilities within the Superficial Deposits. The Bagshot Sand Formation is a Secondary A Aquifer, with high vulnerability. The London Clay Formation is classified as Unproductive Strata.

There are two (2no.) inland rivers within the northern parcel of land, which cross in the centre. Based on the local topography and location of these surface watercourses, it is considered that shallow

groundwater, if present, will flow towards these inland watercourses.

A third inland river is located on the southern boundary of the southern parcel of land. Therefore, based on this and local topography, shallow groundwater within this area of the site, will flow south towards this inland watercourse.

Further tributaries relating to the Emm Brook are located within a 100m radius of the site, and so it is anticipated that groundwater within the surrounding area is considered likely to flow towards its nearest inland river.

4.1.1 Groundwater Flooding

In areas where the superficial deposits (Head, Alluvium and River Terrace Deposits) are recorded to be present, the risk of groundwater flooding is designated as low. Where there is an absence of superficial deposits, the risk of groundwater flooding is negligible.

4.2 Hydrology and Flooding

4.2.1 Water Network

The Groundsure report identifies a number of entries of inland watercourses on the site. These relate to three (3no.) separate watercourses.

The first bisects through the northern parcel of land from east to west, and historical mapping indicates it flows in this direction too. This is an inland river, not influenced by normal tidal action and contains water all year round. LiDAR Data indicates the topography within the area of the watercourse is elevated on either side; forming a shallow valley, the water course follows the valley.

The second bisects through the northern parcel of land from northeast to southwest. Historical mapping indicates this watercourse to be a drainage pathway. LiDAR Data indicates the topography within the area of the water course is elevated on either side; forming a shallow valley shape, with the valley elevation decreasing towards the southwest. the watercourse follows the valley and is assumed to flow towards the southwest although this was not observed during the site walkover.

The third is located on the southern boundary of the southern parcel of land and is classified as a 'WFD River, canal and surface water transfer water bodies'. This is an inland river, not influenced by normal tidal action and contains water all year round.

There are multiple entries (>50no.) for inland watercourses identified within 250m of the site. The majority of these are inland rivers, most of which relate to drainage pathways depicted within the historical mapping. One (1no.) entry relates to a lake, situated 78m east.

4.2.2 Surface water body catchment

A surface water body catchment was recorded on site as the River Emm Brook. The Emm Brook was noted as having a chemical and ecological ratings of 'fail' and 'moderate' respectively, with an overall rating of 'moderate' measured in 2019 by the Environment Agency.

4.2.3 Flooding

Northern parcel of land

There is a medium to high risk of river and coastal flooding in the area where the river flowing from east to west is situated. The remainder of this area of the site has a negligible risk. The Environment Agency designated this section of the site as being within both Flood Zones 2 & 3 (High risk – need for a flood risk assessment).

In the locations of both inland rivers within this section of the site, the risk for surface water flooding varies from a 1 in 30 return period at a depth greater than 1.0m to a 1 in 1,000 return period at a depth between 0.1 – 0.3m. The risk reduces the further away from the river. There are small, sporadic areas that are designated as having a 1 in 1,000 return to 1 in 250 period across this parcel of land. The remainder of this area of the site has a negligible risk.

Southern parcel of land

The southern boundary of the southern parcel of land is classified as having a medium to high risk of river and coastal flooding in the area where the inland river is location. The risk for surface water flooding in this area varies from a 1 in 30 return period to a 1 in 1,000 return period. The Environment Agency designated this section of the site as being within both Flood Zone 2 & 3 (High risk – need for a flood risk assessment).

The remainder of this area of the site has a negligible risk for river, coastal and surface water flooding.

4.3 Geotechnical Data

Geotechnical Data presented within the Groundsure Report identifies the following potential ground hazards which are summarised in Table 4-2 below:

Table 4-2 Geotechnical Data

Hazard	Area on Site	Designation
Shrink-Swell Clay	Northern parcel of land	Low – Ground conditions predominantly medium plasticity. This is assumed to relate to the fine-grained deposits of the London Clay Formation.
	Southern slither of southern parcel of land	Very Low – Ground conditions predominantly low plasticity. This is assumed to relate to the Head Deposits.
	Majority of southern parcel of land, and southern slither of northern parcel of land	Negligible – Ground conditions are predominantly non-plastic. This is assumed to relate to the Bagshot Sand Formation.
Landslides	Side-wide	Very Low – Slope instability problems are not likely to occur.
Ground Dissolution	Site-wide	Negligible – Soluble rocks are either not thought to be present within the ground, or not prone to dissolution.
Compressible Ground	Majority of both northern and southern parcels of land	Negligible – Compressible strata are not thought to occur.
	Small area within the western extent of the northern parcel of land, and the southern boundary of the southern parcel of land	Moderate – Compressibility and uneven settlement hazards are probably present. This is assumed to relate to the Alluvium.
Collapsible Deposits	Majority of both northern and southern parcels of land	Very Low – Deposits with potential to collapse when loaded and saturated are unlikely to be present.
	Small area within the western	Negligible – Deposits with potential to collapse

Hazard	Area on Site	Designation
	extent of the northern parcel of land, and the southern boundary of the southern parcel of land	when loaded and saturated are believed not to be present. This is assumed to relate to the Alluvium.
Running Sands	Majority of the northern parcel of land, and southern slither of the southern parcel of land	Very Low – Running sand conditions are unlikely. This is assumed to be related to the London Clay Formation.
	Majority of the southern parcel of land, and small area within the western extent of the northern parcel of land	Low – Running sand conditions may be present. This is assumed to be related to the Bagshot Sand Formation and Alluvium.

4.4 Mining and Ground Workings

The site is not located within an area that is affected by coal mining and therefore no Coal Authority mining report was obtained for the purposes of this report. In addition, no records of other mining activities within 500m of the site was reported.

The Groundsure identified twelve (12no.) records of historical surface ground workings within 250m of the site, which relate to three (3no.) workings detailed below:

- 157m south – Unspecified Ground Workings (1910);
- 168m south – Unspecified Heap (1961-1988); and,
- 207-236m southeast – Pond (1898-1988).

As discussed within Section 3.5, the unspecified heap has not been considered further.

4.5 Radon Risk Potential

The site lies within an area where less than 1% of the properties are above the Action Level. At these levels BRE publication BR211 indicates that no special radon protective measures are required in the construction of new extensions or dwellings.

4.6 Current Industrial Land Uses

The Groundsure Report identified eight (8no.) entries relating to six (6no.) current industrial land uses within a 250m radius of the subject site, summarised below:

- 34m northeast – MJ Auto Mechanics and K03 Coachworks – *Upon further review, the structure located 34m northwest as identified by Groundsure is a residential dwelling. The Mechanics and Coachworks identified is located 265m northeast of the site, and as such as not been considered further;*
- 49m northeast – Forest MOT & Service Centre;
- 154m southwest – Moores Motors and MD Vehicle Solutions – *Upon further review, this site is situated approximately 40m south of the Emm Brook. Due to the topography and anticipated groundwater flow to the north into the Emm Brook, it is considered unlikely to pose a significant risk to the subject site and has not been considered further;*
- 205m southwest – Electricity Substation - *Due to the distance and direction from the site and the low mobility of PCBs, the identified electricity sub station is not considered to have the*

potential to impact the subject site and have therefore not been considered further;

- 208m southwest – Aquilla Accident Repair Centre; and,
- 249m southwest – Hall Hunter Partnership (Fruit Farm).

4.7 Sensitive Land Uses

The Groundsure report indicates that the site is located within a currently defined Nitrate Vulnerable Zone (NVZ) associated with the Surface Water of the Emm Brook.

The site is located within four (4no.) SSSI Impact Risk Zones.

The Groundsure report identified seven (7no.) records of Designated Ancient Woodland within 250m radius. The closest is located 3m east to 1m northeast at Easthampstead Park.

4.7.1 Sites of Special Scientific Interest (SSSI) Impact Risk Zones

The Groundsure Report identified that the site is located within four (4no.) SSSI Impact Risk Zones, associated with Heath Lake (Sanding Open Water), Wykery Copse, Broadmoor to Bagshot Woods and Heaths (Crowthorn Woods), and Broadmoor to Bagshot Woods and Heaths (Coniferous Woodland).

The Groundsure Report states that any residential developments with a total net gain in residential units, or any residential developments outside of existing settlements/urban areas with a total net gain in residential units require consultation.

In addition, any proposed infrastructure for transport (including road, rail and by water) requires consultation.

4.7.2 Nitrate Vulnerable Zone (NVZ)

The site lies within a Nitrate Vulnerable Zone for the surface water of the Emm Brook. Farmers operating within the NVZ are required to follow mandatory rules to tackle nitrate loss from agriculture, but based on our understanding of the proposed development it is considered unlikely that the location within an NVZ will pose a significant barrier to development.

4.8 Site Sensitivity Assessment

Based on the information presented in the sections above, the site is considered as being located within a 'Moderate' sensitivity setting due to the following reasons:

- Three (3no.) watercourses located on-site associated with Emm Brook;
- Underlying Secondary Undifferentiated and Secondary A Aquifers within superficial deposits, and Secondary A Aquifer within the Bagshot Sands bedrock;
- Anticipated coarse-grained soils within areas of River Terrace Deposits and Bagshot Sand Formation;
- Site is located within four SSSIs;
- Site is within a Nitrate Vulnerable Zone (NVZ);
- The site is not located within a Source Protection Zone;
- There are no active or historical water abstraction licenses within 250m of the site; and,
- Low to negligible risk of groundwater flooding on the site.

5 CONSULTATIONS

5.1 Contaminated Land Officer

Contact was made with Wokingham Borough Council via email in August 2022 regarding whether the council were aware of any environmental issues pertaining to the site.

At the time of writing a response has yet to be received and should any environmentally pertinent information be received then it will be issued as an addendum to this report.

5.2 Landfill and Waste Treatment Sites

The Groundsure Report identified no records of historic landfill sites or historic waste treatment sites within 250m of the subject site.

The Groundsure Report identified no active or recently closed licensed waste sites within 250m of the site boundary.

5.3 Potentially Infilled Land

The Groundsure report identified no areas of infilled land within 250m of the site. However, a review of Section 0 indicates that the two (2no.) identified historical ground workings have the potential to have been infilled. These relate to:

- 157m south – Unspecified Ground Workings (1910); and,
- 207-236m southeast – Pond (1898-1988).

5.4 Regulatory Database

The following information has been obtained from a commercially available environmental database. The summary table (Table 5-1) only includes records not otherwise detailed in the report. Where more than two entries have been identified, the Table summarises the closest two entries to the site.

Table 5-1 Summary of Groundsure Data

	0-249m	250-500m	Details
Sites Determined as Contaminated Land	0	0	N/A
Control of Major Accident Hazards (COMAH)	0	0	N/A
Regulated Explosive Sites	0	1	348m north - Bracknell Fireworks Bigwood House, Waterloo Road, Bracknell, RG40 3DA
Hazardous substance storage/usage	0	0	N/A
Historical licensed Industrial Activities (IPC)	0	0	N/A
Licensed Industrial Activities (Part A(1))	0	0	N/A
Licensed Pollutant Release	0	0	N/A

	0-249m	250-500m	Details
(Part A(2)/B)			
Radioactive Substance Authorisations	0	0	N/A
Licensed discharges to controlled waters	25	8	On site – New Bungalow, Sutton Court Farm Sewage into the Bagshot Beds Revoked on 01/10/1996 On site – Willow Bank, Easthampstead Road Sewage into Tributary of Emm Brook Effective from 01/11/1999 On site - New House by Sutton House Sewage into Tributary of Emm Brook Revoked on 01/10/1996
Pollutant release to surface water (Red List)	0	0	N/A
Pollutant Release to public sewer	0	0	N/A
List 1 Dangerous Substances	0	0	N/A
List 2 Dangerous Substances	0	0	N/A
Pollution Incidents (EA/NRW)	3	1	33m northeast 29/07/2002 Specific Waste Materials Land Impact: Minor Water and Air Impact: No Impact 33m northeast 05/09/2002 Inert Materials and Waste Land Impact: Minor Water and Air Impact: No Impact.
Pollution Inventory Substances	0	0	N/A
Pollution Inventory Waste Transfers	0	0	N/A
Pollution Inventory Radioactive Waste	0	0	N/A

6 CONCEPTUAL SITE MODEL (CSM)

6.1 Initial CSM

In accordance with Environment Agency, CLR 11 (2004) and BSI 10175 (Code of Practice for Investigation of Potentially Contaminated Land), Omnia Environmental Consulting have developed an initial CSM to identify potential contamination sources, migration pathways and receptors within the study area. A residential end use has been adopted given the proposed site development.

