



The Spirit of Wartime Sherwood Forest, Archaeological Survey



Andy Gaunt
Mercian Archaeological Services CIC
Report MAS053
29/09/2023



Mercian
Archaeological Services CIC



The Spirit of Wartime Sherwood Forest, Archaeological Survey End of Project Report

SK 56449 71559

Andy Gaunt MA BSc CertHE FGS

**OASIS Id: merciana2-518484.
Mercian Archaeological Services CIC
Report No. MAS053
20/03/2024**

This report is part of the Mercian Archaeological Services CIC Open Reports series. The Open Reports series publishes papers to ensure timely dissemination of the results of ongoing research prior to full peer-reviewed publication, and to make available research (such as specialist reports) that might not otherwise be published. While they are internally reviewed, papers in the Open Reports series are not routinely subject to external peer review. It is expected that most projects will see publication in peer reviewed journals or monographs in addition to their Open Series report/s, on completion of the project and analysis of the data.

Title:	The Spirit of Wartime Sherwood Forest, Archaeological Survey End of Project Report
Author:	Andy Gaunt MA BSc CertHE FGS FRGS Director
Derivation:	-
Date of Origin:	21/11/2021
Version Number:	1.0
Date of Last Revision:	03/10/2023
Revisers:	Sean Crossley
Status:	Final
Summary of Changes:	Editorial changes
Mercian Project Identifier:	
Client:	The Sherwood Forest Trust
Checked / Approved for Release by:	Sean Crossley MA PGDip BSc (Hons) Director

Contents

Contents	1
Non-Technical Summary	3
1. Project location and geology	5
1.1. Project Location	5
1.2. Geology	9
2. Archaeological and Historical Background	9
The study area falls within the historic boundary of Medieval Sherwood Forest.	9
3. Research Aims and Objectives	10
4. Methodology	11
4.1. Level One Survey methodology	14
4.2. Level 2 Survey methodology	16
4.2.1. Equipment	16
4.2.2. Control of survey	16
4.2.3. Topographic survey method	17
4.2.4. Subjective survey	17
4.3. Photogrammetric Survey Methodology	17
4.4 LiDAR Analysis	18
4.5. Data preparation and analysis.	19
4.6. Archiving and reporting	19
4.6.2. Public Dissemination on-line	19
5. Results	19
5.1 Area A - Birklands NNR (Sherwood Forest National Nature Reserve, RSPB)21	
5.1.1 Level One	21
5.1.2 Level Two Survey of Military Pit Cluster	33
5.2 Area B - Budby South Forest (Sherwood Forest National Nature Reserve,	

RSPB)	35
5.2.1. Crown Hill Plantation Level One Survey & LiDAR Ground-truthing. ...	36
5.3 Area C - Birklands West (Forestry England), Level One Survey - LiDAR Ground-truthing.	39
5.4 Area D - Neutral Ground, Level One Survey & LiDAR Ground-truthing.	45
5.5 Area E - Edwinstowe former POW, and Displaced persons Camp, Level One Survey.	51
5.6. Area F - Thoresby Old Oaks, Level One Survey & LiDAR Ground-truthing.	56
5.7 Area G - Thoresby South Woods, ‘Spotter’ Survey.	58
5.8 Area H - Thoresby Ollerton Squares, ‘Spotter’ Survey.	60
5.9 Area I - Thoresby Hall, ‘Spotter’ Survey.	63
5.10 Area J - Thoresby North Woods, ‘Spotter’ Survey.	65
5.11 Area K - Kings Wood	67
5.12 Area L - Meden Colliery, ‘Spotter’ Survey.	69
5.13 Area M - Ransom Wood	72
5.14. Area N - Thoresby Tank Wash - Level Two Survey	77
5.15 Additional Sites - Budby Crater	87
6. Conclusions & Discussion	88
7. Bibliography	93
8. Disclaimer	95
9. Acknowledgements	95

Non-Technical Summary

In 1939, *“Britain entered a conflict that was to claim the lives of some 75 million people worldwide, and change every aspect of British daily life. From Mansfield to Newark, from Bestwood to Worksop, the area that was once Royal Sherwood Forest played a special part in the war effort. Its extensive tracts of woodland provided an ideal hiding place for shells, explosives and other ordnance – the tree canopy shielding it from view by enemy aircraft. While the Women’s Timber Corps and Land Army stepped in to keep vital timber and food production going, at Dukes Wood near Eakring, a secret team of Texan oilmen laboured to create a new source of oil to replace supplies blockaded by enemy ships. Sherwood’s ancient heath land – once part of a medieval Royal hunting forest – resounded to the rumble of tanks and military training exercises. Grand country houses of the Nottinghamshire Dukeries such as Rufford Abbey became billets for army officers. At what is today peaceful Bestwood Country Park, soldiers regrouped after evacuation from the beaches of Dunkirk. Prisoner of War camps at Edwinstowe and elsewhere changed to Displaced Persons’ camps as the war in Eastern Europe left millions stateless, bereft of possessions or money, unable to return to their homes.”* (<http://sherwoodforest.org.uk/spirit-of-wartime-sherwood/>)

Under the 2Royal Army Ordnance (R.A.O.C.) Clumber Park, The Dukeries and Sherwood Forest, became **24 Ammunition Sub-Depot (ASD)** covering an area of approximately 100 square miles. In the early 1950's it was renamed CAD Warsop (Central Ammunition Depot Warsop), and it was closed down in 1954. (<http://british-army-units1945on.co.uk/royal-army-ordnance-corps/depots.html>).

“the Army... were tasked with providing security for the Munitions being stored in Sherwood (Clumber, Thoresby, and Welbeck Estates) – they controlled access to the ASDs mounting road blocks and patrols. It was one of the largest ammunition storage depots in the country and covered over 100 square miles. It was called CAD Warsop. During the war, the U.S. Army stored ammunitions there... The camp also used Edwinstowe Hall Stables and Outbuildings... Clumber Park stored over 60,000 tons of ammunitions which were kept in stacks covered with corrugated iron. The Army Pioneer Corps and local POW moved the ammunitions through the forest on a rail track... The R.A.O.C. were responsible for weapons, ammunition, armoured vehicles, clothing and general stores such as laundry, mobile baths and photography.” (<https://edwinstowehistory.org.uk/local-history/war-years/second-world-war/royal-army-ordnance>)

The Spirit of Wartime Sherwood Forest community archaeology project focused on discovering and recording archaeological remains left by the military from this period, which are still present on a large scale in the landscape.

Sherwood Forest is famous all over the world for its medieval landscape and legends. But its key role in the war effort is often overlooked. This project seeks to change that

by undertaking a large landscape-scale survey of the war-time remains and to attempting to understand, the amount of archaeological remains that still exist, their preservation levels, and to interpret this system as a whole.

The project involved research with the latest archaeological technology and techniques, including high-resolution LiDAR survey (which had recently become available via a contemporaneous National Lottery Heritage Fund (NLHF) sponsored scheme), and combined this with public outreach, education, and training of volunteers in undertaking archaeological survey in the woodlands and on the heathland of Sherwood Forest, to measure, document, and record the archaeology they encountered. This information was then brought together in computer mapping software (Geographic Information Systems (GIS)), to analyse the data and to create maps to aid in the future management of the resource and to help in the interpretation of the landscape and its use during the Second World War.

The Archaeological survey for the Spirit of Wartime Sherwood Forest project has helped to record 298 archaeological features during the lifetime of the project.

This information has made it possible to interpret land-use during the war in the various sites studied, and to examine their relationships to each other, and has enabled a landscape-scale interpretation of Sherwood Forest during World War II, and an understanding of the current survival and condition of the archaeological resource from the period in the landscape.

1. Project location and geology

1.1. Project Location

The archaeological fieldwork for the project focused on the area of northern Sherwood Forest. Sites investigated are shown on the maps in Figures 1_1 and 1_2 below.

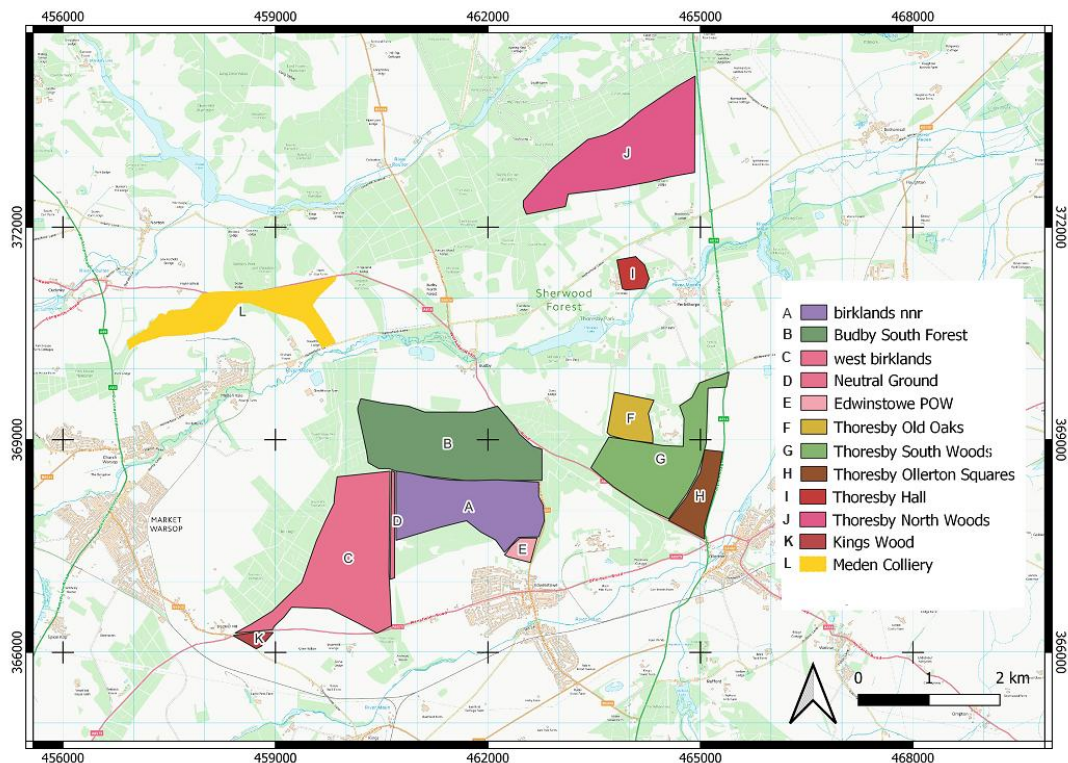


Figure 1_1: Site locations. Contains OS data © Crown copyright [and database right] 2023.

- Area A - Birklands nnr (National Nature Reserve). The areas of Birklands and Bilhaugh that lie within the Sherwood Forest National Nature Reserve, (part of Thoresby Estate, administered by RSPB),
- Area B - Budby South Forest. The area of lowland heath which now forms the northern half of the Sherwood Forest National Nature Reserve, (part of Thoresby Estate, administered by RSPB),

- Area C - West Birklands. The historic western half of Birklands Wood, part of the Welbeck Estate, managed by Forestry England,
- Area D - Neutral Ground. The remnants of a ride cut by the Dukes of Portland in the early 18th century through Birklands Wood from North to South. When the woods were acquired from the Crown in the early 19th century by the Dukes of Portland, the Eastern half of Birklands and all of Bilhaugh wood were transferred to the ownership of Thoresby Estate as part of a land exchange. The Western half of Birklands was retained by the Duke of Portland, and the ride was maintained as neutral round between the two estates. Access was given by Forestry England for this survey- the first to take place there.
- Area E. Edwinstowe POW. Wooded ground to the south of the Historic boundary of Birklands wood- this area was used to house a prisoner of War camp during the war and subsequently a displaced persons camp. This area became a focus when a historic map of the site came into the hands of the author at the outset of the project.
- Area F. Thoresby Old Oaks. An area on private land within Thoresby Park. Home to a large number of ancient oak trees, due to its location within the northern parts of Bilhaugh wood.
- Area G. Thoresby South Woods. For the sake of this survey- defined as the private estate woodlands south of Old Oaks, on the north side of the A616 Worksop Road.
- Area H. Thoresby Ollerton Squares. The area of Thoresby South Woods- separated for this survey, due to lying outside the eastern boundary of the former crown woodland of Bilhaugh, west of the A614 and north of Ollerton roundabout.
- Area I. Thoresby Hall. The lands immediately surrounding Thoresby Hall (now a Warner Hotel), part of Thoresby Estate.
- Area J. Thoresby North Woods. The northern woodlands of Thoresby Estate, north of Netherfield Lane.
- Area K. Meden Colliery. Site of a former RAF logistics base, within the site of Welbeck Colliery, north of Meden Vale.
- Area M. Ransom Wood. Now a Business park, this was the site of a former Hospital (see map in figure 1_2). Basements in the main building were used for a communications centre during the war (figure 1_2 below).
- Area N. Thoresby Tank Wash. On private land (part of the Thoresby Estate) to the north of Netherfield Lane at SK 63133 71773, the remains of a World War II Immersion Tank, known locally as the "Tank Wash".

