Providing Ground Solutions

Planning Potential

Westholme Road, Masham

Phase I Geoenvironmental Desk Study – Revision 2

March, 2017

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Contents

FIGURES

APPENDICES

EXECUTIVE SUMMARY

Card Geotechnics Limited (CGL) was commissioned by Planning Potential, acting on behalf of G & C Jameson, to complete a Phase 1 Geoenvironmental Desk Study for a site located in Masham, North Yorkshire. Currently, the site largely comprises a pasture, with small agricultural buildings and associated hardstanding at the northern end of the site. It is understood that a planning application is to be submitted for development comprising primarily residential properties with some commercial units and public open space in the southern section of the site.

The site forms a roughly rectangular shaped area of land, measuring 2.61 hectares and the north eastern border runs parallel to Swinney Beck. It is directly adjacent to Westholme Road and Foxholme Road which run along the northern border of the site. The site is mainly surrounded by fields to the west and south and residential properties to the north and east of the site.

Maps dating to 1856 show the majority site has been agricultural fields although from the late 1970s, the northern part of the site was in use as a pig farm. The local area has seen the development of residential properties to the north and east of the site in the late 1980's and the development of industrial buildings to the north and west throughout the 1900's.

The site is shown to be underlain by Devensian Till Deposits, which is underlain by bedrock of the Millstone Grit Group (mudstone, siltstone and sandstone) in the north western half and the Cayton Gill Shell Bed (calcareous mudstone) in the south east half of the site. Superficial deposits beneath the site are classified as a 'Secondary Aquifer – Undifferentiated' and underlying bedrock is designated as a 'Secondary A Aquifer'. Shallow groundwater is inferred to flow in a general east/north east direction towards Swinney Beck.

The main potential onsite contamination sources are potential asbestos containing materials (ACMs) present within shallow Made Ground and spoil piles, possibly related to historical demolition activities, and residual waste products associated with historical pig farming. Offsite potential sources included nearby electricity substations, however, these potential sources were deemed to have a low likelihood of affecting the site due their location in relation to the inferred hydraulic gradient of the local area.

In summary, a 'Medium' risk to the human health receptors (future users) from potential ACMs was identified. Lower levels of potential risk were identified associated with other pollutant linkages and receptors.

This report should be submitted for approval by the regulatory bodies before the commencement of works on site.

1. INTRODUCTION

Card Geotechnics Limited (CGL) has been commissioned by Planning Potential, acting on behalf of G & C Jameson, to complete a Phase 1 Geoenvironmental Desk Study for a site located in Masham, North Yorkshire. Currently, the site comprises a pasture with small agricultural buildings and associated hardstanding at the northern end of the site. It is understood that a planning application is to be submitted for development of the site for mixed residential and commercial use. Outline development plans, presented in Appendix A, indicate the location of the proposed properties and outbuildings, however, detailed proposals were not available at the time of compiling this report.

The purpose of this report is to review the geoenvironmental and geological setting of the site in the context of historical land uses and the development proposals. Potential risks, liabilities and development constraints are then outlined along with requirements for further investigation and assessment, if appropriate.

This report assesses the history of the site, potential sources of ground contamination and the underlying ground conditions. It presents a preliminary conceptual site model (PCSM) to assist in meeting the requirements of the local Environmental Health Officer at Harrogate District Council for planning purposes.

This report has been undertaken in general accordance with the Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG), formerly known as the Yorkshire and Humberside Pollution Advisory Council, Technical Guidance[1].

[1] Yorkshire and Humberside Pollution Advisory Council. (January 2016). Development on Land Affected by Contamination. Technical Guidance for Developers, Landowners and Consultants. Version 7.2 – January 2016.

2. SITE LOCATION AND DESCRIPTION

2.1 Site location

The site is located off Westholme Road in Masham village, approximately 0.5km west of Masham town centre. The land uses currently surrounding the site are as follows:

- **North:** Westholme Road and Foxholme Lane, beyond which are residential properties and a brewery.
- **South:** Open fields and agricultural land. A small children's playground lies immediately to the south east.
- **East:** Residential properties.
- **West:** Agricultural land, beyond which is an animal feed manufacturer/supplier.

The Ordnance Survey (OS) Grid Reference for the approximate centre point of the site is 422020, 480720. OS Mapping also indicates the majority of the site is located at an elevation of approximately 90mAOD. There is an area of elevated terrain to the south western corner and the site generally gently slopes east/north east.

A site location plan is presented in Figure 1.

2.2 Site description and walkover

A site walkover was undertaken by a CGL engineer on the 26th January 2017 to evaluate the site setting and identify key features of the site, such as potential sources of contamination. The following observations were noted:

- Access to the site is gained through a gate to the north west, along Foxholme Lane and is approximately 5m in width.

- Approximately 85% of the site is a field, used for animal grazing. However, the north western part of the site is occupied by two structures. The first is located on the northernmost tip of the site and approximately 7m in length, 3m in width and 3m in height whilst the second larger structure is more central to the north western area of the site and is approximately 15m in length, 10m in width and 3m in height. Upon a visual inspection, the roofing of the larger structure was identified as potential asbestos containing material (ACMs), possibly asbestos cement sheeting. It is therefore recommended that an asbestos demolition survey be carried out prior to the demolition of any remaining structures. These structures appear to no longer be

in use and are likely to be related to the reported former piggery that occupied this area. There is a small wired fence, approximately 1m in height, which separates the two structures from the remainder of the site. A smaller gate, approximately 2m in width, permits access to the wider site through this fence.

- There are large mounds of material, 1-2m in height, comprising of soil and brick work in addition to piles of brickwork, asphalt and concrete. One large pile is located immediately south of the smaller structure on the northernmost tip of the site and further piles are located immediately to the east and south of the larger structure. It is inferred that these piles are related to the demolition of onsite former agricultural buildings, evidenced by the presence of hardstanding slabs on the site. Given the observed potential presence of ACMs within an existing building on site, ACMs may be present within these piles of material and also within nearby shallow soils if uncontrolled demolition (without prior removal of potential ACMs) was undertaken.

- There were two areas where ground bearing concrete slabs were observed. The first area was along the northern border of the site, totalling approximately 20m in length and 10m in width. The second area observed was immediately south of the larger structure and was of a similar dimension, although it was partially buried beneath mounds of soil and rubble.

- The general topography of the site is relatively flat at approximately 90mAOD. There is an elevated area of land to the south west corner of the site, a few metres higher than the rest of the site. There was a small depression noted along the southern border of the site, approximately 0.5m deep and 12m in width.

- There were a number of overhead telegraph cables running across the length of the site, with five poles noted. One pole was located on the eastern boundary of the site and, two in the central section and two along the northern boundary of the site. The three overhead line sections ran across the site from east to west, south east to north west and north east to south west.

- Regarding vegetation extent, most of the site is grassland with occasional small shrubs. The site is bounded by a wire fence with long grass and shrubbery along all boundaries, in addition to a series of trees, of varying height between 10 and 15m being present along the southern boundary.

- Swinney Beck flows along the immediate north eastern border of the site, running parallel with Westholme Road. The watercourse is roughly 1m in width and flows west to east.

As potential ACMs were identified one of the existing structures, if uncontrolled demolition of previous onsite structures occurred then potential contamination of the shallow surface soils with asbestos may have occurred. Furthermore, the mounds of rubble, inferred to be from the demolition of former onsite structures, may also contain asbestos should the original structures have contained asbestos that was not removed prior to demolition. Site photographs taken during the walkover survey are included within Appendix B and Figure 2 shows a site features and layout plan, highlighting features noted during the walkover.

2.3 Proposed development

It is understood that the proposed development comprises primarily residential properties with some commercial units in the northern section of the site. An initial proposed development plan, as presented in Appendix A shows residential properties occupying the majority of the site, some commercial units to the north west and a public open space to the south. The structures are proposed to be a mix of terrace, semi-detached and detached properties.

3. HISTORICAL DEVELOPMENT

3.1 Sources of information

The historical development of the site and surrounding 500m has been traced from Ordnance Survey maps, scales between 1:2500 and 1:10,560, dating between 1856 and 2016. Details are summarised below in Tables 1 and 2, with approximate distances taken from the boundary of the site. The full historical maps are presented in Appendix C.

3.2 Summary of development

Table 1. Summary of development onsite

Historical Feature	*Area of site*	*First Date Mapped*	*Last Date Mapped*	*Comments*
Site is unoccupied. Field with vegetation. Field boundary running down the centre of the site from north to south.	Whole Site	1856	Present	2017 aerial imagery indicates livestock grazing on the site.
Development of small structure in corner of site.	North West	1929	Present	Due to scale, it is difficult to discern as to whether these structures were demolished or combined with later developed structures.
Two small structures.	West	1956	1994	1975 mapping indicates these structures may have been expanded upon since first built.
A collection of buildings labelled as 'Pig Farm'.	North west	1975-1979	2006	Post 2006, site is no longer labelled as 'pig farm' but small structures are still present. 2009 mapping indicates all but two structures on site are demolished and this is confirmed in 2017 aerial imagery.
Unnamed large building.	West	1975-1979	1987	Unclear whether this is associated with the pig farming activity also shown onsite at this time. Aerial imagery in 1999 indicates the structure has been demolished.

Table 2. Summary of development offsite

Historical Feature	*Approximate distance and direction from site*	*First Dates Mapped*	*Last Date Mapped*	*Comments*
Wellgarth Brewery	400m north east	1856	1975-1979	Renamed to 'Wellgarth Maltings' in 1975-1979. Renamed to 'Black Sheep Brewery in 1994.
Gas Works	500m north east	1892	1914	-
Site labelled 'The Brewery'	250m east	1892	Present	-
Residential buildings constructed adjacent to the site, across Westholme Road	<20m north east	1957-1979	Present	-

Industrial building complex constructed with associated 'Silo'.	50m west	1975-1979	Present	Site is labelled in 2006 mapping as a 'Mill'. Present day imagery indicates the site is an animal feed manufacturer and supplier.
Warehouse of unknown use	120m east	1975-1979	1975-1979	-
Electricity Substation	40m south	1985	Present	Whilst the electricity substation is still noted on 2017 mapping, aerial imagery and site walkover information indicates it is no longer present.
Industrial building complex	50m north	1985	Present	-
Residential properties constructed in close proximity to the site	Immediately to the north east.	1987	Present	Further residential properties constructed immediately to the east of the site in 1994.
Electricity Substation	180m west	Present	-	-

In summary, the majority of the site has been unoccupied from 1856 to the present day. The north western area of the site was shown from 1975 to at least 2006 as a pig farm with associated buildings, including a larger structure on the west edge of the site. After 2006, many of the buildings appear to have been demolished. The surrounding area, from 1856 to the present day has shown substantial development of predominately residential land uses with some notable features in the surrounding area, including breweries and industrial complexes. There are also two electricity substations within 200m of the site.

An initial review of the historical maps shows the main contaminative risk onsite is from any possible residual waste products, such as ammonia, associated with the historical pig farm. The two substations present a potential risk of contamination from poly-chlorinated biphenyls (PCB's).

4. ANTICIPATED GROUND CONDITIONS

4.1 Sources of information

An initial review of the geology at the site was undertaken by consulting online British Geological Survey (BGS) maps[2] of the area and available BGS historical borehole data, details of which are presented within Appendix D. The Environmental Disclosure Report[3] datasheets are presented within Appendix E and the Environmental Agency (EA) website[4] has also been referenced.

