

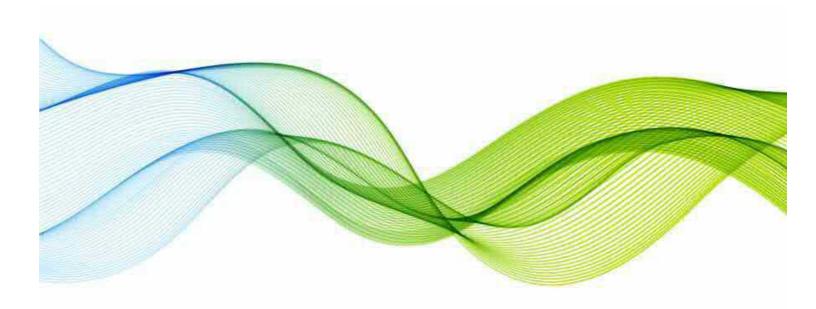
Phase I Geo-Environmental Site Assessment

Rookery Farm, Rookery Farm Lane, Basingstoke, RG26 5HW

Prepared for:
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March 2023

Omnia ref: A11764/1.1





QUALITY ASSURANCE

Project Number: A11764 March 2023						
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	Executive Summa
Site Address	Rookery Farm, Rookery Farm Lane, Basingstoke, RG26 5HW
National Grid Reference	460790, 156034
Site Area	0.47ha
Current Site Use	There were four (5no.) agricultural barns, one (1no.) stable block and an additional barn used for storage. There was a footpath running across the site from northwest to southeast. There were multiple areas of material storage.
Site History	By the earliest available historical mapping (1872), the site consisted of fourteen (14no.) buildings either wholly or partially on site. Minor reconfigurations were observed between 1894 and 1968. By 1968-1969, the existing buildings on site were demolished and three (3no.) main central barns were depicted. From 1990-1994 the configuration on site appears to be the same as the current layout.
Geology & Hydrogeology	Geology Published BGS Geological mapping indicates that superficial deposits are absent from the site. The northeasternmost area of the site is underlain by bedrock of the Lambeth Group which is classified as a Secondary A Aquifer. The remainder of the site is directly underlain by bedrock of the Seaford Chalk Formation which is classified as a Principal Aquifer. Hydrogeology The site is not located within a groundwater Source Protection Zone. Based on BGS Hydrogeological Mapping (Sheet 9, Hydrogeological map of Hampshire and the Isle of Wight, Scale of 1:100,000, 1979), groundwater depth was estimated as being situated approximately 10m bgl (80mAOD).
Hydrology & Flooding	The Groundsure report identified one (1no.) inland watercourse 182m east of site unaffected by tidal actions. A surface water body catchment was recorded on site noted as the Vyne Stream. The Vyne Stream was noted as having chemical and ecological ratings of 'fail' and 'moderate' respectively, with an overall rating of 'moderate' measured in 2016 by the Environment Agency. The Groundsure report indicates that the risk of groundwater flooding on site is designated as high within the southeast, moderate to high within the centre of site, and moderate in the north and west of site. The majority of the site is not at risk from surface water flooding. However, the southeastern extent is considered to be at risk. The ratings range from a 1 in 1000 years return period with a 0.1 – 0.3m flood event, to a 1 in 30 year risk on site of 0.30-1.0m.
Natural Cavities	The site is located within a soluble rock risk area associated with the underlying Chalk. The Groundsure report states that very significant soluble rocks are likely to be present with a moderate possibility of localised natural subsidence of dissolution-related degradation of bedrock, especially in adverse conditions such as concentrated surface of subsurface water flow.
Landfill Sites & Ground Gases	The Groundsure Report identified no records of historic landfill sites or historic waste treatment sites within 250m of the subject site. However, the closest active landfill is located 251m south of the site at Manor Farm with the Groundsure Report indicating that the landfill was licenced to accept inert waste. A review of the Groundsure Report indicates that the Manor Farm Landfill extends from approximately 250 – 500m south of the subject site and has previously been licenced to

	accept >75,000 tonnes of other wastes as well as operating as a waste transfer station
	for household, commercial and industrial waste.
	Historical ground workings relating to a chalk pit 55m south of site and a pond 32m
	northwest have the potential to have been infilled.
	The site lies within an area where between 3% and 5% of the properties are above the
Radon	Action Level. At these levels the Groundsure Report indicates that basic radon protective
	measures are required in the construction of new extensions or dwellings.
Concentual Cita Made	

Conceptual Site Model

The Conceptual Site Model has identified the presence of a series of potentially active pollution linkages associated with the previous recorded use of the site and surrounding areas which are considered to have the potential to present a risk to identified receptors at the site based on the proposed development.

Recommendations

Environmental

Given the proposed end use as a residential end use it is recommended that further investigation should be undertaken across the site.

The site investigation should include chemical and geotechnical testing of soil samples for a suite of determinants representative of the potential sources 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 the enable mitigation measures to be formulated, if required.

A preliminary Karstic Feature assessment is also recommended to investigate the potential for dissolution features in the vicinity of the geological boundary between the Seaford Chalk Member and overlying Lambeth Group.

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.

The site lies within an area where between 3% and 5% of the properties are above the Action Level. At these levels the Groundsure Report indicates that basic radon protective measures are required in the construction of new extensions or dwellings.

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1 INTRODUCTION

1.1 Background

Omnia have been commissioned by The Manydown Company Ltd to undertake a Phase 1 Geo-Environmental Desk Top Study at the site of Rookery Farm, Rookery Farm Lane, Basingstoke, RG26 5HW, in order to assist with the pre-planning stage for the redevelopment of the site.

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

1.2 Proposed Development

It is understood that The Manydown Company Ltd is proposing to submit a planning application for the redevelopment of the former Rookery Farm. The proposal is to include the development of three (3no.) residential dwellings including associated infrastructure and soft landscaping.

The outline proposed site layout 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 historical land uses on and surrounding the site;
- Assess the 'sensitivity' of the site location as determined by factors such as hydrogeology, proximity of watercourses, neighbouring land use, etc;
- Assess the potential for historic mine workings within influencing distance of the site;
- Review available site-specific environmental information;
- Undertaken informal enquiries with relevant environmental regulatory bodies; and,
- Analyse the significance of all potential contaminated land risks identified in the context of the proposed site use.

1.4 Sources of Information

Background information was sought from the following sources:

- Groundsure Environmental Database Search (GS-9380197);
- Historical Ordnance Survey Mapping (1872 –2023);
- The British Geological Survey (BGS) map for the site (Sheet 284, Basingstoke, Solid and Drift Edition at a scale of 1:50,000, 1981);

- BGS Hydrogeological Map (Sheet 9, Hydrogeological map of Hampshire and the Isle of Wight, Scale of 1:100,000, 1979);
- Environment Agency flood designations, aquifer designations and groundwater source protection zones (https://magic.defra.gov.uk/MagicMap.aspx) [Accessed: 2023/02/27];
- Zetica UXO Risk Maps (https://zeticauxo.com/downloads-and-resources/risk-maps); [Accessed: 2023/02/27]; and,
- British Standard BS10175:2011+A2:2017 –Investigation of Potentially Contaminated Sites Code of Practice.

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	Rookery Farm, Rookery Farm Lane, Monk Sherborne, Tadley, RG26 5HW
National Grid Reference	460790, 156034
Site Area	0.47ha

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 190m south of Monk Sherborne and was approximately rectangular in shape, covering an area of 0.47ha. The site boundary included an access route approximately 70m in length from the south-eastern corner which exits onto Rookery Farm Lane to the east of site. A site walkover plan (Figure 3.0 within Appendix III) should be used in conjunction with the site walkover.

At the time of site walkover, the access route comprised a private concrete road off Rookery Farm Lane to the east (Photographs 1-3). This was noted from superficial visual inspection to be in good condition. The road was also an access point for a residential property adjacent to the east of the site. The Rookery Farm entrance was marked by a metal gate with pedestrian access either side of the gate (Photograph 4). The access route led onto a yard area, which contained 5 main barns and a stable block (Photograph 5, Figure 3.0 within Appendix III).

Barn 1 was located on the southwestern corner and was approximately 28m x 10m in size (I x w) with the long axis aligned east to west. The barn was of metal frame construction with walls of corrugated metal cladding, concrete blockwork and a roof of corrugated cement sheeting considered to be Potential Asbestos containing Material (PACM). The northern elevation of the barn was open (Photograph 7). In the centre of the barn were approximately fifteen (15no.) 2x2m metal and wooden fencing panels with some waste materials (approximately thirty (30no.) 0.20m empty glass bottles, nine (9no.) cardboard boxes ranging in sizes 0.20m-0.40m, two (2no.) animal feed plastic packaging 1mx1m) scattered on the ground (Photograph 8). To the south and southeast of the barn were two (2no.) approximately 3m tall elder trees.

Barn 2 was located at the western side of site (Figure 3.0 Appendix III) and was approximately 28m x 18m (I x w), with the long axis aligned north to south. The entrance to this barn was through the south elevation. The barn was of metal frame construction with walls of corrugated metal cladding, concrete blockwork and a roof of corrugated cement sheeting considered to be PACM. Barn 2 contained harvested grain on over 60% of the internal space (Photograph 10), with agricultural equipment and an electricity circuit board within the southeast corner (Photograph 9 and Photograph 11).

Barn 3 was positioned immediately east of Barn 2 and west of Barns 4 and 5. Barn 3 was 14m x 28m (I x w), with the long axis aligned north to south in alignment with Barns 2, 4 and 5. The barn was of metal frame construction with walls of corrugated metal cladding, concrete blockwork and a roof of

corrugated cement sheeting considered to be PACM. Internally Barn 3 contained grain storage on the western side (Photograph 12) and agricultural equipment within the eastern side (Photograph 11).

Barns 4 and 5 comprised a single structure which had been internally subdivided into two (2no.) sections, one to the north (Barn 4) and a second to the south (Barn 5) which appeared to have different uses. The barn was of metal frame construction with walls of corrugated metal cladding, concrete blockwork, some plaster board (barn 5) and a roof of corrugated cement sheeting considered to be PACM. This structure was located immediately east of Barn 3, but were separated by an approximately 1m wide alleyway between them. Barn 4 was used as a garage with an open entrance (Photograph 14). At the time of the walkover, it contained two (2no.) vehicles with tyre storage and general waste bin situated behind these (Photograph 15).

The eastern section of Barn 5 was used as storage. This contained three (3no.) vehicles including two (2no.) cars and a quad bike and a trailer. Other items stored internally comprised a mountain bike, electrical components, a sofa and vehicle repair items. The remainder of Barn 5 was used for agricultural purposes. Grain was stored within the north-western corner and dark brown grain detritus within the south-eastern corner.

An external review of Barns 2 to 5 indicated the presence of cement guttering, downpipes, soffits, fascias and ridge tiles in addition to the corrugated cement cladding and roofing materials which are considered to comprise PACM.

North of Barn 4 was a stable block, which contained four (4no.) wooden-built stables (Photograph 27). It was approximately 18m x 10m in size (I x w) with the long axis aligned north to south. Within the stable block was a locked metal container, assumed to contain equestrian-related materials (Photograph 28). The barn was of metal frame construction with walls of corrugated metal cladding and a roof of corrugated cement sheeting considered to be Potential Asbestos containing Material (PACM). The eastern elevation of the barn was open (Photograph 27). However, an internal inspection was not undertaken. A vehicle was parked south of the stable block with scattered general waste materials (including plastic tarpaulin, empty plastic bottles, string and wood) behind the car (Photographs 25-26).

To the south of the stable block was a burnt area approximately 1.5m x 1.5m showing scorch marks on the surface (Photograph 29). To the east of the stable block was an area of grass, which contained discarded straw on it and wooden fencing around it. To the west of the stable block was an area of mostly discarded materials including empty containers, disused animal feeders, empty plastic wrappings and an old trailer with general household waste within it (Photographs 30-31).

Also to the west of the stable block was a blue shipping container (Figure 3.0, Appendix III), which was locked. An internal inspection was not undertaken of the container.

Further west of the stables, off-site but adjacent to the north-western boundary, was a stockpile approximately 5 x 3 x 3m (l x w x h) in size. The stockpile appeared to contain bricks, concrete, and old tarmacadam from an initial visual inspection, however a detailed inspection of the contents was not undertaken.

Three (3no.) aboveground storage tanks (AST) were identified on site, and two (2no.) AST off-site but within influencing distance. These are further discussed within Section 2.2.2. below.

The boundaries of the site predominantly comprised wooden fencing. On the western side of the site the boundary consisted of a 1-2m grass embankment. There was a track on the north-western corner of the site leading to agricultural fields to the west with several footpath paths.

The overall topography of the site was flat, with a very gentle slope from west (highest elevation) to east (lowest elevation).

An annotated site location plan showing observations from the walk-over survey is presented as Figure 3.0 (Appendix III). Relevant photographs from the site walk-over survey are located in Appendix IV.

2.2.2 Hazardous Materials Storage

There were three (3no.) AST tanks identified on site (Tanks 1, 3 and 4 within Figure 3.0, Appendix III).

Tank 1 was within Barn 5 and was approximately 200L and was constructed of metal. It was placed on top of breezeblocks on a concrete surface inside the barn's vehicle storage area and was not bunded. Anecdotal evidence stated that this was used for disused waste oil.

Tank 3 was identified west of the stable block and had a capacity of 500L and was constructed of green metal in a rusted condition and was not bunded. The tank was empty, however after visual inspection was suspected to have previously contained diesel.

Tank 4 was an Intermediate Bulk Container (IBC) located south of the stable block and had a capacity of 300L. It was placed on top on three (3no.) wooden pallets placed on grass. The tank was empty, however from labelling on the tank it had previously contained nitrogen fertiliser solution with sulphur, named YaraVita Thiotrac. The ingredients label listed it containing 10.5% ammonia, 15.2% Nitrogen and 22.8% Sulphur.

Two (2no.) additional tanks were located off-site, but within influencing distance of the site (Tanks 2 and 5 within Figure 3.0, Appendix III).

Tank 2 was situated adjacent to the eastern site boundary, within the garden of the neighbouring residential property. The tank was green plastic, and the capacity was noted to be 500L. It was suspected that the tank was a kerosene oil tank used by the residential property, and appeared to be in use. It was unclear if the tank was bunded however it was raised.

Tank 5 was located approximately 10m west of the site, and was noted to be empty. The contents of this tank were unknown and there was no labelling. It was constructed of black metal that has small amounts of rusting and was not raised or bunded but placed straight on top of the ground.

2.2.3 Potential Asbestos Containing Material (PACM)

Numerous PACM was noted within the construction of all the barns on site in the form of corrugated cement cladding, corrugated cement roofing, concrete gutters, downpipes, soffits, fascias and ridge tiles. In addition, a review of OS historical mapping indicates that the structures on site have been present since 1994. As this pre-dates the year 2000, they have the potential to contain Asbestos Containing Materials (ACMs) within the building fabric.

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.

2.2.4 Waste Storage

There were three areas of discarded waste materials, within these areas there was no noted visual evidence of contamination.

One area was west of the stables around the shipping container and Tank 3, in this area there were nine (9no.) empty barrels that were not labelled, one (1no.) out of use fridge, approximately twenty (20no.) un-used poultry feeders, three (3no.) approximately 40L white storage containers that were empty with one labelled 'Hi-coat W850 blister pack coating'.

The second area to the west side of barn 4 contained ten (10no.) empty plastic bags, one 30L plastic container that was empty with an identifiable previous use, four (4no.) disused poultry feeders and one (1no.) 20L fuel tank that contained an identifiable liquid.

The third area was within barn 5 behind the vehicle storage to the west side of the barn. Within this area there was two (2no.) rusted car materials, four (4no.) wooden blocks, one (1no.) empty barrel, thirteen (13no.) disused car tyres, one (1no.) 1m rubbish bin filled with general rubbish and one (1no.) 10L metal fuel tank that may have been empty.

West of the stable block was a stockpile approximately 5 x 3 x 3m (l x w x h) in size. The stockpile appeared to contain bricks, concrete, and old tarmacadam, however a detailed inspection was not undertaken.

2.2.5 Tree Species

At the access point of the site there were eight (8no) mature trees approximately 8m in height, these were deciduous trees and two (2no.) were identified as willow trees.

South of Barn 1 were two (2no.) approximately 3m tall elder trees.

2.2.6 Potential Invasive Species

During the site walkover no obvious signs of potential invasive species were identified. However, it should be noted that the site walkover was conducted during winter months and as such it is recommended that a further assessment is undertaken during the growing season.

2.3 Surrounding Area

The surrounding land uses are summarised in Table 2-2 below:

Table 2-2 Land Use

Direction	Land Use
North	Agricultural fields. Residential dwellings and the village of Monk Sherborne
	beyond.
East	Rookery Farm Lane and agricultural fields.
South	Agricultural fields, with a church and Manor Farm further south.
West	Public footpaths and agricultural fields.

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			
Wap Edition	On Site	Off Site		
1872 (1:2,500) 1877 (1:10,560)	Fourteen (14no.) buildings either wholly on partially on site, with a track running down the eastern side of site. Footpath running across site from western edge in a south-easterly direction off site. Access road running across the eastern extent of site.	Four (4no.) ponds identified which were 32m northwest, 72m northwest, 79m northeast and 149m northeast. Chalk pit 54m south of site. Grave Yard and associated church from 180m south. Manor farm consisting of fourteen (14no.) buildings was 236m south of site. The surrounding area comprises woodland (deciduous with coniferous beyond) to the east, with scattered residential houses situated within a 250m radius.		
1894-97 (1:10,560) 1896 (1:2,500)	Slight reconfiguration of buildings mapped.	Pump located 6m east of site. Woodland areas to the east no longer mapped.		
1909-1912 (1:10,560) 1911 (1:2,500)	Slight reconfiguration of buildings within the northwest mapped.	Pump located 6m east of site was no longer present. Mixed woodland mapped from 90m northeast.		
1956 (1:10,560)	No significant changes	Increased in residential development from 50m northwest of the site associated with the development of Monk Sherbourne.		
1968 (1,2,500) 1969 (1:10,560) Only the land immediately south of the site is available to view within the 1968 map	Demolition of the buildings on site and three (3no.) structures are now present on the site, with an additional structure overlapping the southern boundary.	The pond located 32m northwest was no longer present on mapping. Drain depicted on mapping approximately 190m northeast of the site running northwest to southeast.		
1988-1991 (1:10,000)	No significant changes	Swimming pool listed 39m northeast.		