6.1.1 On-site Potential Sources

- Agricultural Use of Land across majority of entire site;
- Active Hambridge Farm including;
 - Tanks within Hambridge Farm;
 - Mixed waste stockpile (SP4 – Figure 3.3) within Hambridge Farm;
 - PACM materials stored within northeast of Hambridge Farm.
- Historical Orchard within Hambridge Farm; and,
- Made Ground associated with historical development within Areas 1 and 2.

6.1.2 Off-site Potential Sources

- Immediately south of Area 3, 49m northeast of Area 1 – Forest MOT and Service Centre;
- 9-10m east – Historical Made Ground identified on BSG Mapping
- 157m south – Historical unspecified ground working (assumed infilled);
- 187m north – Historical Unspecified Tanks;
- 207-230m southeast – Historical pond (assumed infilled);
- 208m southwest – Aquilla Accident Repair Centre; and,
- 249m southwest – Hall Hunter Partnership.

6.1.3 Potential Pathways

- Inhalation and ingestion of impacted soils and dusts;
- Dermal contact with impacted soils;
- Inhalation of vapours;
- Vertical and lateral migration; and,
- Migration of gas into confined spaces.

6.1.4 Potential Receptors

- Future Site Users.
- Controlled Waters
 - Groundwater in underlying Secondary Aquifers; and,
 - Emm Brook and associated tributaries located on-site.

Construction workers are not considered to be a plausible receptor due to management of their exposure through the use of suitable PPE and hygienic working practices as required under HSE/CDM regulations. Furthermore, the length of any exposure is considered to be very short in comparison to the criteria for which the adopted end use has been derived. An Initial Conceptual Site Model has been prepared for the site and is presented overleaf within Table 6-1.

Table 6-1 Initial Conceptual Site Model

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
On-Site Potential Sources							
Agricultural use of land across majority of site	Herbicides and Pesticides	Inhalation and ingestion of impacted soils and dusts	Future Site Users	Low	Moderate	Low/Moderate	Potentially Active – Further investigation required
		Dermal contact with impacted soils	Future Site Users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Secondary A Aquifers	Low	Minor	Low	
			On-site watercourses	Low	Moderate	Low/Moderate	
	Total Petroleum Hydrocarbons (TPH)	Inhalation and ingestion of impacted soils and dusts	Future Site Users	Low	Moderate	Low/Moderate	
		Dermal contact with impacted soils	Future Site Users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Secondary A Aquifers	Moderate	Minor	Low/Moderate	
			On-site watercourses	Moderate	Moderate	Moderate	
Hambridge Farm (general use)	Heavy Metals	Inhalation and ingestion of impacted soils and dusts	Future Site Users	Moderate	Moderate	Moderate	Potentially Active – Further investigation required
		Dermal contact with impacted soils	Future Site Users	Moderate	Moderate	Moderate	
		Vertical and lateral migration	Secondary A Aquifers	Low	Minor	Low	
			On-site watercourses	Low	Moderate	Low/Moderate	
	Polycyclic Aromatic Hydrocarbons (PAH)	Inhalation and ingestion of impacted soils and dusts	Future Site Users	Moderate	Moderate	Moderate	
		Dermal contact with impacted soils	Future Site Users	Moderate	Moderate	Moderate	
		Vertical and lateral migration	Secondary A Aquifers	Low	Minor	Low	
			On-site watercourses	Low	Moderate	Low/Moderate	
	Total Petroleum Hydrocarbons (TPH)	Inhalation and ingestion of impacted soils and dusts	Future Site Users	Moderate	Moderate	Moderate	
		Dermal contact with impacted soils	Future Site Users	Moderate	Moderate	Moderate	
		Inhalation of vapours	Future Site Users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Secondary A Aquifers	Moderate	Minor	Low/Moderate	
			On-site watercourses	Moderate	Moderate	Moderate	
Fuel Tanks within	Total Petroleum Hydrocarbons	Inhalation and ingestion of impacted soils and dusts	Future Site Users	Moderate	Moderate	Moderate	Potentially Active – Further investigation required

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
Hambridge Farm	(TPH)	Dermal contact with impacted soils	Future Site Users	Moderate	Moderate	Moderate	
		Inhalation of vapours	Future Site Users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Secondary A Aquifers	Moderate	Minor	Low/Moderate	
			On-site watercourses	Moderate	Moderate	Moderate	
Mixed waste stockpile (SP4) within Hambridge Farm	Heavy Metals	Inhalation and ingestion of impacted soils and dusts	Future Site Users	Low	Moderate	Low/Moderate	Potentially Active – Further investigation required
		Dermal contact with impacted soils	Future Site Users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Secondary A Aquifers	Low	Minor	Low	
			On-site watercourses	Low	Moderate	Low/Moderate	
	Polycyclic Aromatic Hydrocarbons (PAH)	Inhalation and ingestion of impacted soils and dusts	Future Site Users	Low	Moderate	Low/Moderate	
		Dermal contact with impacted soils	Future Site Users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Secondary A Aquifers	Low	Minor	Low	
			On-site watercourses	Low	Moderate	Low/Moderate	
	Total Petroleum Hydrocarbons (TPH)	Inhalation and ingestion of impacted soils and dusts	Future Site Users	Low	Moderate	Low/Moderate	
		Dermal contact with impacted soils	Future Site Users	Low	Moderate	Low/Moderate	
		Inhalation of vapours	Future Site Users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Secondary A Aquifers	Moderate	Minor	Low/Moderate	
			On-site watercourses	Low	Moderate	Low/Moderate	
	Asbestos Fibres	Inhalation of Fibres	Future Site Users	Moderate	Moderate	Moderate	
PACM materials stored within northeast of Hambridge Farm	Asbestos Fibres	Inhalation of Fibres	Future Site Users	Moderate	Moderate	Moderate	Potentially Active – Further investigation required
Historical Orchard within Hambridge Farm	Heavy Metals (As & Pb)	Inhalation and ingestion of impacted soils and dusts	Future Site Users	Low	Moderate	Low/Moderate	Potentially Active – Further investigation required
		Dermal contact with impacted soils	Future Site Users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Secondary A Aquifers	Low	Minor	Low	
			On-site watercourses	Low	Moderate	Low/Moderate	

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive		
	Polycyclic Aromatic Hydrocarbons (PAH)	Inhalation and ingestion of impacted soils and dusts	Future Site Users	Low	Moderate	Low/Moderate			
		Dermal contact with impacted soils	Future Site Users	Low	Moderate	Low/Moderate			
		Vertical and lateral migration	Secondary A Aquifers	Low	Minor	Low			
			On-site watercourses	Low	Moderate	Low/Moderate			
Made Ground associated with historical development within Areas 1 and 2	Heavy Metals	Inhalation and ingestion of impacted soils and dusts	Future Site Users	Low	Moderate	Low/Moderate	Potentially Active – Further investigation required		
		Dermal contact with impacted soils	Future Site Users	Low	Moderate	Low/Moderate			
		Vertical and lateral migration	Secondary A Aquifers	Low	Minor	Low			
			On-site watercourses	Low	Moderate	Low/Moderate			
	Polycyclic Aromatic Hydrocarbons (PAH)	Inhalation and ingestion of impacted soils and dusts	Future Site Users	Low	Moderate	Low/Moderate			
		Dermal contact with impacted soils	Future Site Users	Low	Moderate	Low/Moderate			
		Vertical and lateral migration	Secondary A Aquifers	Low	Minor	Low			
			On-site watercourses	Low	Moderate	Low/Moderate			
	Total Petroleum Hydrocarbons (TPH)	Inhalation and ingestion of impacted soils and dusts	Future Site Users	Low	Moderate	Low/Moderate			
		Dermal contact with impacted soils	Future Site Users	Low	Moderate	Low/Moderate			
		Inhalation of vapours	Future Site Users	Low	Moderate	Low/Moderate			
			Secondary A Aquifers	Moderate	Minor	Low/Moderate			
		Vertical and lateral migration	On-site watercourses	Low	Moderate	Low/Moderate			
	Asbestos Fibres	Inhalation of Fibres	Future Site Users	Moderate	Moderate	Moderate			
		Ground Gas (CH ₄ and CO ₂)	Migration of gas into confined spaces	Future Site Users	Very Low	Severe		Low/Moderate	Inactive – Given that the historical development on site has been minimal, it is considered unlikely that a significant thickness of Made Ground (>1m thickness) with the potential to generate ground gas is present.

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
Off-Site Potential Sources							
Forest MOT and Service Centre (Immediately south of Area 3 and 49m northeast of Area 1)	Heavy Metals	Lateral Migration	Future Site Users	Low	Moderate	Low/Moderate	Potentially Active – Further investigation required
	Polycyclic Aromatic Hydrocarbons (PAH)	Lateral Migration	Future Site Users	Low	Moderate	Low/Moderate	
	Total Petroleum Hydrocarbons (TPH)	Lateral Migration	Future Site Users	Moderate	Moderate	Moderate	
	Ground Gas (CH ₄ and CO ₂)	Lateral Migration	Future Site Users	Moderate	Severe	High	
9-10m east-Made Ground identified on BSG Mapping	Heavy Metals	Lateral Migration	Future Site Users	Low	Moderate	Low/Moderate	Potentially Active – Further investigation required
	Polycyclic Aromatic Hydrocarbons (PAH)	Lateral Migration	Future Site Users	Low	Moderate	Low/Moderate	
	Total Petroleum Hydrocarbons (TPH)	Lateral Migration	Future Site Users	Low	Moderate	Low/Moderate	
	Ground Gas (CH ₄ and CO ₂)	Migration of gas into confined spaces	Future Site Users	Moderate	Severe	High	
157m south – Historical unspecified ground working	Ground Gas (CH ₄ and CO ₂)	Migration of gas into confined spaces	Future Site Users	Low	Severe	Moderate	Potentially Active – Further investigation required
187m north – Historical unspecified tank	Total Petroleum Hydrocarbons (TPH)	Lateral Migration	Future Site Users	Very Low	Moderate	Low	Potentially Active – Further investigation required
207-230m southeast – Historical pond (assumed infilled)	Ground Gas (CH ₄ and CO ₂)	Migration of gas into confined spaces	Future Site Users	Very Low	Severe	Low	Inactive – Given the size of the pond, distance away from the site, age of the source it is not considered that ground gas has the potential to pose a significant risk to future site users.

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
208m southwest - Aquilla Accident Repair Centre	Total Petroleum Hydrocarbons (TPH)	Lateral Migration	Future Site Users	Very Low	Moderate	Low	Inactive – Given the distance away from the site, topography, groundwater flow direction and location of the water course between the sources would sever the pollution linkage and therefore it is not considered that these contaminants have the potential to pose a significant risk to future site users.
249m southwest – Hall Hunter Partnership (Horticultural Nursery)	Herbicides and Pesticides	Lateral Migration	Future Site Users	Very Low	Moderate	Low	Inactive – Given the distance away from the site, topography, groundwater flow direction and location of the water course between the sources would sever the pollution linkage and therefore it is not considered that these contaminants have the potential to pose a significant risk to future site users.
	Heavy Metals	Lateral Migration	Future Site Users	Very Low	Moderate	Low	
	Polycyclic Aromatic Hydrocarbons (PAH)	Lateral Migration	Future Site Users	Very Low	Moderate	Low	
	Total Petroleum Hydrocarbons (TPH)	Lateral Migration	Future Site Users	Very Low	Moderate	Low	Potentially Active – Further investigation required

7 CONCLUSIONS AND RECOMMENDATIONS

Revised Conceptual Site Model

The Conceptual Site Model has identified the presence of a series of potentially active pollution linkages associated with the historical use of the site and immediately adjacent sites which are considered to have the potential to present a significant risk to identified receptors.

Whilst the potentially active pollution linkages are present, they are considered unlikely to present a significant barrier to development. However, this should be established and assessed further through follow-on intrusive ground investigation and assessment.

Recommendations

It is recommended that an asbestos survey is undertaken in accordance with the Control of Asbestos Regulations (2012) prior to the commencement of any refurbishment or demolition works within Area 1. Before moving or disposing of the PACM sheeting and tiles within Area 2 these should also be inspected.

It is understood that Condition 5 of the granted planning application for the development specifies that 'no development, including demolition and site works, shall begin until there has been submitted to and agreed in writing by the Authority a site investigation report documenting the ground conditions of the site and incorporating chemical and gas analysis identified as appropriate by the desktop study.'