4.2 Published geology

The site is shown to be underlain by superficial deposits comprising Devensian Till and BGS resources provided no further details on the deposits. These superficial deposits are underlain by bedrock of the Millstone Grit Group comprising mudstone, siltstone and sandstone in the north western half of the site. The bedrock in the south eastern portion of the site is shown to be the Cayton Gill Shell Bed, comprising shelly silty mudstone (calcareous and siliceous), with beds of siltstone and sandstone.

4.3 Unpublished geology

The published geology of the area is generally confirmed by nearby available historical borehole logs, which have been obtained from the BGS and are summarised in Table 3 below. The locations relative to the site are shown in Figure 3.

Table 3. Selected BGS Exploratory Hole Records

Borehole Reference	*Approximate distance and direction from site (m)*	*National Grid Reference*	*Details*
SE28SW37	100m, north west.	421930,480910	0-0.4m Topsoil. 0.4-2.4m Brown clayey sand with gravel. 2.4-3.2m Claybound gravel. 3.2-5.0m Sand, gravel and cobbles.
SE28SW36	100m, north west.	421950,480930	0-0.4m Topsoil. 0.4-1.8m Claybound sand and gravel. 1.8-2.4m Clayey sand, gravel and cobbles. 2.4-4.0m Sand, gravel and cobbles.
SE28SW35	100m, north west.	421930,480940	0-0.3m Topsoil. 0.3-1.5m Claybound sand and gravel. 1.5-3.0m Sand, gravel and cobbles.

[2] http://mapapps.bgs.ac.uk/geologyofbritain/home.html (accessed on 23/01/2017)
[3] Envirocheck Report: Order Number: 111048515_1_1 Date: 19-Jan-2017 rpr_ec_datasheet v50.0
[4] www.environment-agency.gov.uk. (accessed on 23/01/17)

These records provide an indication as to what the Devensian Till in the area comprises, as BGS mapping provides no further details.

No evidence of quarrying activity was determined during the historical review. According to GeoIndex mapping[5], the site does not appear to be located within 250m of any active mines or quarries at present.

A review of the National Coal Mining Authority Website[6] indicates the site is not located in a coal mining reporting area.

4.4 Hydrogeology and Hydrology

The Landmark Envirocheck Report for the site area has been reviewed to inform the following sections along with the EA website.

The EA has produced an aquifer designation system consistent with the requirements of the Water Framework Directive. The designations have been set for superficial and bedrock geology and are based on the importance of aquifers for portable water supply, and their role in supporting surface water bodies and wetland ecosystems.

The Environmental Disclosure Report (included in Appendix E) indicates that the superficial Devensian Till deposits beneath the site are designated as a 'Secondary Aquifer – Undifferentiated', this means that the layer in question has possibly previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the strata. Bedrock beneath the superficial deposits is designated as a 'Secondary A Aquifer' relating to the Millstone Grit Group and Cayton Gill Shell Bed, which comprises permeable material capable of supporting water supplies at a local level and may also be important as a source of base flow to rivers. The Environmental Disclosure Report also classifies the permeability of the aquifer as 'negligibly permeable'.

The site is not located within a groundwater Source Protection Zone (SPZ) or a Groundwater Vulnerability Zone. The Environmental Disclosure Report records ten groundwater abstractions within 500m of the site, located at distances varying from 127m and 462m from the site. Six of these abstractions relate to local brewery activities and the remaining four relate to local industrial uses.

[5] http://mapapps2.bgs.ac.uk/geoindex/home.html (accessed on 23/01/2017)
[6] http://mapapps2.bgs.ac.uk/coalauthority/home.html (accessed on 23/01/2017)

The nearest surface water course is Swinney Beck, located along the north eastern boundary of the site. Swinney Beck flows generally south where it confluences with the River Burn approximately 800m south east of the site and which ultimately confluences with the River Ure approximately 1.3km south east of the site.

Shallow groundwater beneath the site is inferred to flow north east / east, towards Swinney Beck.

According to the Environmental Disclosure Report, the north and north eastern boundary of the site is at risk of flooding from rivers or seas and is classed as being within a 'Zone 3' designation. Furthermore, a large section of the northern and central area of the site is designated as being within 'Zone 2'. There is also the potential for groundwater flooding at surface to occur. Due to part of the site lying within a Flood Zone 3, it is recommended that a flooding risk assessment be undertaken in order to review the detailed flood risk.

4.5 Ground hazards

The Environmental Disclosure Report provides information regarding the risk posed by a range of ground hazards. A summary of these points is detailed below.

The potential for collapsible and compressible ground, dissolution stability, landslide hazards, running sands and shrinking/swelling clay ground hazards are classified as very low or of no hazard to the site.

5. ENVIRONMENTAL SETTING

5.1 Environmental disclosure report

The Environmental Disclosure Report obtained, was used to provide information on the environmental setting of the site and possible sources of ground contamination. A summary of the key points is set out below and the full report is included in Appendix E.

- There are no discharge consents within 250m of the site.
- There are three Local Authority Pollution Prevention and Control licensed facilities within 500m of the site. One of these relates to a petrol filling station, located 328m north east and another relates to the operation of a garage, located 271m east of the site.
- There are two pollution related incidents to controlled waters that occurred onsite. They occurred whilst the site was used as a piggery and relate to pig slurry/washings being discharged to a freshwater stream/river, inferred to be Swinney Beck. They occurred in 1989 and 1990 and were categorised as a significant incident and a minor incident respectively. There are a further two incidents within 250m and relate to pig slurry (22m NE) and urban runoff (122m NE). Both date from 1989 with a freshwater stream/river being the receiving water.
- There is one substantiated pollution incident register, dated August 2001, recorded 5m east of the site. It is recorded as a Category 2 (significant incident) impact to water but Category 4 (no impact) to air and land. The pollutant is identified as inert materials and wastes (soils and clay).
- There are no records of historical or current landfills within 1000m of the site.
- There are twelve contemporary trade directory entries located within 500m of the site. Entries pertinent to the site include a Brass and Copper Manufacturers/Suppliers, located approximately 110m north east of the site and an agricultural merchants located approximately 150m west of the site.
- Points of interest, of pertinence to the site, include; two vehicle repair and servicing garages located at approximately 180m south east and 270m east of the site. There is also a petrol filling station/car wash at approximately 328m north east of the site.

- The only environmentally sensitive site within 500m of the site relates to a nitrate vulnerability zone located approximately 264m east of the site.

5.2 Radon

References to BRE[7] and HPA[8] guidance documents on radon and the radon potential classified in the Environmental Disclosure Report, indicates that the site is positioned within an intermediate probability radon affected area and 5 - 10% of homes are above the action level. Hence, basic radon protection measures are considered necessary for development at this site.

5.3 Environmental setting summary

Two pollution incidents to controlled waters were recorded on site and relate to pig slurry/washings being discharged to a freshwater stream/river, inferred to be Swinney Beck. These are not thought to be significant in the context of the site due to occurring in 1989/1990 and are likely to be direct discharges to the beck via a discharge pipe, with minimal/no impact to the underlying ground. The substantiated pollution incident register entry 5m east of the site is also deemed unlikely to be significant to the site as, from the available information, it appears that inert clay/soil was placed in Swinney Beck.

No other potentially significant sources of contamination were identified within the Environmental Disclosure Report.

[7] BRE. (1999). Radon: Guidance on protective measures for new buildings. Building Research Establishment, Report BR211, 1999

[8] HPA. (2007). Interactive atlas of radon in England and Wales. Health Protection Agency, HPA-RPD-033, 2007

6. PRELIMINARY RISK ASSESSMENT

6.1 Introduction

Potentially historical contamination of land may present harm to human health and the environment. Current UK legislation stipulates that the risk associated with any potential land contamination is assessed and remediated, if necessary. Under the Town and Country Planning Act, 1990 (as amended), potential land contamination is a "material planning consideration" together with the National Planning Policy Framework (March 2012) which means that a planning authority must consider contamination when it prepares development plans or considers individual applications for planning permission. It is the responsibility of the developer to carry out the remediation where it is required and satisfy the Local Authority that the remediation has been carried out as agreed.

Additionally, Part 2A of the Environment Protection Act 1990 required that a significant source-pathway-receptor linkage exists to determine a site as contaminated land. This means that there has to be a contaminant present, a receptor that could be harmed by this contaminant, and a pathway linking the two. Part 2A deals with the contamination risk from a site in its current use, however, the planning system requires that the proposed use is considered. Where remediation is carried out under the planning system, it should be ensured that the site is in such a condition that it would still not meet the definition of contaminated land under Part 2A.

6.2 Preliminary conceptual site model

A PCSM has been compiled for the site based on the desk study information to identify the potential sources of contamination and the associated potential pollutant linkages. The preliminary conceptual site model is presented as Figure 4.

Potential contamination sources can include current and historical activities on the site and in the surrounding area.

6.2.1 Potential sources

Onsite potential sources of contamination have been identified and these include:

- Residual animal waste products and washings, which include ammonia, associated with the historical use of the site as a pig farm.

- Potential asbestos fibres present within the shallow Made Ground, associated with historical demolition of structures on the site.
- Potential asbestos fibres present within the mounds of rubble/brickwork, which may have been by-products of on-site demolition.

Offsite potential sources of contamination have been identified and these include:

- Electricity substation, located 180m west of the site.
- Electricity substation, located 40m south of the site.

6.2.2 Potential pathways

The potential migration pathways that may be present at the site include:

- Ingestion & inhalation – Contaminated shallow soils and groundwater may result in ingestion or inhalation of contaminants and vapour;
- Direct/dermal contact – Direct contact with contaminated soils or groundwater can result in uptake of contaminants through the skin or permeation/degradation of buried services/concrete;
- Drainage and services - Old drainage and service routes can act as preferential pathways and enable the migration of contaminants to sensitive receptors;
- Geological pathways – Permeable soils and rock may enable the migration of contaminants both laterally and vertically in liquid and gaseous form and groundwater could facilitate the migration of contaminants either from offsite sources or from the site to sensitive receptors such as the underlying aquifer and nearby surface water bodies;
- Root Uptake – Uptake of potential contaminants through soil and groundwater into vegetation onsite.

6.2.3 Potential receptors

- Future site occupiers – Considered to be primarily at risk from shallow contamination and soil gas/vapour accumulation within future buildings;
- Off-site occupiers – Considered to be primarily at risk from shallow contaminated groundwater migrating off-site and soil gas/vapour accumulation within buildings;

- Construction workers – Could be affected acutely by contamination during the site works and are likely to be in close contact with potentially contaminated materials;

- Controlled waters – Secondary A Aquifer and Secondary Undifferentiated Aquifer, Millstone Grit Group and Devensian Till Deposits - contamination could affect the quality of the groundwater within the aquifers and also surface body waters such as Swinney Beck;

- Future buildings & structures – Buried concrete and services can be at risk from chemically aggressive ground. Soil gases, mine gases and vapours may also accumulate in future buildings and structures presenting an explosive risk and penetrate water supply pipes.

- Vegetation – Any future soft landscaping areas could be affected by potential contamination through root uptake.

6.3 Preliminary qualitative risk assessment

A preliminary qualitative risk assessment has been undertaken based on the findings of the PCSM and the potential pollutant linkages that may exist at the site in accordance with Contaminated Land Report (CLR) 11[9]. The risks identified are in accordance with the DEFRA and Contaminated Land Report (CLR) 6[10], site prioritisation and categorisation rating system, which is summarised below in Table 4.