Map Edition	Historical Land Use			
Wap Edition	On Site	Off Site		
1990-1994 (1:2,500)	There are now five (5no.) structures on site, which appear to be in the same configuration as present day.	The site and land/structures to the east of the site are labelled as 'Rookery Farm'.		
1994-1995 (1:2,500)	No significant changes	Chalk Pit 55m south of site no longer present on mapping.		
2001 (1:10,000)	No significant changes	No significant changes		
2003 (1:1,250)	No significant changes	No significant changes		
2010 (1:10,000)	No significant changes	No significant changes		
2023 (1:10,000)	No significant changes	No significant changes		

A selection of historical maps are presented in Appendix V.

3.2 Historical Tank Database

The Groundsure Report did not identify any records of historical tanks within 250m of the study site. However, as stated within Section 2.2 and displayed on Figure 3.0 (Appendix III), three (3no.) tanks were located on site during the site walkover, and two (2no.) within 50m off-site.

3.3 Historical Energy Features Database

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

3.4 Historic Garages and Petrol Stations

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

3.5 Historic Industrial Land Uses

The Groundsure Report identified seven (7no.) records of historical industrial land uses within 250m of the study site. Upon further review these relate to two (2no.) separate historical land uses detailed below:

- 45-54m southeast –Chalk Pit (1888-1988). The Groundsure details that between 1969 and 1988 this pit was also designated as a quarry. This is the same chalk pit identified within historical mapping within Section 3.1 above, which is considered to have been infilled in the early to mid-1990s based on historical mapping;
- 153m south Grave Yard (1873). This is the same graveyard identified within historical mapping within Section 3.1 above.

Due to the age, distance from site and small size, the Grave Yard is not considered to have the potential to significantly impact the subject site and has therefore not been considered further.

3.6 Planning History

A review of the online planning portal of Basingstoke and Deane Council identified nineteen (19no.) planning applications attributed to the study site postcode.

The applications relate to activities (chalk mining, recycling facilities and agricultural related) south of site at Manor Farm. The agricultural related activities are not considered pertinent to the proposed development. The only applications considered relevant are summarised below:

Planning Reference	BDB/75622 - BDB/75621
Date	19/12/2011
Proposal	Variation of condition 3 (method of site working) and condition 4 (extension of time) of Planning Permission BDB20721/CM - Application no. BDB/75621 Mr Rob Storey PLAN/WJA/BA054
Decision	Raise objections
Notes	Objections raised on the impact of machinery on Rookery Farm Lane. Skip hire/recycling use of the site has been in operation since 2004. Chalk extraction has been in operation since 1987. Ground water level at this location is 90.44 AOD and was identified by the Environmental Agency letter.

Planning Reference	21/03535/CONS –21/0534/CMA
Date	19/11/2021
Proposal	Variation of Condition 1 of planning permission BDB/75626 to extend the use of the site for waste transfer and recycling until 31 December 2029 Case officer Sam Dumbrell - HCC/2021/0694 PLEASE NOTE THE DECISION ON THIS APPLICATION IS MADE BY THE HAMPSHIRE COUNTY COUNCIL
Decision	Unknown
Notes	Detailed site waste storage maps are available on the website. Existing waste transfer & small-scale recycling facility comprising 0.8 hectares of land and was also an existing mineral extraction and landfill development. Two planning conditions (5 and 6) detailed hardstanding to be in placed to severe pollution pathways for potential contaminants on site.

Planning Reference	21/03765/CONS –21/03764/CMA
Date	14/12/2021
Proposal	Variation of Condition 1 of planning permission BDB/75621 to ensure that all mineral extraction and tipping of waste shall cease, and all plant, machinery and associated ancillary development shall be removed and the site restored to agriculture no later than 31 December 2029 Case officer Sam Dumbrell - HCC/2021/0729 BA054 PLEASE NOTE THE DECISION ON THIS APPLICATION IS MADE BY THE HAMPSHIRE COUNTY COUNCIL
Decision	Unknown
Notes	Documents on planning website gave detailed locations of the chalk pit at Manor farm. Original permission was granted on 12.08.1987 and the extraction was for agricultural lime. The supporting statement details that 'the remaining area will need to be lined with a suitable quality assured clay liner before infilling can commence.' It also states that planning permission has recently been approved for

a new chalk quarry. The restoration will use inert waste and the imported waste is
regulated by the environmental agency and an environmental permit has been held
in abeyance during the chalk excavation. Stipulations explain it will be restored to
agricultural usage.

Planning Reference	23/00411/ENS
Date	20/02/2023
Proposal	Request for a scoping opinion for a solar farm with estimated capacity up to 45
	MW.
Decision	Unknown
Notes	Change to industrial land use in the area, however permission is yet to be
	determined.

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 284, Basingstoke, Solid and Drift Edition at a scale of 1:50,000, 1981) indicates that the site is underlain by the following geological sequence:

Table 4-1 Published Geological Sequence

Area of site	•	Geological Unit	Formation Name	Description	Aquifer Classification
Site wide 99%		Superficial	No	S	
of site	Bedrock	Seaford Chalk Formation Chalk		Principal	
Extreme North-easte	rn	Superficial	No	S	
area of site only	Bedrock	Reading Beds (Lambeth Group)	Clay, Silt and Sand	Secondary A	

The Groundsure report records no data for Artificial and Made Ground on the proposed site or within 500m of the site. However, as highlighted within Section 3.1, Made Ground is anticipated to be located approximately 50m southeast and associated with a historically infilled chalk pit.

The nearest available historical borehole is situated 196m northeast at Queens House, Monk Sherborne (BGS Reference: SU65NW4). The borehole identified the London Clay Formation to 10.67m bgl, overlying the Reading Beds (Lambeth Group) to 31.09 m bgl, which was further underlain by Chalk to the base of the borehole (39.62m bgl).

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 are located within 250m of the site. There are no active or historical potable water abstractions are located within 250m of the site.

Groundwater vulnerability data indicates that the site is underlain by a Principal Bedrock Aquifer associated with Seaford Chalk Formation with high vulnerability. The Lambeth Group is classified as a Secondary Aquifer, with high vulnerability.

It is important to note that the site is located within a soluble rock risk area, associated with the underlying Chalk. The Groundsure report states that very significant soluble rocks are likely to be present with a moderate possibility of localised natural subsidence of dissolution-related degradation of bedrock, especially in adverse conditions such as concentrated surface of subsurface water flow. Further discussion is provided in Section 4.5.

The Groundsure report states that site is situated within a WFD Groundwater Body for the 'Old Basing Tertiaries' which was noted as having chemical and quantitative ratings of 'good' and 'good' respectively, with an overall rating of 'good' measured in 2019 by the Environment Agency. However, it should be noted that a review of the Environment Agency catchment Data Explorer indicates that the site is located approximately 50m north of the Basingstoke Chalk Groundwater Body having an overall rating of 'poor' in 2019 by the Environment Agency.

Based on BGS Hydrogeological Mapping (Sheet 9, Hydrogeological map of Hampshire and the Isle of Wight, Scale of 1:100,000, 1979), groundwater depth is estimated to be present at a depth of approximately 10m bgl (80mAOD).

Based on local topography and the location of the nearest surface watercourses it is considered that shallow groundwater, if present, will follow topography and flow in a north-easterly direction towards an unnamed surface watercourse.

4.1.1 Groundwater Flooding

The Groundsure report indicates that the risk of groundwater flooding on site is designated as high within the southeast, moderate to high within the centre of site, and moderate in the north and west of site. This pattern of groundwater flooding risk appears to correlate with local topography with topographic contours suggesting the presence of a northeast to southwest and a west-northwest to east-southeast aligned dry valleys with the area of highest risk associated with the confluence of these two features. The groundwater flooding risk for the site is depicted in Figure 4-1 below.

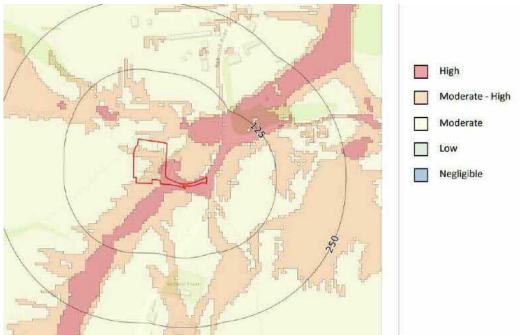


Figure 4-1 Groundwater Flooding Risk – (GS-9380197. Ordnance Survey Licence 100035207)

4.2 Hydrology and Flooding

The Groundsure report identified one (1no.) inland watercourses within 250m of the site. This is located 182m and is described as an inland river on ground surface not influenced by normal tidal action. This watercourse is considered likely to comprise a drainage ditch, as it was depicted on mapping Section 3.1 as 'drain'.

The site is situated within the Water Framework Directive (WFD) surface water body catchment area for the Vyne Stream, which is situated 1683m east. The Vyne Stream was noted as having chemical and ecological ratings of 'fail' and 'moderate' respectively, with an overall rating of 'moderate' measured in 2019 by the Environment Agency.

No surface water abstraction licences were identified on-site or within a 250m radius.

The majority of the site is not at risk from surface water flooding. However, the south-eastern extent is considered to be at risk. The ratings range from a 1 in 1000 years return period with a 0.1 –0.3m flood event, to a 1 in 30 year risk on site of 0.30 - 1.0m. This is shown in Figure 4-2 overleaf.

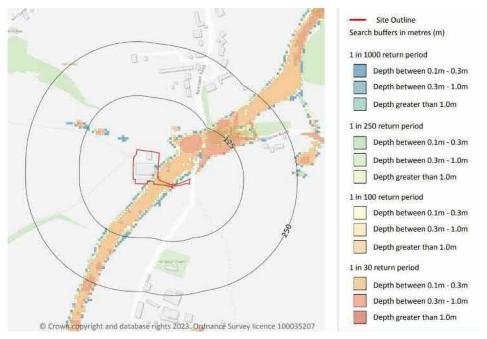


Figure 4-2 Surface Water Flooding Risk-(GS-9380197. Ordnance Survey Licence 100035207)

The site is not considered to be at risk of flooding from rivers and the sea. The site is not located within a Flood Zone 2 or 3 as designated by the Environment Agency.

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	Designation
Shrink-Swell Clay	Negligible –(Seaford Chalk formation) Ground conditions are predominantly non- plastic.
	Moderate –(Lambeth Group) Ground conditions are predominantly high plasticity.
	Negligible –(Seaford Chalk formation) Slope instability problems are not thought to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
Landslides	Moderate –(Lambeth Group) Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
Ground Dissolution	Very low –(Seaford Chalk formation) Soluble rocks are present within the ground. Few dissolution features are likely to be present. Potential for difficult ground

Hazard	Designation				
	conditions or localised subsidence are at a level where they need not be considered.				
	Moderate –(Boundary between the two geological strata) Soluble rocks are present within the ground. Some dissolution features may be present. Potential for difficult ground conditions are at a level where they may be considered, localised subsidence need not be considered except in exceptional circumstances.				
	High –(Lambeth Group) Soluble rocks are present within the ground. Some dissolution features may be present. Potential for difficult ground conditions are at a level where they may be considered, localised subsidence need not be considered except in exceptional circumstances.				
Compressible Ground	Negligible – Compressible strata are not thought to occur within the site.				
Collapsible Deposits	Very low –Deposits with potential to collapse when loaded and saturated are unlikely to be present within the site.				
Running Sand	Negligible –(Seaford Chalk formation) Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.				
	Very low –(Lambeth Group) Running sand conditions are unlikely. No identified constraints on land use to running conditions unless water table rises rapidly.				

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.

However, there are four (4no.) BritPits within 500m of the site. Britpits are an abbreviation of British Pits, which is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. The closest BritPit is located 99m southeast of the site, a former chalk pit entitled 'Manor Farm Chalk Pit'. Further review indicates that this is the same chalk pit highlighted within historical mapping (Section 3.3) and the historical industrial land uses (Section 3.5).

The Groundsure report identified two (2no.) records of non-coal mining areas within 500m of the site, which were both for chalk. One of these was noted on site, detailed below:

On-site –Commodity: Chalk, 'Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions is unlikely and localised and are at a level where they need not be considered'.

Seventeen (17no.) records exist for historic surface ground workings within 250m of the study site, which relate to five (5no.) records. The identified Groundsure records have been cross referenced with the historical mapping and are detailed as below:

- 28-39m northwest –Ponds (1873-1956);
- 45-54m southeast –Chalk Pit/Quarry (1873-1988);
- 72-78m northwest –Pond (1888-1956);
- 151m north –Pool (1988); and,
- 153m south –Graveyard (1873).

4.5 Natural Cavities

The Groundsure Report did not identify any natural cavities within the site boundary, however as discussed in Section 4.1 the Groundsure report indicated that the site is located within a soluble rock risk area.

A review of published literature suggests that karstic features are particularly common in the vicinity of the Chalk-Palaeogene boundary with up to 97% of karstic features occurring where there is a "cover deposit" overlying the Chalk and that they usually, although not exclusively, occur within 200m of a "cover deposit" margin (McDowell, et. al. 2008).

A review of Table 4-1 indicates that the boundary between the Chalk and overlying Lambeth Group passes through the northeastern area of the site and as such the majority of the site is located within 200m of the Chalk-Palaeogene boundary and as such consideration should be given to the potential for solution pipes and other karstic features to be present within the site boundary.

It is recommended that a preliminary karstic hazard assessment is undertaken for the site prior to development.

4.6 Radon Risk Potential

The site lies within an area where between 3% and 5% of the properties are above the Action Level. The Groundsure Report indicates that at these levels that basic radon protection measures will be required in the construction of new extensions or dwellings.

4.7 Current Industrial Land Uses

The Groundsure Report identified no current industrial land uses within a 250m radius of the subject site. A review of recent satellite mapping indicates that Manor Farm is situated from approximately 190m southeast of the site. Given the distance away from the study site, and the anticipated groundwater flow towards the northeast, the farm is not considered to have the potential to significantly impact the subject site. Manor Farm has therefore not been considered further.

4.8 Sensitive Land Uses

The Groundsure report indicates that the site is located within a currently defined Nitrate Vulnerable Zone (NVZ) associated with the Groundwater of Kingsclere and Greywell.

The Groundsure report identified the following sensitive land uses within a 250m radius of the site:

- SSSI Impact Risk Zone (On-site);
- Conservation area of Monk Sherbourne (On-site);
- Priority Habitat Inventory of mostly Deciduous Woodland (92-94m east, 118m northwest and 139m north).

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

The Groundsure Report identified that the site is located within an SSSI Impact Risk Zone. However, after further review the proposed residential development does not require further consultation.

4.8.2 Nitrate Vulnerable Zone (NVZ)

The site lies within the Kingsclere and Greywell NVZ due to site lying within a SSSI Impact Risk Zone. However, this relates to agricultural nitrate pollution only and therefore is not considered to be applicable to the proposed residential development.

4.9 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:

- Underlying Principal Aquifer and Secondary A Aquifer within bedrock;
- Absence of superficial deposits across the site;
- Groundwater flooding risk ranges from moderate to high;
- The site is not situated within a Source Protection Zone; and,
- No groundwater abstraction licenses within 250m of the site.
- Inland river located 182m east and located within the Loddon and Trib surface water body catchment.

5 CONSULTATIONS

5.1 Contaminated Land Officer

Contact was made with Basingstoke and Deane Borough Council via email in February 2023 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 active or historic landfill sites, nor any active or historic waste treatment sites within 250m of the subject site.

However, the closest active landfill is located 251m south of the site at Manor Farm with the Groundsure Report indicating that the landfill was licenced to accept inert waste. A review of the Groundsure Report indicates that the Manor Farm Landfill extends from approximately 250 –500m south of the subject site and has previously been licenced to accept >75,000 tonnes of other wastes as well as operating as a waste transfer station for household, commercial and industrial waste.

5.3 Potentially Infilled Land

The Groundsure report did not identify any areas of infilled land within 250m of the site. However, a review of Sections 3.1 and 4.4 indicate that the former chalk pit from 45m southeast, and the pond situated 32m northwest have now been infilled and therefore have the potential to present plausible ground gas risks to the site. Furthermore, the Manor Farm Landfill is located from 251m south of the site.

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	0	N/A
Hazardous substance storage/usage	0	0	N/A
Historical licensed Industrial Activities (IPC)	0	0	N/A
Licensed Industrial Activities (Part A(1))	0	2	338m S- Waste landfilling by G. B. Foot LTD. Last date noted as effective is 01/12/2022
Licensed Pollutant Release (Part A(2)/B)	0	0	N/A
Radioactive Substance Authorisations	0	0	N/A

	0-249m	250-500m	Details
Licensed discharges to controlled waters	0	0	N/A
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)	0	0	N/A
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

- Made Ground associated with historical development of the site;
- On-site areas of visible burning Identified within the site walkover;
- Tank 1 of disused waste oil (Current) *Identified within the site walkover*;
- Tank 3 of suspected old diesel fuel (Current) *Identified within the site walkover;*
- Tank 4 IBC fertiliser tank (Current) *Identified within the site walkover:*
- Agricultural use of the site (Current) Identified within the site walkover;
- Vehicle and machinery storage (Current) Identified within the site walkover; and.
- Asbestos Cladded and roofed barn buildings (Current) Identified within the site walkover.

6.1.2 Off-site Potential Sources

- Directly east of site –Tank 2 of suspected Heating Oil Tank (Current);
- Directly west of site –Stockpile containing building materials (Current);
- 10m west of site -Tank 5 Empty and suspected to be a diesel fuel tank (Current);
- 32m northwest Infilled Pond (Historic 1972-1969);
- 55m south of site Chalk Pit (Historic 1872-1969); and,
- 251m south of site Manor Farm Landfill (current).

6.1.3 Potential Pathways

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

6.1.4 Potential Receptors

- Future Site Users.
- Controlled Waters
 - Groundwater in underlying Principal Chalk Aquifer; and,
 - Groundwater in underlying Secondary A Aquifer.