It is therefore recommended that an intrusive site investigation should be undertaken to investigate the potential pollution linkages identified by the Conceptual Site Model and determine the potential risks posed to the identified receptors. If areas of the site are inaccessible during site investigation works prior to demolition, further investigation will be necessary in those areas post-demolition.

The site investigation should include chemical and geotechnical testing of soil samples for a suite of determinants representative of the potential sources of impact identified within the CSM.

Upon return of chemical testing results a Tier 1 Risk Assessment should be undertaken to determine whether the encountered soils have the potential to present a significant risk to the identified receptors. This would then enable mitigation measures to be formulated, if required.

APPENDIX I - LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between Omnia and the Client as indicated in Section 1.2.
 2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.
 3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination, which are enforced, by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
 4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
 5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
 6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
 7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.
 8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
 9. Omnia cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by Omnia is owned by them, and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by Omnia in this connection without their explicit written agreement there to by Omnia.
 10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.
-

APPENDIX II – GLOSSARY

AST	Above Ground Storage Tank
BGS	British Geological Survey
BSI	British Standards Institute
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CIEH	Chartered Institute of Environmental Health
CIRIA	Construction Industry Research Association
CLEA	Contaminated Land Exposure Assessment
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid (Chlorinated Solvents, PCB)
DWS	Drinking Water Standard
EA	Environment Agency
EQS	Environmental Quality Standard
GAC	General Assessment Criteria
GL	Ground Level
GSV	Gas Screening Value
HCV	Health Criteria Value
ICSM	Initial Conceptual Site Model
LNAPL	Light Non-Aqueous Phase Liquid (Petrol, Diesel, Kerosene)
ND	Not Detected
LMRL	Lower Method Reporting Limit
NR	Not Recorded
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Poly-Chlorinated Biphenyl
PID	Photo-Ionisation Detector
QA	Quality Assurance
SGV	Soil Guideline Value
SPH	Separate Phase Hydrocarbon
TPH (CWG)	Total Petroleum Hydrocarbon (Criteria Working Group)
SPT	Standard Penetration Test
SVOC	Semi Volatile Organic Compound
UST	Underground Storage Tank
VCCS	Vibro Concrete Columns
VOC	Volatile Organic Compound
WTE	Water Table Elevation

UNITS

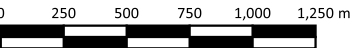
M	Metres
KM	Kilometres
%	Percent
%V/V	Percent Volume in Air
MB	Milli Bars (Atmospheric Pressure)
L/HR	Litres Per Hour
µG/L	Micrograms Per Litre (Parts Per Billion)
PPB	Parts Per Billion
MG/KG	Milligrams Per Kilogram (Parts Per Million)
PPM	Parts Per Million
MG/M ³	Milligram Per Metre Cubed
M BGL	Metres Below Ground Level
M BCL	Metres Below Cover Level

MAOD	Metres Above Ordnance Datum (Sea Level)
KN/M ²	Kilo Newtons Per Metre Squared
µM	Micrometre

APPENDIX III - DRAWINGS

Key

— Site Boundary



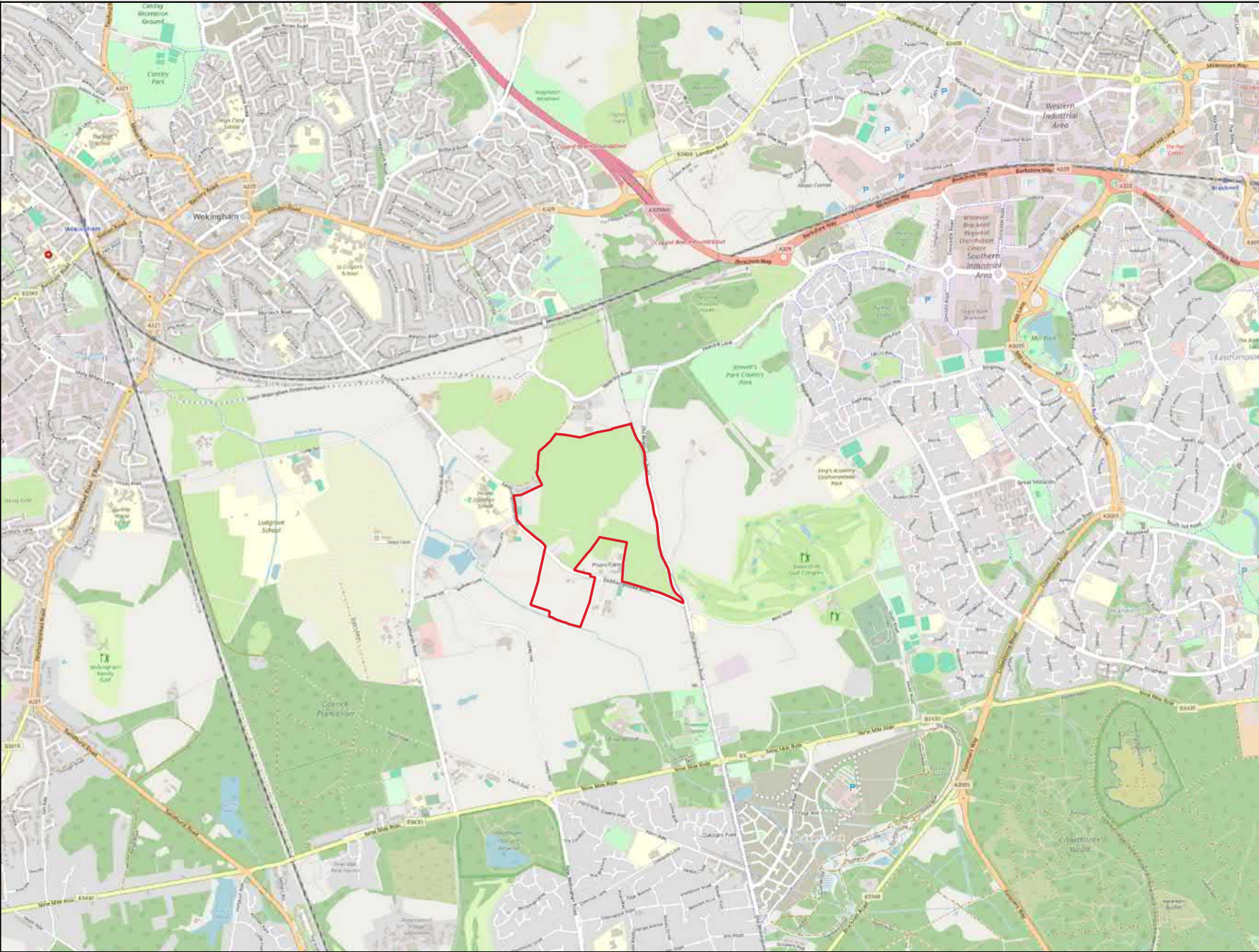
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Job Title:
Land at South Wokingham

Client:
Lightwood Strategic

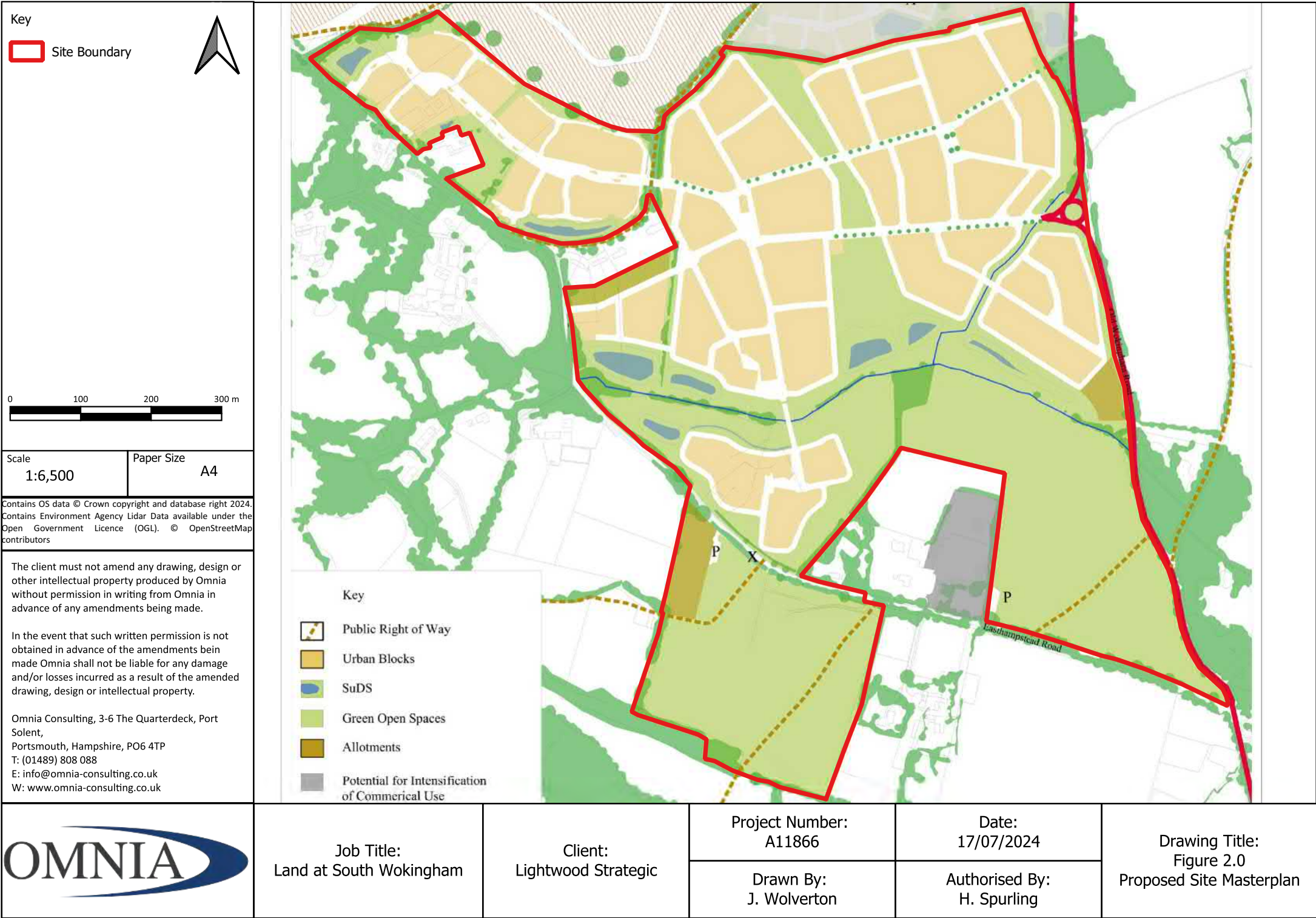
Project Number:
A11866

Drawn By:
J. Wolverton

Date:
17/07/2024

Authorised By:
H. Spurling

Drawing Title:
Figure 1.0
Site Location Map



Key

- Site Boundary
- Watercourses
- Area 1
- Area 2
- Area 3
- Area not accessible during walkover