Table 4. Risk Rating Terminology

Risk Rating	Description
High Risk	Contaminants very likely to represent an unacceptable risk to identified targets Site probably not suitable for proposed use Enforcement action possible Urgent action required
Medium Risk	Contaminants likely to represent an unacceptable risk to identified targets Site probably not suitable for proposed use Action required in the medium term
Low Risk	Contaminants may be present but unlikely to create unacceptable risk to identified targets Site probably suitable for proposed use Action unlikely to be needed whilst site remains in current use
Negligible Risk	If contamination sources are present they are considered to be minor in nature and extent Site suitable for proposed use, no further action required

[9] The Environment Agency. (2004). Model Procedures for the Management of Land Contamination. CLR 11.
[10] M.J. Carter Associates. (1995). Prioritisation and Categorisation Procedure for Sites which may be Contaminated. Department of the Environment. CLR 6

Using the above terminology, an assessment of the current risks posed by the potential pollutant linkages at the site is outlined in Table 5 below, based on the PCSM presented as Figure 4.

Table 5. Qualitative risk assessment

Source/Medium	Receptor	Potential Exposure Route	Risk Rating	Comments
Onsite				
Residual waste products, arising from historical use of site as piggery, within soils and shallow groundwater, namely ammonia.	Construction workers	Direct ingestion of soil & dust, inhalation of particulates & gas/vapours and dermal contact.	**Negligible - Low**	An acute risk during construction works. Risks can be mitigated through use of PPE and control measures.
	Off-site users	Direct ingestion of soil & dust, inhalation of particulates & gas/vapours and dermal contact.	**Negligible - Low**	Presence of possible contaminants within shallow groundwater or soils could pose a risk though any contaminants would likely be limited.
	Future site users			
	Buildings and structures	Accumulation and migration within building space.	**Negligible - Low**	Vapours from possible contaminants underlying the site may rise into the proposed buildings.
	Controlled Waters – Secondary A and Undifferentiated Aquifers and Swinney Beck	Vertical and horizontal migration of contaminants within groundwater	**Low**	Whilst the risk is low, Secondary (undifferentiated) and Secondary A aquifers underlie the site and Swinney Beck is immediately adjacent. Potential exists for migration offsite to Swinney Beck.
	Vegetation	Root uptake.	**Negligible - Low**	Future areas of soft landscaping could be affected by potential contamination.
Potential of asbestos fibres within shallow Made Ground and within mounds of rubble/brickwork located on-site.	Construction workers	Inhalation of loose fibres	**Low**	A potential risk during construction works. Risks can be mitigated through use of PPE and control measures. Exposure duration is limited.
	Off-site users	Inhalation of loose fibres	**Negligible - Low**	Potential asbestos fibres in current state are of negligible risk to off-site occupiers, unless fibres become airborne.
	Future site users	Inhalation of loose fibres	**Medium**	Presence of possible asbestos fibres within Made Ground and rubble mounds could pose a risk.

Offsite				
Electricity substation 180m west. Electricity substation 40m south of the site.	Construction workers	Direct ingestion of soil & dust, inhalation of particulates & gas/vapours and dermal contact.	**Negligible - Low**	The site is considered unlikely to be down gradient of both electricity substations. Groundwater flow from both is likely to be towards Swinney Beck, bypassing the site.
	Future site users	Lateral migration on to site and subsequent inhalation of gases/vapours and dermal contact.	**Negligible - Low**	
	Buildings & structures	Direct contact and migration & accumulation within existing building spaces following lateral migration on to site.	**Negligible - Low**	

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

It is understood that the proposed development of the land located in Masham will comprise primarily residential properties with some commercial units in the northern section of the site

Based upon a review of the available information, the potential risks associated with the development are considered to vary according to the source and receptor. The risk from pig farming residual waste products and offsite contaminative sources is generally considered to be 'Negligible to Low' to all identified receptors. There is a more substantial risk however arising from the potential presence of asbestos fibres within shallow Made Ground and spoil piles. Therefore, the risk rating to identified receptors, from this potential source, is deemed to be 'Medium', until proven otherwise.

7.2 Recommendations

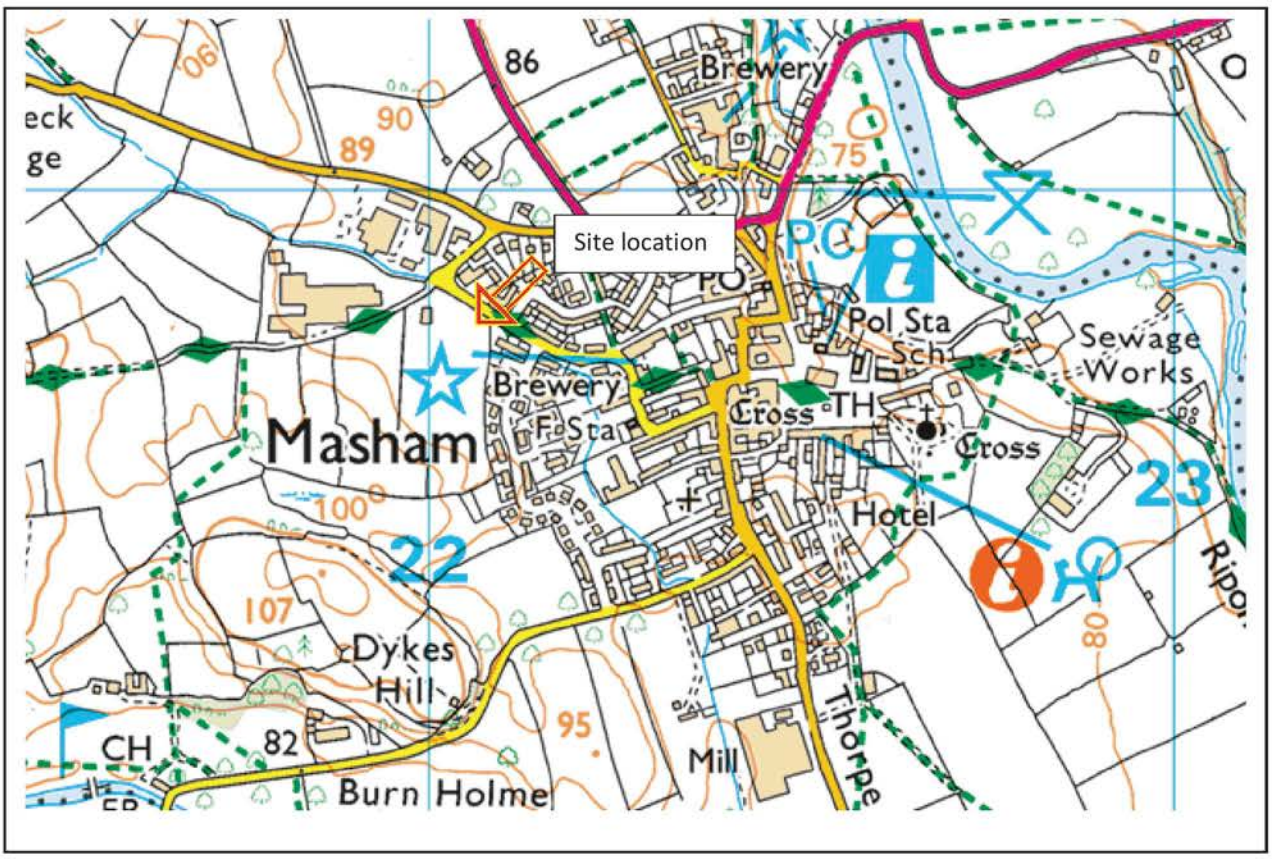
Due to the above, it is recommended a ground investigation is undertaken to further assess the potential risks that have been identified. Furthermore, it is recommended that the following are also undertaken:

- Asbestos demolition survey of the remaining onsite structures;
- Flood risk assessment; and
- A topsoil/subsoils assessment for possible reuse within the development scheme.

It is also recommended that due to the site lying within an intermediate probability radon affected area, basic radon protection measures are considered to be necessary for development at this site in accordance with BRE and HPA guidance documents.

The conclusions to this report are subject to the approvals of the regulatory bodies, and no work should be started on site until their approvals have been received.

FIGURES



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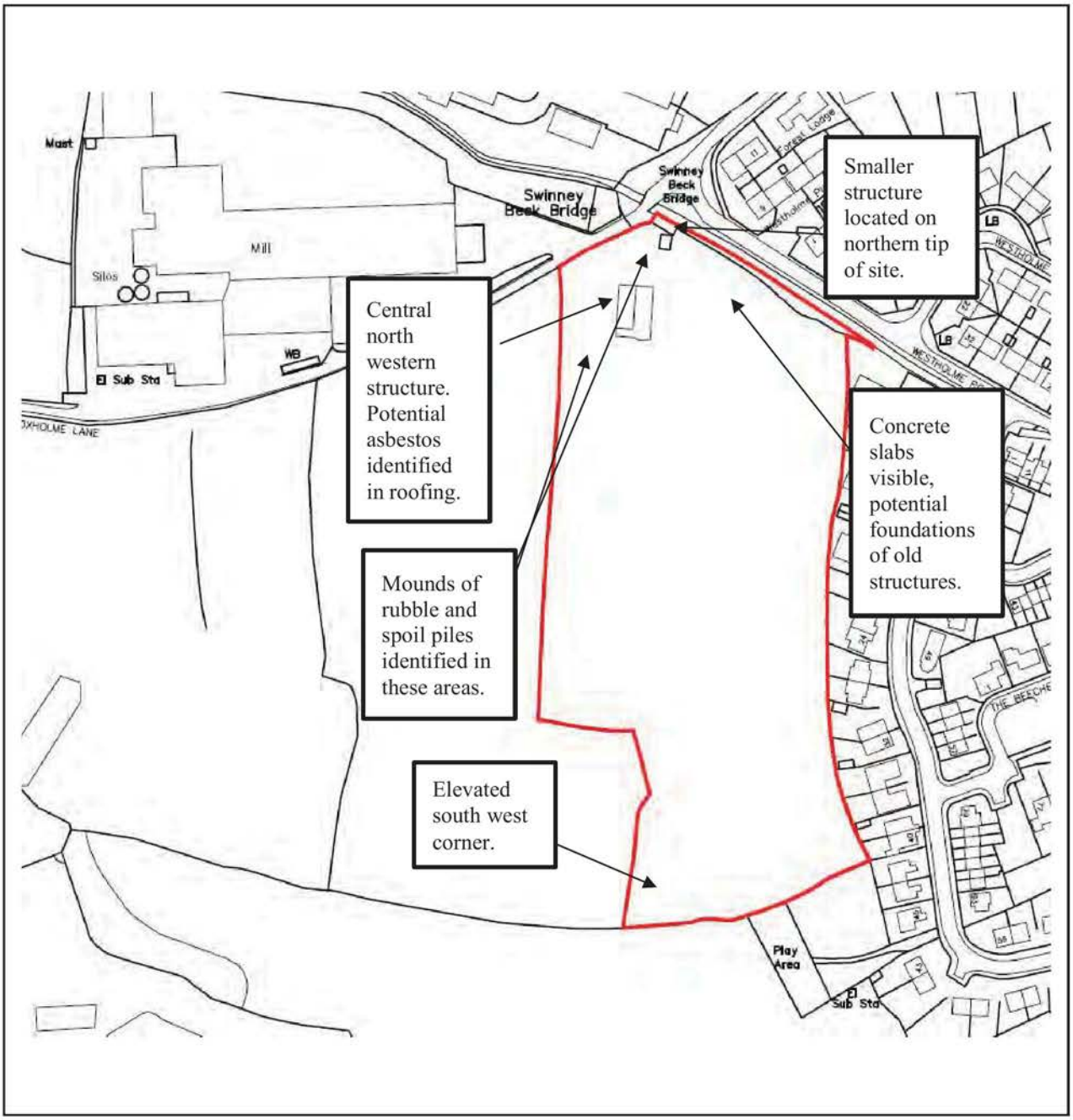
Client	Project	Job No
Planning Potential on behalf of G & C Jameson	**Westholme Road, Masham**	**CGN/03835**
CGL	Title: **Site Location Plan**	**Figure 1**