The Spirit of Wartime Sherwood Forest Archaeological Survey
End of Project Report

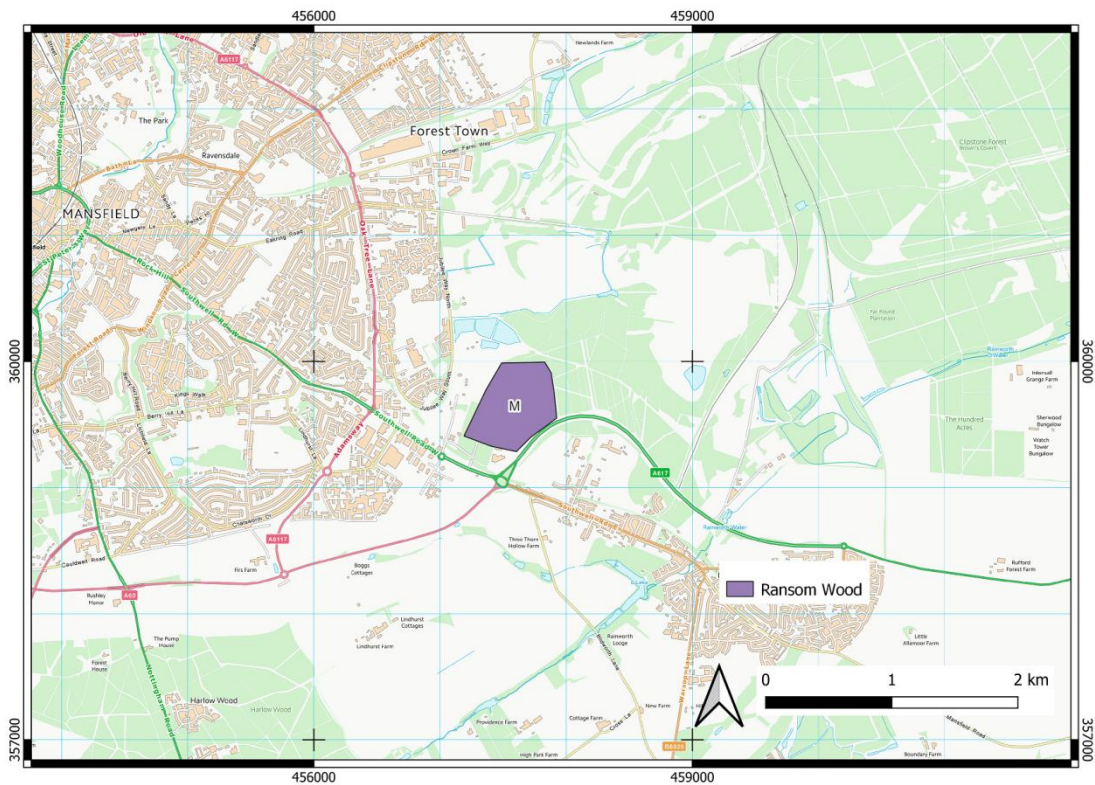


Figure 1_2: Location of Ransom Wood Site. n. Contains OS data © Crown copyright [and database right] 2023.

Areas A, B, E, F, G, H, I and J, all form part of the Thoresby Estate. At the outset of the project- following public consultation and on-line presentations, a copy of a six inch reproduction of the 1930's Estate Map of Thoresby Estate was uncovered (courtesy of Robin Orr) which was (according to Rowan McFerran of Thoresby Trustees) - coloured by Hubert Argles - the Agent and dated 1942 or 1943 (pers comm 21/08/2023). This map shows areas of Thoresby Estate requisitioned by the military for Training areas, and for munitions storage. The two different form of usage are marked in different colours. Red represents ammunities sites, and brown represents areas of tank training. A copy can be seen in figure 1_3 below. Areas A, F G, H, and J, are shown as Ammunition sites. Areas B, and N, are shown as Tank Training areas. Areas E and I are labelled "camp".

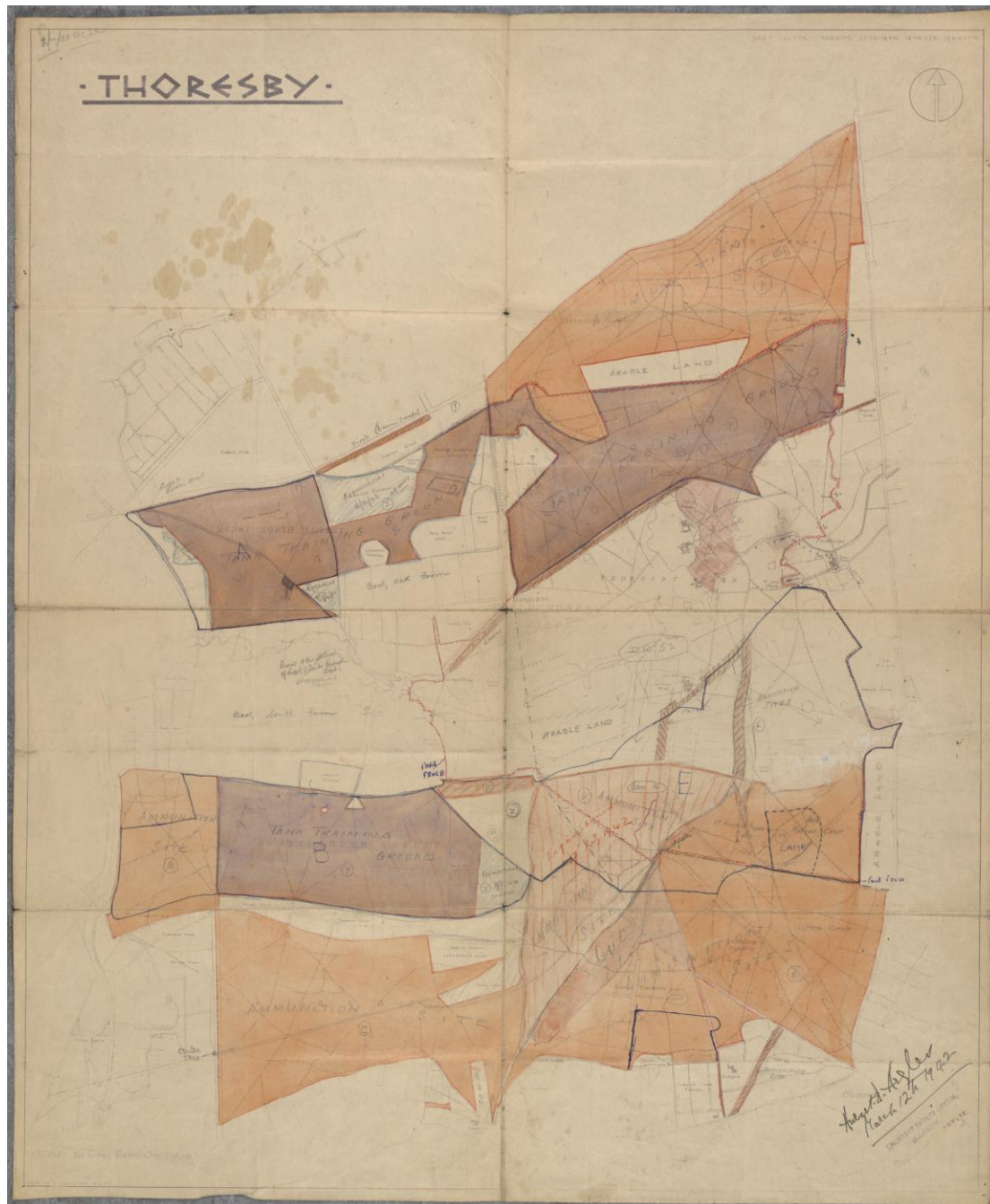


Figure 1_3:Requisitioned areas Map. A six inch reproduction of the 1930's Estate Map of Thoresby Estate - coloured by Hubert Argles - the Agent and dated 1942 or 1943. Reproduced courtesy of Rowan McFerran on behalf of the Trustee of Thoresby Estate. Copy available as Ma 5 E 211, Nottingham archives. Red colour-wash de-marks areas of Ammunition storage, brown areas denote tank training area. Other area of interest include the marking of "camps" at Edwinstowe, Proteus, and Thoresby Hall.

1.2. Geology

The study area is mainly underlain by rocks of the Chester Formation - Sandstone, Pebbly (gravelly). This Sedimentary Bedrock formed approximately 247 to 250 million years ago in the Triassic Period. The local environment at the time of deposition was dominated by rivers. They are detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river or estuary (if in a coastal setting) (www.BGS.ac.co.uk).

2. Archaeological and Historical Background

The study area falls within the historic boundary of Medieval Sherwood Forest.

The area was by the end of the Medieval period a patchwork of varying land use including villages and open fields, but significantly, also large expanses of heath land and woodland. A description of the landscape can be found in Gaunt and Wright 2013.

Research by the author suggests that the landscape of heathland and woodland was in places still to some degree intact from the Medieval period. When the land (now in the hands of various Dukes and Earls), was requisitioned by the Crown for the War effort, the areas of heathland were used as Tank training sites, and areas which were more wooded were chosen for use as ammunition storage sites.

No previous archaeological Survey has focused on the World War Two remains across the entirety of the study area.

A number of archaeological projects however been undertaken previously, within parts of the study area. A full list of all archaeological events and elements including an Historic Environment Search will be included in the Final Report.

The most relevant works include:

From circa 2004 - 2011 Nottinghamshire County Council undertook an initial survey of archaeological remains within the Birklands area of the Sherwood Forest National Nature Reserve as part of the Heritage Lottery Fund (Now National Lottery Heritage Fund) sponsored project. The current author wrote a short report on the findings in the Transactions of the Thoroton Society (Gaunt and Gillott 2011). The results from this project provided much of the data for a report in 2018 (alongside an element of field survey) for the *Sherwood Country Park Conservation Management Plan* (Malone 2018).

The Friends of Thynghowe group have been researching and surveying the

landscape of West Birklands around Thynghowe for many years and the results of their work, and their support, have been crucial in enabling the surveys in West Birklands for this project.

Since 2013, Mercian Archaeological Services CIC have been undertaking the Sherwood Forest Archaeology Project, with the Sherwood Forest Archaeology Survey (under a few changing names) having formed a continuous part of this project, with annual winter surveys being undertaken. Since 2018 these have been reported as interim reports in the Transactions of the Thoroton Society (Gaunt 2018, 2019, 2020, 2012, 2022). This survey which began in the Sherwood Forest National Nature Reserve (Birklands, Bilhaugh, and Budby South Forest), has expanded to include Western Birklands, and large areas of the Thoresby Estate. The findings from these initial surveys has helped form the basis of the work undertaken in the Spirit of Wartime Sherwood Forest, and the experience and knowledge of the team was fundamental in the choice of Mercian Archaeological Services CIC to undertake the work.

3. Research Aims and Objectives

The project seeks to better understand the archaeological remains dating from World War II activity, in the Sherwood Forest Landscape, and the level of their preservation.

The project aims to better interpret the way in which the landscape of Sherwood Forest was utilised in World War II, and what level archaeology can play in that understanding.

The project forms part of Mercian Archaeological Services CIC's research questions into the landscape development of Sherwood Forest.

Mercian's aim is to provide a community focused archaeological project for the Archaeological Investigation of World War Two sites in Sherwood Forest, and to create an integrated landscape scale approach, aimed towards linking these sites together and understanding their relationships as part of a larger whole. The aim is to ensure that there is the maximum opportunity for community engagement, involvement and learning. The aim is also to assess the size, nature and importance of the archaeological resource and the levels of preservation to enable ongoing future conservation of the archaeological resource from World War Two

The aim of the project is to engage, and train members the public in archaeological recording techniques and methods. The fieldwork methodology was therefore designed to be as inclusive and community driven as possible to maximise this requirement.

Key to the success of the project is engaging and involving expert local knowledge, in the form of existing local history groups, interest groups and knowledgeable individuals.

Much of the World War Two landscape has been investigated by the wide ranging community of groups and experts, however these are often focused at the village level, and this project seeks to tie all this work and effort and interest together.