Scale
1:7,000

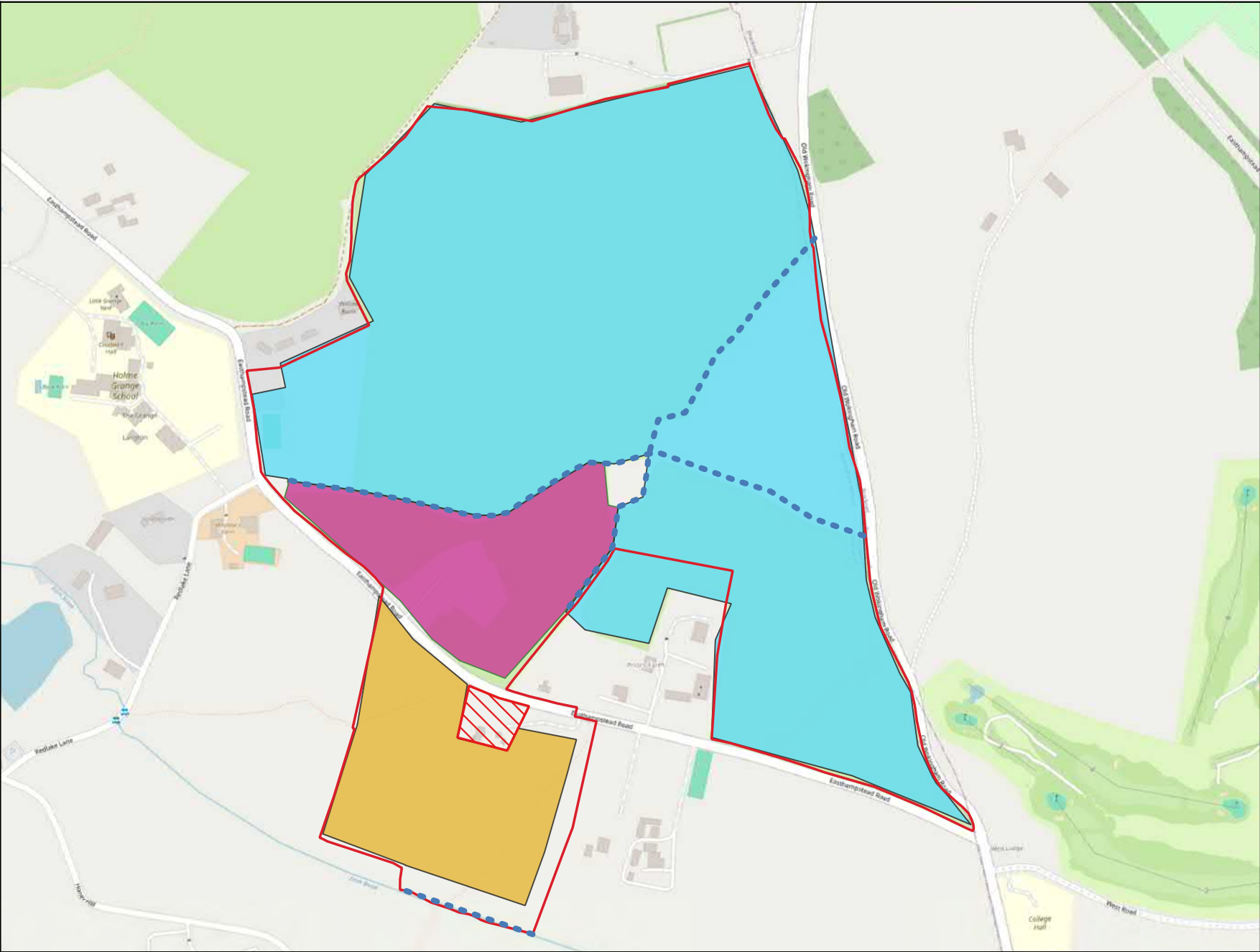
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Job Title:
Land at South Wokingham

Client:
Lightwood Strategic

Project Number:
A11866

Drawn By:
J. Wolverton

Date:
17/07/2024

Authorised By:
H. Spurling

Drawing Title:
Figure 3.1
Site Walkover (Areas)

Key

- Site Boundary
- Access
- ... Watercourses
- - - Access track
- - - Public Footpath
- No Access
- Corn Fields
- Paddock
- Boat Storage

0 20 40 60 80 100 m

Scale 1:2,500	Paper Size A4
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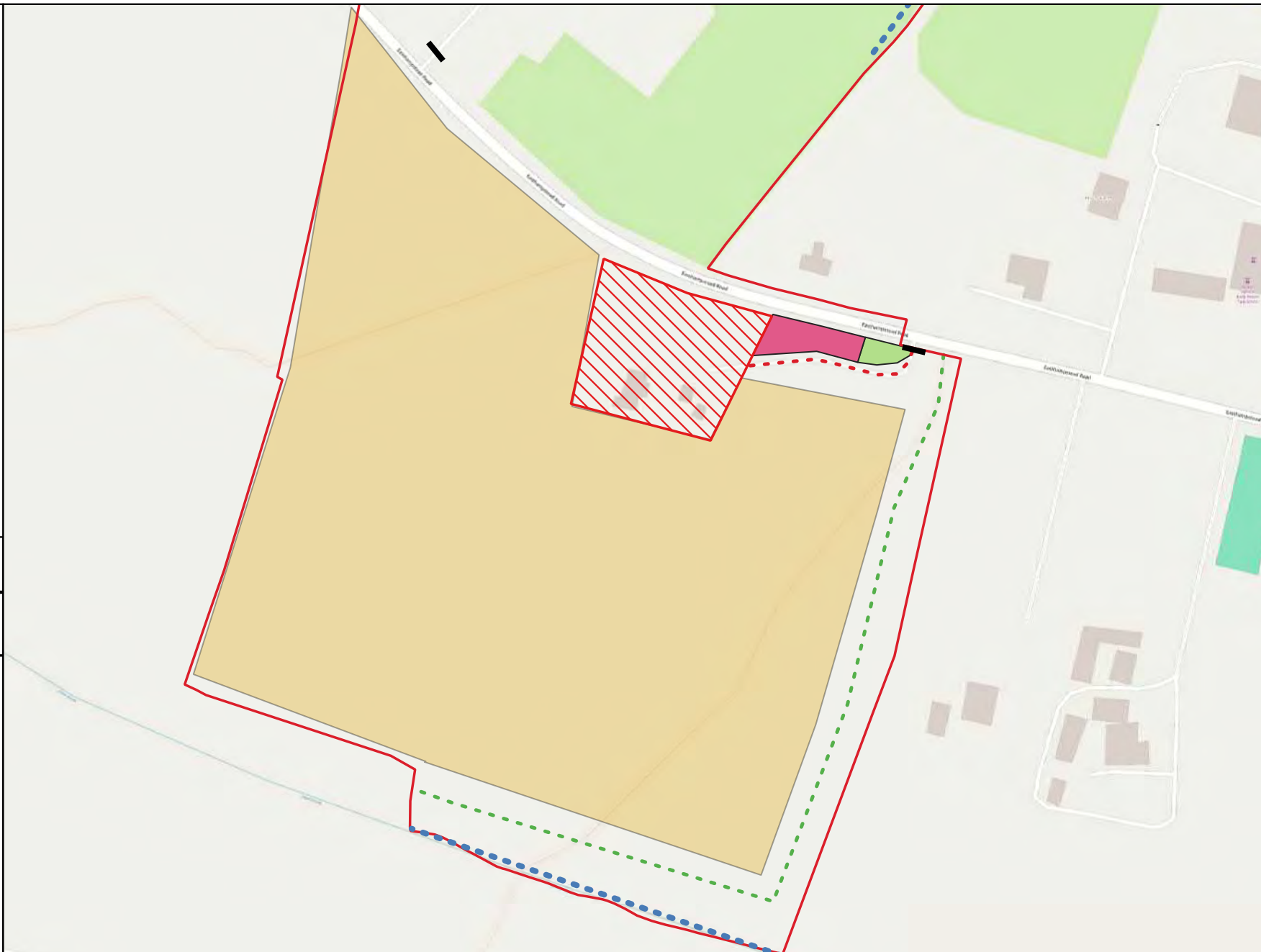
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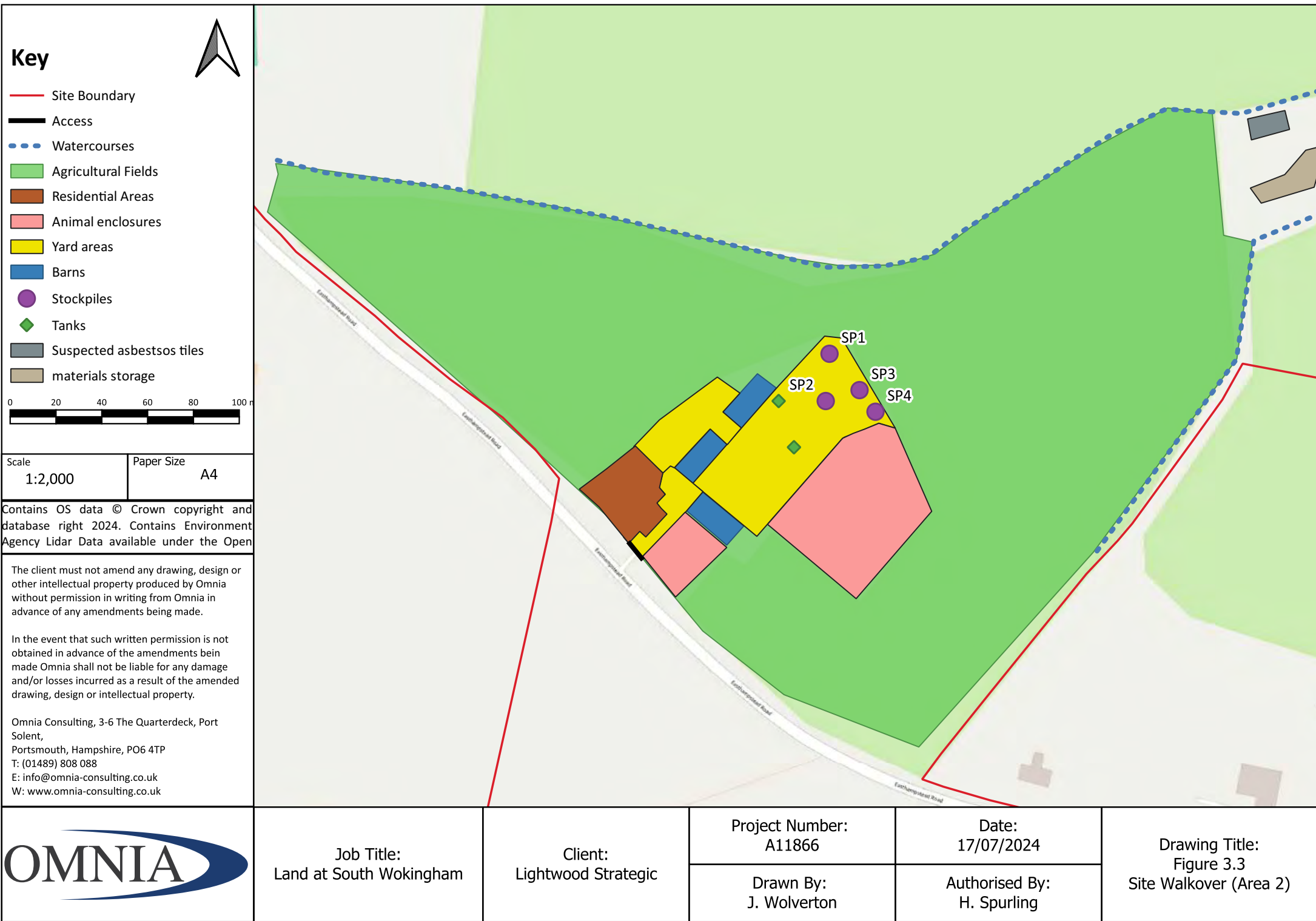
Project Number:
A11866

Drawn By:
J. Wolverton

Date:
17/07/2024

Authorised By:
H. Spurling

Drawing Title:
Figure 3.2
Site Walkover (Area 1)



APPENDIX IV - PHOTOGRAPHS



Photograph 1 – Corn fields within Area 1 (facing south)



Photograph 2 – Watercourse located on the southern boundary of Area 1, flowing west to east (facing south)



Photograph 3 – Access track leading to private yard area within Area 1



Photograph 4 – Area north of the access track within Area 1



Photograph 5 – Residential dwelling within Hambridge Farm



Photograph 6 – Pig enclosures within the southeast section of Area 2



Photograph 7 – Internal area of Barn 1



Photograph 8 – Internal access of Barn 1



Photograph 9 – External view of Barn 2 (facing southwest)



Photograph 10 – Barn 3 used for vehicle storage (facing south)



Photograph 11 – Construction of a fourth barn within Hambridge Farm (facing south)



Photograph 12 – Stockpile 1 within Area 2



Photograph 13 – Stockpile 2 within Area 2



Photograph 14 – Stockpile 3 within Area 2



Photograph 15 – Stockpile 4 within Area 2



Photograph 16 – Tank 1 (bunded fuel tank) adjacent to Barn 3 (facing south).



Photograph 17 – Tank 2 containing Kerosene located south of Barn 1 (facing north)



Photograph 18 – Portable fuel bowser situated south of Tank 2 (facing east)



Photograph 19 – Internal area of the open metal container within Area 2



Photograph 20 – 6-yard skip within Area 2



Photograph 21 – Hay storage within the western extent of the farmyard in Area 2 (facing north)



Photograph 22 – Overview of the farmyard area within Area 2 (facing east)



Photograph 23 – Overview of the farmyard area within Area 2 (facing south)



Photograph 24 – Overview of the farmyard area within Area 2 (facing north)



Photograph 25 – PACM tiling within a trailer located in the northeast corner of Area 2



Photograph 26 – Agricultural field within Area 2 (facing west)



Photograph 27 – Agricultural field within Area 2 (facing south)



Photograph 28 – Agricultural fields within Area 3 (facing southwest)



Photograph 29 – Agricultural fields within Area 3 (facing north)



Photograph 30 – Inland watercourse trending north to south within Area 3 (facing south)



Photograph 31 – Pile of plastic tubing within agricultural field of Area 3.