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 Sou							
	Asbestos fibres	Inhalation of fibres	Future site users	Moderate	Moderate	Moderate	
		Dermal contact with impacted soils and dust	Future site users	Low	Moderate	Low/Moderate	
	Metals (As, B, Cd, Cr, Pb, Hg,	Ingestion of impacted soils and dust	Future site users	Low	Moderate	Low/Moderate	
	Se, Ni, Zn)	Vertical and Lateral	Controlled Waters – Principal Aquifer	Low	Moderate	Low/Moderate	
		Migration	Controlled Waters – Secondary A Aquifer	Low	Minor	Low	
	Polycyclic	Dermal contact with impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
Made ground associated with		Polycyclic Aromatic	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate
historical	Hydrocarbons	Inhalation of vapours	Future site users	Very Low	Moderate	Low	Potentially Active – Further investigation
development of the site	(PAH)	Vertical and Lateral	Controlled Waters – Principal Aquifer	Moderate	Moderate	Moderate	required
		Migration	Controlled Waters – Secondary A Aquifer	Moderate	Minor	Low/Moderate	
		Dermal contact with impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
	Total Petroleum		Future site users	Moderate	Moderate	Moderate	
	Hydrocarbons (TPH)		Controlled Waters – Principal Aquifer	Moderate	Moderate	Moderate	
			Controlled Waters – Secondary A Aquifer	Moderate	Minor	Low/Moderate	
		Inhalation of vapours	Future site users	Low	Moderate	Low/Moderate	

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
	Ground Gas (CH ₄ and CO ₂)	Migration of ground gas into confined spaces	Future site users	Low	Moderate	Low/Moderate	
		Dermal contact with impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
	Polycyclic	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
	Aromatic Hydrocarbons	Inhalation of vapours	Future site users	Low	Moderate	Low/Moderate	
	(PAH)	Vertical and Lateral	Controlled Waters – Principal Aquifer	Low	Moderate	Low/Moderate	
Visible Areas of Burning identified		Migration	Controlled Waters – Secondary A Aquifer	Low	Minor	Low	Potentially Active – Further investigation
on site during site walkover	Total Petroleum Hydrocarbons (TPH)	Dermal contact with impacted soils and dust	Future site users	Moderate	Moderate	Moderate	required
		Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
		Inhalation of vapours	Future site users	Low	Moderate	Low/Moderate	
		Vertical and Lateral	Controlled Waters – Principal Aquifer	Low	Moderate	Low/Moderate	
		Migration	Controlled Waters – Secondary A Aquifer	Low	Minor	Low	
		Dermal contact with impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
	Total Petroleum	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
Bulk Storage of	Hydrocarbons	Inhalation of vapours	Future site users	Low	Moderate	Low/Moderate	Potentially Active – Further investigation
disused waste oil (Tank 1)	(TPH)	Vertical and Lateral Migration	Controlled Waters – Principal Aquifer	Moderate	Moderate	Moderate	required
			Controlled Waters – Secondary A Aquifer	Moderate	Minor	Low/Moderate	
	Polycyclic Aromatic	Dermal contact with impacted soils and dust	Future site users	Moderate	Moderate	Moderate	

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
	Hydrocarbons (PAH)	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
		Inhalation of vapours	Future site users	Low	Moderate	Low/Moderate	
		Vertical and Lateral	Controlled Waters – Principal Aquifer	Moderate	Moderate	Moderate	
		Migration	Controlled Waters – Secondary A Aquifer	Moderate	Minor	Low/Moderate	
		Dermal contact with impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
	Total Petroleum	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
	Hydrocarbons	Inhalation of vapours	Future site users	Low	Moderate	Low/Moderate	
	(TPH)	Vertical and Lateral	Controlled Waters – Principal Aquifer	Moderate	Moderate	Moderate	
Bulk storage of		Migration	Controlled Waters – Secondary A Aquifer	Moderate	Minor	Low/Moderate	
diesel fuel (Tank 3)	Polycyclic Aromatic	Dermal contact with impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
		Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
	Hydrocarbons	Inhalation of vapours	Future site users	Low	Moderate	Low/Moderate	
	(PAH)		Controlled Waters – Principal Aquifer	Moderate	Moderate	Moderate	
		Migration	Controlled Waters – Secondary A Aquifer	Moderate	Minor	Low/Moderate	
		Inhalation and ingestion of impacted soils and dusts	Future site users	Moderate	Moderate	Moderate	
Bulk storage of Fetrtiliser on-site	Fertiliser (Nitrogen and	Dermal contact with impacted soils	Future site users	Moderate	Moderate	Moderate	Potentially Active – Further investigation
(Tank 4)	Sulphur)	Vertical and lateral	Controlled Waters – Principal Aquifer	Moderate	Moderate	Moderate	required
		migration	Controlled Waters – Secondary A Aquifer	Moderate	Minor	Low/Moderate	
Agricultural use of the site	Herbicides and Pesticides	Inhalation and ingestion of impacted soils and dusts	Future site users	Moderate	Moderate	Moderate	Potentially Active – Further investigation required
(including bulk	FESTICIAES	Dermal contact with	Future site users	Moderate	Moderate	Moderate	i equii eu

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
storage of		impacted soils					
herbicides)		Vertical and Lateral	Controlled Waters – Principal Aquifer	Moderate	Moderate	Moderate	
		migration	Controlled Waters – Secondary A Aquifer	Moderate	Minor	Low/Moderate	
		Dermal contact with impacted soils and dust	Future site users	Low	Moderate	Low/Moderate	
	Polycyclic Aromatic	Ingestion of impacted soils and dust	Future site users	Low	Moderate	Low/Moderate	
	Hydrocarbons (PAH)	Vertical and Lateral	Controlled Waters – Principal Aquifer	Low	Moderate	Low/Moderate	
Vehicle and machinery storage		Migration	Controlled Waters – Secondary A Aquifer	Low	Minor	Low	Potentially Active – Further investigation
(Including incidental spillages)		Dermal contact with impacted soils and dust	Future site users	Low	Moderate	Low/Moderate	required
incluental spillages)	Total Petroleum Hydrocarbons (TPH)	Ingestion of impacted soils and dust	Future site users	Low	Moderate	Low/Moderate	
		Inhalation of vapours	Future site users	Low	Moderate	Low/Moderate	
		Vertical and Lateral Migration	Controlled Waters – Principal Aquifer	Low	Moderate	Low/Moderate	
			Controlled Waters – Secondary A Aquifer	Low	Minor	Low	
Asbestos Cladded and roofed barn buildings (Current)	Asbestos fibres	Inhalation of fibres	Future site users	High	Moderate	High	Potentially Active – Further investigation required
Off-Site Potential Sou							
Suspected Heating Oil Tank (Tank 2)	Polycyclic Aromatic Hydrocarbons (PAH)	Lateral Migration (Airborne Dust/ Groundwater flow)	Future site users	Moderate	Moderate	Moderate	Potentially Active – Further investigation required
Directly east of site	Total Petroleum Hydrocarbons (TPH)	Lateral Migration (Groundwater flow)	Future site users	Moderate	Moderate	Moderate	requireu
Stockpile containing building materials - Directly west of the	Asbestos fibres	Lateral Migration (Airborne Dust –Inhalation of Fibres)	Future site users	Low	Moderate	Low/Moderate	Potentially Active – Further investigation required

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
site –	Metals (As, B, Cd, Cr, Pb, Hg, Se, Ni, Zn)	Lateral Migration (Airborne Dust)	Future site users	Low	Moderate	Low/Moderate	
	Polycyclic Aromatic Hydrocarbons (PAH)	Lateral Migration (Airborne Dust/ Groundwater flow)	Future site users	Low	Moderate	Low/Moderate	
	Total Petroleum Hydrocarbons (TPH)	Lateral Migration (Groundwater flow)	Future site users	Moderate	Moderate	Moderate	
Suspected Fuel Storage Tank (AST) -	Polycyclic Aromatic Hydrocarbons (PAH)	Lateral Migration (Airborne Dust/ Groundwater flow)	Future site users	Moderate	Moderate	Moderate	Potentially Active – Further investigation
5m west of site – (Tank 5)	Polycyclic Aromatic Hydrocarbons (PAH)	Lateral Migration (Groundwater flow)	Future site users	Moderate	Moderate	Moderate	required
	Ground Gas (CH ₄ and CO ₂)	Migration of gas into confined spaces	Future site users	Low	Severe	Moderate	Potentially Active – Further investigation required
32m northwest –	Metals (As, B, Cd, Cr, Pb, Hg, Se, Ni, Zn)	Lateral Migration (Groundwater flow)	Future site users	Low	Moderate	Low/Moderate	Inactive – Given the anticipated
Infilled Pond (Historic 1969- 1972)	Polycyclic Aromatic Hydrocarbons (PAH)	Lateral Migration (Groundwater flow)	Future site users	Low	Moderate	Low/Moderate	groundwater flow to the northeast, it is considered unlikely that PAH and TPH will mobilise onto site and significantly impact the site.
	Total Petroleum Hydrocarbons (TPH)	Lateral Migration (Groundwater flow)	Future site users	Low	Moderate	Low/Moderate	uie site.
55m south of site – Chalk pit (Historic	Ground Gas (CH ₄ and CO ₂)	Migration of gas into confined spaces	Future site users	Moderate	Severe	High	
1872-1994) and 251m south of site -	Metals (As, B, Cd, Cr, Pb, Hg, Se, Ni, Zn)	Lateral Migration (Groundwater flow)	Future site users	Low	Moderate	Low/Moderate	Potentially Active – Further investigation required
Manor Farm	Polycyclic	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	

	Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
	Landfill (current).	Aromatic Hydrocarbons (PAH)	(Groundwater flow)					
		Total Petroleum Hydrocarbons (TPH)	Lateral Migration (Groundwater flow)	Future site users	Moderate	Moderate	Moderate	

7 CONCLUSIONS AND RECOMMENDATIONS

Conceptual Site Model

The Conceptual Site Model has identified the presence of a series of potentially active pollution linkages associated with the previous recorded use of the site and surrounding areas which are considered to have the potential to present a risk to identified receptors at the site based on the proposed development.

Recommendations

Environmental

Given the proposed end use as a residential end use it is recommended that further investigation should be undertaken across the site.

The site investigation should include chemical and geotechnical testing of soil samples for a suite of determinants representative of the potential sources 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 the enable mitigation measures to be formulated, if required.

A preliminary Karstic Feature assessment is also recommended to investigate the potential for dissolution features in the vicinity of the geological boundary between the Seaford Chalk Member and overlying Lambeth Group.

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.

The site lies within an area where between 3% and 5% of the properties are above the Action Level. At these levels the Groundsure Report indicates that basic radon protective measures are required in the construction of new extensions or dwellings.

APPENDIX I - LIMITATIONS

- 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.
- 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.
- 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.
- 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.
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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)

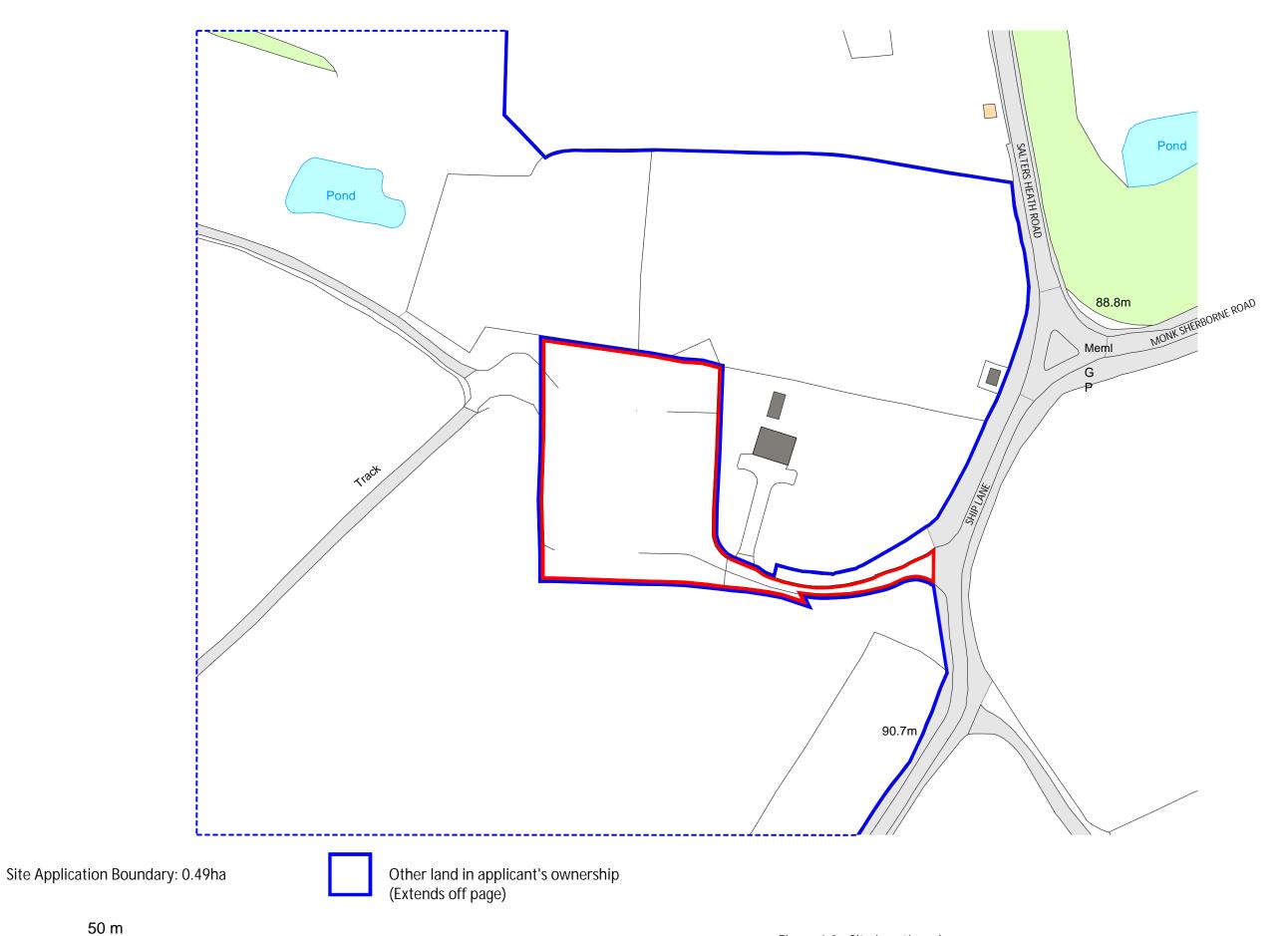
PPM Parts Per Million

MG/M³ Milligram Per Metre Cubed M BGL Metres Below Ground Level M BCL Metres Below Cover Level MAOD Metres Above Ordnance Datum (Sea Level)

KN/M² Kilo Newtons Per Metre Squared

μM Micrometre

APPENDIX III - DRAWINGS





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ISSUE	DATE	DESCRIPTION	DRAWN	CHECKED
v1	21.07.23		RD	
v2	24.07.23	PLANNING ISSUE	MH	RD
V3	08.09.23	PLANNING ISSUE - Blue Line added	MH	RD

Figure 1.0 - Site Location plan

CLIENT.	Manudal Co Ltd			
CLIENT:	Manydo Co. Ltd			
PROJECT:	Rookery Farm, Monk Sherbourne			
DRAWING	Site Location Plan	1:1250		
NUMBER:	50997-XX-P1-01	A3		
ISSUE:	v3	08.09.23		



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v4

08.09.23

Landscaping shown on this plan is indicative only. Please refer to Landscaping Strategy by Enderby Associates Ltd.



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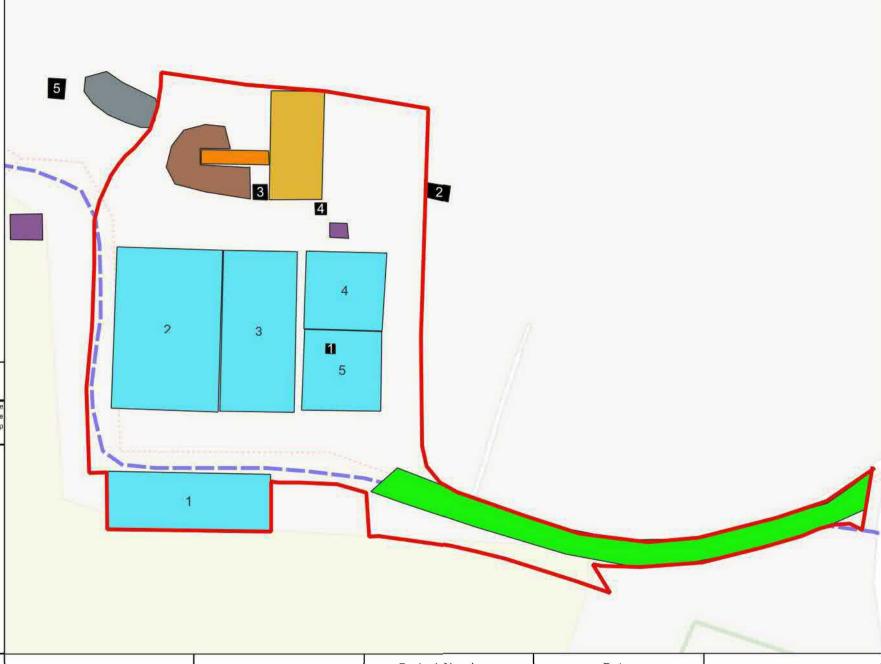
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Job Title: Rookery Farm, Basingstoke

Client: Pro-Vision Project Limited Project Number: A11764

Date: 24.02.2023

Drawn By: A. Dodds Authorised By:

L. Burnett

Drawing Title: Figure 3.0 Site Walkover Plan

APPENDIX IV - PHOTOGRAPHS



Photograph 1: Access road.