4. Methodology

The project fieldwork methodology included a mixture of Level One Survey, and Level Two Survey around sites in the Sherwood Forest area, which will be described in detail below. The project also consist of a large amount of desktop LiDAR and Geographic Information System (GIS) work (described below). The project methodology was originally outlined in the tender brief from Mercian. This methodology was designed with the intention of splitting the project area into radiating 'zones' which would receive corresponding levels of survey intensity, and different methods of survey applied.

This original method was changed due to opportunities which presented themselves during the course of the project, and although the project did include the mix of fieldwork methods originally intended, there were changes to the ratio of different techniques undertaken, in terms of the number of days undertaken on each method, and at which sites these techniques would focus.

Firstly, the Thoresby Requisitions map of 1942/3, discussed in section 1, helped focus much of the attention on areas within the Thoresby Estate as the land use in the War was recorded on this map.

Secondly, the Spirit of Wartime Sherwood project was running contemporaneously with, although separate from, The Miner to Major Landscape Partnership Project (M2M), a regional partnership also sponsored by the National Lottery Heritage Fund. As part of the M2M project a large-scale LiDAR survey was flown across an area stretching from Bestwood Park in the South, to the River Meden in the North. This LiDAR survey therefore coincided in its northern part, with a large part the area being studied in the Spirit of Wartime Sherwood Forest Project.

This data was, unfortunately, not available to Mercian until after the Level One survey dates for the first year (Autumn 2021 - Spring 2022) had been completed. But once integrated this data had an enormous impact on what was achievable in terms of feature detection, ground-truthing, level one survey, and on the continuation of level 2 survey within the project.

Since the arrival of the 16cm LiDAR data set, over 200 tiles of data (representing ground coverage of 400m x 400m per tile) became available in Digital Surface model

(DSM) and over 200 tiles of data in Digital Terrain Model (DTM) format (See LiDAR methodology), within the direct study area for fieldwork. These data tiles all required processing (multi-directional hill-shade modelling etc) in order to be of use in identifying sites within the study area, to enable maps etc to be produced for this report, and fieldwork sessions, and to be integrated into the project GIS.

This LiDAR data fundamentally changed the focus of the fieldwork for the project.

Previously, LiDAR data had been available from 2 sources. The Friends of Thynghowe have LiDAR data from a 2012 National Lottery Heritage Fund Sponsored project, which offered a 0.5m resolution (for Birklands West and Birklands nnr areas). Also Environment Agency LiDAR data available from the DeFRA website which offered coverage at 1m resolution, which was used for the surrounding areas. In short, the higher the resolution, the better the data for use in Archaeological survey, and the 16cm resolution data sets offered a dramatic shift in the quality of information available for surveying. The difference in quality is shown below in figures.

This more detailed LiDAR data shifted the focus to increased amounts of Level One survey and Ground-truthing, and away from Level Two survey in year 2 of the project.

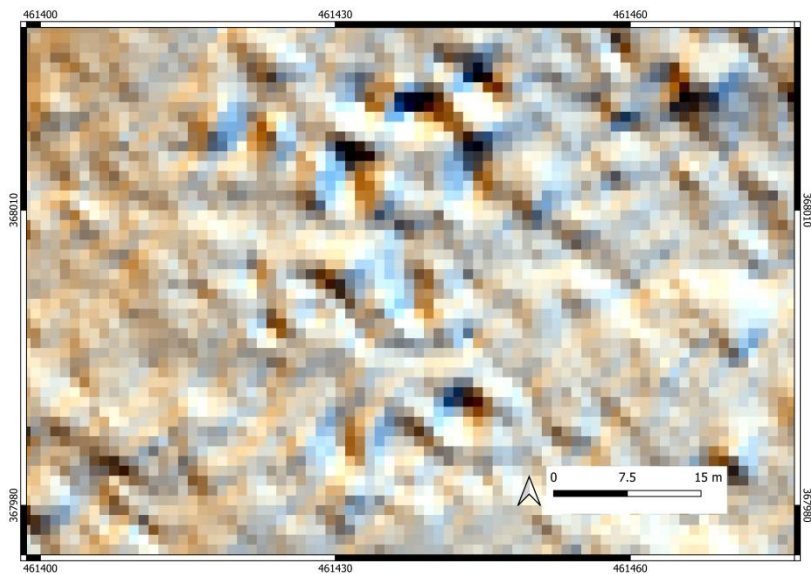


Figure 4_1: 1m resolution LiDAR data of a cluster of military pits in 'Birklands nnr' area (Sherwood Forest National Nature Reserve).

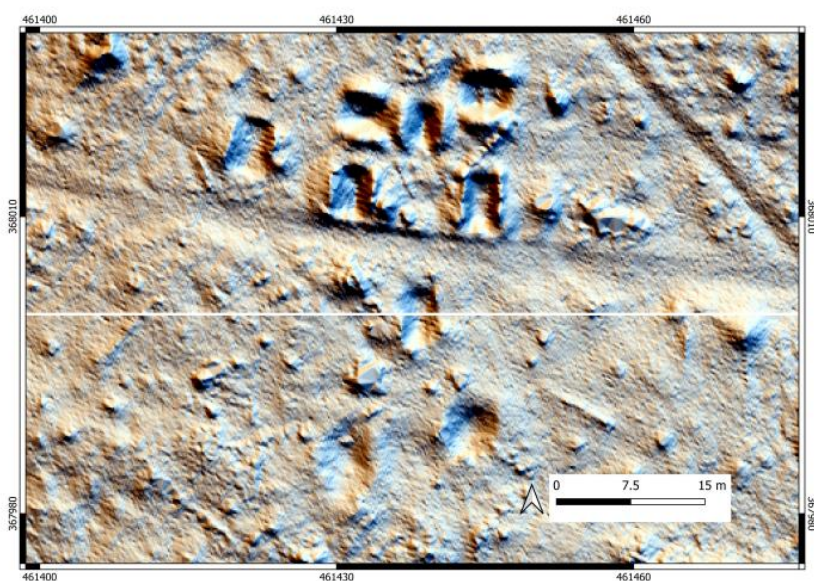


Figure 4_2: 16cm resolution LiDAR data of the same cluster of military pits in 'Birklands nnr' area (Sherwood Forest National Nature Reserve), as shown above in figure 5_1. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

The 1m resolution LiDAR data is shown in Figure 4_1, for a cluster of military pits in 'Birklands nnr' area (Sherwood Forest National Nature Reserve). The image is difficult to interpret and only a suggestion of possible archaeological remains can be seen due to the clustering of dark areas in the image. This image was used initially in the project to ground-truth for archaeology at the location. The site was selected for the Level Two survey (see section 5.1.2 below), following the initial ground-truthing, in order to allow recording in greater detail.

The 16cm resolution data for the same pit cluster shown in figure 4_2, shows a far higher quality of output. This level of increased detail fundamentally changed what was considered achievable via Level One Survey and Ground-truthing.

It was considered that surveying with the new higher quality 16cm resolution LiDAR data, represented an opportunity within the project which could not be missed, and the focus was changed from examining the wider zones, to focusing on the opportunity to work with this data within the sites outlined in above. There was also a shift in season 2 away from Level 2 topographic survey towards more time spent on data processing and on ground-truthing and level one survey. The Tank Wash was surveyed at Level Two after the LiDAR data had become available as the site lay north of the River Meden, and outside the area covered by the 16cm Resolution LiDAR survey (See section 6.13 below).

This meant that in season 2 of field work, no level 2 survey was undertaken (2 separate areas were subject to Level 2 survey in season 1), with more focus being on

utilising the LiDAR data to enable more features to be identified on the ground from LiDAR with volunteers.

4.1. Level One Survey methodology

A Level One Survey is the lowest level of Archaeological survey as prescribed by Historic England. It is the method recommended by Historic England for recording archaeological earthworks across landscapes (Historic England, 2017). It is combined in this survey with Ground-truthing of features as detected in LiDAR data.

In this project the Level One survey involved initial examination of LiDAR data (see methodology for LiDAR below) in Geographic Information Systems (GIS), combined with Mercian's knowledge of the landscape and the previous encountering of earthworks by Mercian's experienced staff (the project leader has been undertaking survey in Sherwood Forest every year since 2006), to determine target areas for survey.

Once areas were decided upon, volunteers, under the supervision of Mercian staff were dispatched to search for, detect and record the archaeological features, from LiDAR, but also any features which were not seen in that data.

For each feature the following information was recorded:

- Individual Identification code for features,
- GPS location accurate to within 10m as required but recorded with +/- 2-4 m accuracy using Navigation Grade GPS,
- Grid references are recorded manually on site sheets / book for each location to avoid data problems
- Measurements including depth width, length and height recorded in field using hand tapes and ranging poles,
- Photographic record of all features including use of appropriate scales,
- Description of feature,
- Interpretation of feature,
- Possible date,
- Comments on preservation,
- Archaeological importance,
- Relationship to other features (including diagrams/ sketches),

- Notes taken on all of above to enable future discussion.
- Distribution maps to be produced in GIS software



Photograph 4_A : Volunteers undertaking Level One survey on Budby South Forest. Using ranging poles and tape measures to produce cross-section measurements of an archaeological feature.

Where archaeological features were encountered within the Level One survey, which were deemed not to be military or from the Second World War, their location was noted during the field work for this project. These features were then recorded separately by Mercian Archaeological Services CIC as part of the Sherwood Forest Archaeology Project. This helped to ensure that the project funding was not diverted away from World War II remains, while ensuring all archaeology encountered of any period was recorded.

This method was employed across the survey area, and demonstrates the importance and success of joined-up project work and employing contractors with a long-term commitment to a landscape and its archaeology. It also represents excellent value for money. Many volunteers from the Spirit of Wartime Sherwood project have also since continued to be involved with Mercian archaeological Services CIC volunteer network, working across both projects.

4.2. Level 2 Survey methodology

Level Two Survey is the higher level of archaeological surveying as prescribed by Historic England, and is used at both the site and feature level, where a greater understanding of a feature, and/ or site is required (Historic England. 2017). The sites chosen for Level Two survey in the Spirit of Wartime Sherwood Forest were a cluster of military munitions storage pits (earthwork remains of former buildings) in the Sherwood Forest Nature Reserve, and the remains of a former World War II Immersion Tank (used for tank training, and tank washing). The former was chosen as these pits represented a cluster of a specific type of pit, previously not recorded in high detail, and the latter due to its likely national significance.

4.2.1. Equipment

The survey was undertaken using differential survey grade Global Positioning System (GPS), combined with Electronic Distance Measuring Total Station. The GPS system used was a *Leica GPS Viva* enabled to use Smartnet technology. This GPS system operates using Differential GPS (DGPS), where corrections are made to errors in the location data received from the satellites. The GPS rover was set to record static points, and the Total Station was used to allow recordings where satellite link was absent as recommended in Ainsworth, S. & Thomason, B. (2003). The DGPS device is mounted on a 2-metre-high carbon fibre pole. The height of the pole is entered into the DGPS. The DGPS is therefore held by the operator 2m above the ground to help improve communication with satellites and mobile phone signals. The DGPS records its location in 3D, receives corrections from a remote source to correct its location, and then removes the 2m staff height before recording and storing its location in a data logger.

Alongside *Leica GPS Viva* the survey was undertaken using a *Leica TS16 Robotic Total Station* and *Leica TS06 plus*.

4.2.2. Control of survey

'Control is the accurate framework of carefully measured points within which the rest of the survey is fitted' (Ainsworth, et al. 2007). Section 2.1 Control of Survey in Metric Survey Specifications for English Heritage (Lutton 2003) states that metric survey *'must provide reliable and repeatable control capable of generating the required coordinates within the tolerances stated'* (Lutton 2003). As well as falling within the accepted tolerance levels, this technique also fulfils the requirement that the

control must be repeatable.

4.2.3. Topographic survey method

The survey was undertaken using a combination of objective and subjective survey techniques. Static points were recorded by Differential GPS around the site to act as control points and station locations for subjective survey using Total Station.

4.2.4. Subjective survey

A 'subjective' survey of archaeological features was undertaken. In this method the survey is 'subjective' because the surveyor chooses what to record.

4.3. Photogrammetric Survey Methodology

Photogrammetry is the method of recording measurements from photographs. The process enables the recording of high accuracy point locations on surfaces. In very basic terms a Photogrammetric survey consists of a large number of photographs being taken of an object of feature. These are then combined together using computer software to create models.

The project utilised photogrammetric survey, using Structure from Motion techniques, to create a detailed record of standing remains at the site of the Area J - Thoresby North Woods, to record the military immersion tank, alongside the Level Two Survey of the remains, to provide a record of the state of preservation of the remains, and to aid interpretation and analysis of the structures. Results from the Photogrammetric survey will be presented in the final Archaeological Report for the project.