APPENDIX V - HISTORICAL MAPS

Site Details:

483439 , 167219

Client Ref: A11866_-_PO1164
Report Ref: GS-8946632
Grid Ref: 483412, 167051

Map Name: County Series

Map date: 1898

Scale: 1:10,560

Printed at: 1:10,560



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

Surveyed 1870
 Revised 1898
 Edition N/A
 Copyright N/A
 Levelled N/A

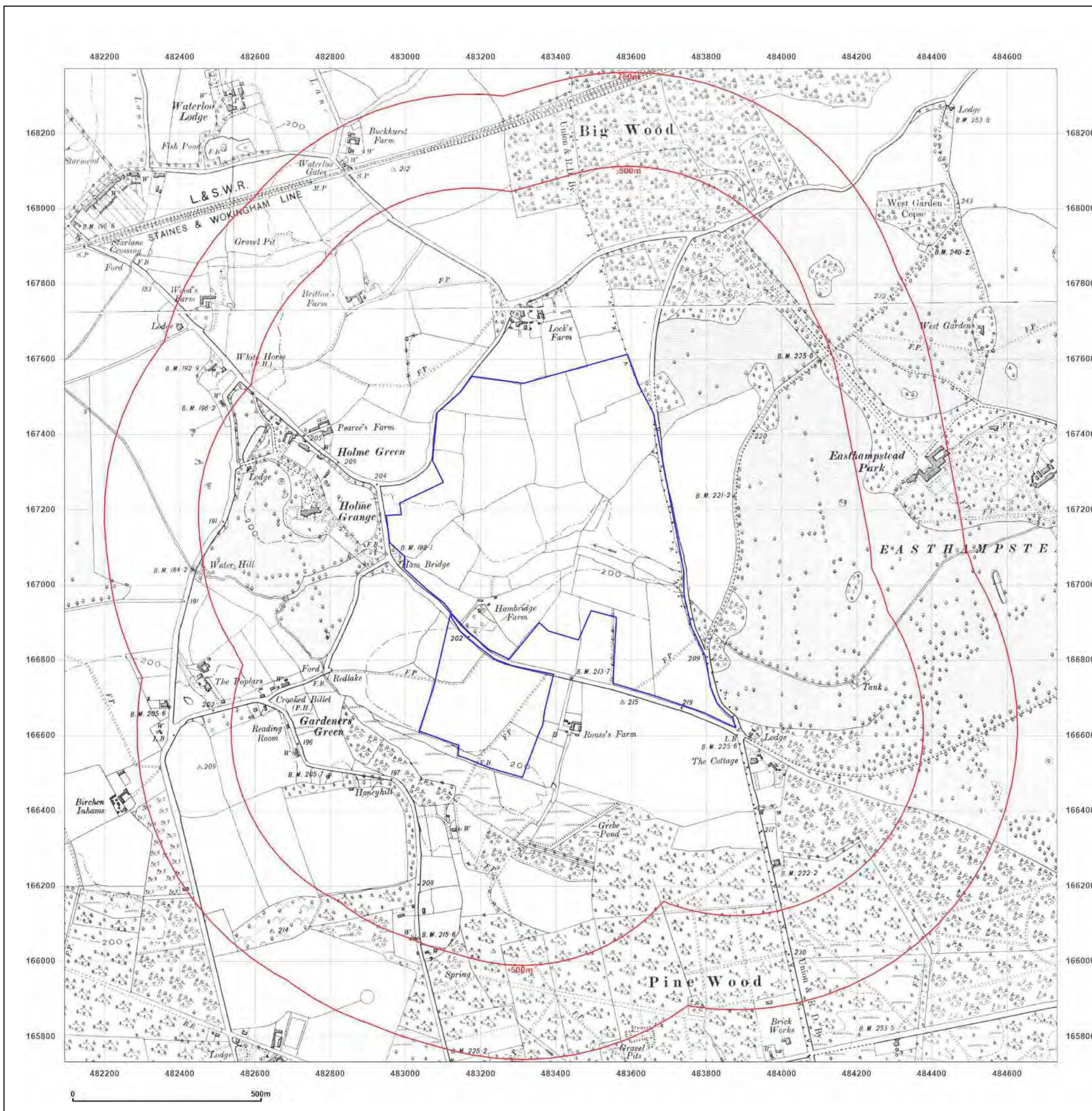


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Site Details:

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Client Ref: A11866_-_PO1164
Report Ref: GS-8946632
Grid Ref: 483412, 167051

Map Name: County Series

Map date: 1909-1910

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1871
 Revised 1909
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1871
 Revised 1910
 Edition N/A
 Copyright N/A
 Levelled N/A

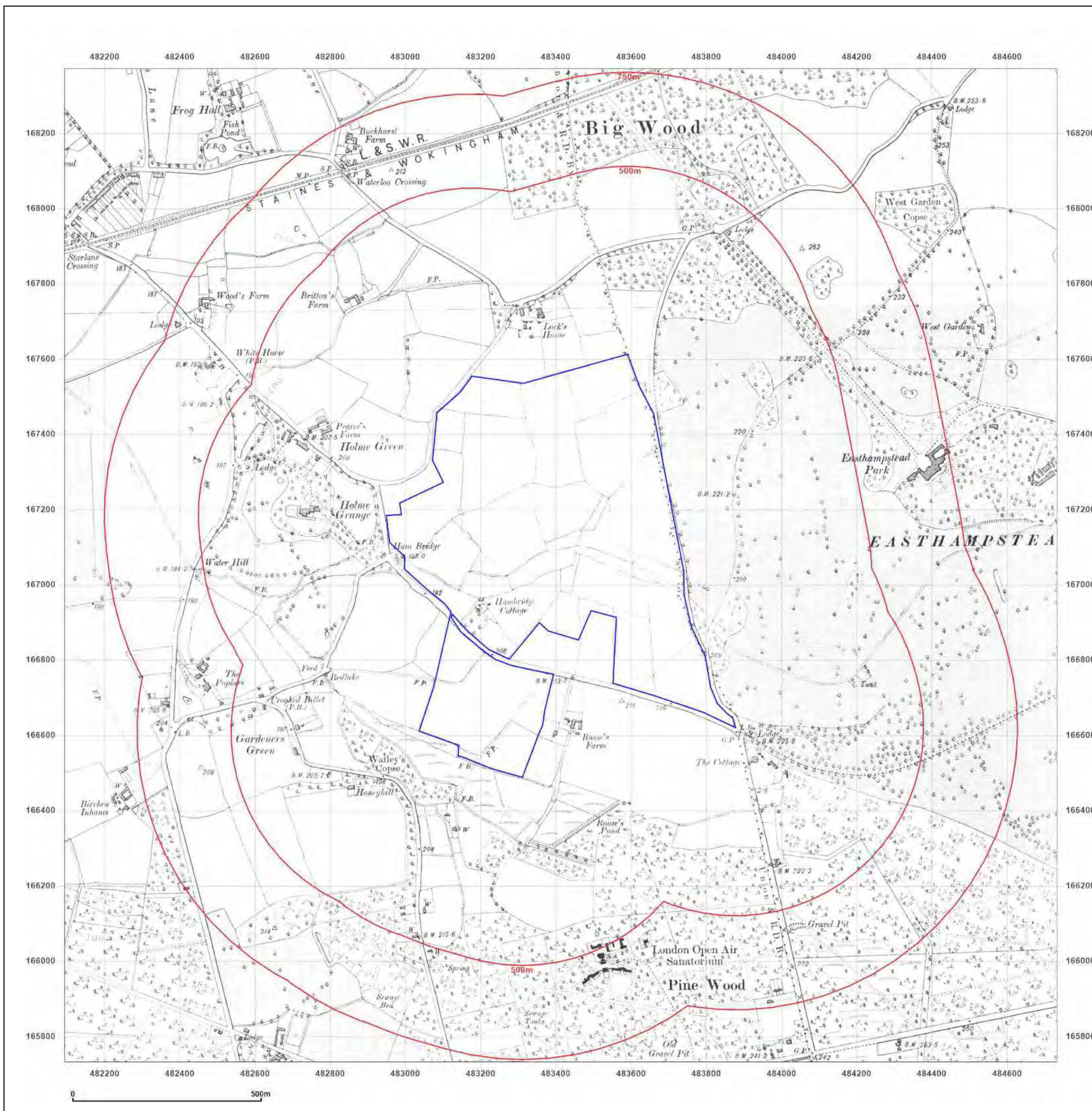


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Site Details:

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Report Ref: GS-8946632
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Map Name: County Series

Map date: 1932

Scale: 1:10,560

Printed at: 1:10,560



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 Revised 1932
 Edition N/A
 Copyright N/A
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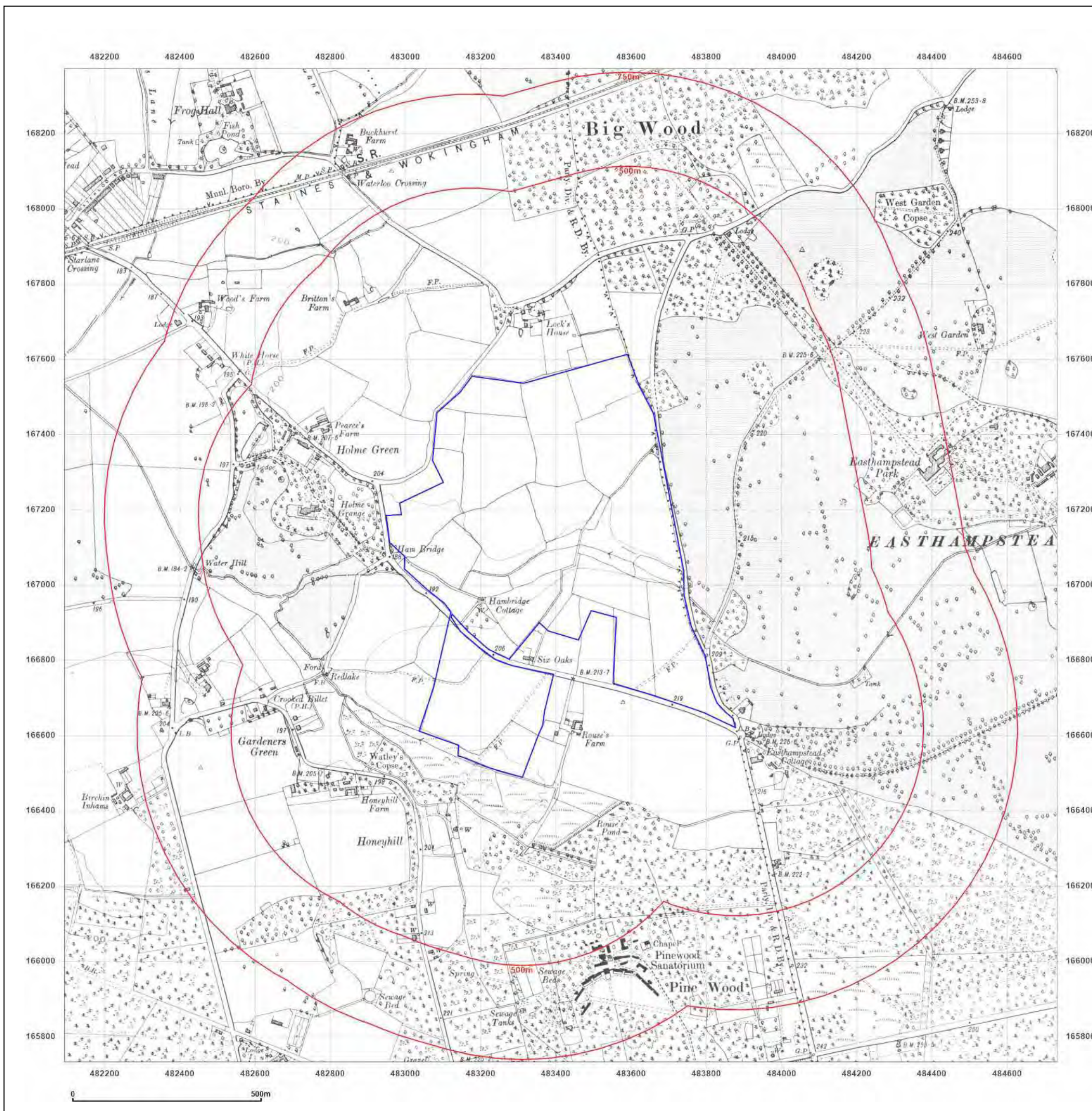


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Site Details:

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Report Ref: GS-8946632
Grid Ref: 483412, 167051