Photograph 2 – View of trees at site entrance



Photograph 3 –Concrete access road



Photograph 4 –Gate located on driveway into site



Photograph 5 – Overview of yard area



Photograph 6 –Road that ran north-south on the western side of site



Photograph 7 –Western side of Barn 1



Photograph 8 –Internal area of Barn 1



Photograph 9 –South-eastern corner of Barn 2 including circuit board and agricultural equipment



Photograph 10 –Inside of Barn 2



Photograph 11 –Eastern side of Barn 3



Photograph 12 –Western side of Barn 3



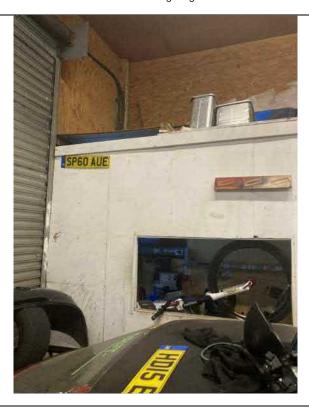
Photograph 13 –Concrete troughs to the east of Barn 1



Photograph 14 –Garage area of Barn 5



Photograph 15 –Behind the vehicles in the garage area of Barn 5 including Tank 1



Photograph 16 –Southwestern corner of the private storage area of Barn 5



Photograph 17 –North-western corner of the private storage area of Barn 5



Photograph 18 –Eastern edge of the private storage area of Barn 5



Photograph 19 –Southern facing view of the inside of Barn 4



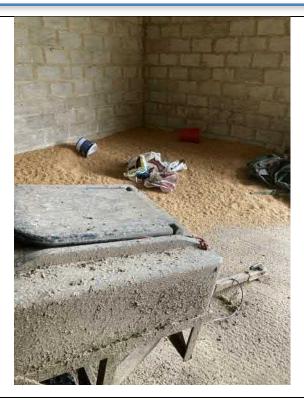
Photograph 20 – South-eastern corner of Barn 4



Photograph 21 –South-western corner of Barn 4 of signage



Photograph 22 – Materials on the western side of Barn 4



Photograph 23 –North-western corner of Barn 4



Photograph 24 –Tank 4



Photograph 25 – Southern side of the stables



Photograph 26 – Southwestern corner of the stables



Photograph 27 –Western side of the stables



Photograph 28 –Northern side of the stables



Photograph 28 –Tank 2 situated off-site to the east



Photograph 29 –Burnt area south of the stables



Photograph 30 –Discarded materials to the west of the stables including Tank 3 and the shipping container



Photograph 31 –Discarded materials to the west of the stables



Photograph 32 –Northern side of Barn 2



Photograph 33 –Land north of the container containing general waste

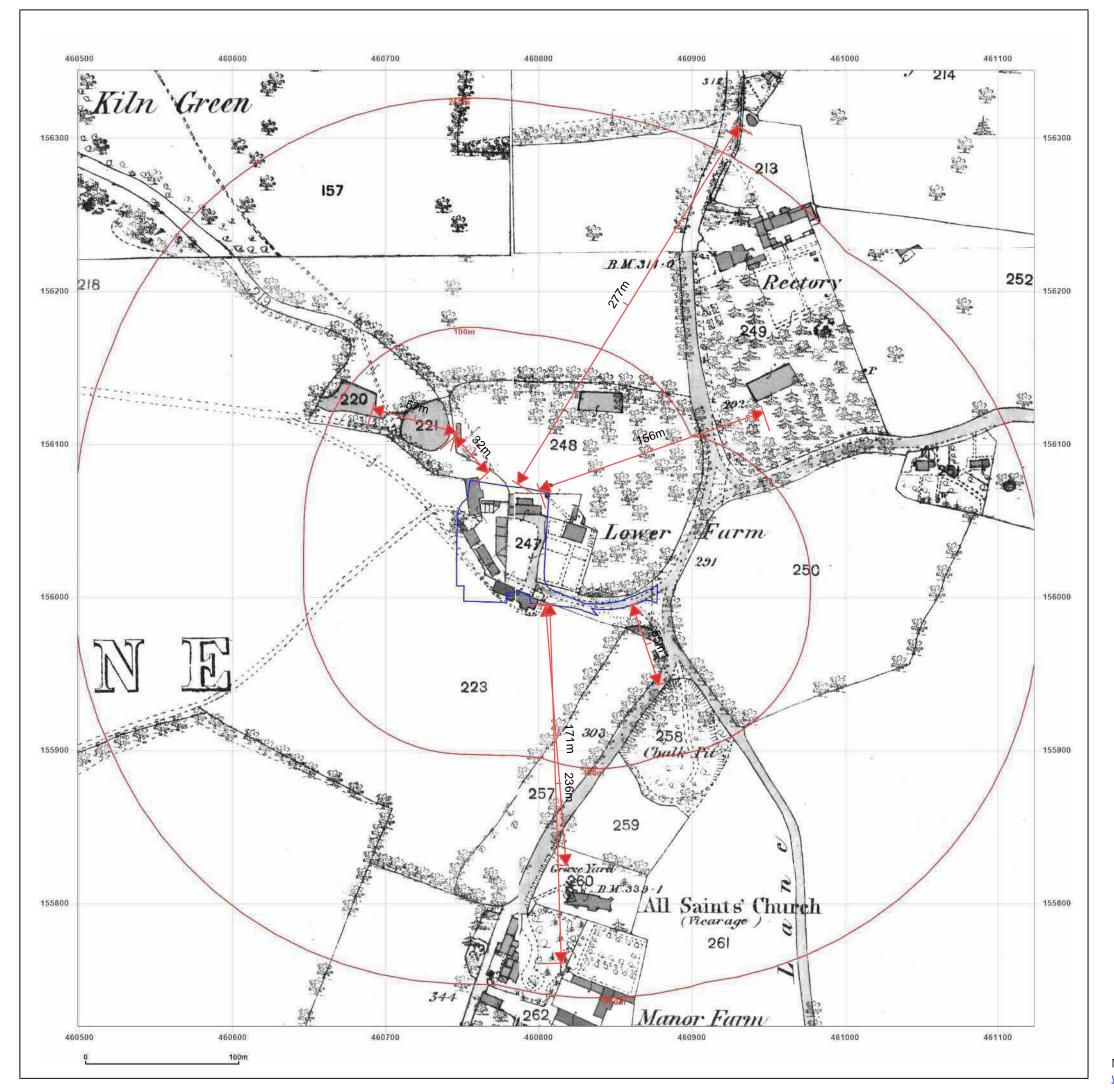


Photograph 34 –Stockpile in the northwest corner of site

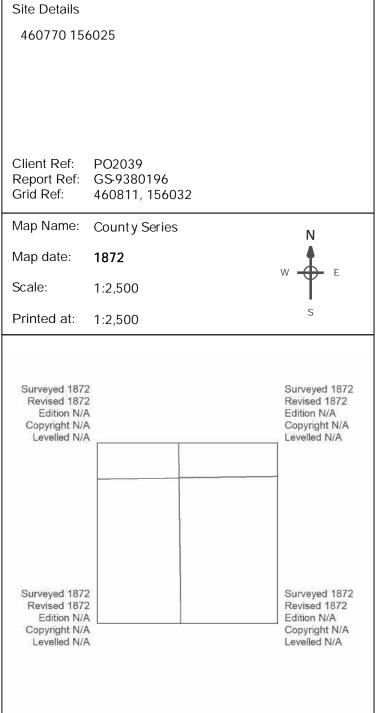


Photograph 35 –Area northwest of site including Tank 5

APPENDIX V - HISTORICAL MAPS





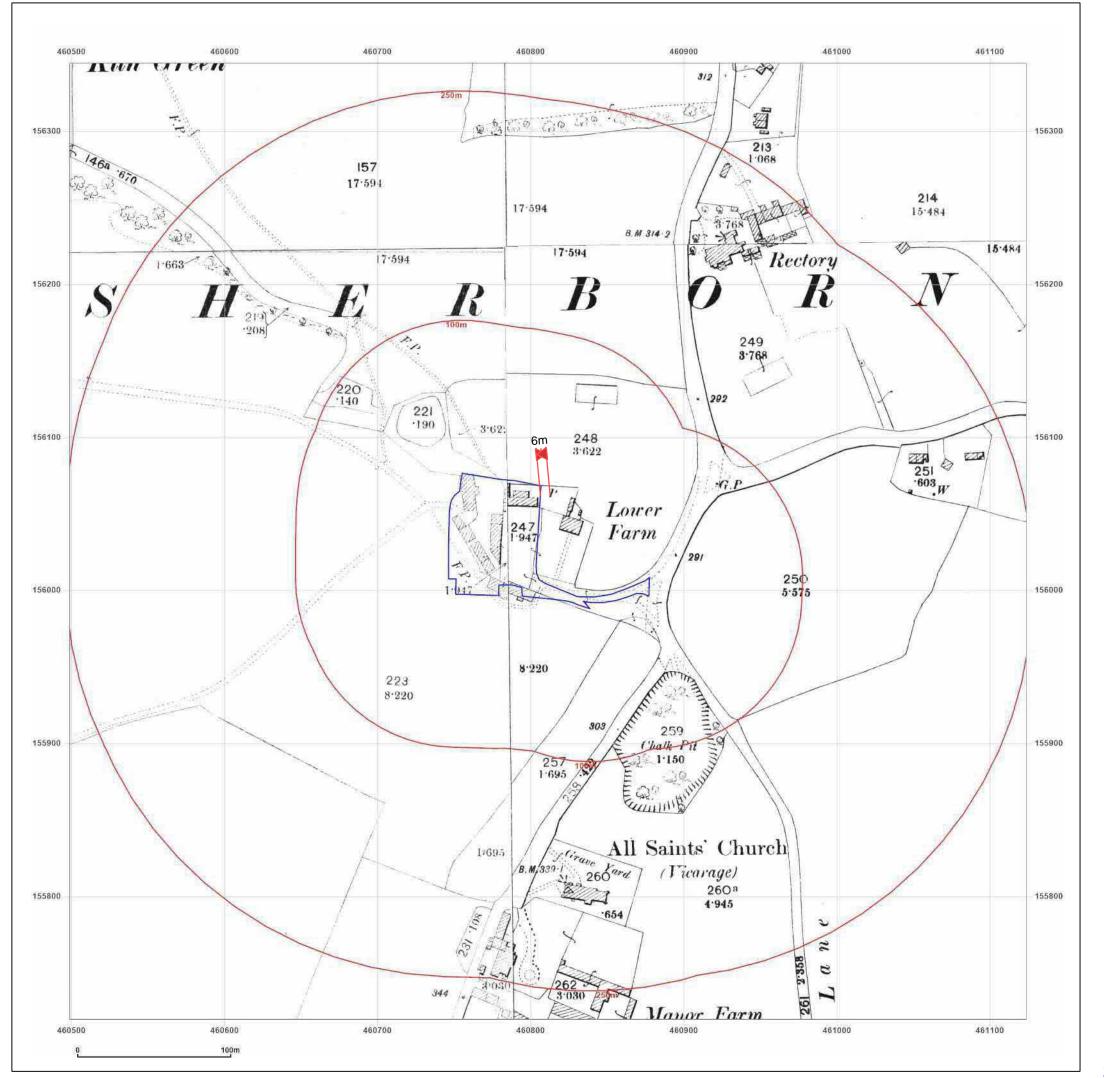




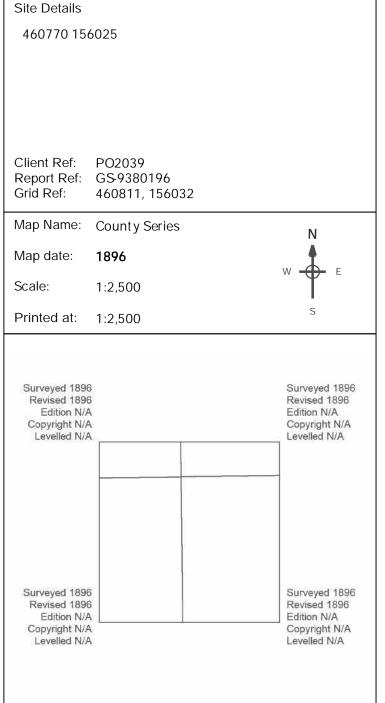
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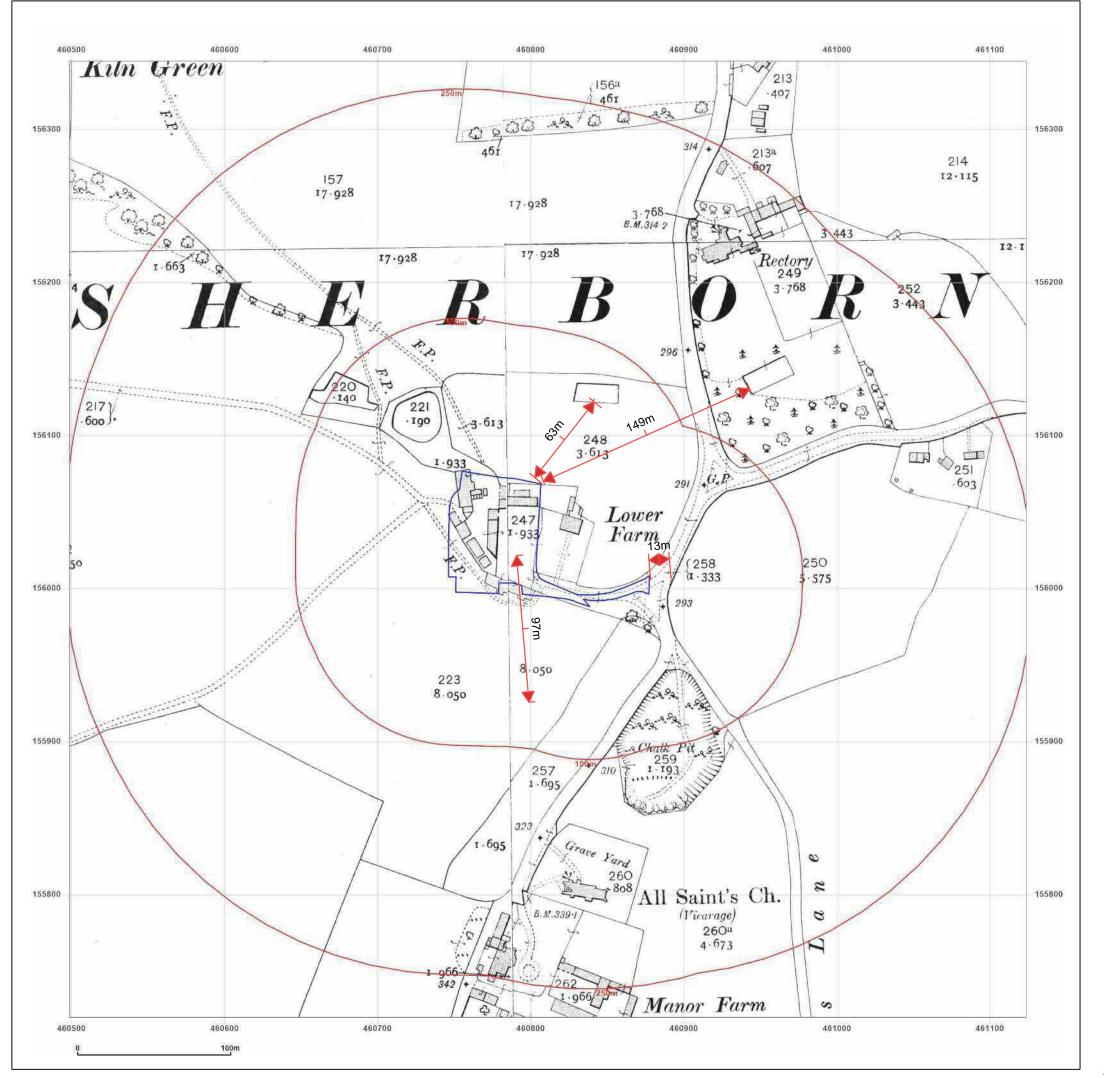




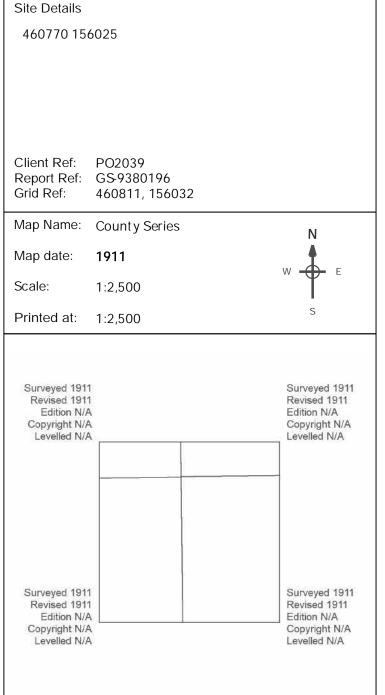
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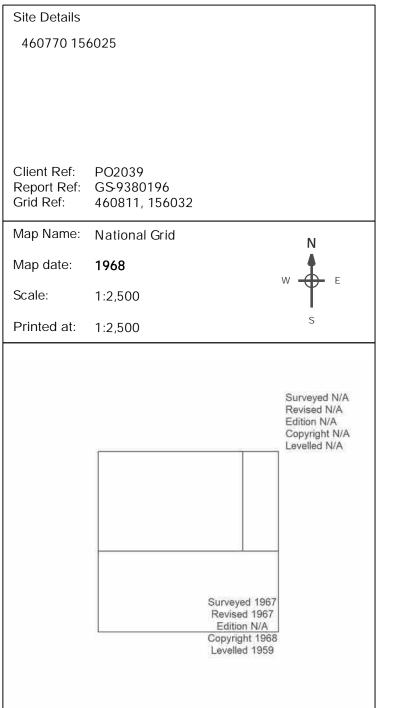
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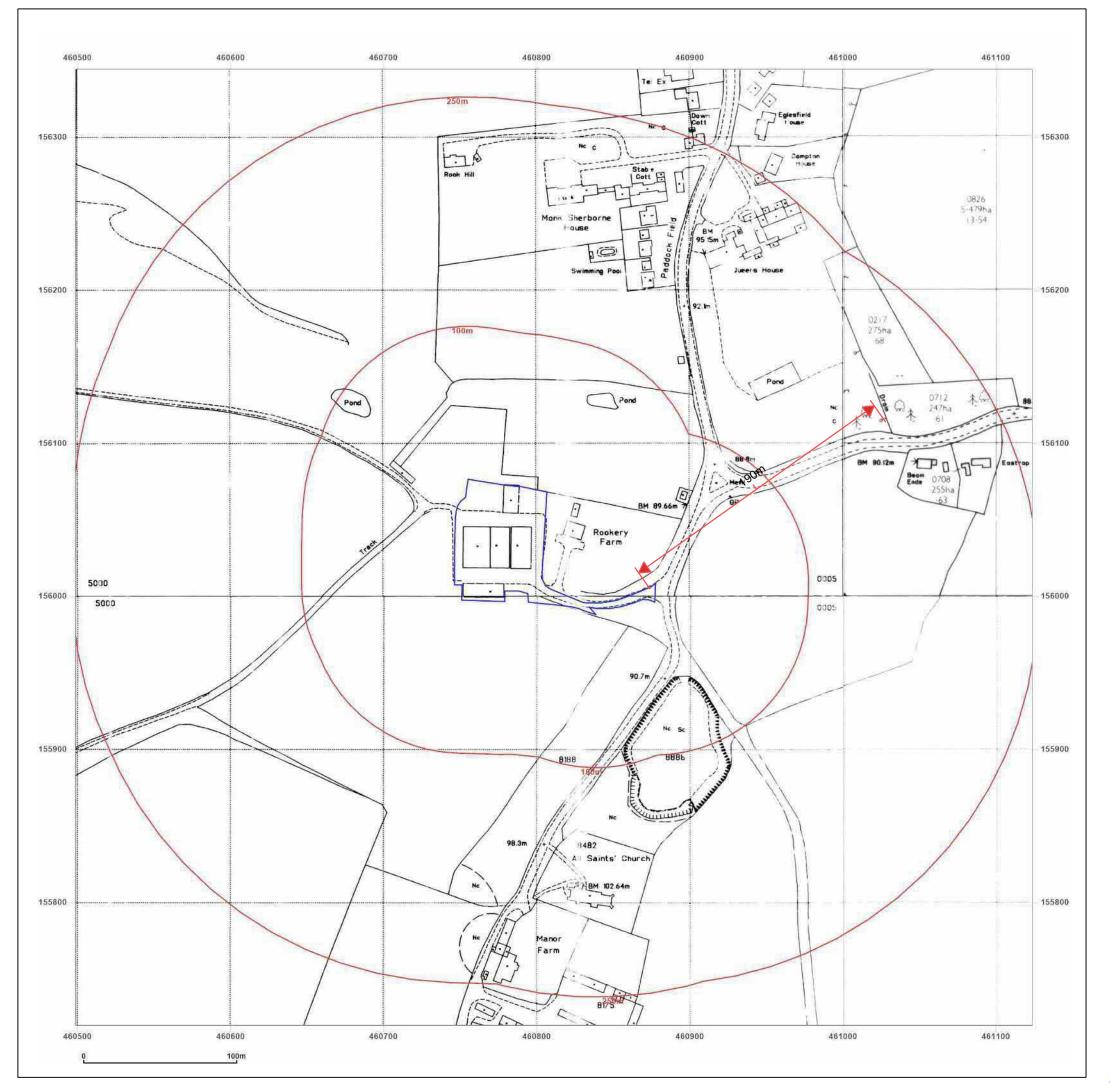