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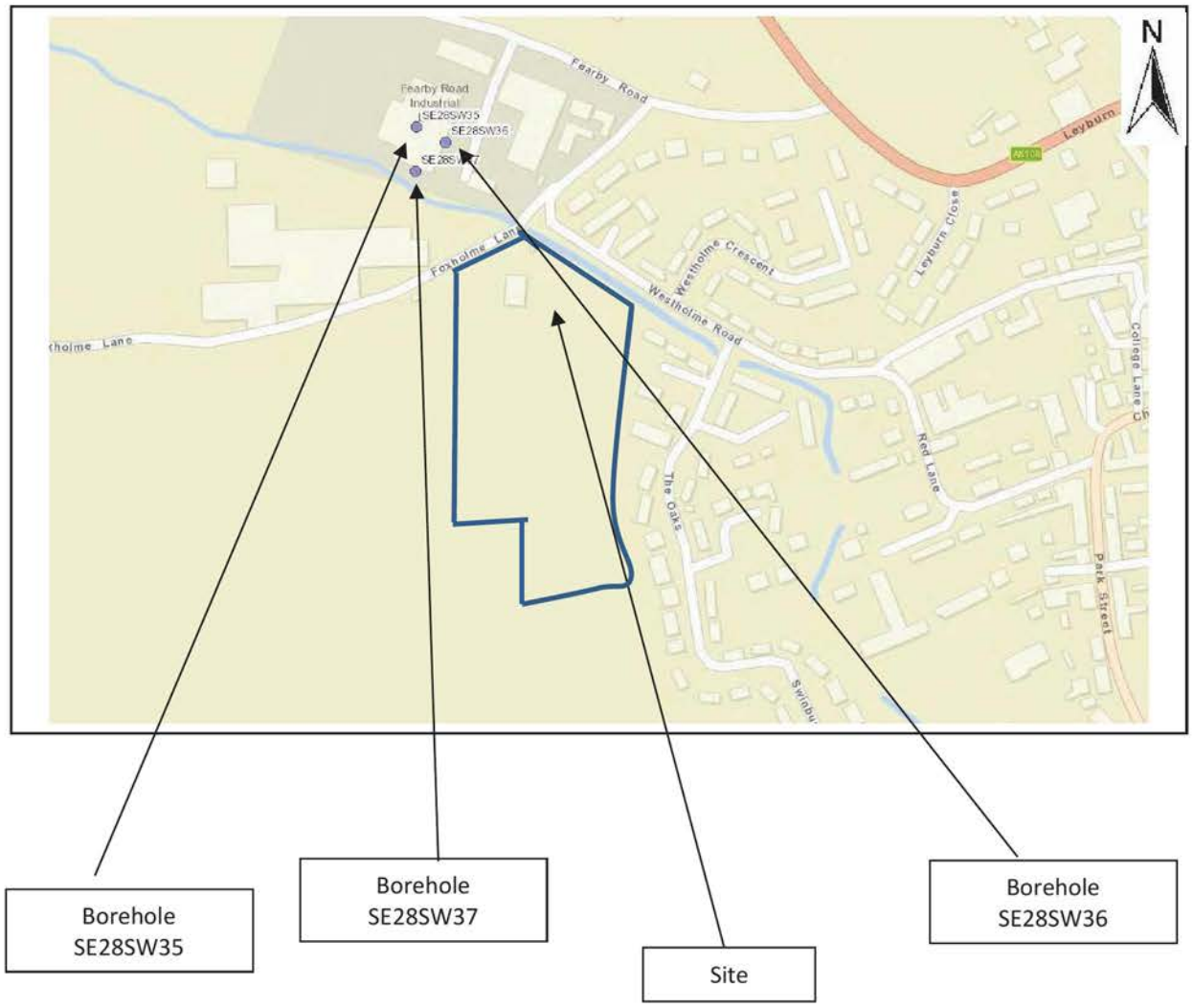
Reproduced from: Westholme Road, Masham. Location Site Plan. P+HS Architects. Drawing number: 2764-D-90-1000. Dated: Jan 17.

Client	Project	Job No
Planning Potential on behalf of G & C Jameson	**Westholme Road, Masham**	**CGN/03835**
CGL	Title: **Site Layout Plan**	**Figure 2**



Client	Project	Job No
Planning Potential on behalf of G & C Jameson	**Westholme Road, Masham**	**CGN/03835**
CGL	Title: **BGS Borehole Location Plan**	**Figure 3**

Potential Sources

Onsite

A – Residual waste products from past use of the site as a pig farm.

B – Potential asbestos fibres within shallow Made Ground and spoil piles.

Offsite

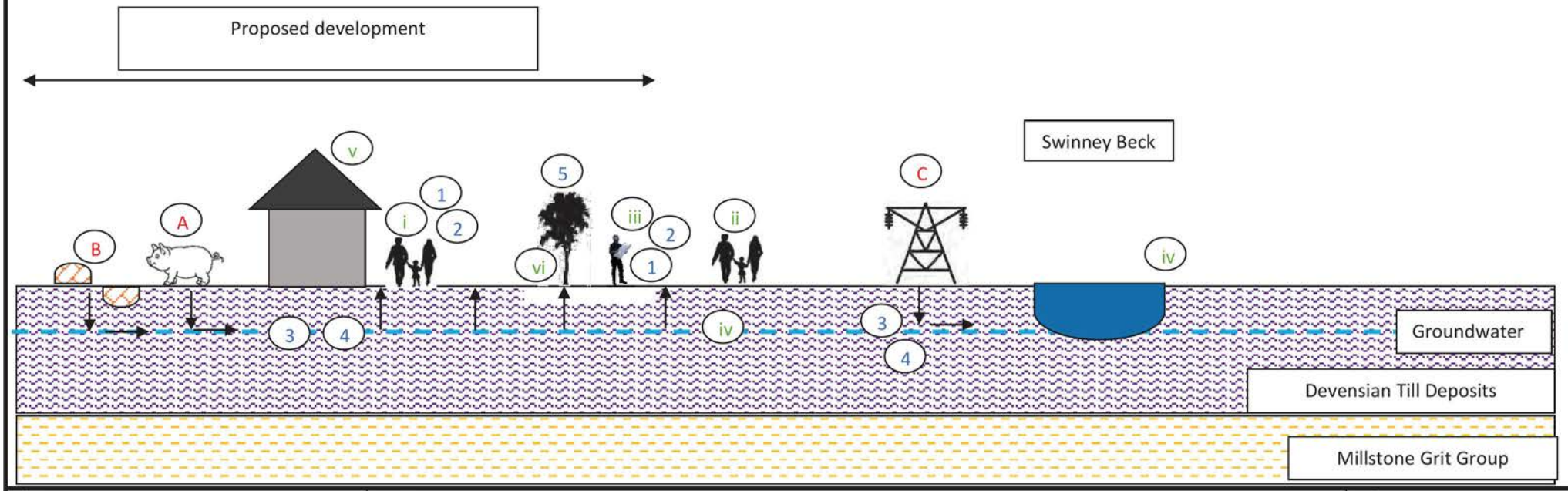
C – Electricity substations

Potential Pathways

1 – Ingestion and inhalation
2 – Direct/dermal contact
3 – Drainage and services
4 – Geological pathways
5 – Root uptake

Potential Receptors

i – Future site users
ii – Off-site occupiers
iii – Construction Workers
iv – Controlled waters – Swinney Beck/ Secondary A and Undifferentiated Aquifer
v – Future buildings and structures
vi – Vegetation



Client	Project	Job No
Planning Potential on behalf of G & C Jameson	**Westholme Road, Masham**	**CGN/03835**
CGL	Title: **Preliminary Conceptual Site Model**	**Figure 4**

APPENDIX A

Proposed Development Plans

Indicative Layout

P+HS architects

APPENDIX B

Photosheets

PHOTO SHEET

Date	Job No	Made by	Checked by	Sheet No
January 2017	CGN/03835	AP	JAS	01

View of the concrete slabs, as viewed looking east along the northern border.

View looking south west, from the northern boundary, of the larger structure. Potential asbestos has been identified in the roof of the structure. Overhead line services seen running into the building.

Notes

PHOTO SHEET

Date	Job No	Made by	Checked by	Sheet No
January 2017	CGN/03835	AP	JAS	02

View looking west, along the northern boundary of the site. Second smaller dilapidated structure visible with pile of building rubble/concrete next to it, potentially containing asbestos fibres. Animal feed manufacturer/supplier plant (client) visible in distance.

View from elevated south west corner of site, showing southern grassland area. Potential for this topsoil to be reused as part of the development scheme.

Notes

PHOTO SHEET

Date	Job No	Made by	Checked by	Sheet No
January 2017	CGN/03835	AP	JAS	03

View looking north. Two telegraph poles running north west across the centre of the site.

View from centre of site, looking north west. Southern sides of the two structures visible along with mounds of soil/rubble.

Notes

PHOTO SHEET

Date	Job No	Made by	Checked by	Sheet No
January 2017	CGN/03835	AP	JAS	04

View looking south from the access point into the site. Showing the rear of the larger structure.

View looking east along the northern border of the site. Showing the rear of the smaller structure and Swinney Beck.