The methodology of the survey was undertaken in line with current best practice and standards and guidance, including but not limited to that in the bibliography.

The survey was undertaken using the Ordnance Survey British National Grid. The coordinate system and vertical datum was established using the control of survey mentioned above, and points recorded from a combination of Leica GPS Viva and TS06 Total Station, and the OSGM02 transformation. The image control points for each survey were provided to a three dimensional accuracy of +/-3mm. No permanent survey marks were established on the site.

The photogrammetric survey used a Nikon D5100 16.2 megapixel DSLR with stock 18-55mm lens. Structure from Motion techniques was utilised.

Methodology of the photogrammetric survey followed Waldhäusl and Ogleby (1994), Grussenmeyer, Hanke K, Streilein A (2002), Historic England (2017), and other technical papers and standards and guidance, including those referenced therein, as appropriate.

The photogrammetric survey employed a camera base to subject distance ratio of no more than 1:4. Overlap between adjacent stereo images was of at least 80% and an overlap between adjacent strips of stereo image of at least 40%. The ground sample distance was a maximum of 3mm.

Community volunteers undertook part in the image capture process. All project volunteers received training and guidance from Mercian staff to ensure the images met the specifications and parameters for SfM photogrammetric survey. Image capture by project volunteers was supervised in the field by competent staff from Mercian Archaeological Services CIC to ensure compliance with the standard and guidance.

The photographs taken for the photogrammetric survey were used to produce a 3D point cloud model of the Immersion Tank in full, and various parts of the structure in detail, via structure from motion algorithms built in to 3DFlow's Zephr software. This software was used generate and output a textured point cloud that was manipulated and edited in Meshlab software (Cignoni et al 2008).

4.4 LiDAR Analysis

A LiDAR (light detection and ranging) was undertaken by Bluesky as part of the Miner2Major Veiled Landscape Project (2021). This was funded by the National Lottery Heritage Fund. The survey was undertaken at a resolution of 16cm.

This data was received in the form of Digital Surface model (DSM) and Digital Terrain Models (DTM). Digital surface models include vegetation and buildings. Digital Terrain models are of the ground surface with vegetation and buildings removed.

The DTMS and DSM were processed in Geographic Information Systems (GIS) and multi-directional hill-shade models were created of each 400m x 400m LiDAR tile, using the Relief Visualisation Toolbox plug-in in QGIS. This created simulated hill-shade from 16 different directions simultaneously, with a sun elevation at 35 degrees.

Maps were created from these data set to enable ground-truthing of features, for analysis (cross-section. Slope analysis etc), and publication.

4.5. Data preparation and analysis.

All survey data was processed in QGIS Geographic Information Systems (GIS) software.

4.6. Archiving and reporting

4.6.1. OASIS

An OASIS entry pertaining to the work has been created. The OASIS identifier for the project is OASIS ID - merciana2-518484. A copy of the final archive report will be uploaded via OASIS, and logged with the Nottinghamshire Historic Environment Record (HER).

4.6.2. Public Dissemination on-line

Mercian Archaeological Services CIC will publish free downloadable versions of this end of project report via our website, as part of our Open Series Reports.

5. Results

The Archaeological survey for the Spirit of Wartime Sherwood Forest project has helped to record 298 archaeological features during the lifetime of the project. This has brought the total number of archaeological features recorded on the Sherwood Forest Archaeology Project survey database to 943 (this database is updated regularly- numbers are correct at the time of writing). Of the 943 features currently on the Sherwood Forest Archaeology Project survey database, 605 are identified as military. This means that the spirit of Wartime Sherwood Forest has helped contribute 49% of the military features currently in the SFAP survey database. It has enable many features previously unknown to be identified, and has also enabled many previously known sites to receive a measured and photographic record.

The Spirit of Wartime Sherwood Forest Archaeological Survey
End of Project Report

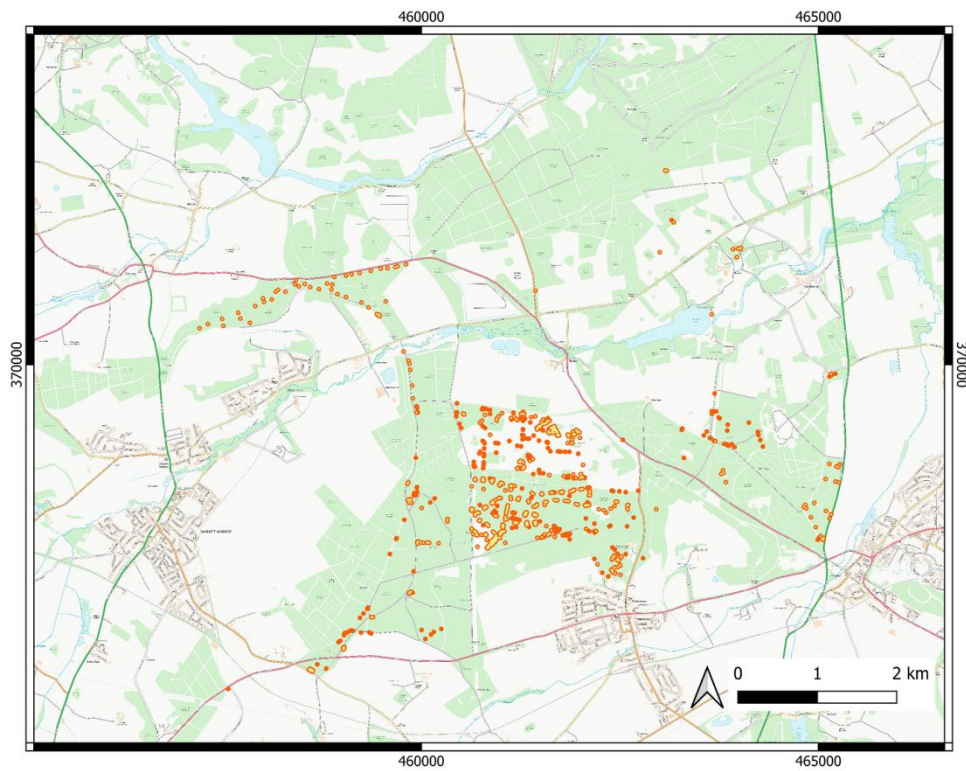


Figure 5_1: The location of features recorded for the Mercian's Sherwood Forest Archaeology Project Survey, as of 09/2023 (red circles), which fall within the Spirit of Wartime Sherwood Forest Project area. Overlain with the 605 features (yellow circles) recorded as 'Military'.

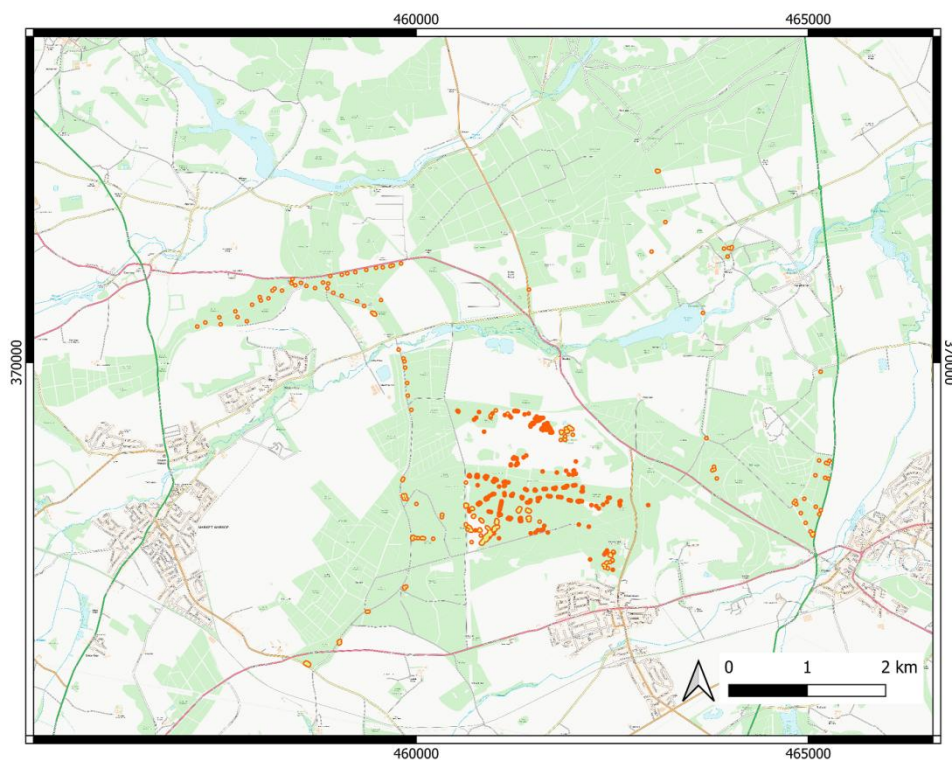


Figure 5_2: Location of the features recorded as 'Military' for Mercian's Sherwood Forest Archaeology Project Survey, as of 09/2023 (red circles) which fall within the Spirit of Wartime Sherwood Forest Project

area. Overlain with the 298 features recorded during the Spirit of Wartime Sherwood Forest project (yellow circles).

This significant addition to the known archaeological record is invaluable and will help with both the future management of the resource, and in the interpretation of the heritage of Sherwood Forest, which includes a significant contribution in the landscape of the Forest from the Second World War.

The project has also identified and undertaken a Level Two survey of a potentially nationally significant monument, in the form of the military Immersion Tank (see below in 5.13. Area N - Thoresby Tank Wash - Level Two Survey).

5.1 Area A - Birklands NNR (Sherwood Forest National Nature Reserve, RSPB)

5.1.1 Level One



Figure A1: Target areas for Level One Ground-truthing survey. Contains OS data © Crown copyright [and database right] 2023.

Birklands nnr area (as named for this project) is the Eastern half of Birklands Wood, which forms western half of the wooded area of the Sherwood Forest National Nature Reserve. The site is owned by Thoresby Estate, as it was at the time of the Second World War.

The map in Figure 1_3 shows that this area was requisitioned as an ammunition storage site. This part of the study area is the only one to have been subject to a long history of archaeological survey dating back to circa 2004, with the author having surveyed in the site every year since 2006 (see previous work section above).

This previous and ongoing work has identified large number of 'pits' - usually rectangular, and often with earthen blast-banks, dotted around the site. Many of these pits are located along the remains of a former narrow-gauge railway system (in some places cuttings exist (although ephemeral), and in other railway embankments are present). Mercian has identified that the pits which line this railway are all rectangular with embanked sides, and of a similar size. These pits are referred to as Military 'Bunker Pits' in the survey data, and represent the earthwork remains of former corrugated iron buildings which were for housing munitions. The earthworks are the remains of where a rectangular pit was dug to enable the floor level of the building to be slightly below ground level. The earth from this excavation was then used to build earthen banks along the sides of the long- axis. This design presumably was in case of explosion, and was designed to force the energy from such an even upwards rather than side ways in order to limit the damage to neighbouring buildings and ammunition. The pits lie in groups of three along the route of the railway, perpendicular to the track suggesting they were loaded directly from the railway track. Their careful spacing in groups of three suggests this was also to do with explosion risk mitigation.

It does appear that where ever these particular 'Bunker Pits' exist, then the railway was present, and their presence has been used in interpreting the whereabouts of the railway track in places. The survey work and LiDAR used in this project (including on the Neutral Ground area discussed below) has now enabled a route for the railway system within Birklands nnr to be proposed.

Other pits, some with 2 or more compartments are also found, and these were surveyed in large numbers on this project (see figures below). These pits also represent the remains of buildings, but do not seem related to the railway system and instead occupy clusters in proximity to track-ways. Their different nature suggests either a different function for the building within, or perhaps a different kind of ammunition was being stored within them to the 'Bunker Pits', and this seems borne out by the apparent difference in transportation requirements to these pits.

A further distinct category of feature that appear in large numbers are shallow

rectangular 'scrapes' or ground levelling platforms. These are found either side of track-ways in particular A3 and A8 along a single route-way. These may represent the former location of buildings, or could be sites for tank and vehicle storage- a painting seen by the author (details of which will be in the final archaeological report) by the Dowager Countess Manvers (now in Newark Museum) shows rows of Tanks parked between trees and hidden beneath camouflage netting.

In total 134 features were recorded in Birklands nnr as part of the Spirit of Wartime Sherwood Forest project, which has enabled a large amount of understanding of the site and its use during the war.

All features were measured and photographed in line with the methodology and the relevant information was recorded. Each feature was given the site code [BRKBILXXYYY]- where BRKBIL is short for Birklands and Bilhaugh Woods, XX refers to the year (eg 2022 = 22 and 2023 = 23), and where XXX represents the three digit identifier for the feature (eg 001, 002, 003 etc).