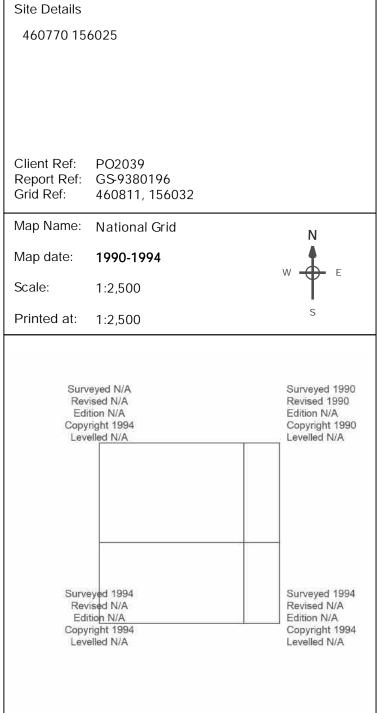
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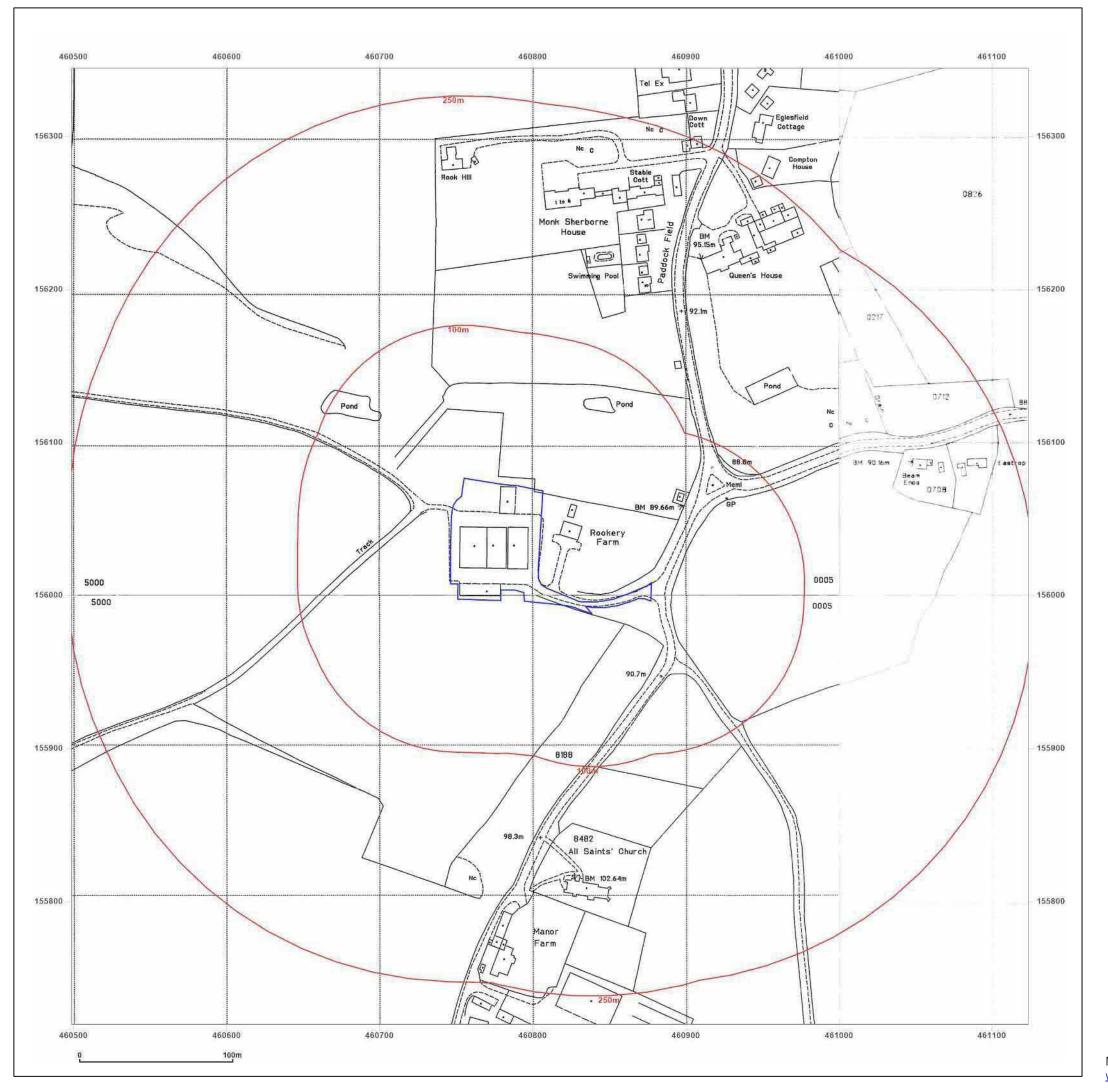




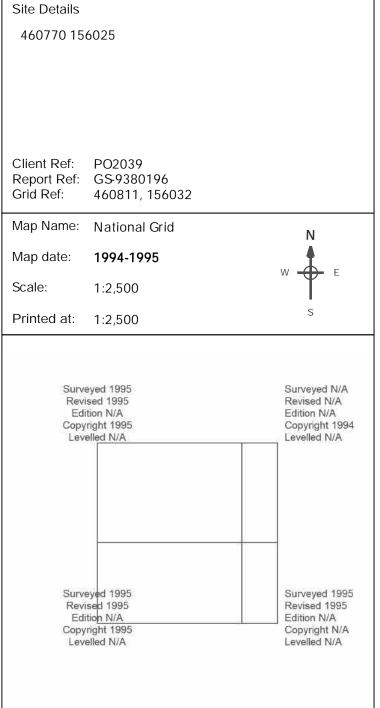
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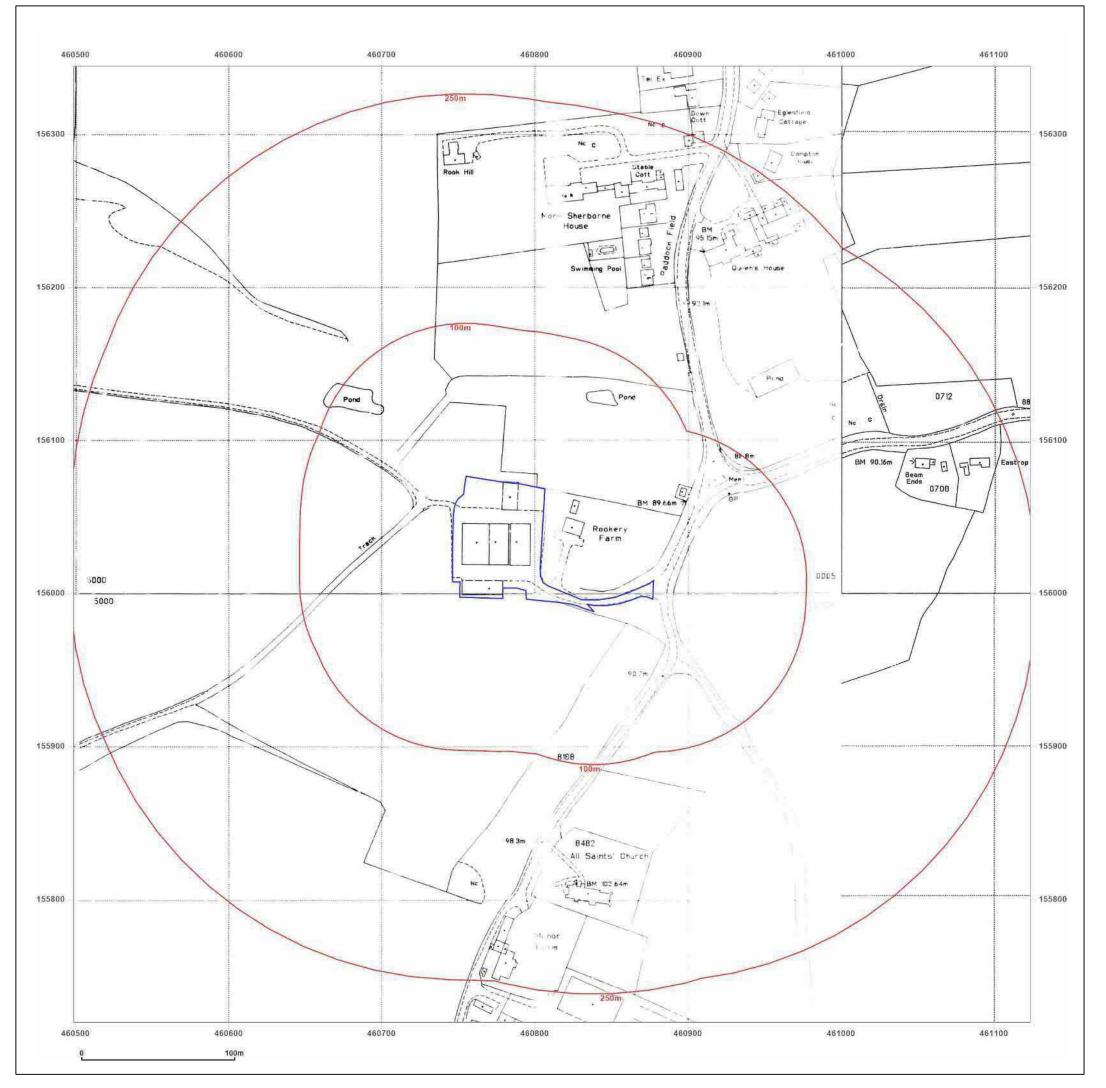




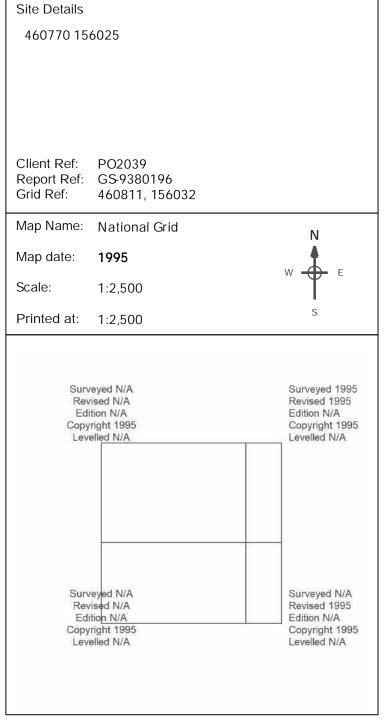
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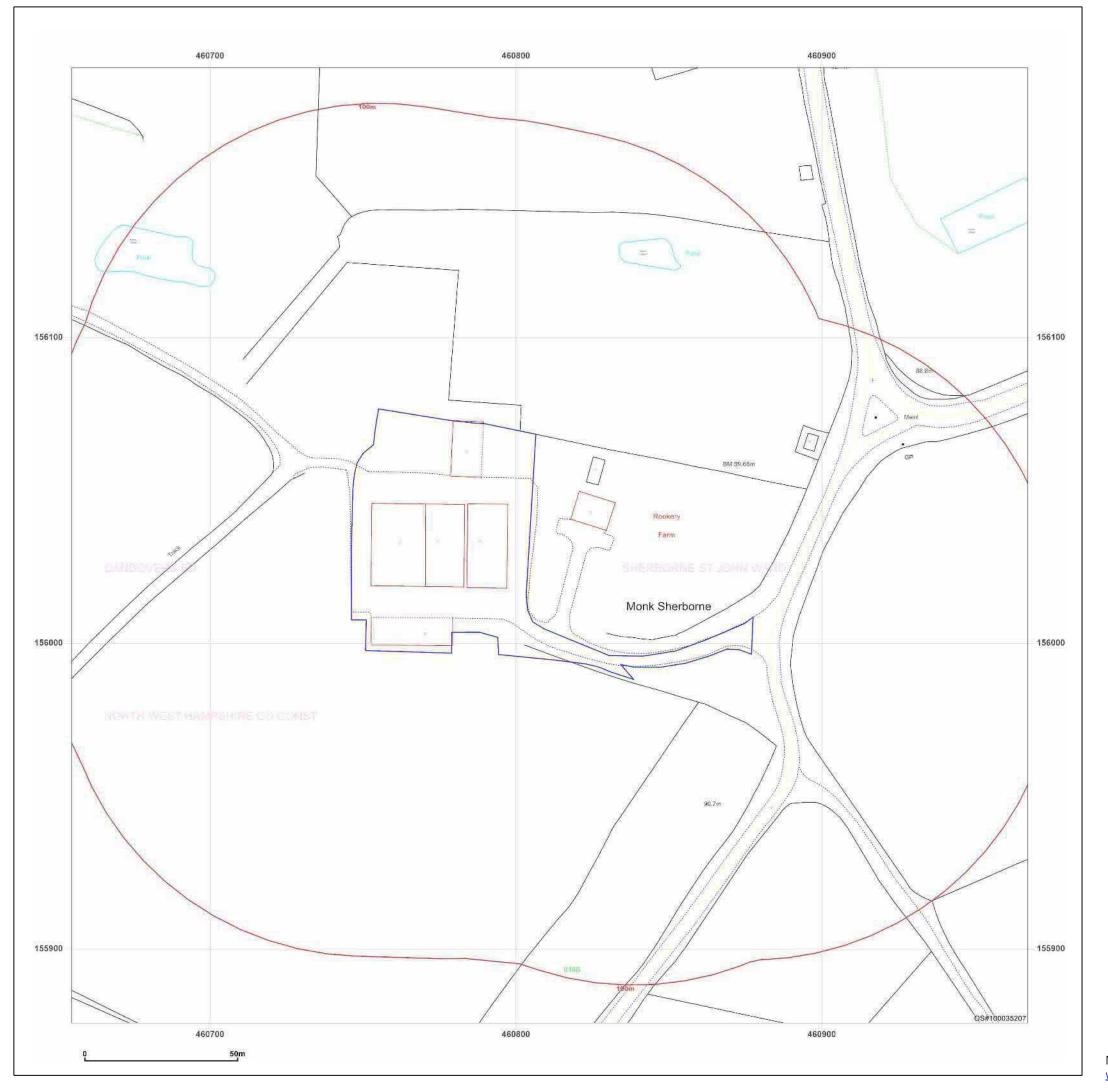