Map Name: County Series

Map date: 1938

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Printed at: 1:10,560



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 Revised 1938
 Edition N/A
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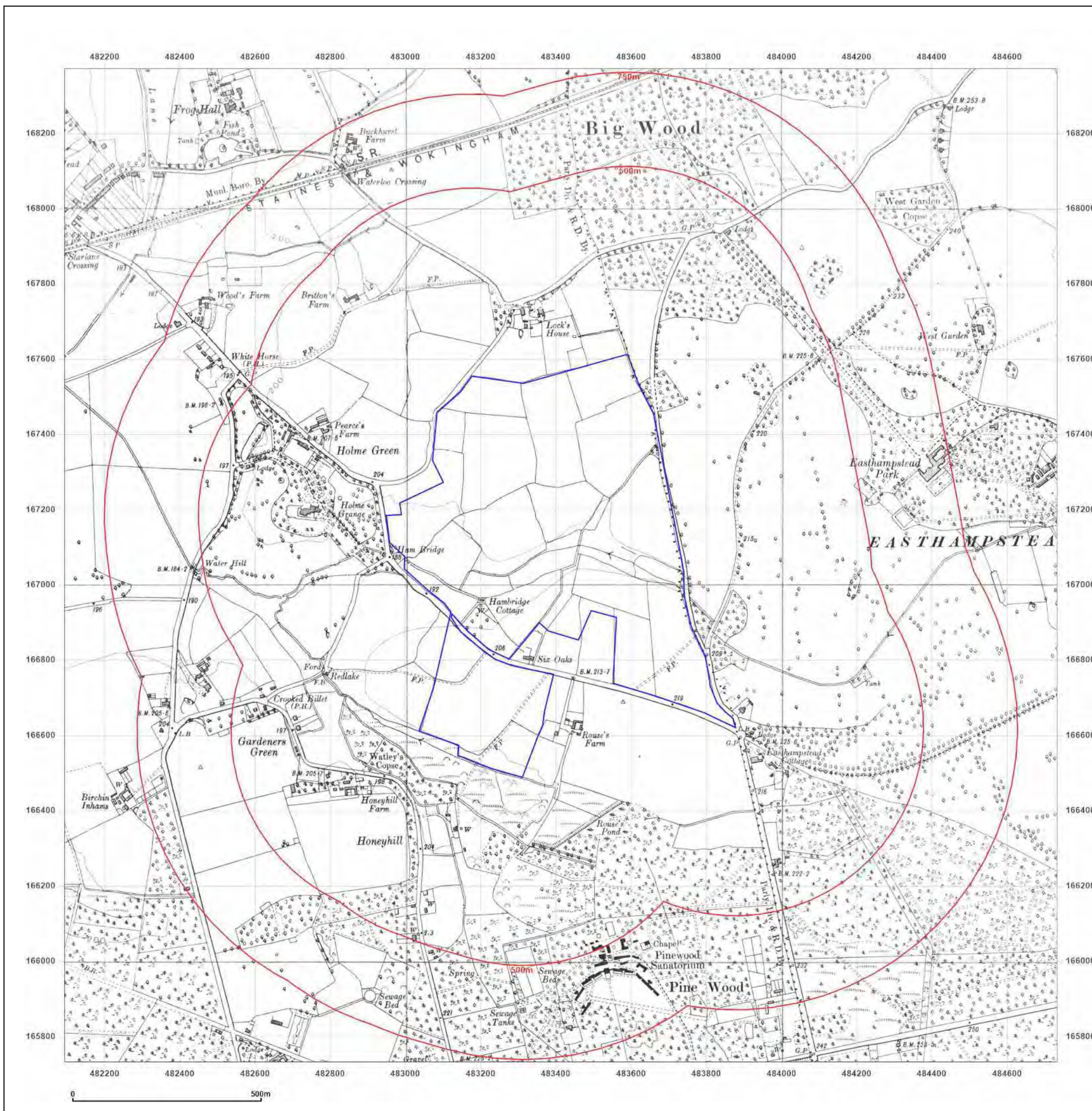


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Site Details:

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Client Ref: A11866_-_PO1164
Report Ref: GS-8946632
Grid Ref: 483412, 167051

Map Name: Provisional

Map date: 1961

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Surveyed 1956
 Revised 1956
 Edition N/A
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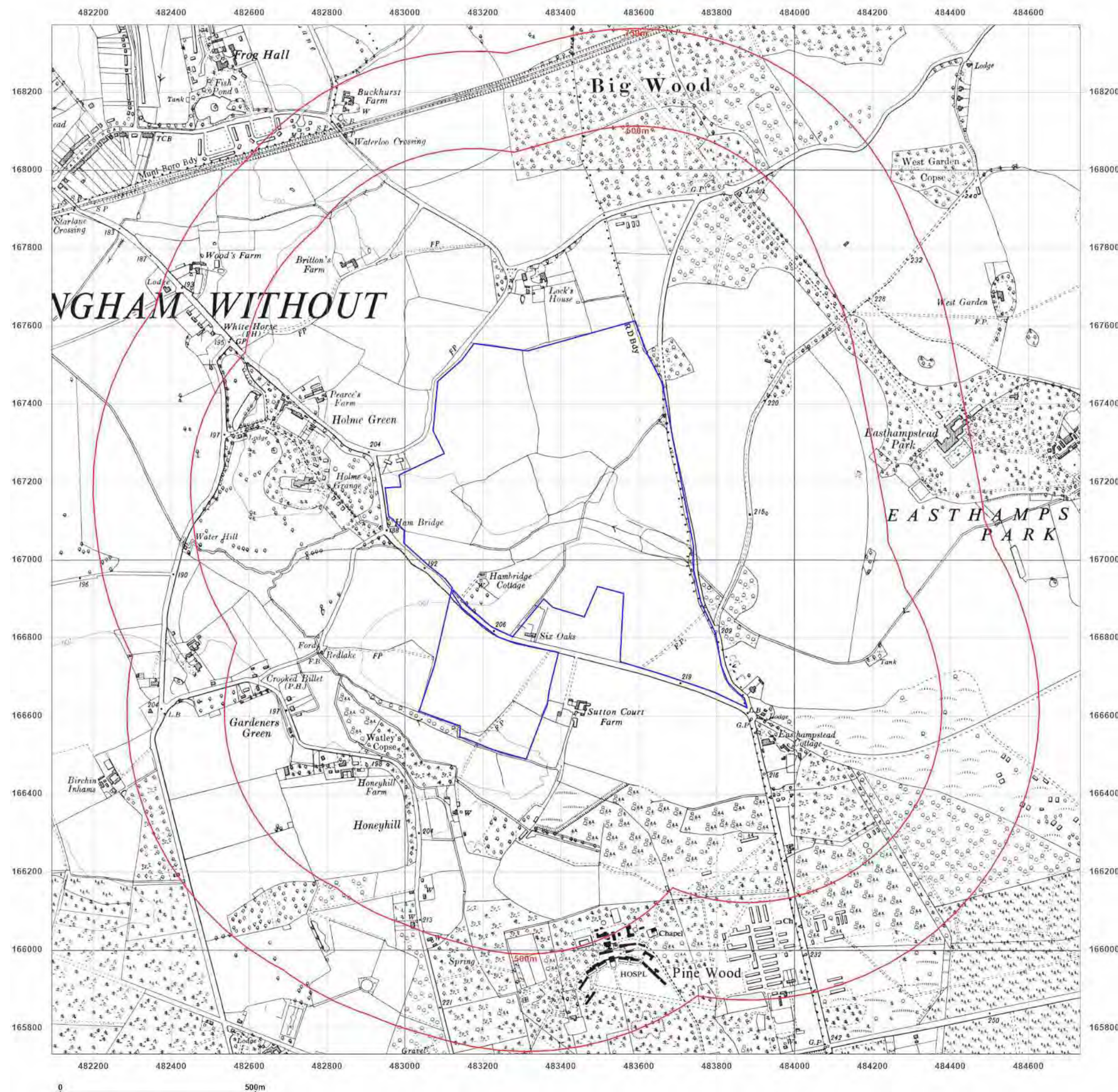


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Site Details:

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Client Ref: A11866_-_PO1164
Report Ref: GS-8946632
Grid Ref: 483412, 167051

Map Name: National Grid

Map date: 1975

Scale: 1:10,000

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Surveyed 1973
 Revised 1975
 Edition N/A
 Copyright 1975
 Levelled 1973

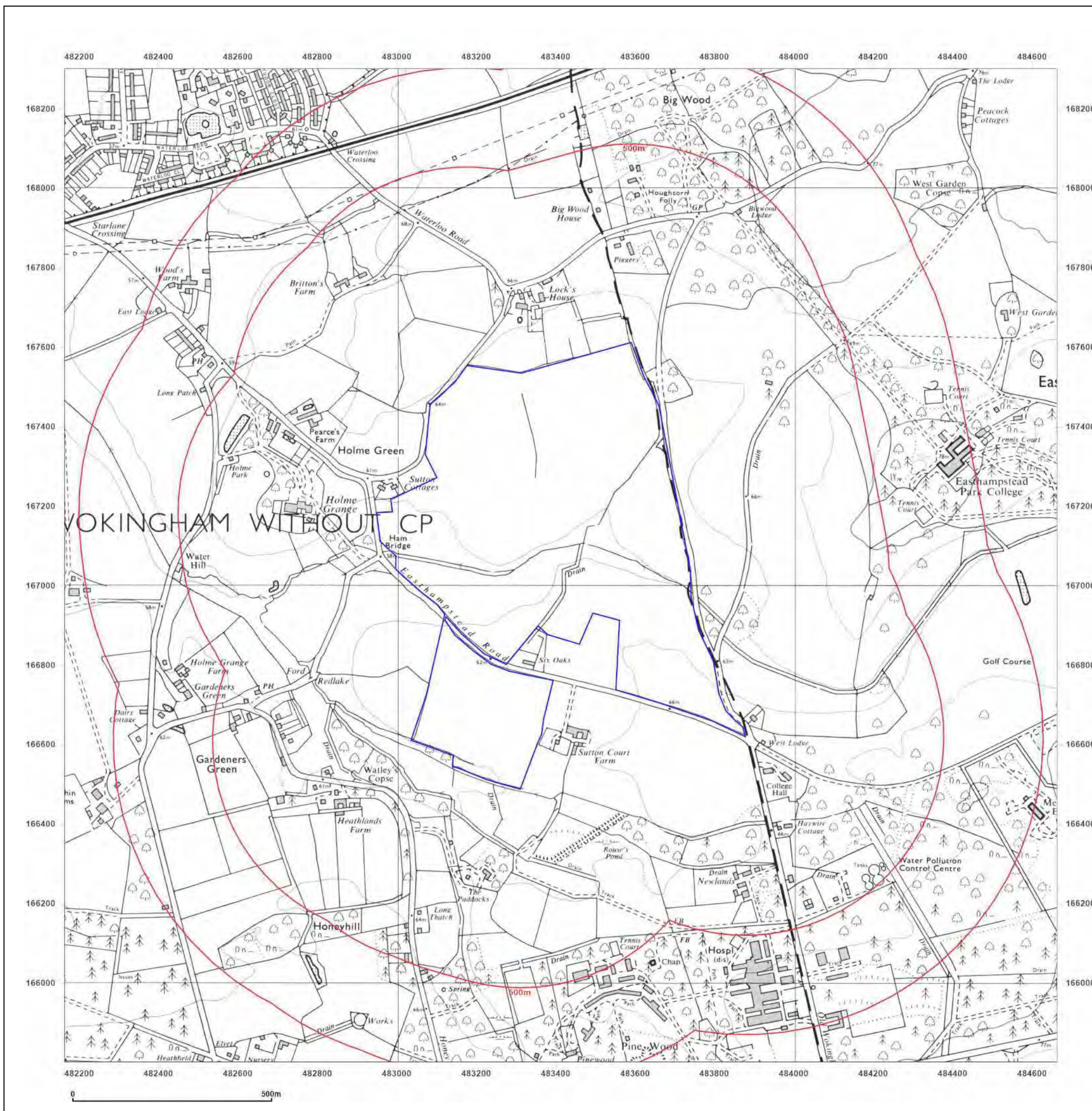


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Site Details:

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Client Ref: A11866_-_PO1164
Report Ref: GS-8946632
Grid Ref: 483412, 167051