The following figures and photographs give a flavour of the work undertaken and the features recorded. The results will be presented in full in the archaeological report.

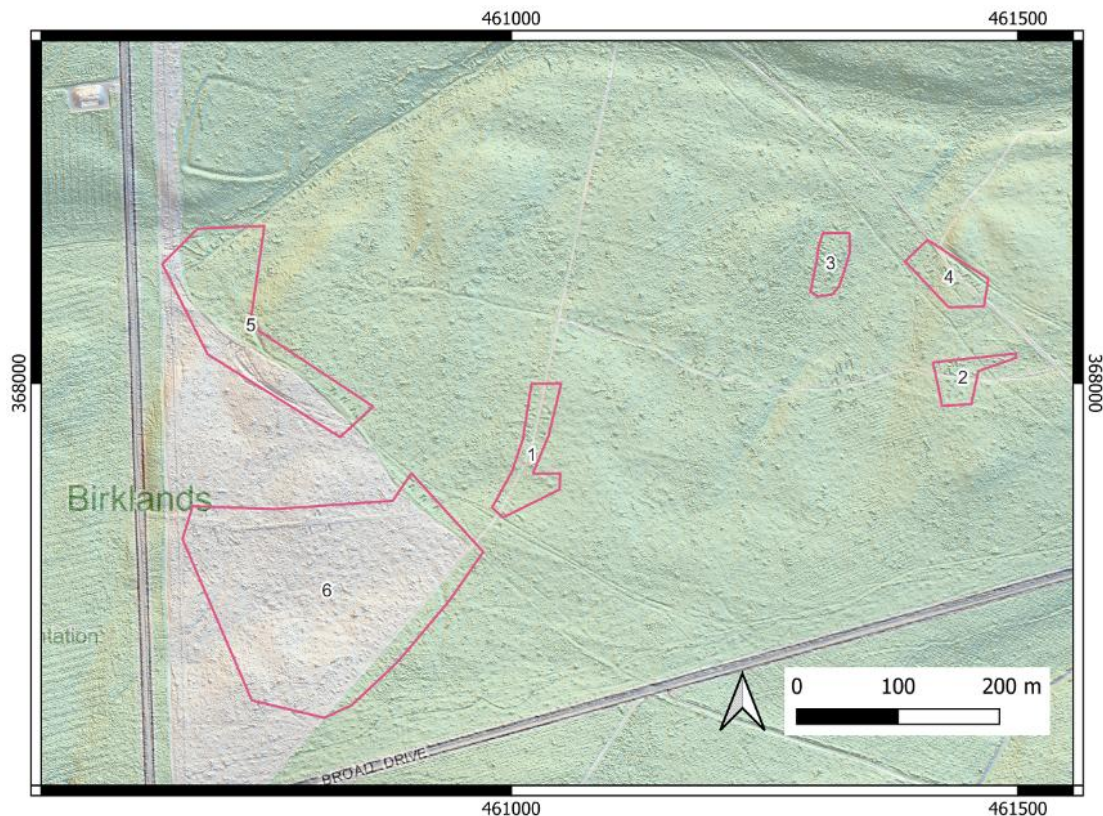


Figure A2: Target areas for survey numbered 1- 6. These areas are shown in detail below. Overlain on 16cm LiDAR data. Contains OS data © Crown copyright [and database right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

The Spirit of Wartime Sherwood Forest Archaeological Survey
End of Project Report



Photograph A_1: Volunteers recording a Military bunker pit- the former location of a munitions storage building.

The Spirit of Wartime Sherwood Forest Archaeological Survey
End of Project Report

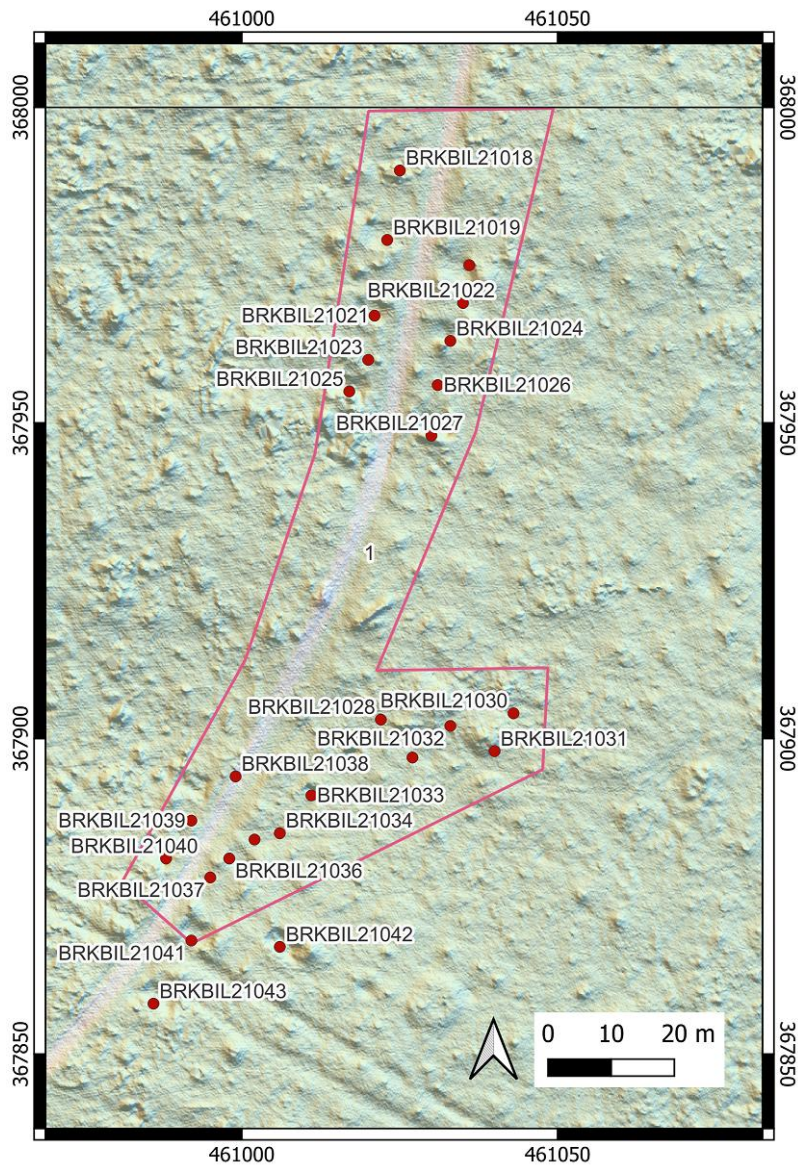


Figure A3: Birklands nnr survey area 1. Overlain on 16cm LiDAR data. Contains OS data © Crown copyright [and database right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

The Spirit of Wartime Sherwood Forest Archaeological Survey
End of Project Report

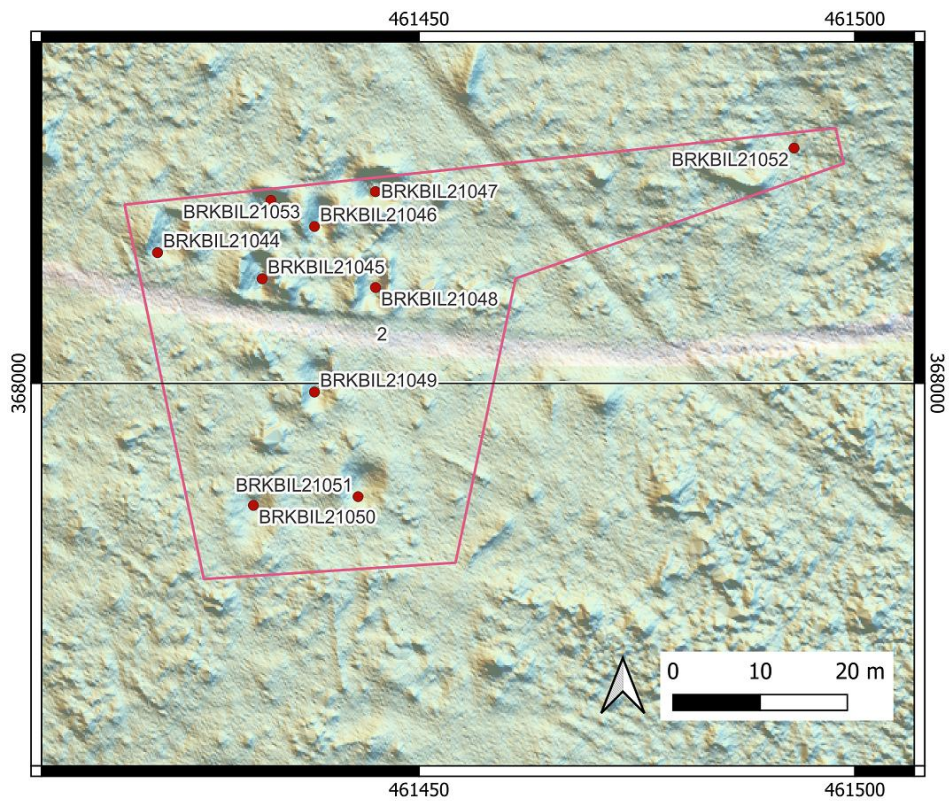


Figure A4: Birklands nnr survey area 2. Overlain on 16cm LiDAR data. Contains OS data © Crown copyright [and database right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)



Photograph A_2: Volunteers recording a shallow rectangular military pit- the former location of a possible building.

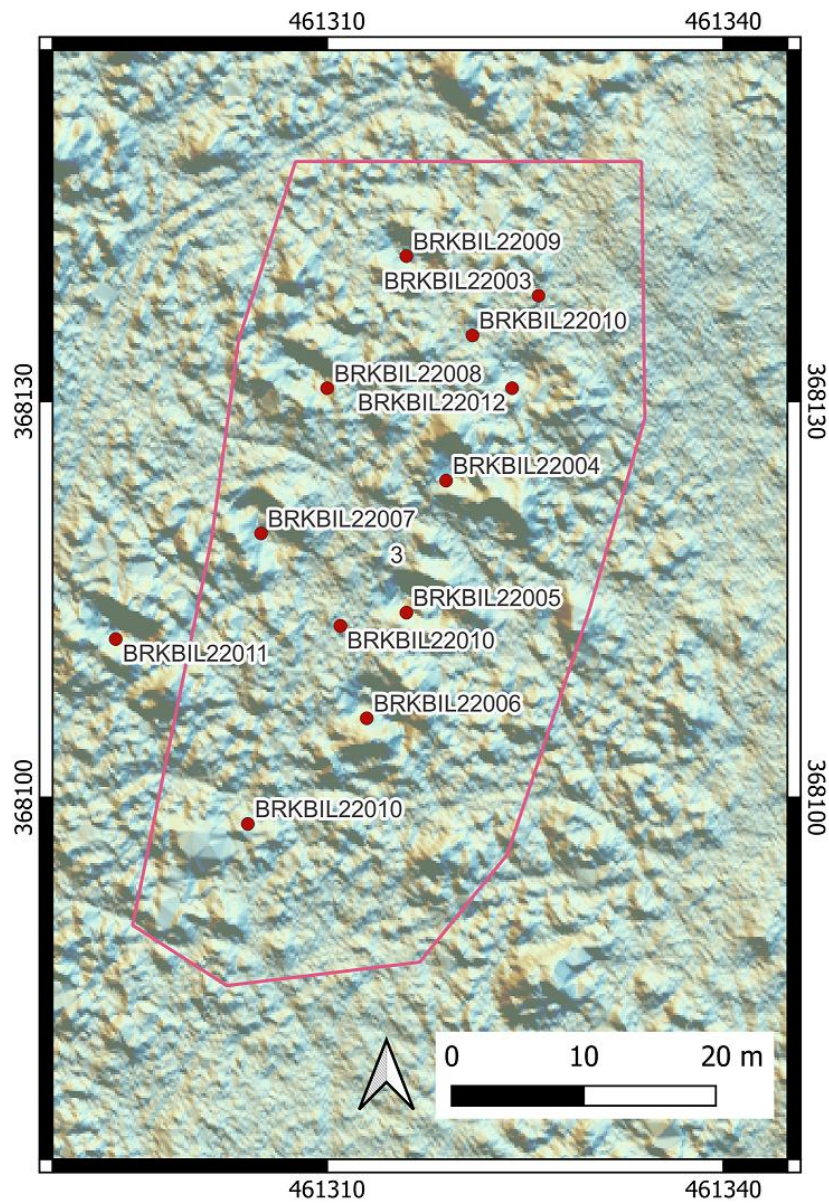


Figure A5: Birklands nnr survey area 3. Overlain on 16cm LiDAR data. Contains OS data © Crown copyright [and database right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