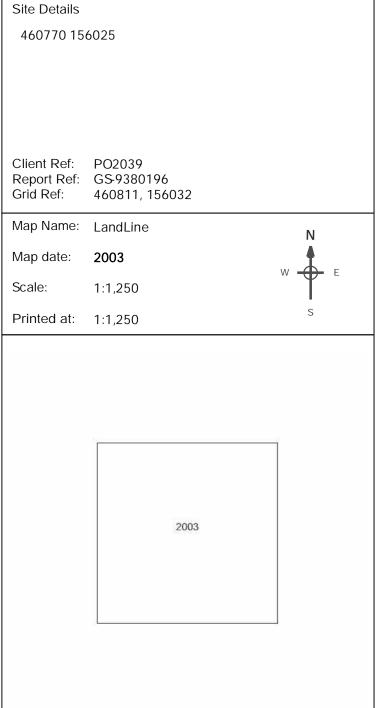
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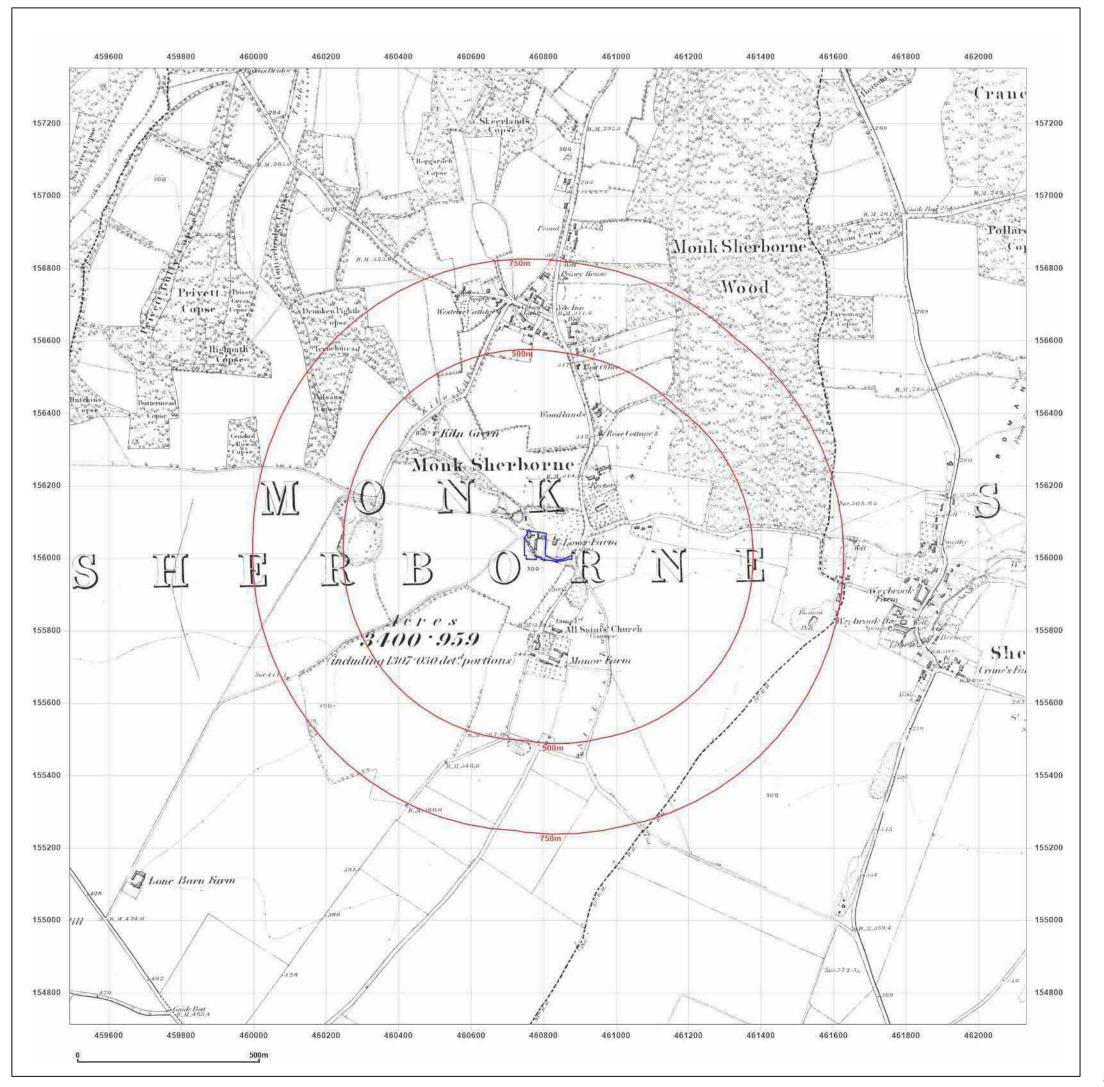




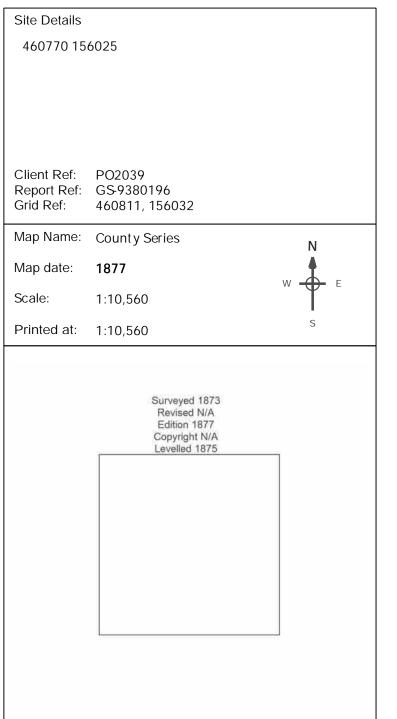
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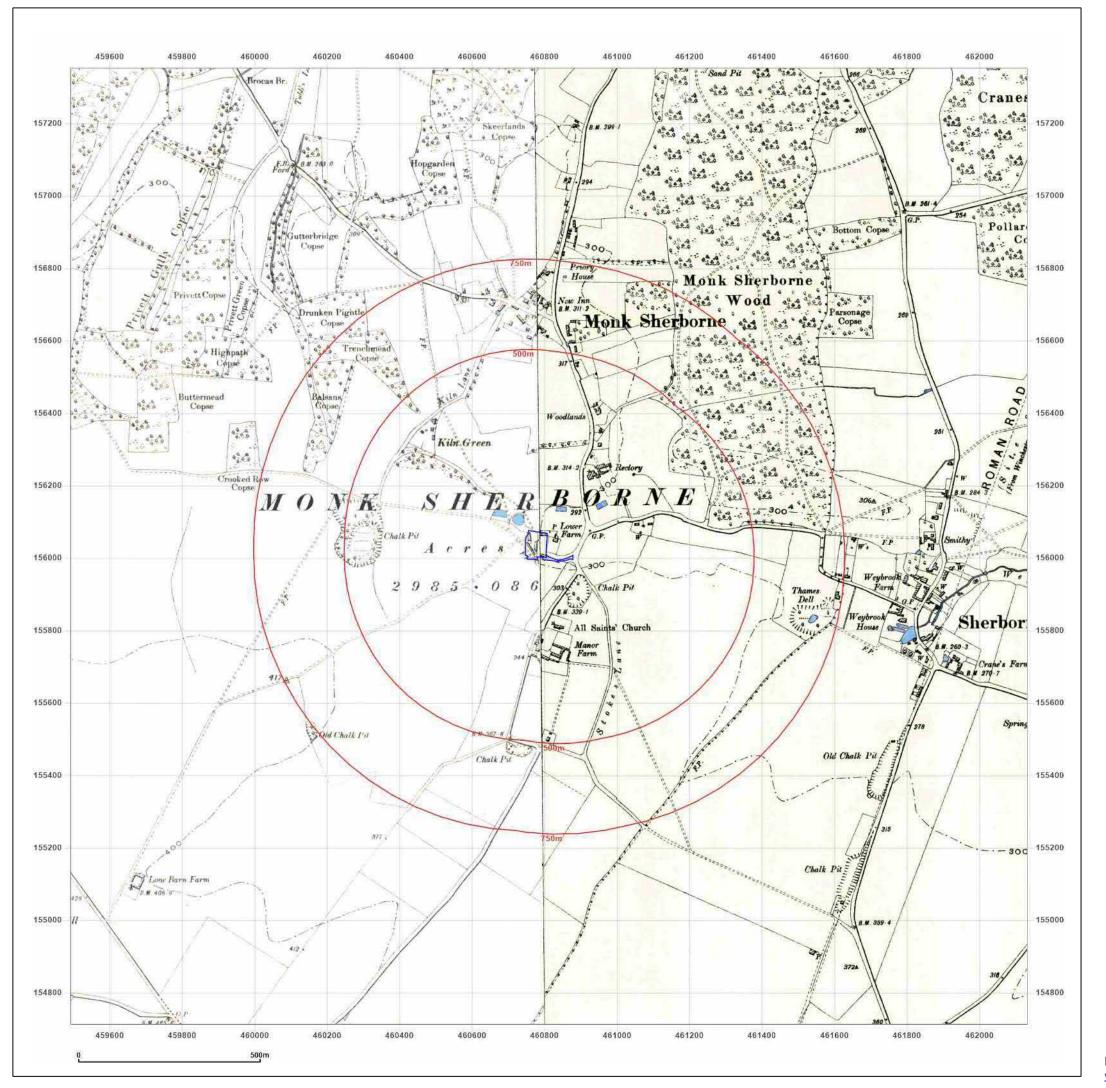




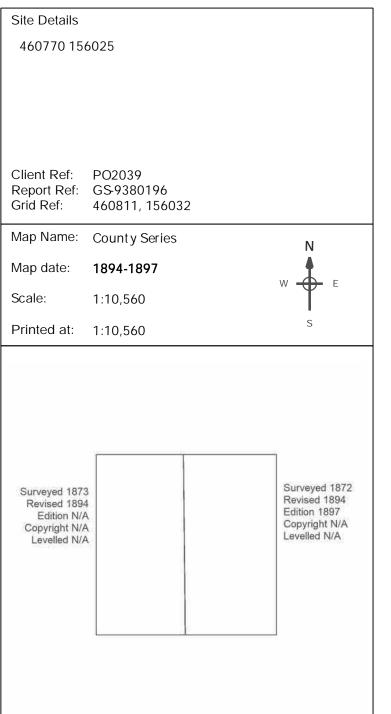
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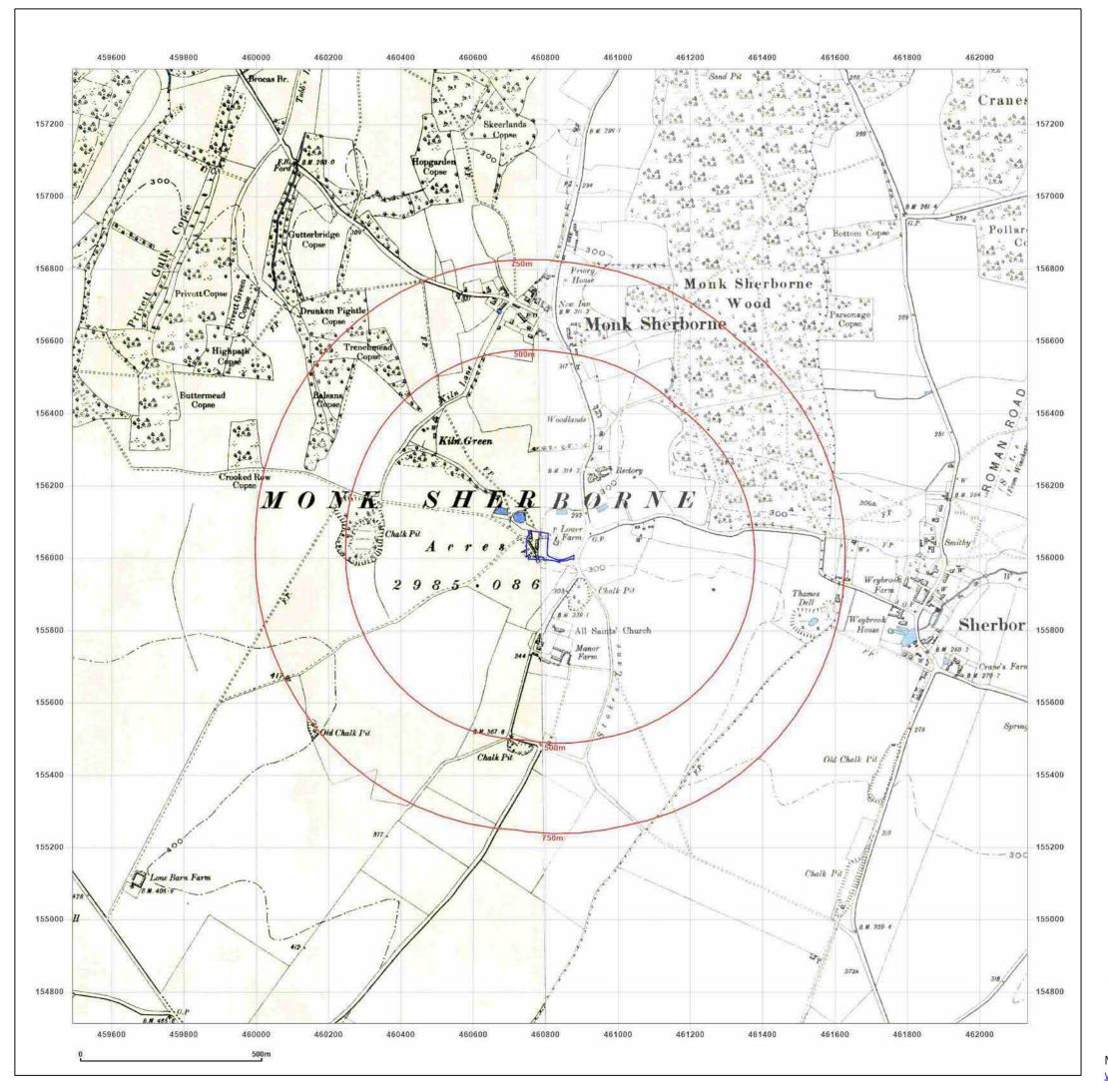




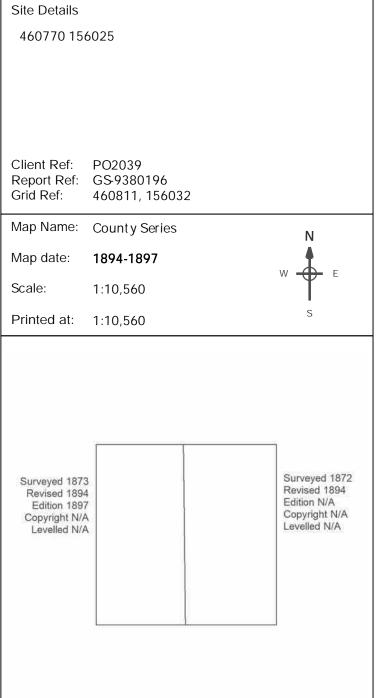
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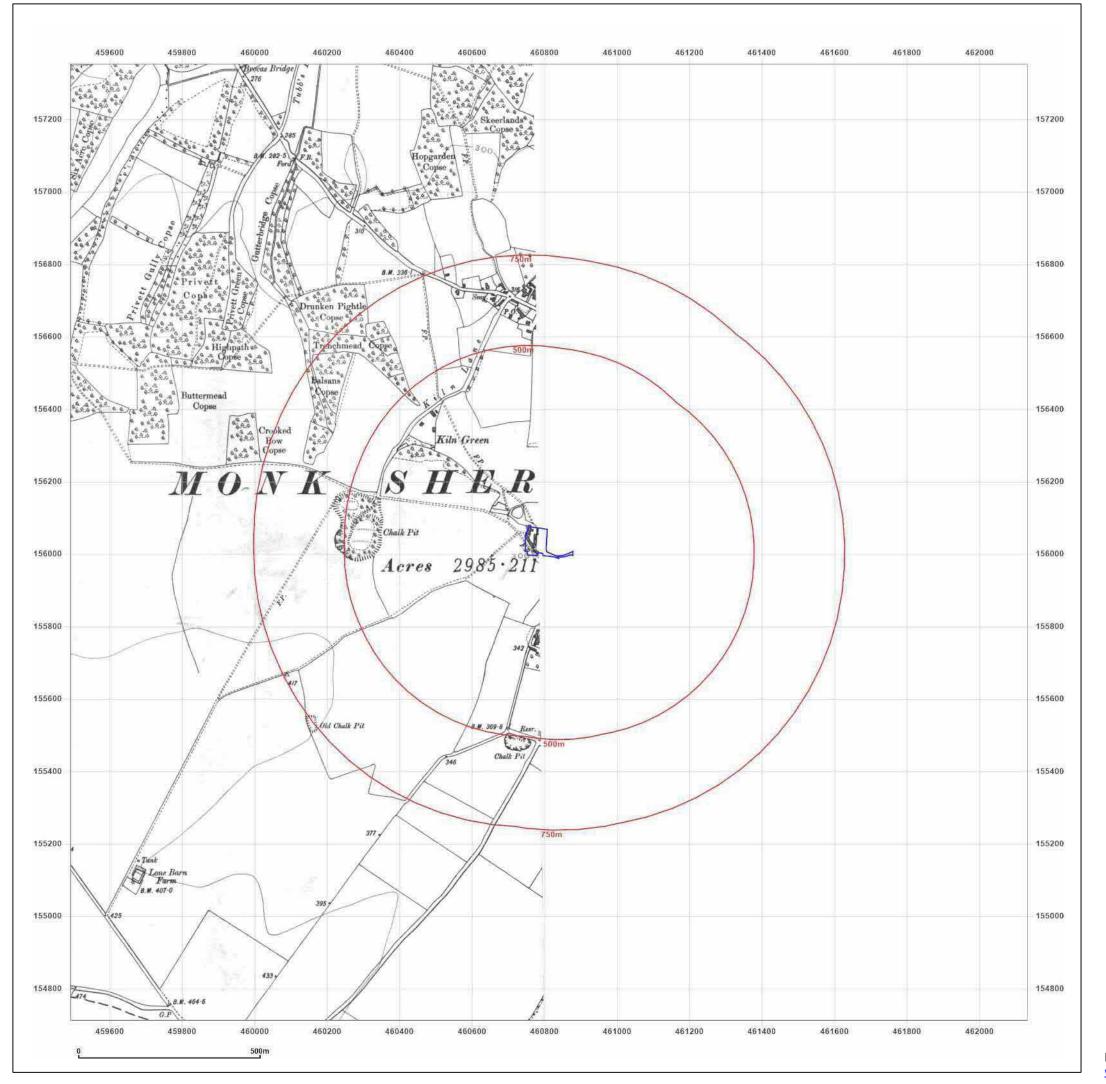