Map Name: National Grid

Map date: 1980

Scale: 1:10,000

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Surveyed 1973
 Revised 1980
 Edition N/A
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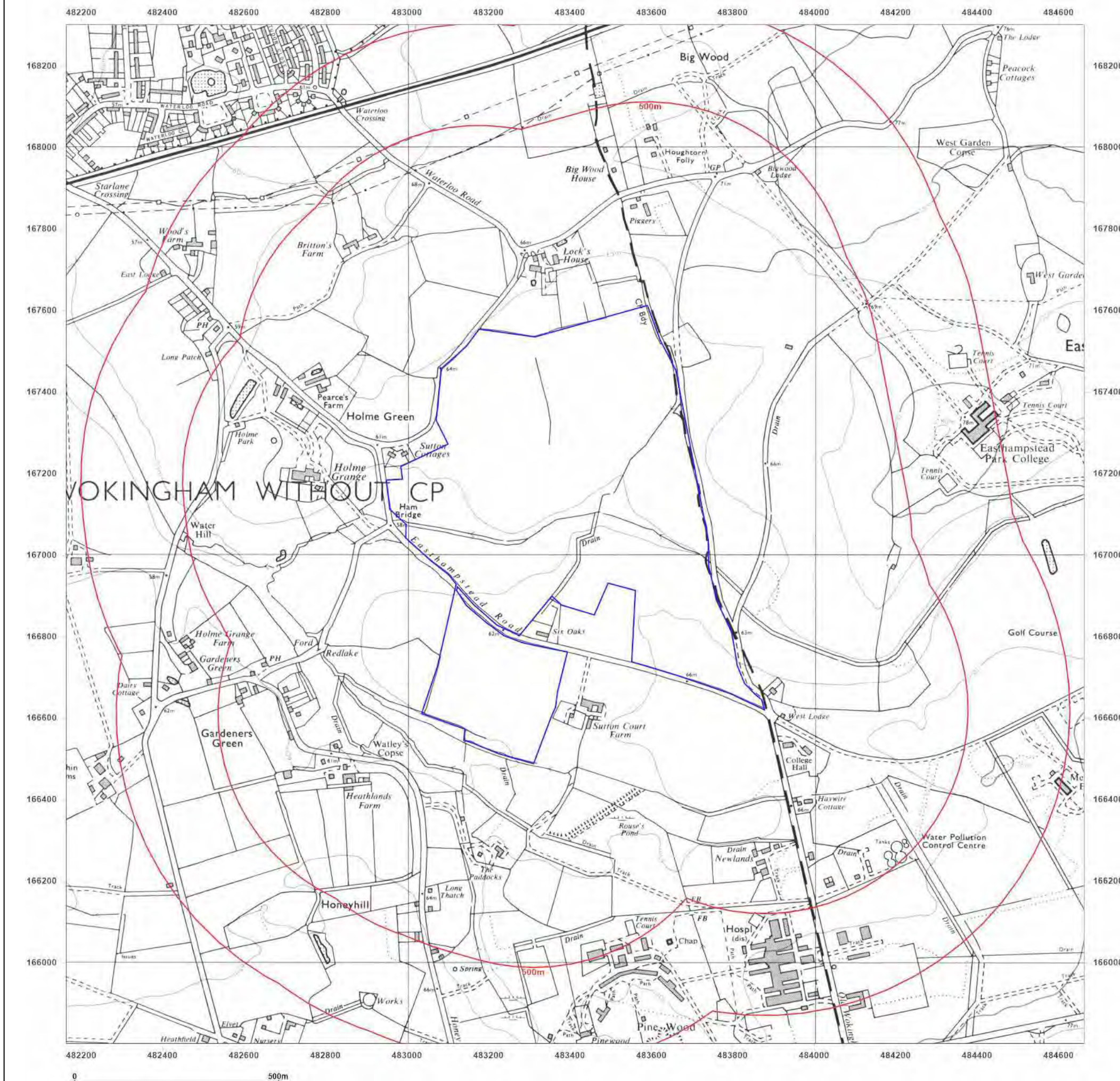


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Client Ref: A11866_-_PO1164
Report Ref: GS-8946632
Grid Ref: 483412, 167051

Map Name: National Grid

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Surveyed 1977
 Revised 1988
 Edition N/A
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 Levelled N/A

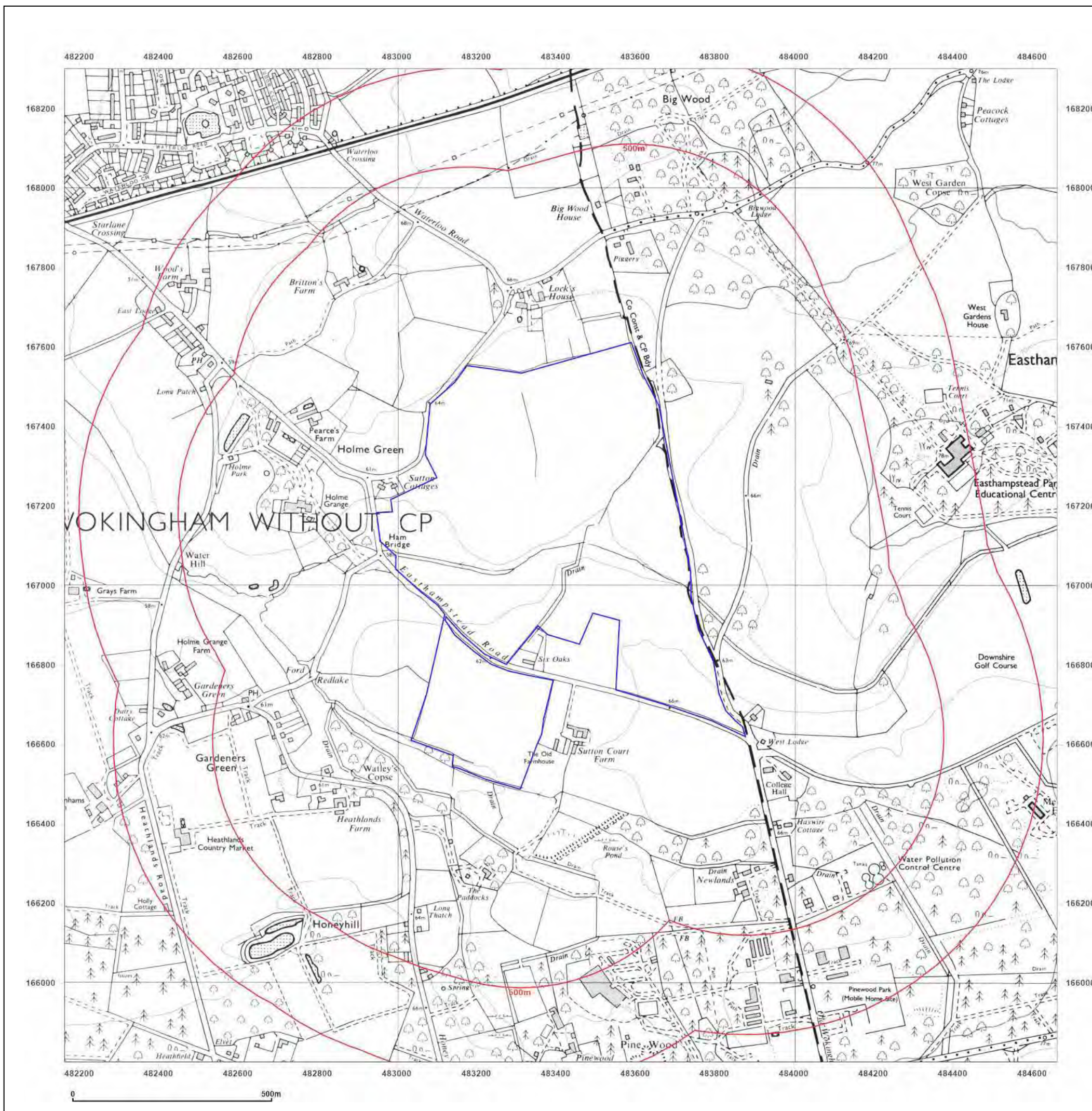


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Site Details:

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Client Ref: A11866_-_PO1164
Report Ref: GS-8946632
Grid Ref: 483412, 167051

Map Name: National Grid

Map date: 2001

Scale: 1:10,000

Printed at: 1:10,000



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Client Ref: A11866_-_PO1164
Report Ref: GS-8946632
Grid Ref: 483412, 167051

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

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Report Ref: GS-8946632
Grid Ref: 483412, 167051

Map Name: National Grid

Map date: 2022

Scale: 1:10,000

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Site Details:

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Report Ref: GS-8946632_LS_1_1
Grid Ref: 483099, 166425

Map Name: County Series

Map date: 1871

Scale: 1:2,500

Printed at: 1:2,500



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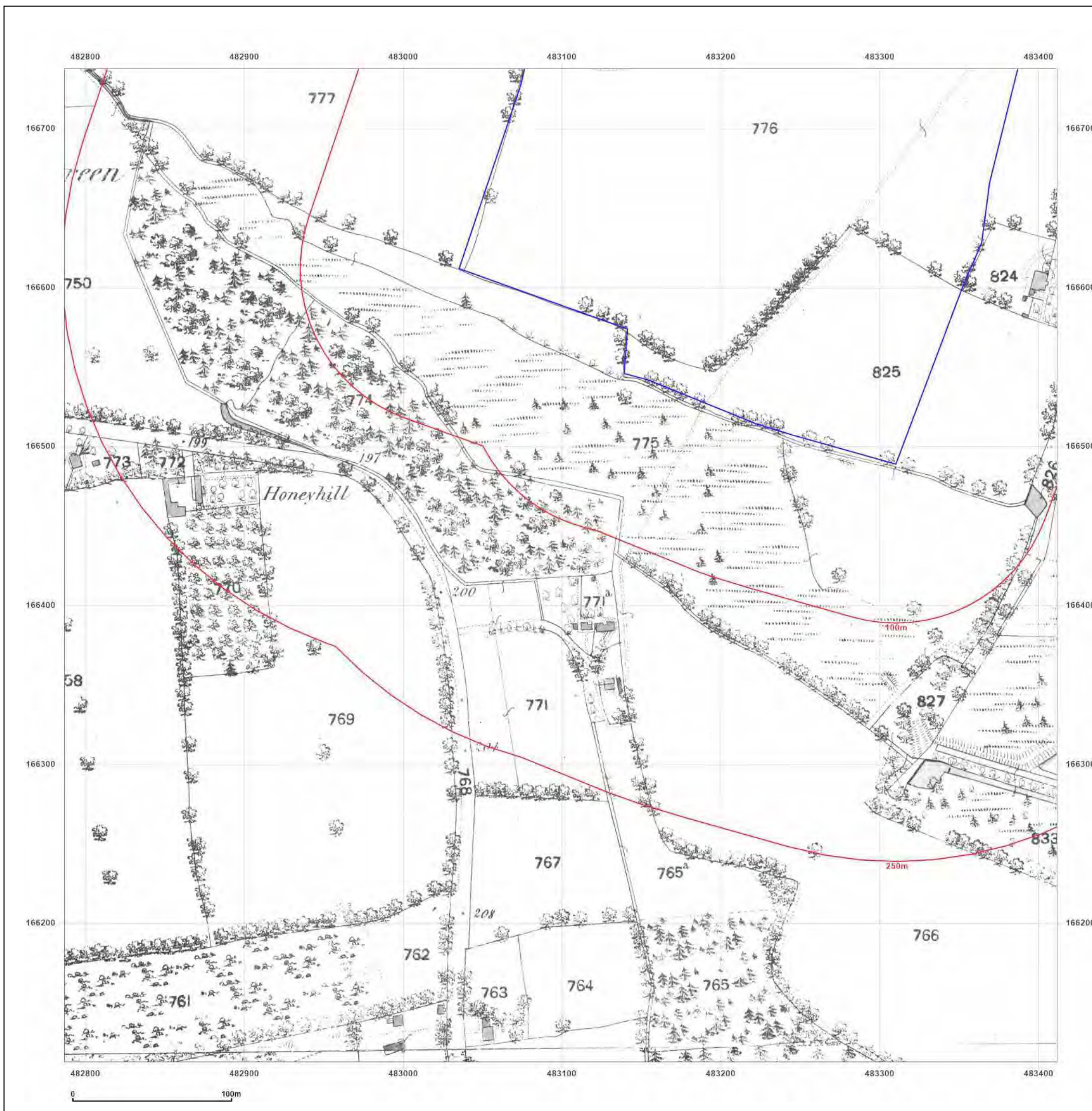


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Client Ref: A11866_-_PO1164
Report Ref: GS-8946632_LS_1_1
Grid Ref: 483099, 166425