The Spirit of Wartime Sherwood Forest Archaeological Survey
End of Project Report

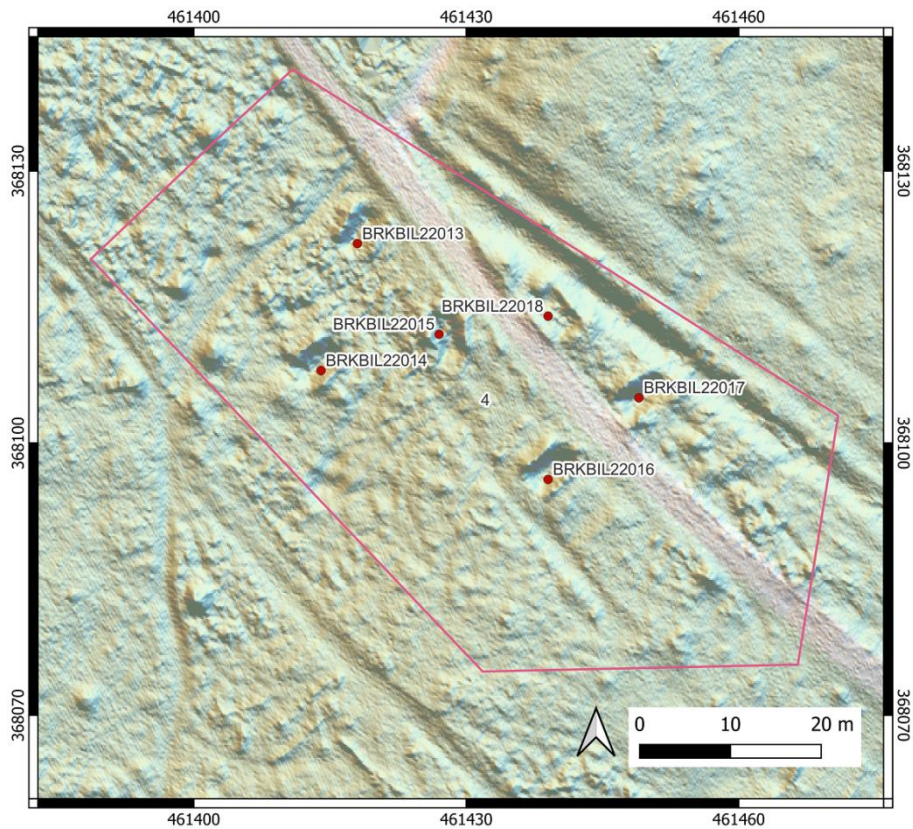


Figure A6: Birklands nnr survey area 4. Overlain on 16cm LiDAR data. Contains OS data © Crown copyright [and database right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)



Photograph A_3: Volunteers recording a rectangular military bunker pit- the former location of a possible munitions storage building.

The Spirit of Wartime Sherwood Forest Archaeological Survey
End of Project Report

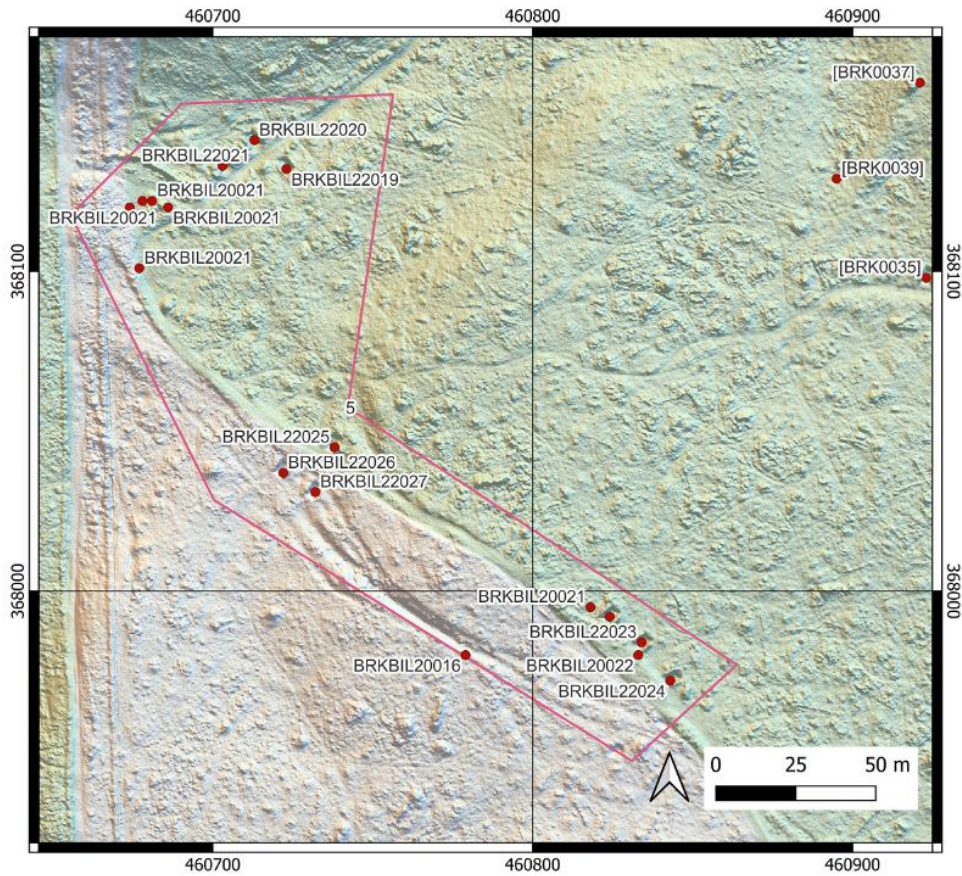


Figure A7: Birklands nnr survey area 5. Overlain on 16cm LiDAR data. Contains OS data © Crown copyright [and database right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

The Spirit of Wartime Sherwood Forest Archaeological Survey
End of Project Report

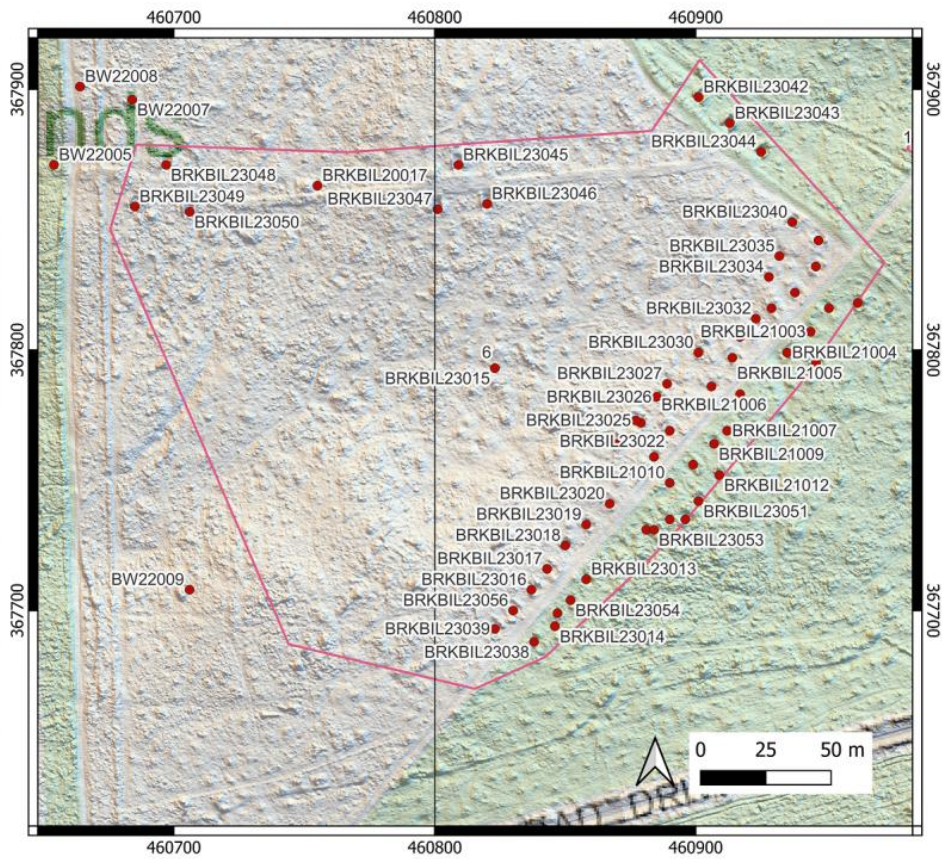


Figure A8: Birklands nnr survey area 6. Overlain on 16cm LiDAR data. Contains OS data © Crown copyright [and database right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021).



Photograph A_4: Volunteers recording a shallow rectangular military pit/ platform, in Birklands Wood, as part of the Level One Survey.



Photograph A_5 : Volunteers recording a shallow rectangular military pit/ platform, in Birklands Wood, as part of the Level One Survey.



Photograph A_6 : Students from Nottingham University undertaking a 3D survey of a military pit, with an Auto Level (Dumpy Level) during a training session in Birklands Wood.



Photograph A_7 : Students from Nottingham University drawing up the results of a 3D survey with and Auto Level (Dumpy Level) following a training session in Birklands Wood.



Photograph A_8 : Volunteers surveying in Birklands Wood.



Photograph A_9 : Railway embankment in Birklands Wood.

5.1.2 Level Two Survey of Military Pit Cluster

A Level Two survey of the site of a number of military pits in Birklands Wood was undertaken in October 2021. The survey used control points acquired from Differential Survey Grade GPS. These control points were used to configure Total Stations which then recorded the outlines and tops and bottoms of the slopes of the earthworks in the area, as part of a subjective survey of the remains as specified in the methodology. The results from the survey can be seen in the Hachure plan in figure A9 below.

The Spirit of Wartime Sherwood Forest Archaeological Survey
End of Project Report

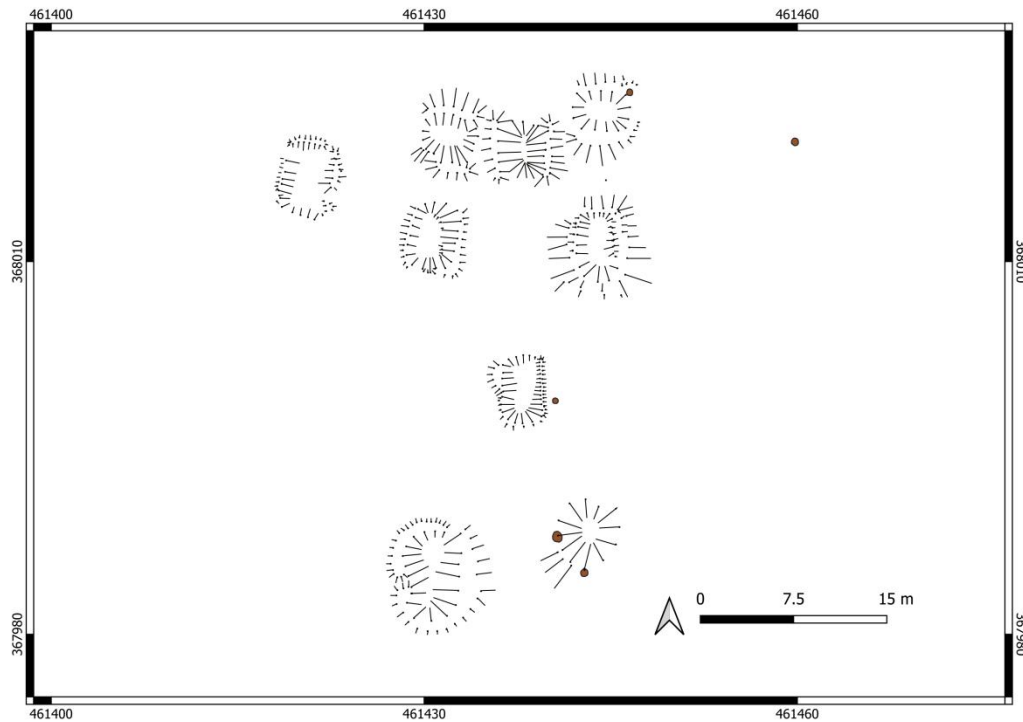


Figure A9: Hachure Plan of Level Two survey of a cluster of military pits in Birklands nnr survey area 2. Brown circles depicted in the plan represent the trunks of trees surveyed due to their relationship to the pits.



Photograph A_10 : Volunteers undertaking Level Two Survey using EDM Total Station in Birklands nnr (Sherwood Forest National Nature Reserve, 2021).