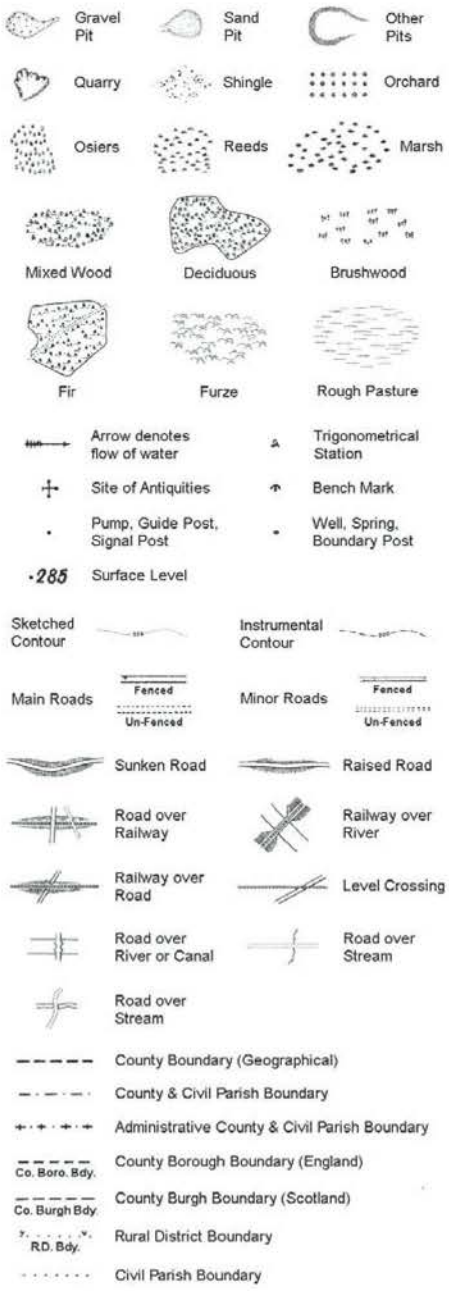
Notes

APPENDIX C

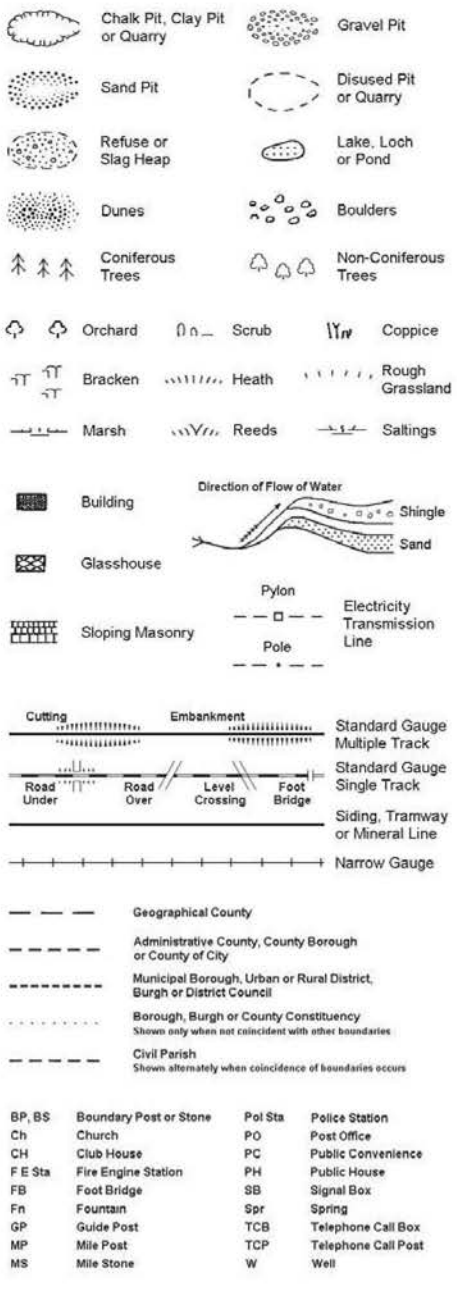
Historical Maps

Historical Mapping Legends

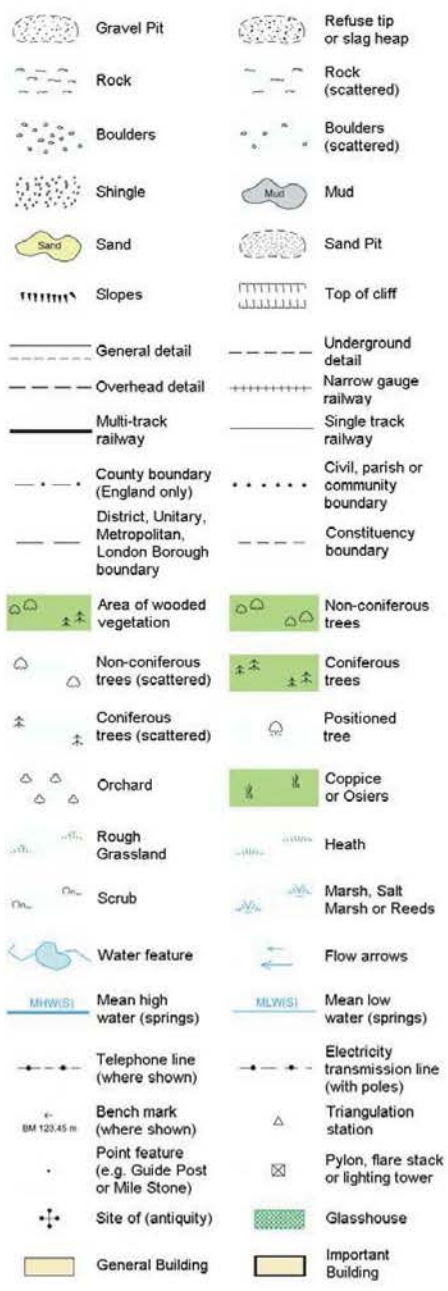
Ordnance Survey County Series 1:10,560



Ordnance Survey Plan 1:10,000



1:10,000 Raster Mapping

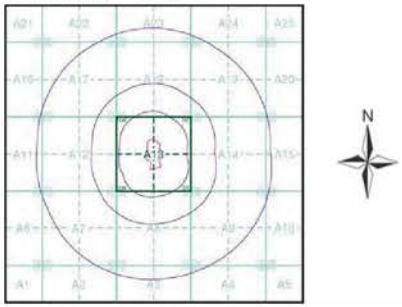


CGL

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Yorkshire	1:10,560	1856	2
Yorkshire	1:10,560	1895	3
Yorkshire	1:10,560	1895	4
Yorkshire	1:10,560	1910 - 1914	5
Yorkshire	1:10,560	1930	6
Ordnance Survey Plan	1:10,000	1956	7
Ordnance Survey Plan	1:10,000	1978	8
Ordnance Survey Plan	1:10,000	1982	9
10K Raster Mapping	1:10,000	1999	10
10K Raster Mapping	1:10,000	2006	11
VectorMap Local	1:10,000	2016	12

Historical Map - Slice A



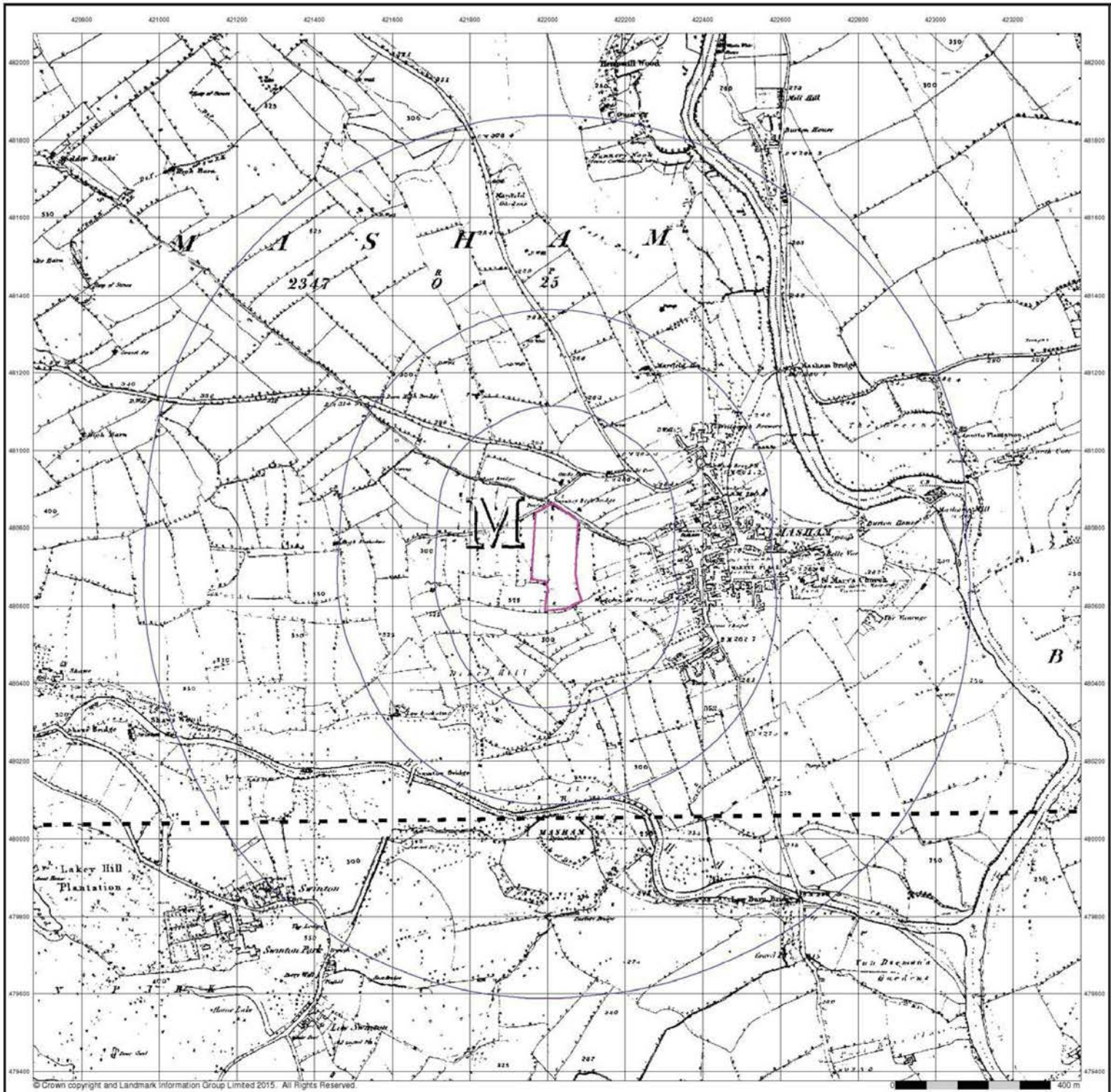
Order Details

Order Number: 111048515_1_1
Customer Ref: CGN03835
National Grid Reference: 422020, 480720
Slice: A
Site Area (Ha): 2.61
Search Buffer (m): 1000

Site Details

Site at, Masham, North Yorkshire

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



CGL

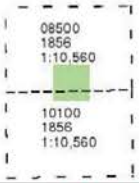
Yorkshire

Published 1856

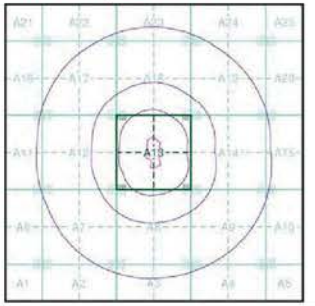
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