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Scale: 1:2,500

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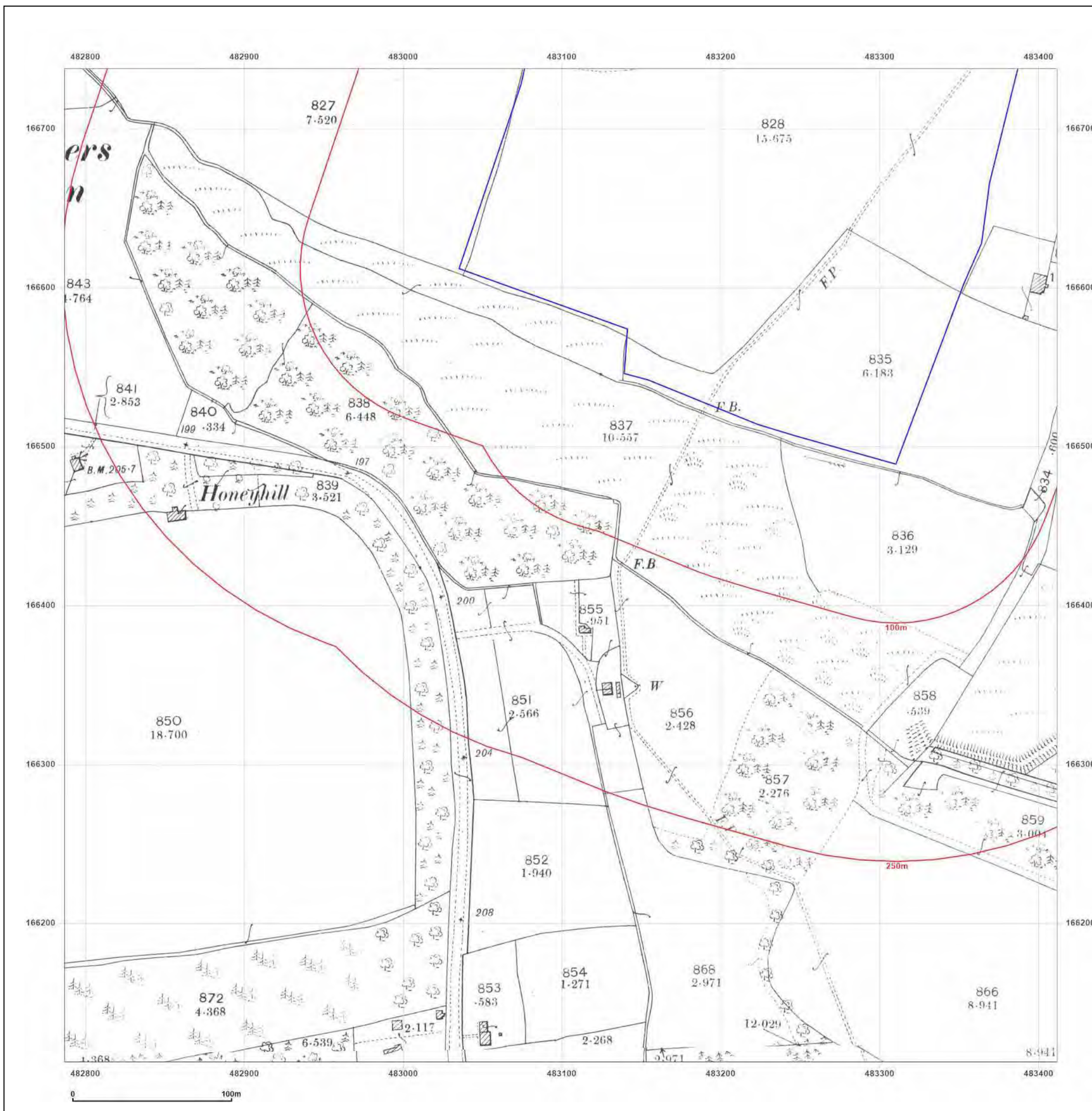


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Report Ref: GS-8946632_LS_1_1
Grid Ref: 483099, 166425

Map Name: County Series

Map date: 1911-1912

Scale: 1:2,500

Printed at: 1:2,500



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Surveyed 1911
 Revised 1911
 Edition N/A
 Copyright N/A
 Levelled N/A

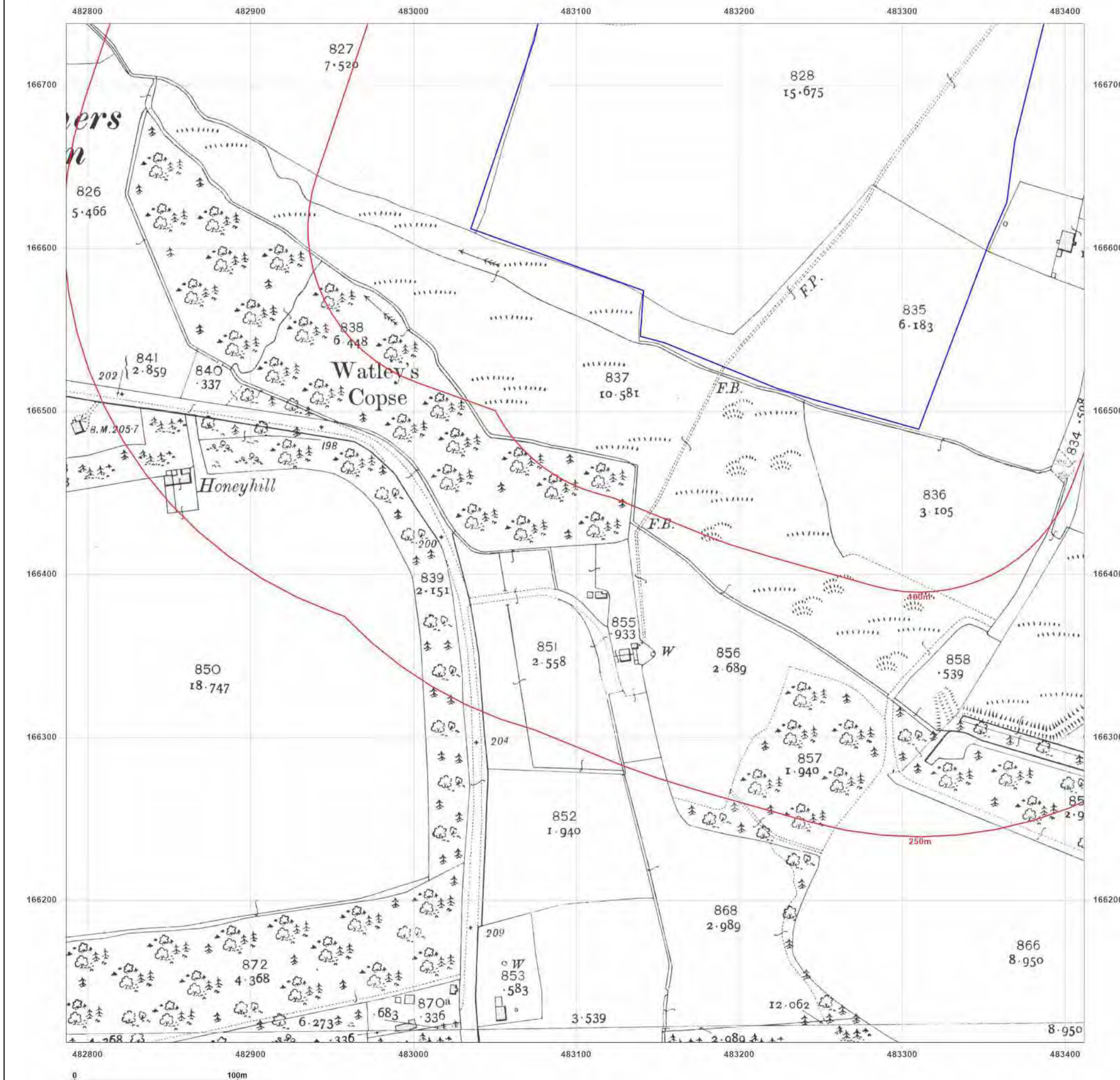


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Report Ref: GS-8946632_LS_1_1
Grid Ref: 483099, 166425

Map Name: County Series

Map date: 1933

Scale: 1:2,500

Printed at: 1:2,500



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 Revised 1933
 Edition N/A
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 Revised 1933
 Edition N/A
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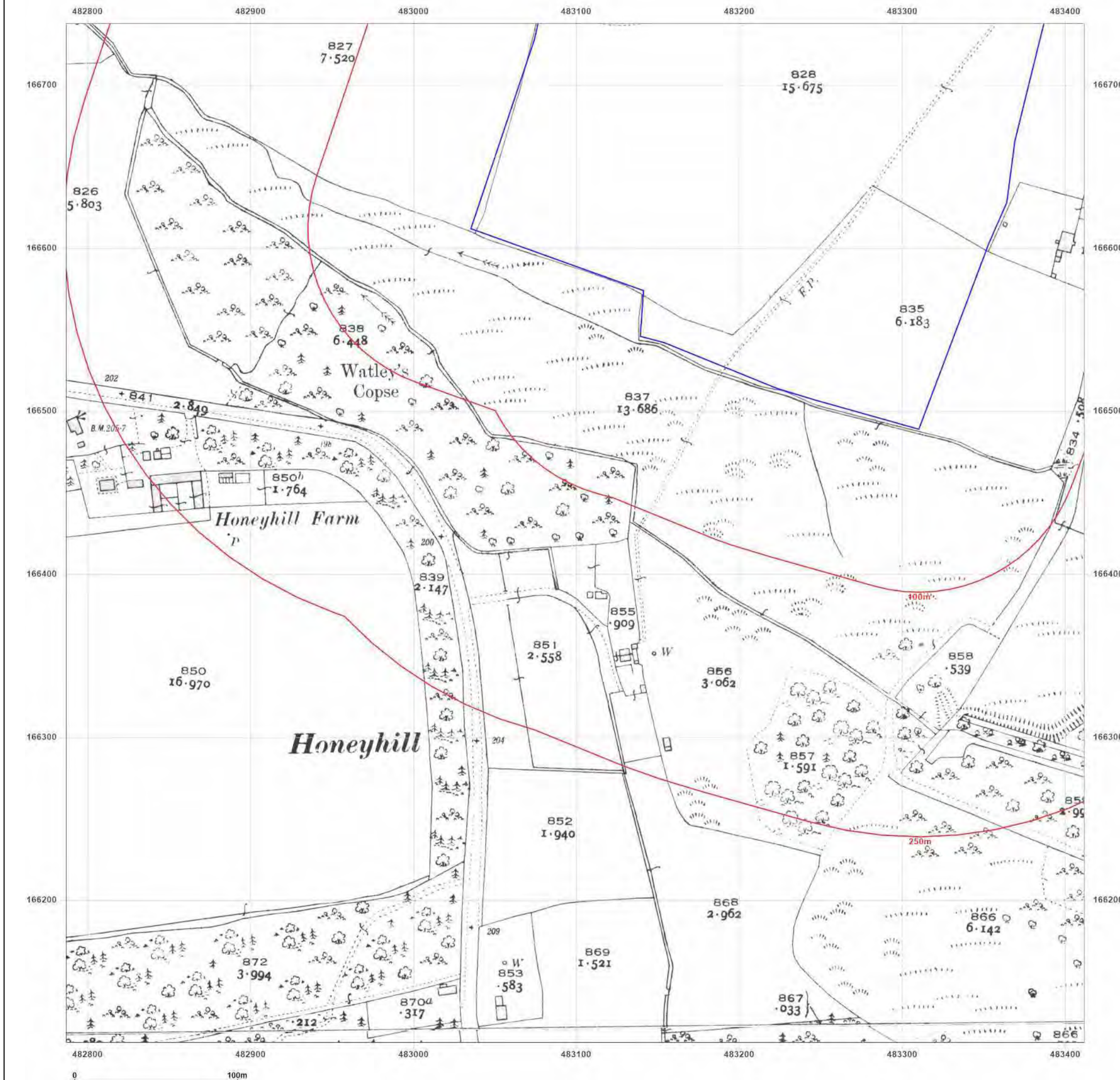


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Client Ref: A11866_-_PO1164
Report Ref: GS-8946632_LS_1_1
Grid Ref: 483099, 166425

Map Name: National Grid

Map date: 1965

Scale: 1:2,500

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Site Details:

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Client Ref: A11866_-_PO1164
Report Ref: GS-8946632_LS_1_1
Grid Ref: 483099, 166425

Map Name: National Grid

Map date: 1985-1987

Scale: 1:2,500

Printed at: 1:2,500



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 Edition N/A
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 Levelled 1964

Surveyed 1964
 Revised 1987
 Edition N/A
 Copyright 1987
 Levelled 1964



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