Photograph A_11 : Volunteers recording a cross-section using a Auto-Level (Dumpy Level), during the Level Two Survey in Birklands nnr (Sherwood Forest National Nature Reserve, 2021).

The Level Two Survey was a great success and has helped in the understanding of this category of remains within the Forest.

5.2 Area B - Budby South Forest (Sherwood Forest National Nature Reserve, RSPB)

Mercian Archaeological Services CIC have undertaken a number of seasons of Archaeological Survey Level One and LiDAR Ground-truthing on Budby South Forest in recent years on behalf of the RSPB, as part of the Sherwood Forest Archaeology Project.

These surveys concentrated on areas of heath land that were to be subject to ground-works by RSPB. Areas of woodland were not surveyed during those seasons as the ground-clearance works were not scheduled to take place in wooded areas. It was decided to include the area of woodland on Crown Hill Plantation on Budby South Forest in the Spirit of Wartime Sherwood Project, as Mercian had identified these areas as containing a large number of upstanding archaeological earthwork remains likely to date from the Second World War era.

The area is south of the River Meden and therefore 16cm LiDAR data of the site is available. This data was used to guide the survey.

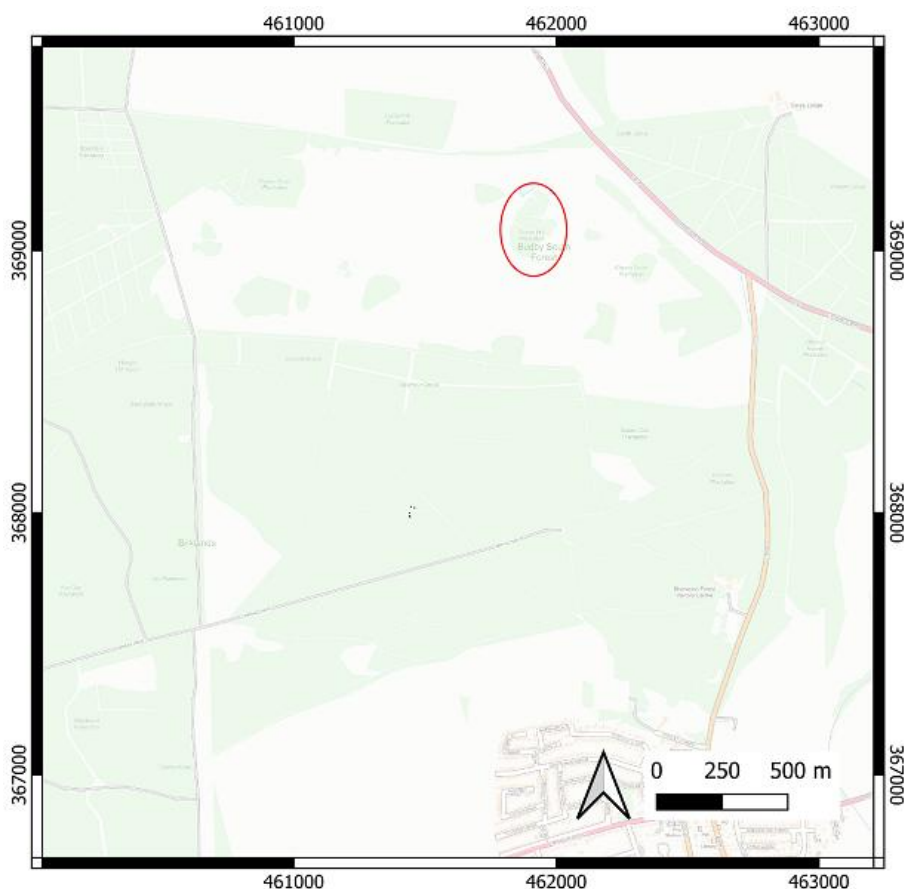


Figure B1: Location of Crown Hill Plantation (red oval), Budby South Forest. Contains OS data © Crown copyright [and database right] 2023.

5.2.1. Crown Hill Plantation Level One Survey & LiDAR Ground-truthing.

A Level One Survey, and LiDAR Ground-truthing of Crown Hill Plantation was undertaken with volunteers in February 2022 and 2023. The survey detected and recorded 24 archaeological features to Level One standards in February 2022 and February 2023. These features were measured and photographed in line with the methodology and the relevant information was recorded. Each feature was given the site code [BUDXXYYY]- where BUD is short for Budby South Forest, XX refers to the year (eg 2022 = 22 and 2023 = 23), and where XXX represents the three digit identifier for the feature (eg 001, 002, 003 etc). This nomenclature is repeated for all sites below and all features recorded.

Time on site was restricted due to licensing requirements and therefore only 24 features were recorded in full. The final archive report contains over 50 additional

feature detected and recorded from the 16cm LiDAR data. Some of these can be seen (without annotation in the image in figure B1), alongside the features recorded (these are marked with the relevant site code).



Figure B2: Features recorded at Crown Hill Plantation, 2022 & 2023, displayed over 16cm LiDAR data. Contains OS data © Crown copyright [and database right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

Feature [BUD22001] is shown below as an example, with volunteers setting out to record the feature in photograph B_1, and the resulting photographs (B_2 and B_3) of the feature for reporting purposes. [BUD22001] is a rectangular trench or pit, 0.14 metres deep, with a long-axis 4.08 metres long.



Photograph B_1: Example of volunteers setting up ranging poles for measuring and photographing feature [BUD23001], Crown Hill Plantation, Budby South Forest, February 2022.



Photograph B_2: Feature [BUD22001] Rectangular Trench/ Pit. Photograph facing North-north-east, of long-axis of feature. Crown Hill Plantation, Budby South Forest, February 2022.



Photograph B_3: Feature [BUD22001] Rectangular Trench/ Pit. Photograph facing North-north-east, of long-axis of feature. Crown Hill Plantation, Budby South Forest, February 2022.

5.3 Area C - Birklands West (Forestry England), Level One Survey - LiDAR Ground-truthing.

Similar to the area of Budby South Forest, Mercian Archaeological Services CIC have undertaken a number of seasons of Archaeological Survey Level One and LiDAR Ground-truthing in Western Birklands in recent years on behalf of the Forestry England, as part of the Sherwood Forest Archaeology Project. These surveys have highlighted archaeological remains which are likely to relate to military activity in the Forest in the Second World War. It was chosen to include this area in the survey to enable recording of archaeological features. The 16cm LiDAR data enable the detection and recording of a number of features not previously recognised.

The Figures below focus on a few key areas. The site of West Birklands, was in the possession of the Dukes of Portland during World War II. It is very different in character today to the National Nature Reserve which lies immediately to the East and consists partly of the same original woodland. West Birklands was altered greatly in the Post-medieval and modern periods, becoming a Sweet Chestnut plantation, and later a Forestry Commission (now Forestry England) Pine plantation. The site is still in the ownership of Welbeck Estate, unlike Birklands nnr which belongs to Thoresby Estate and is managed by RSPB. This different ownership seems to have influenced the use of the land during the Second World War, as the site was used in a

very different way to its neighbour.

The main use of the site seems to have focused along the route of Cavendish Drive (Figure C), where 5 large ammunition storage buildings were distributed along its length. The density of remains is far lower than in the neighbouring Birklands nnr, and the use of the land here seems to have been far less intensive. Movement appears to have been North-South, along this route, rather than East- West in Birklands nnr via the railway system there.

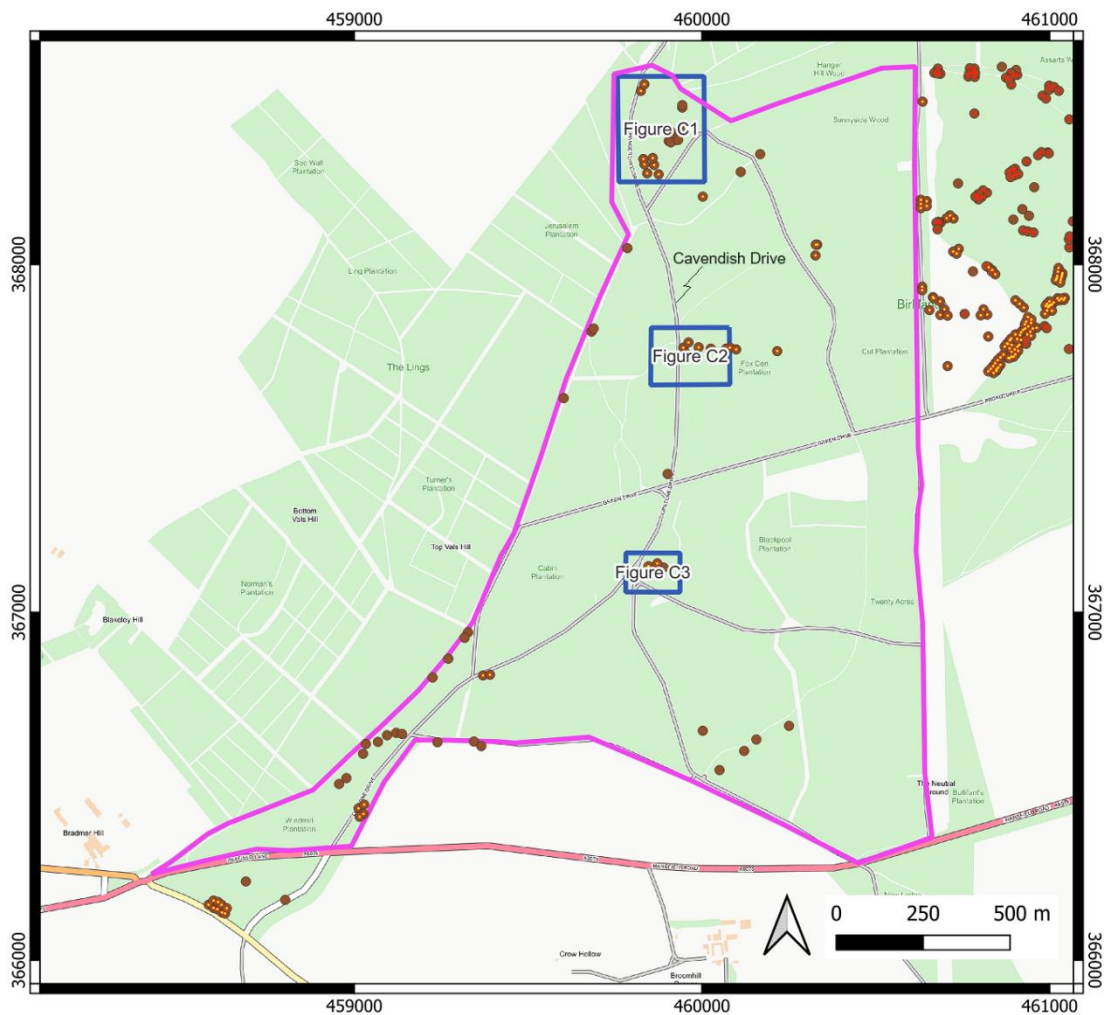


Figure C: Location of West Birklands (purple polygon) and location of Figures C1-C3. Features shown as red dots, with Spirit of Wartime Sherwood features overlain as yellow dots. Contains OS data © Crown copyright [and database right] 2023 LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