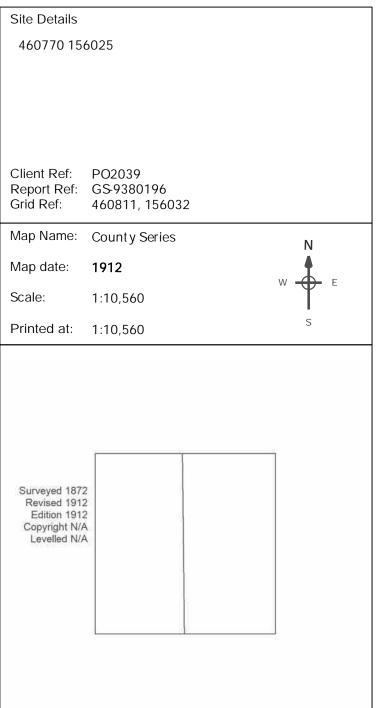
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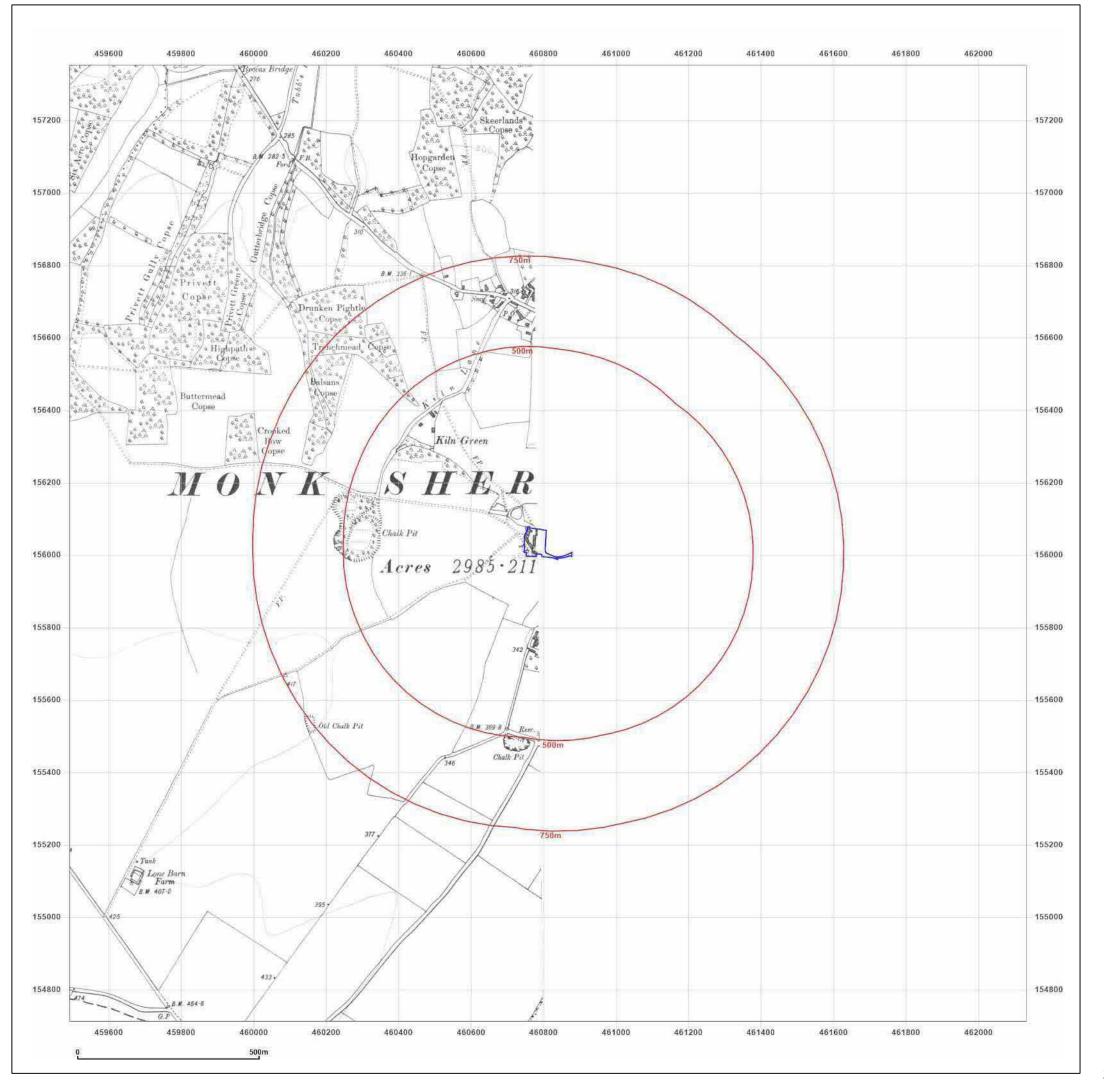




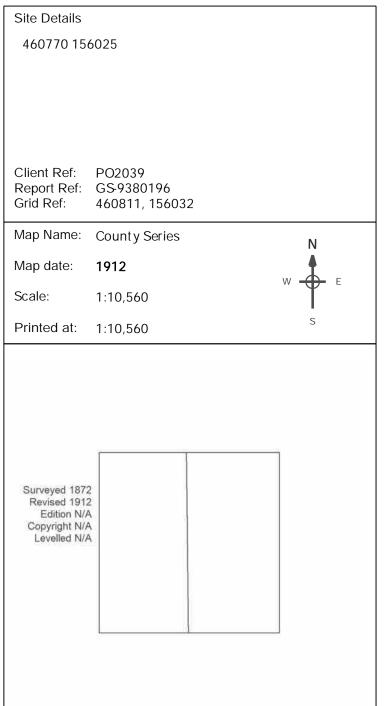
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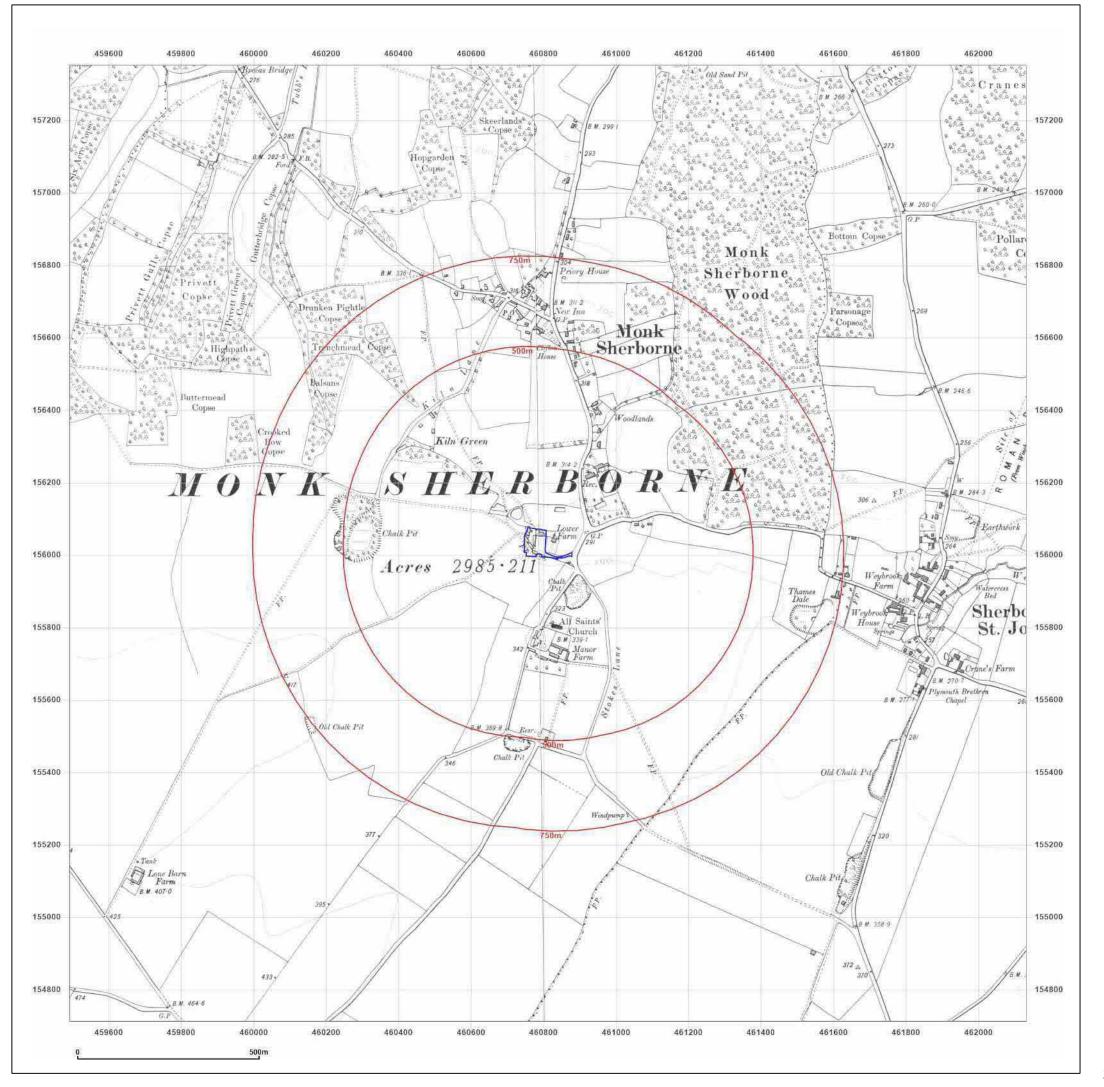




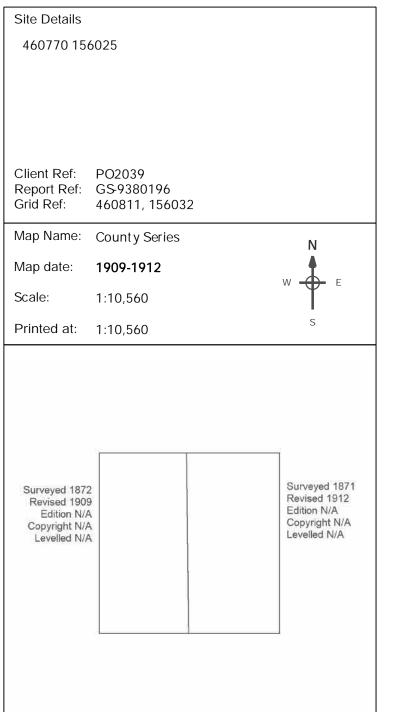
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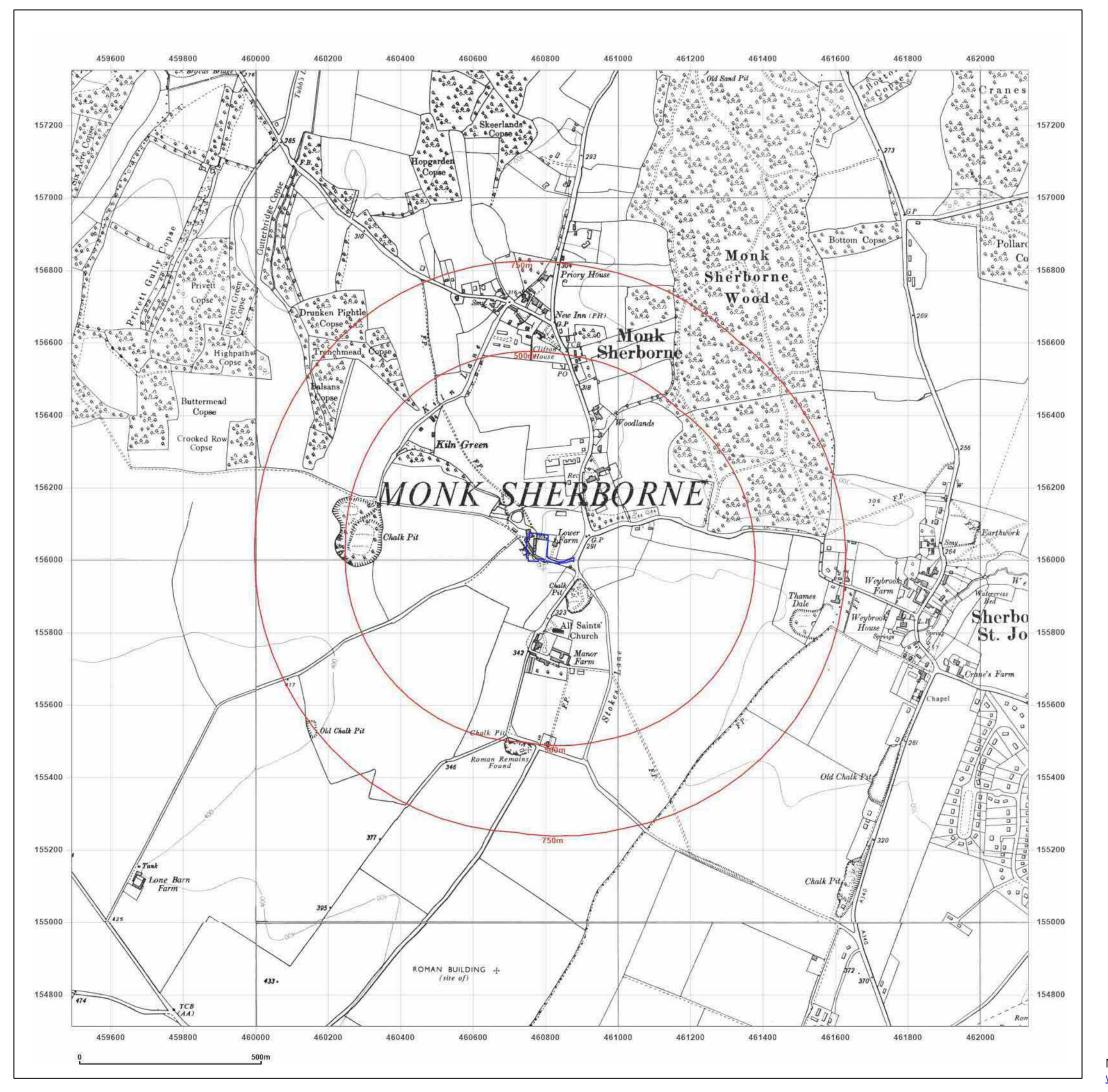




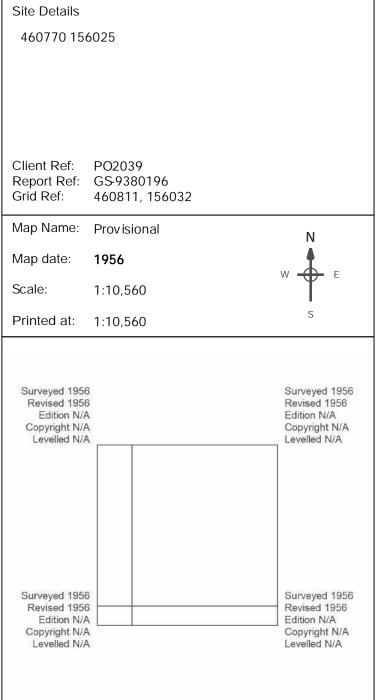
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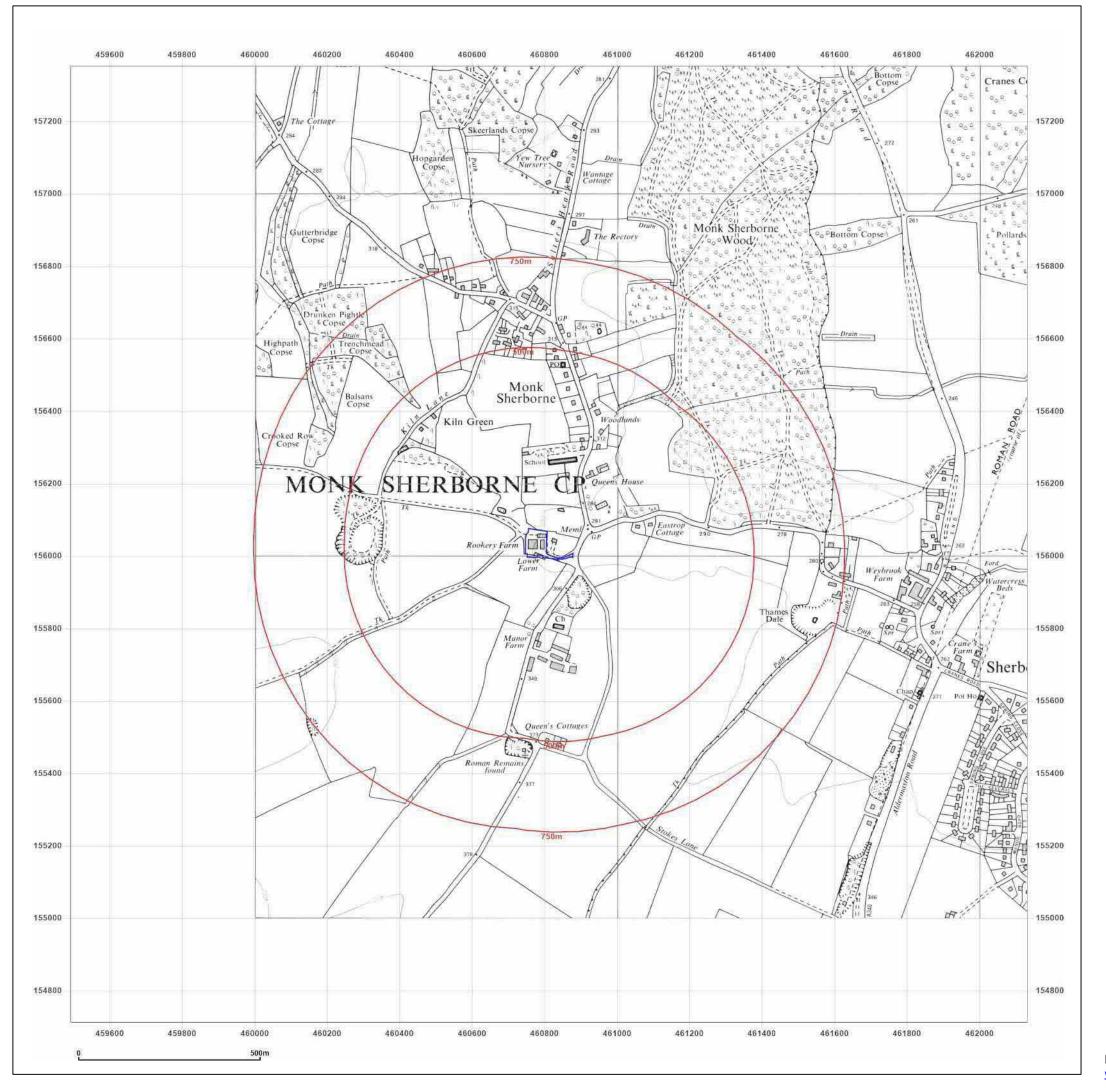