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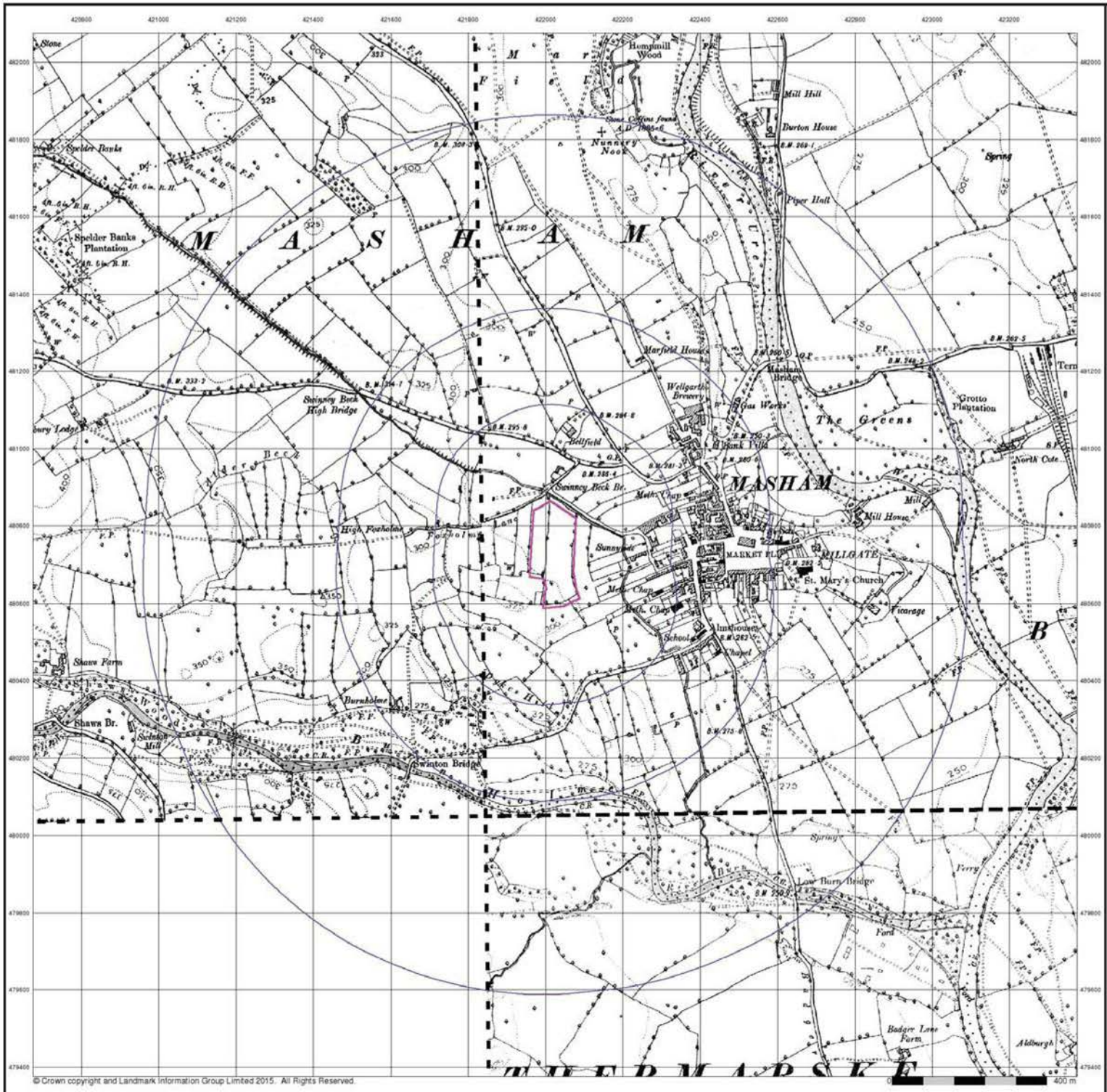

CGL

Yorkshire

Published 1895

Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

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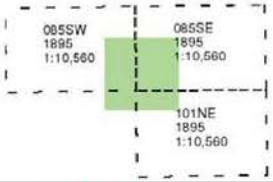
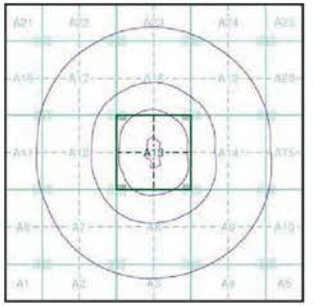


Historical Map - Slice A



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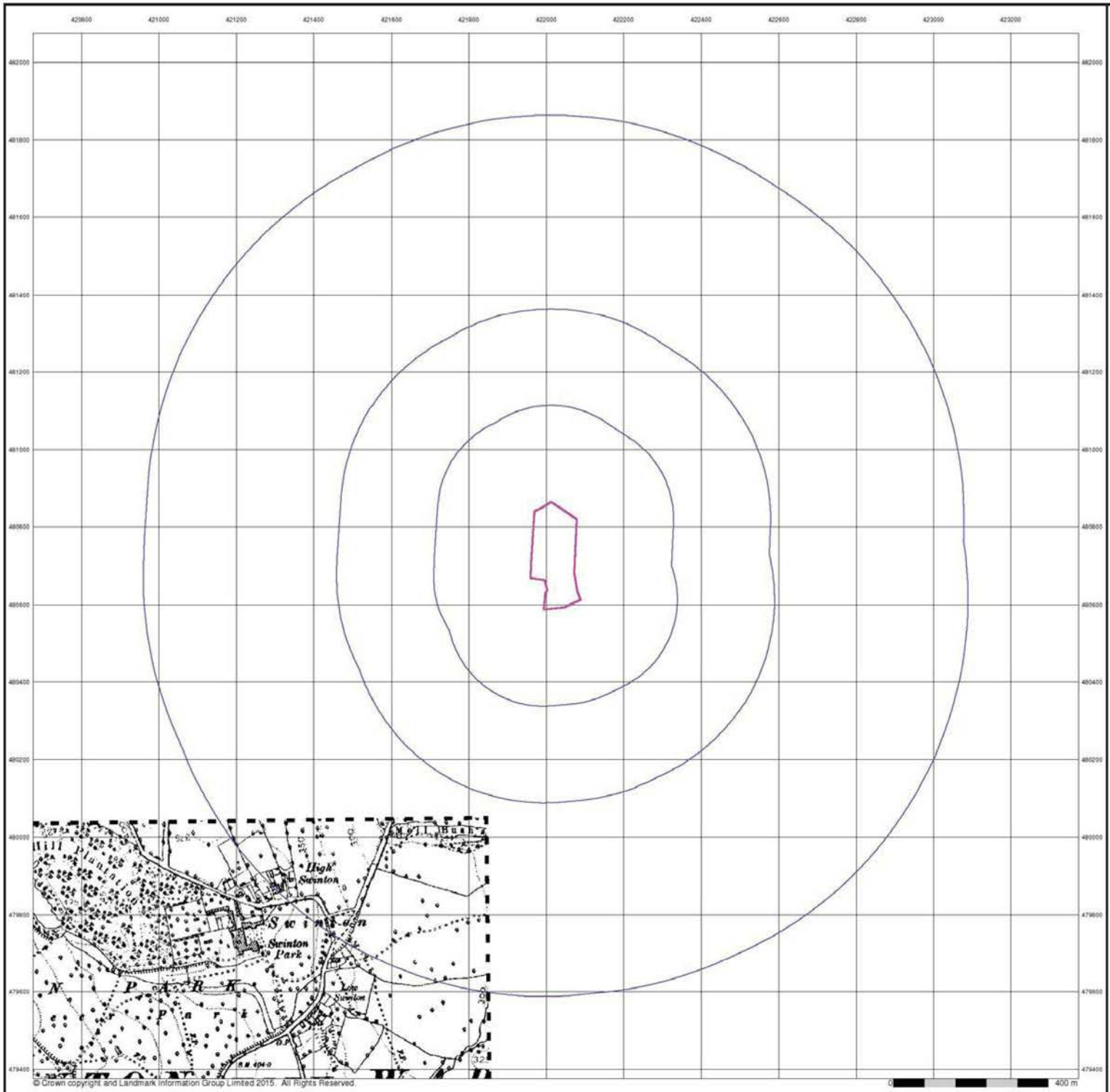

Yorkshire

Published 1895

Source map scale - 1:10,560

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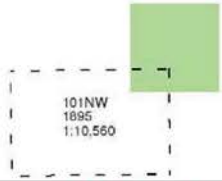
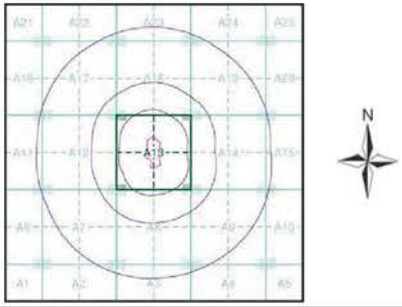


Historical Map - Slice A



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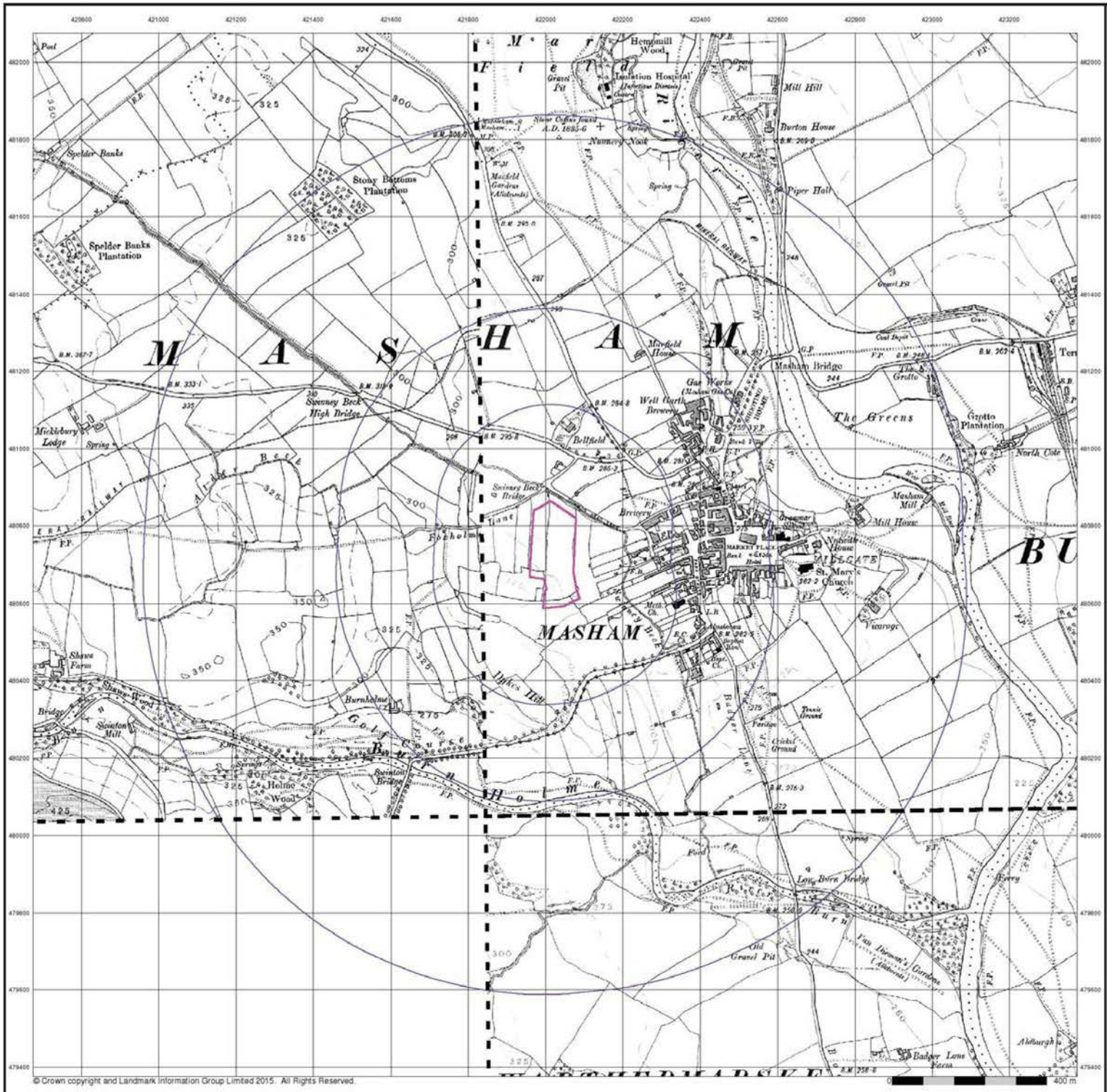

CGL

Yorkshire

Published 1910 - 1914

Source map scale - 1:10,560

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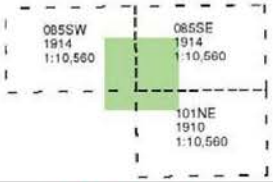
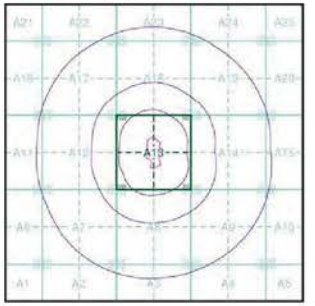


Historical Map - Slice A



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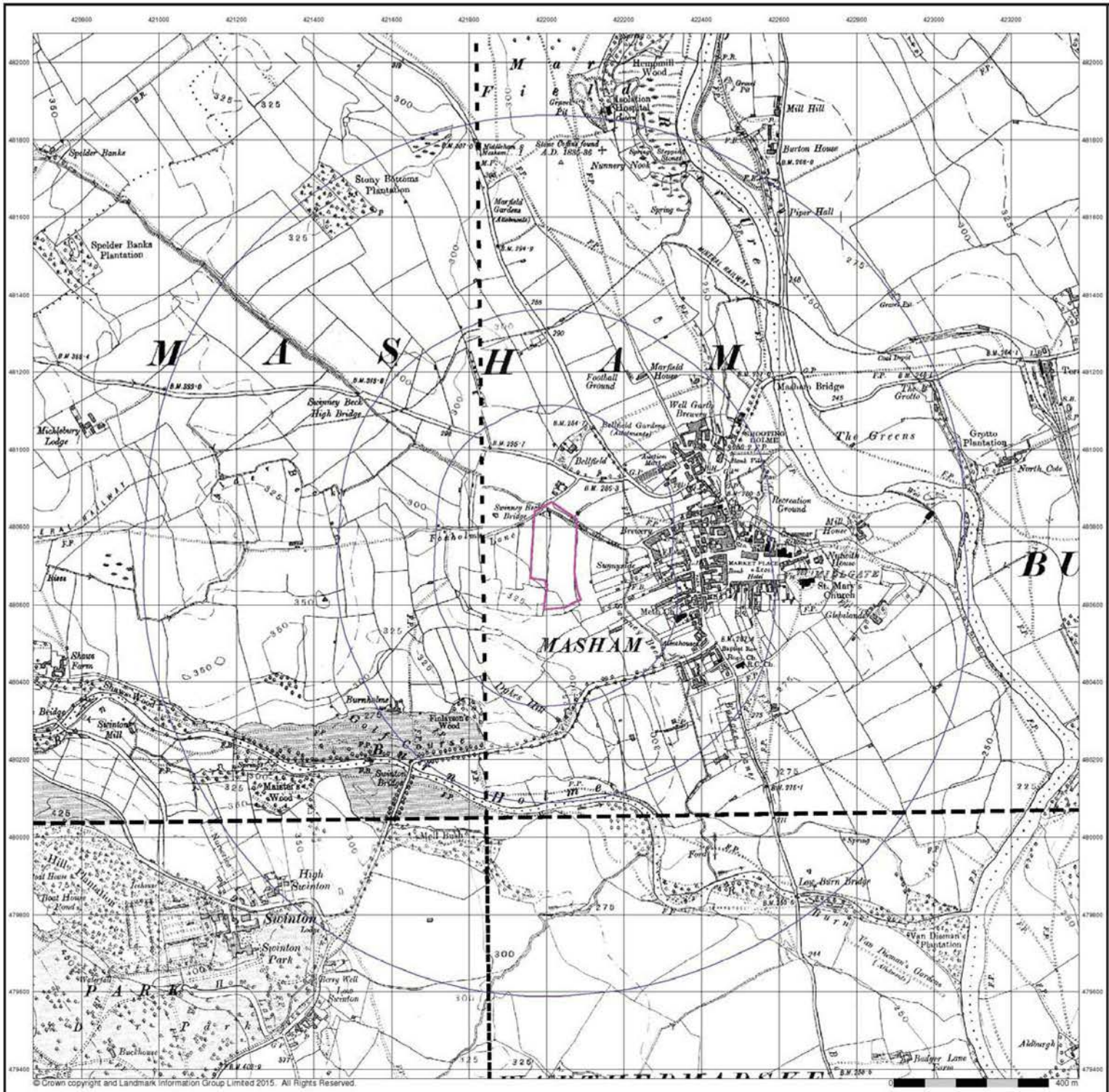

CGL

Yorkshire

Published 1930

Source map scale - 1:10,560

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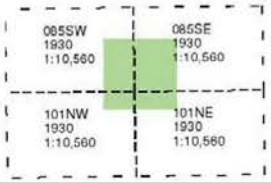
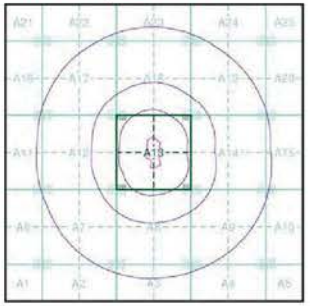


Historical Map - Slice A



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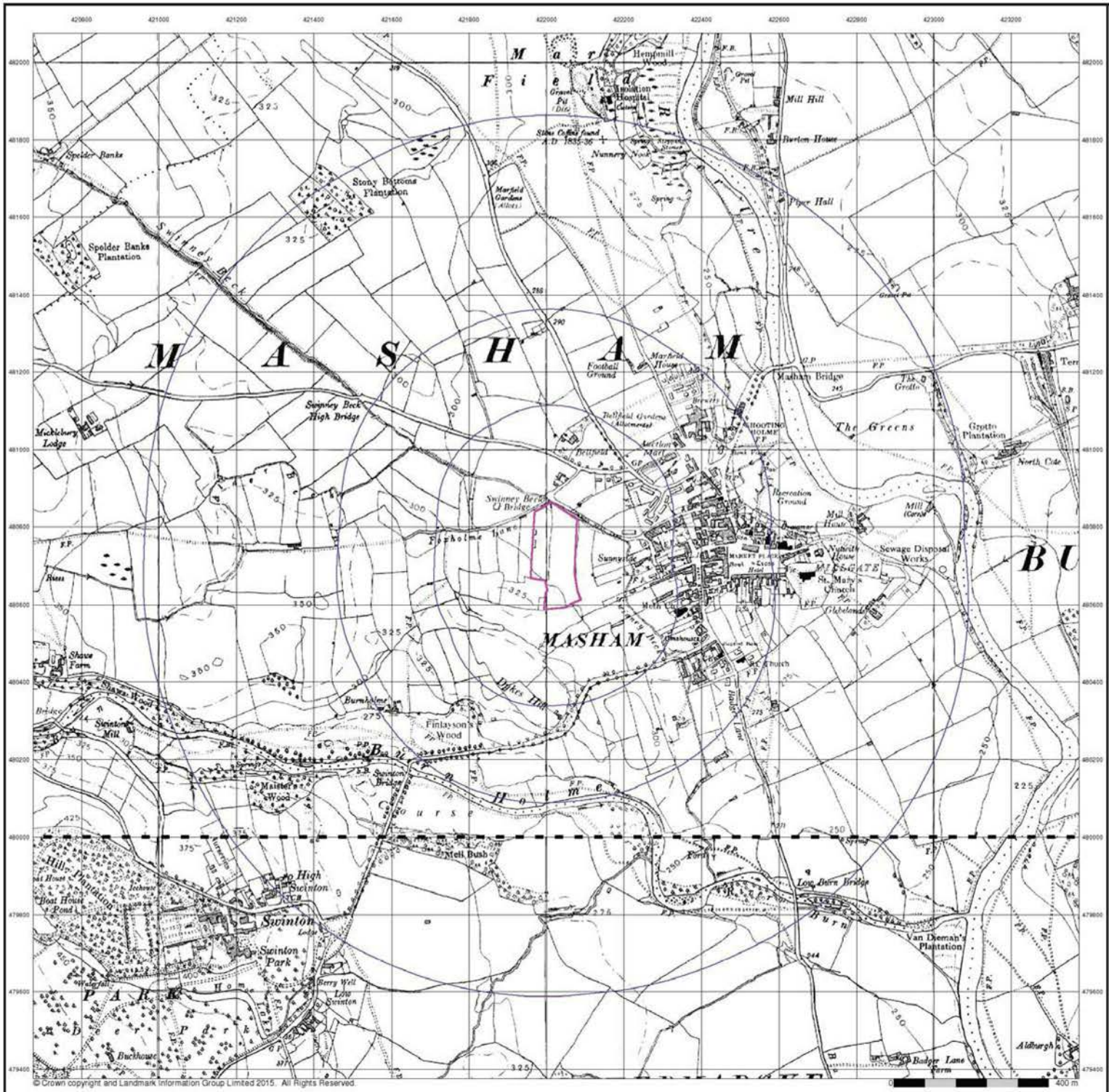


CGL

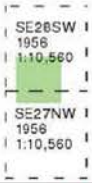
Ordnance Survey Plan

Published 1956

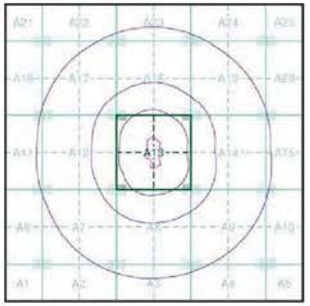
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

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National Grid Reference:	422020, 480720
Slice:	A
Site Area (Ha):	2.61
Search Buffer (m):	1000

Site Details

Site at, Masham, North Yorkshire

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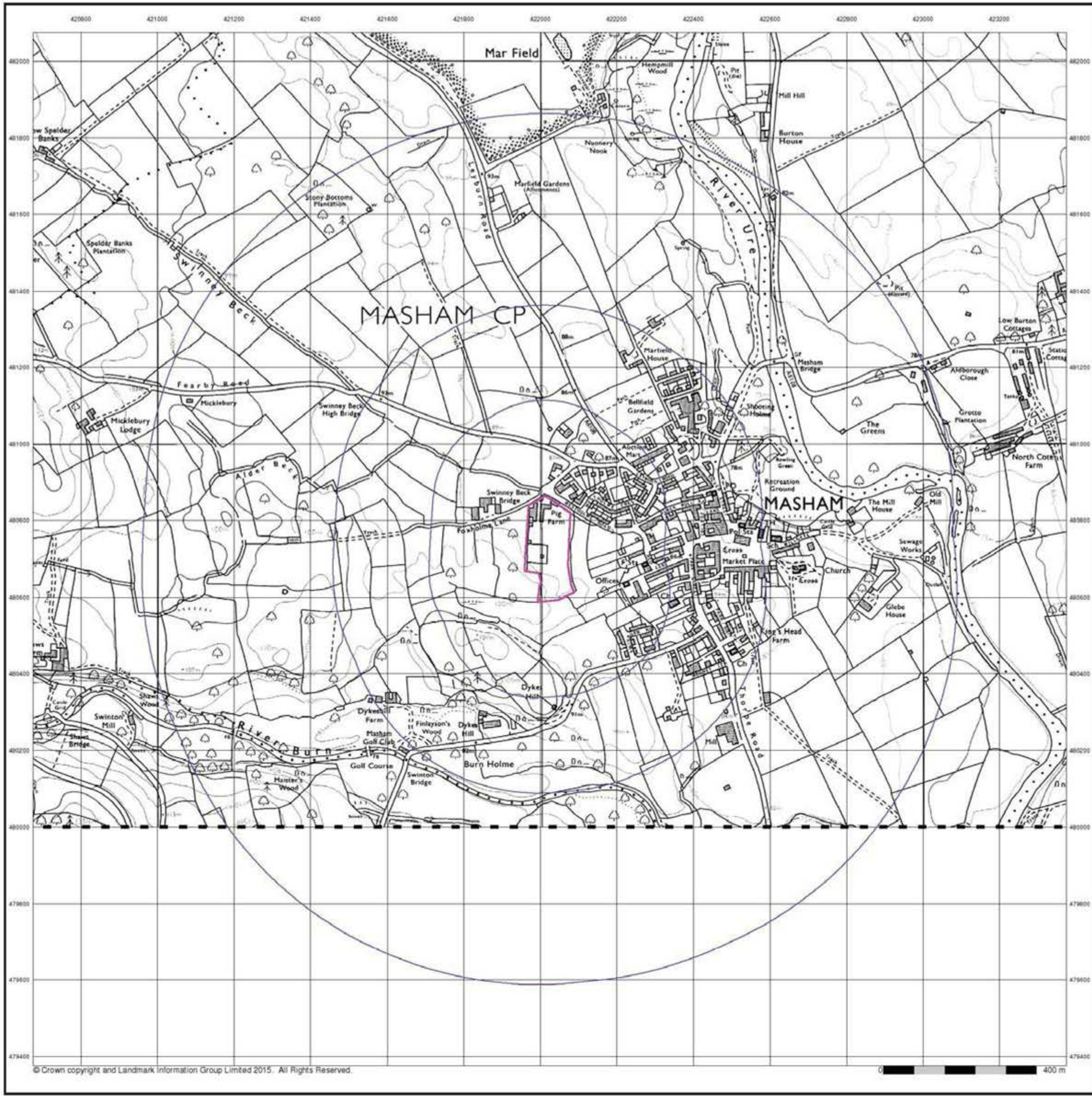