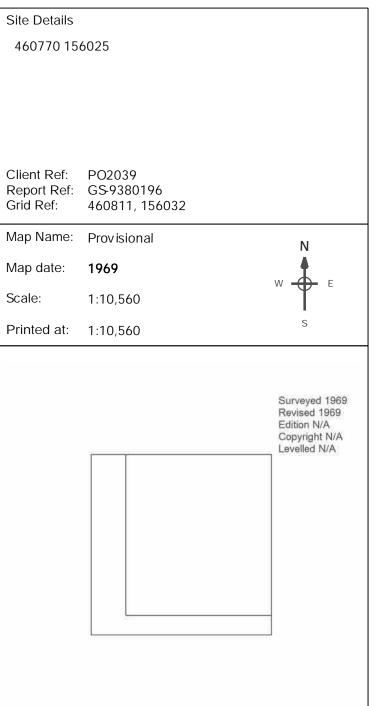
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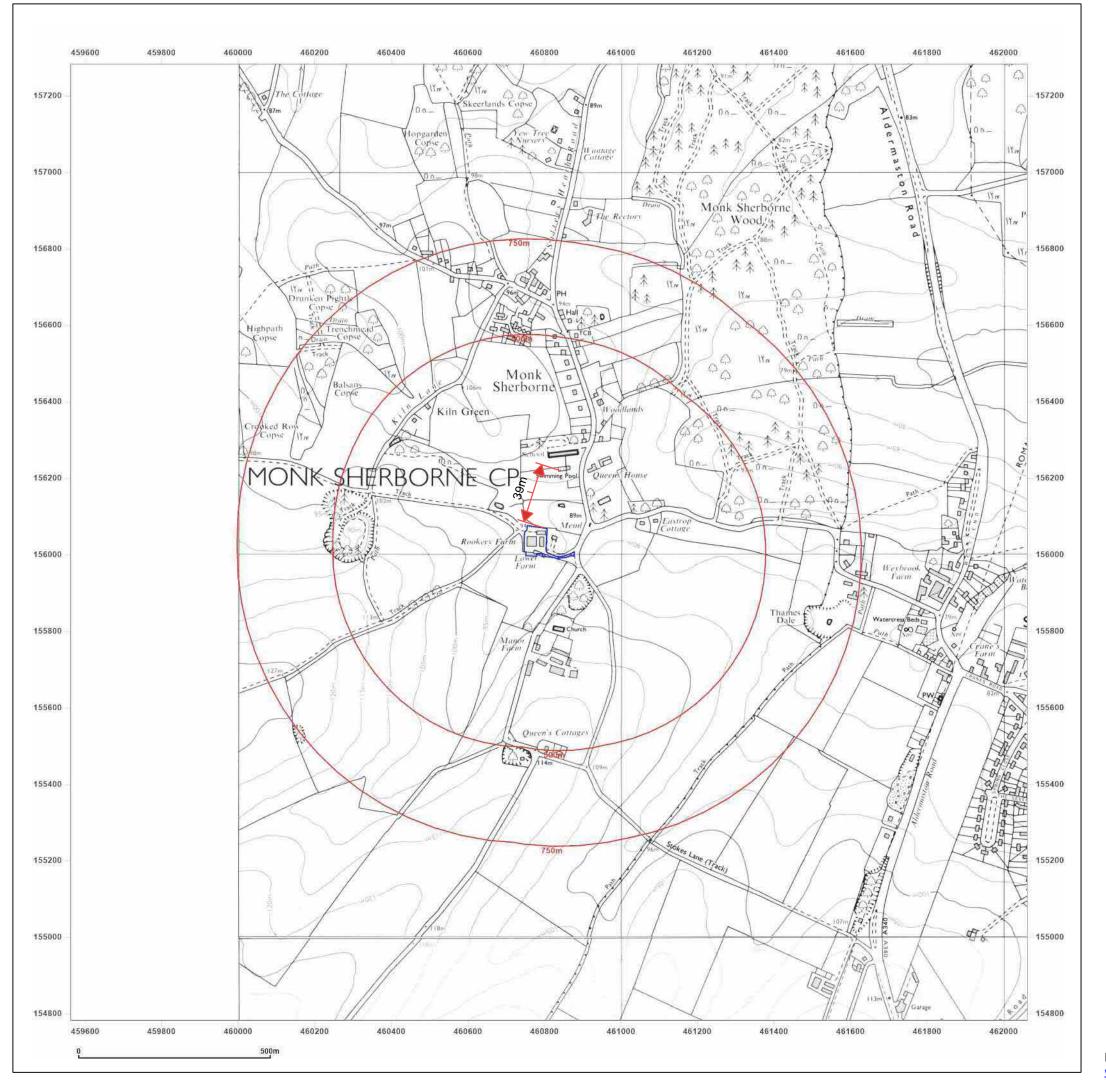




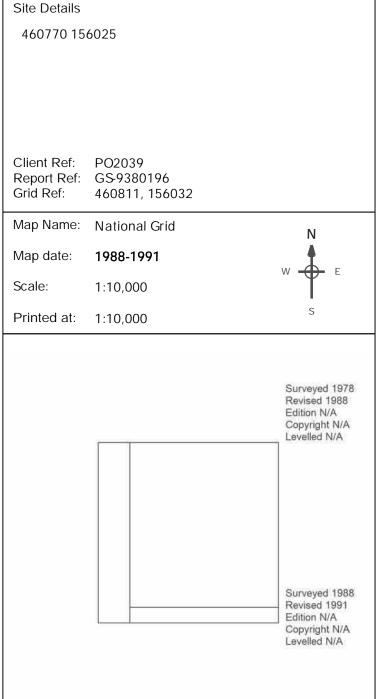
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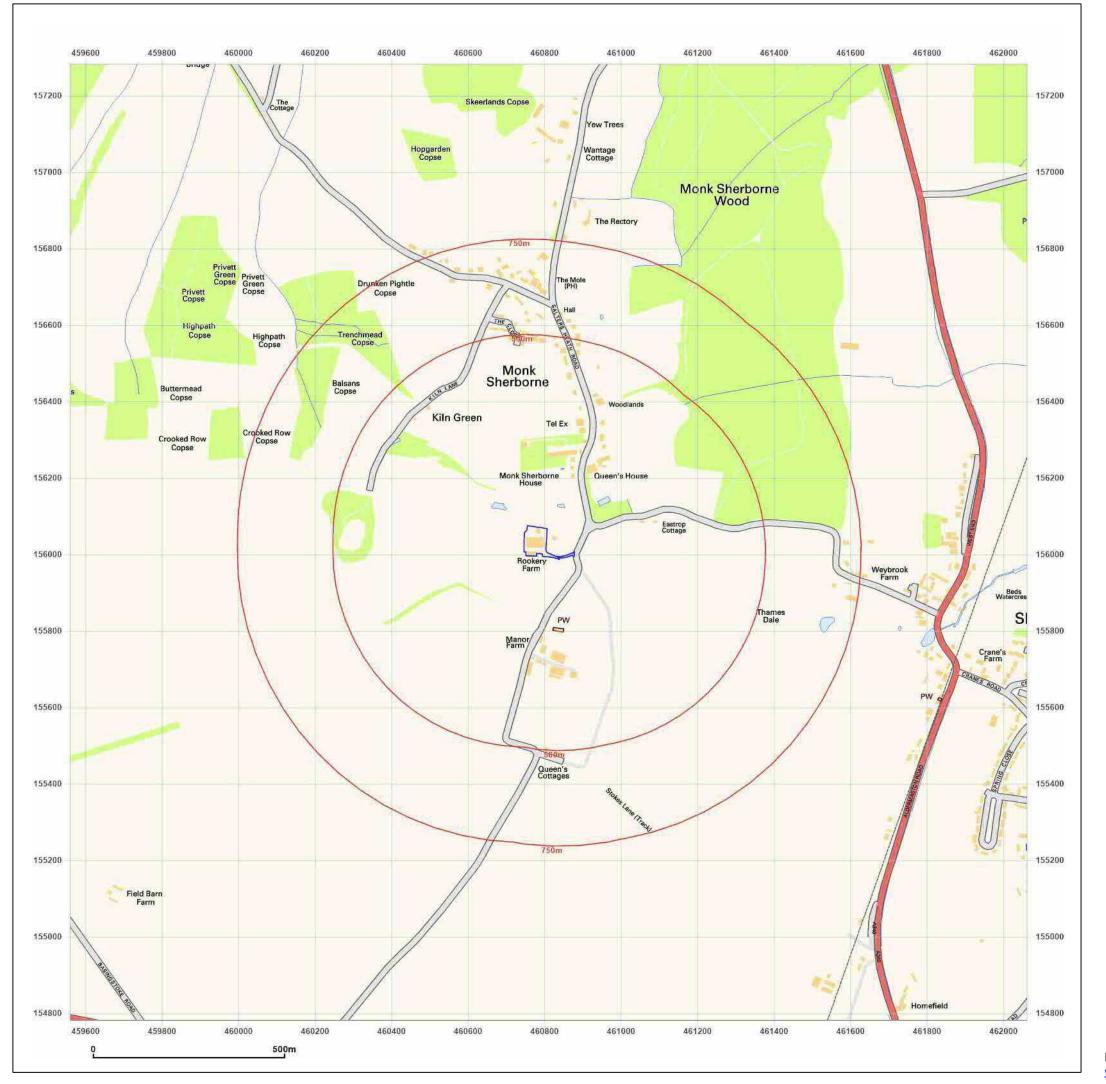




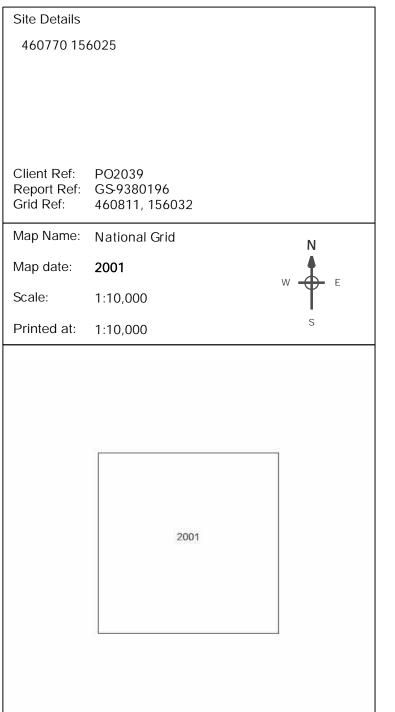
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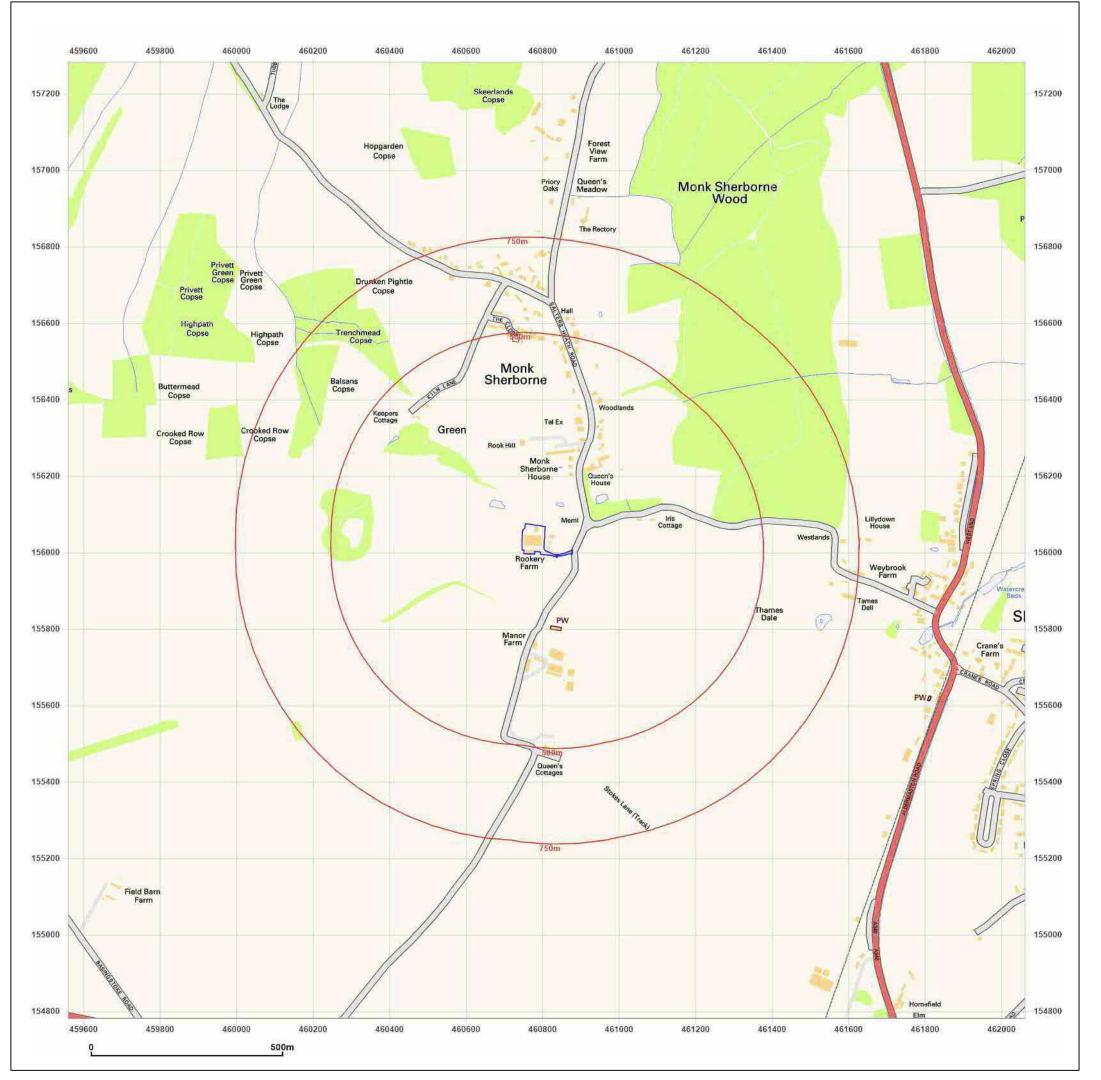




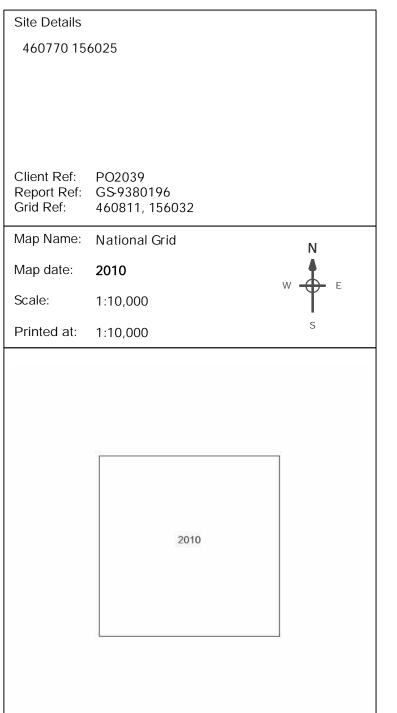
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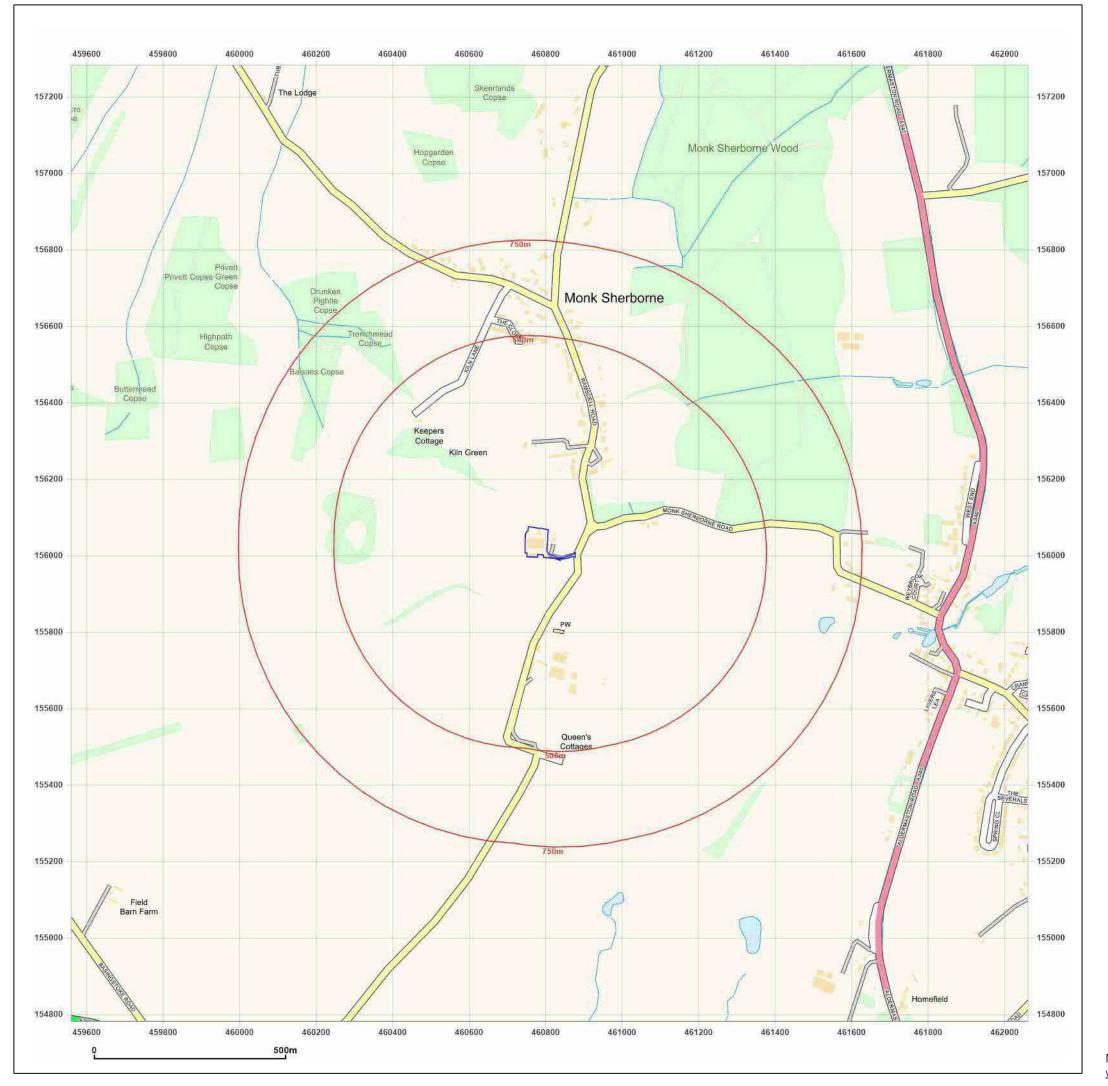




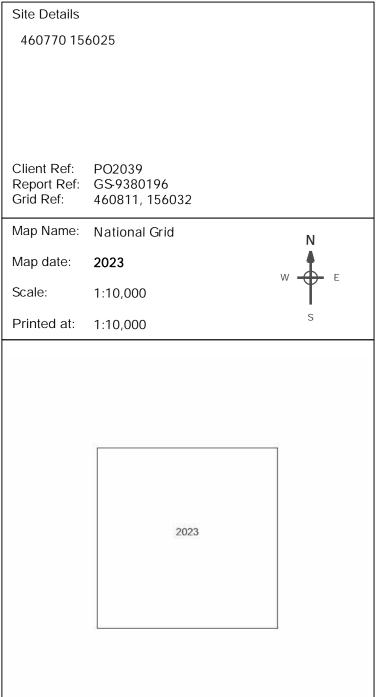
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