CGL

Ordnance Survey Plan

Published 1978

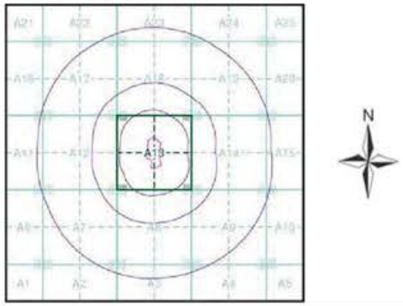
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SE28SW
1978
1:10,000

Historical Map - Slice A



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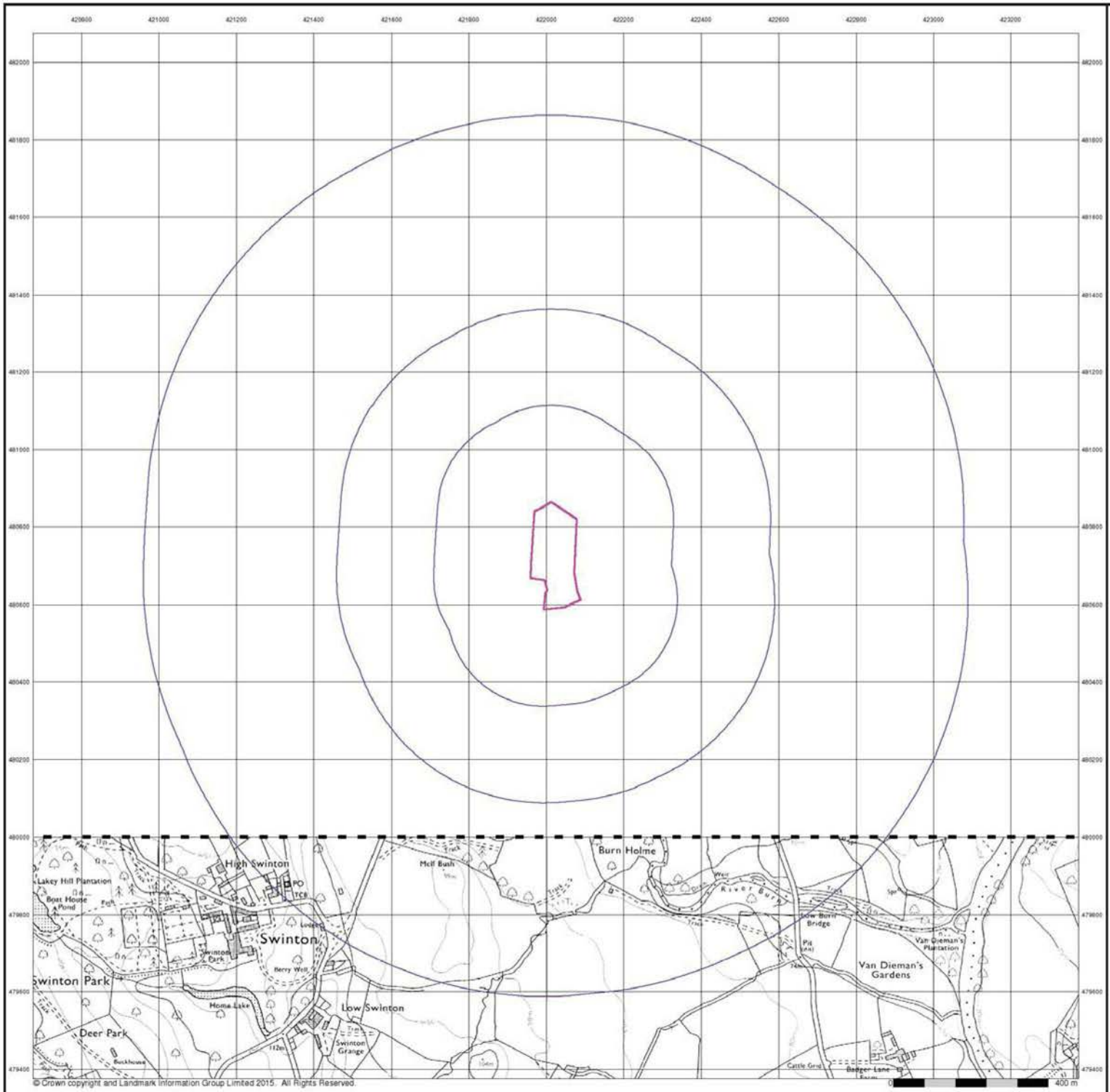

CGL

Ordnance Survey Plan

Published 1982

Source map scale - 1:10,000

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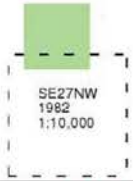
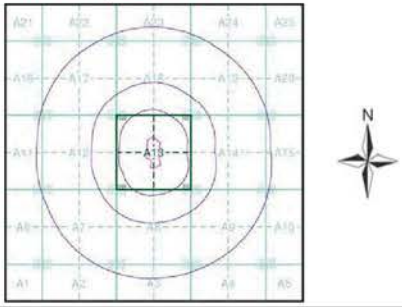
Map Name(s) and Date(s)



Historical Map - Slice A



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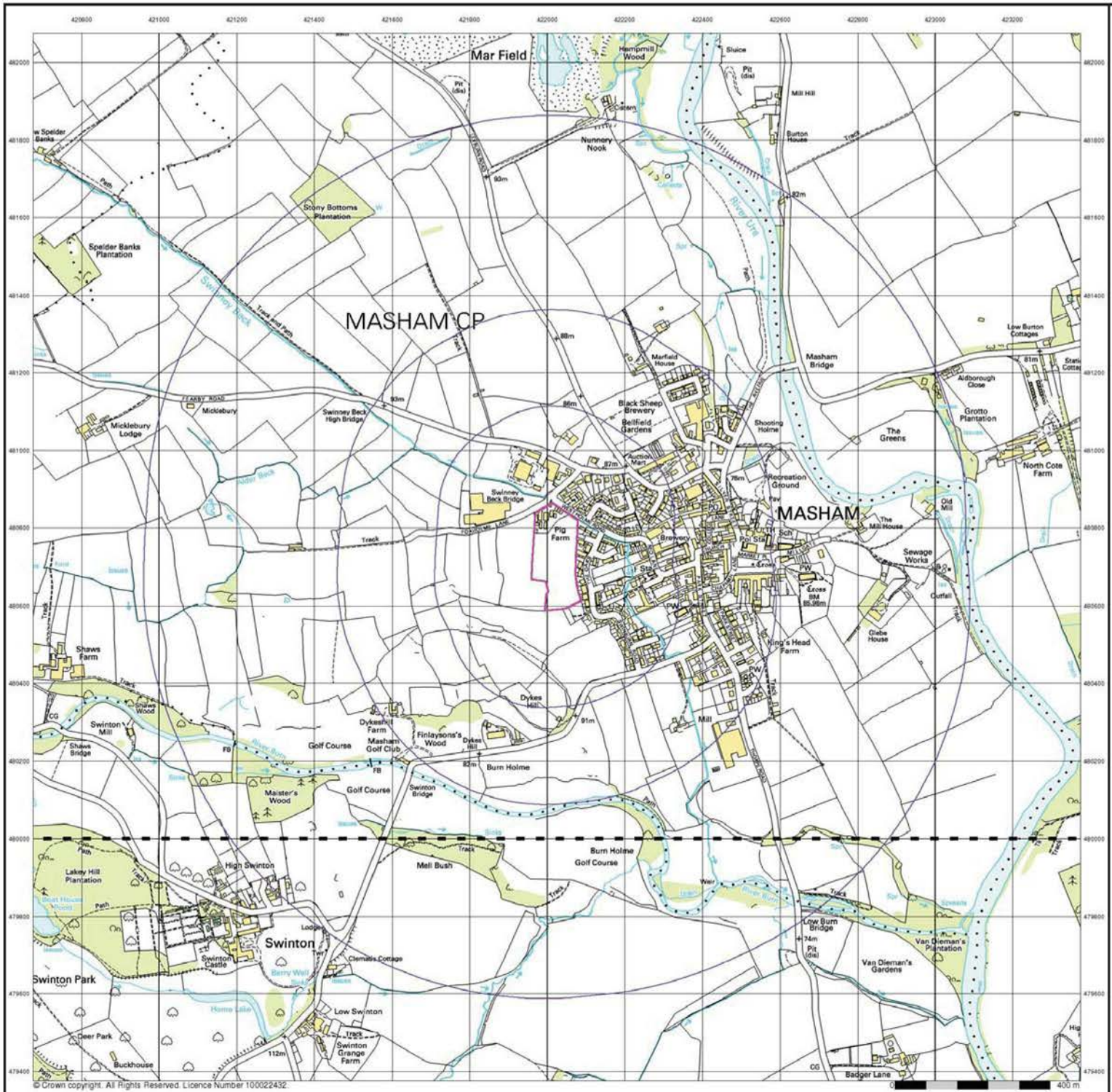


CGL

10k Raster Mapping

Published 1999

Source map scale - 1:10,000

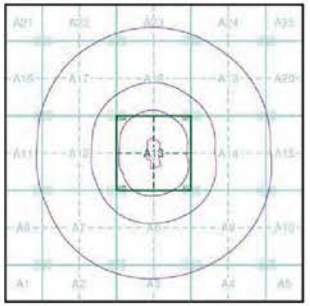
The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

SE28SW
1999
1:10,000

SE27NW
1999
1:10,000

Historical Map - Slice A



Order Details

Order Number:	111048515_1_1
Customer Ref:	CGN03835
National Grid Reference:	422020, 480720
Slice:	A
Site Area (Ha):	2.61
Search Buffer (m):	1000

Site Details

Site at, Masham, North Yorkshire

Landmark INFORMATION GROUP

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