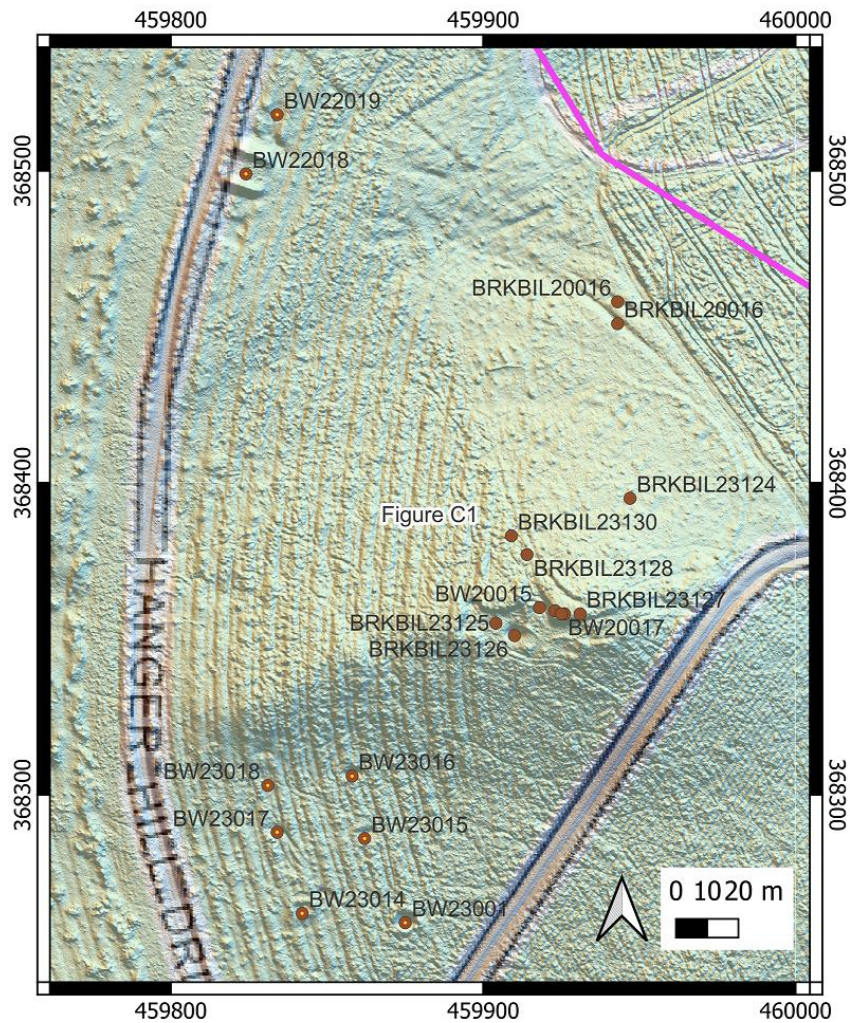


Figure C1: Example features displayed in 16cm LiDAR. Contains OS data © Crown copyright [and database right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

Figure C1 shows the area around Hanger Hill where six ammunition storage pits can be seen on the south-western slope ([BW23001], [BW23014], [BW23015], [BW23016], [BW23017], and [BW23018]). In the north-west, Cavendish Drive (here named Hanger Hill Drive) can be seen curving around the slope of the hill. In the north-west corner of the map is feature [BW22018] which is the remains of a large concrete platform with earth blast-banks along either sides of the long-axis. The feature is situated perpendicular to the road way, and has the footings of a wall running along the roadside to mask the front of the building from view, and forcing anyone entering to do so by going around the wall. This platform is the remains of a building for storing ammunition (see Figure C4 below).

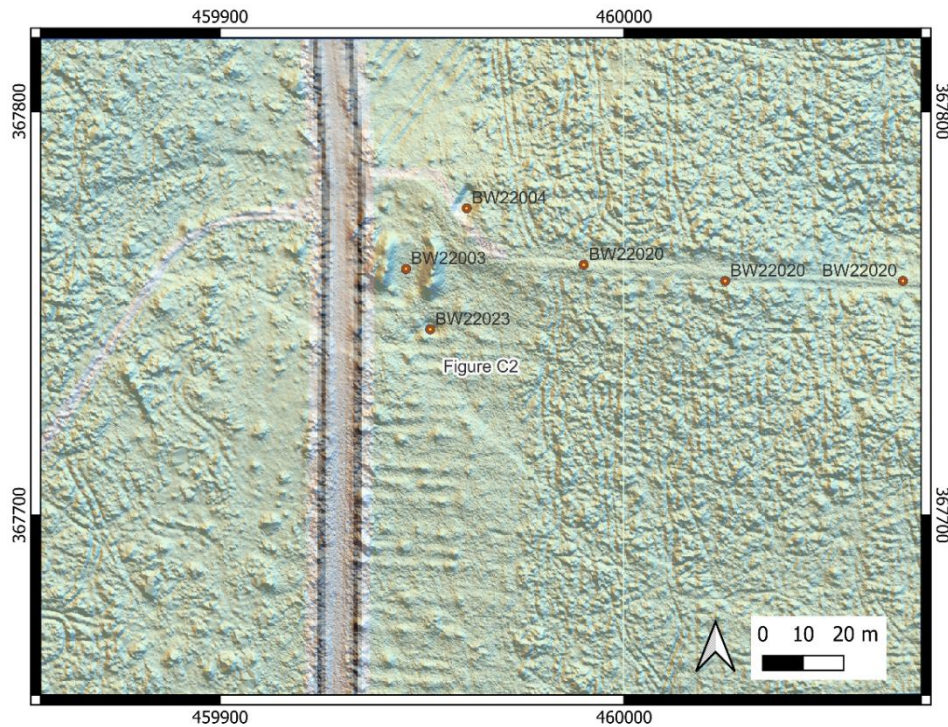


Figure C2: Example features displayed in 16cm LiDAR. Contains OS data © Crown copyright [and database right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

Figure C2 focuses on the site of feature [BW22003], another concrete platform with earthen banks which was the location of a former military ammunition storage building. To the east of the building a linear shale embankment can be seen running East-West [BW22020]. This track way may have brought munitions to the building, and can be seen curving round the building to the North to join Cavendish Drive. The building is orientated close to North-south, suggesting it was loaded from this trackway. The track way extends eastwards but not as far as Birklands NNR, so although heading in that direction it does not appear to provide a link to that site.

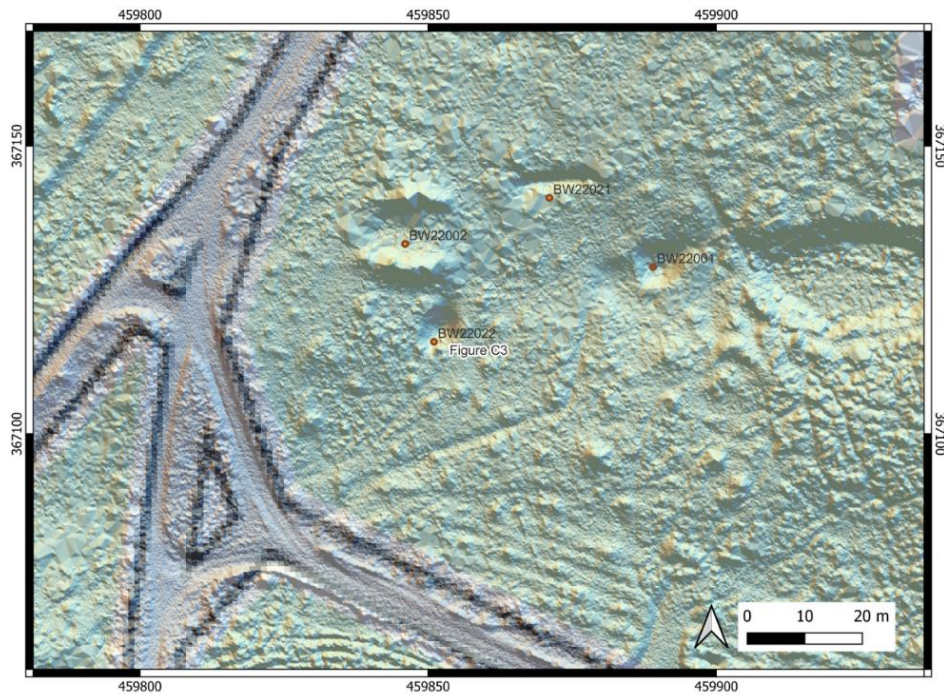


Figure C3: Example features displayed in 16cm LiDAR. Contains OS data © Crown copyright [and database right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

Figure C3 shows the location of a third former ammunition storage building [BW2202] on Cavendish Drive. This building is orientated toward the road suggesting it was loaded and unloaded from this direction.

Figure C4 below is an interpretative drawing from memory of the buildings along Cavendish Drive.

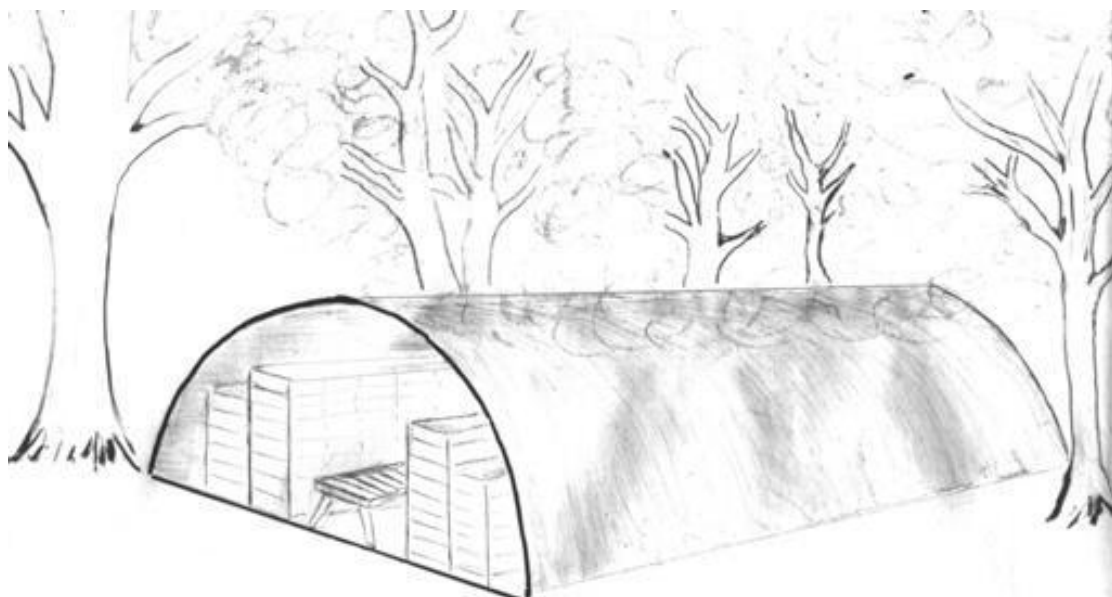


Figure C4: Sketch of ammunition store by Graham Burton



Photograph C_1: Volunteers recording the earthen blast-bank and concrete platform of an ammunition store, in West Birklands.



Photograph C_2: Volunteers recording the earthen blast-banks and concrete platform of an ammunition store, in West Birklands.



Photograph C_3: Volunteers during survey of trench systems in north of West Birklands March 2023.

5.4 Area D - Neutral Ground, Level One Survey & LiDAR Ground-truthing.

The Spirit of Wartime Sherwood Forest Archaeological Survey
End of Project Report

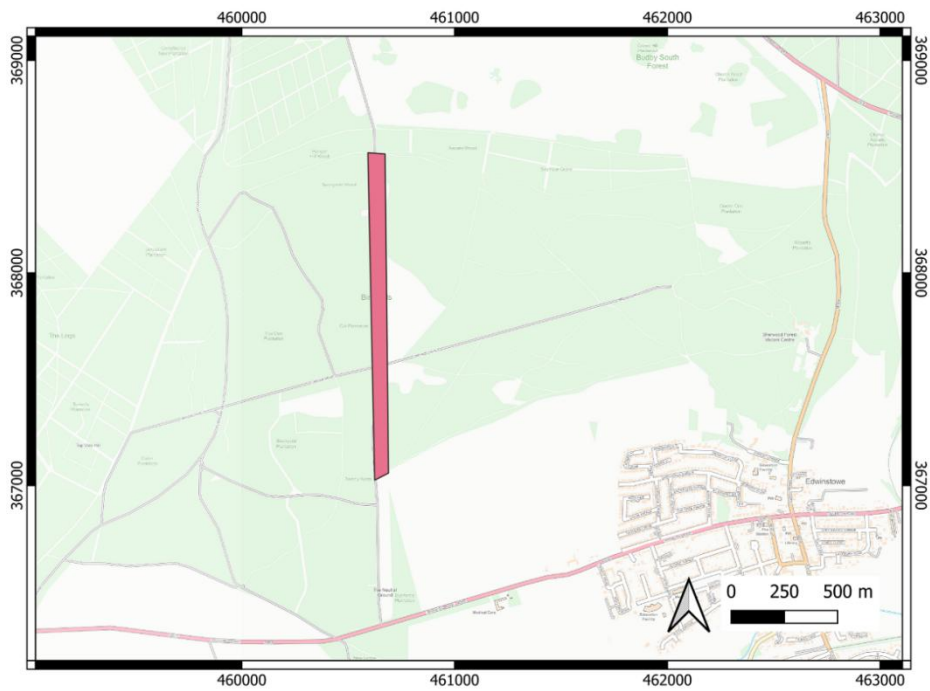


Figure D1: Location of the Neutral Ground Survey area (Pink Polygon), within Birklands Wood. Contains OS data © Crown copyright [and database right] 2023.

A Level One survey and ground-truthing survey of the Neutral Ground, was undertaken with volunteers in April 2022 and 2023. This was the first archaeological survey on the Neutral Ground, and the findings have been very important to understanding the site of Birklands nnr, the railway system, and the relationship to West Birklands in World War II.

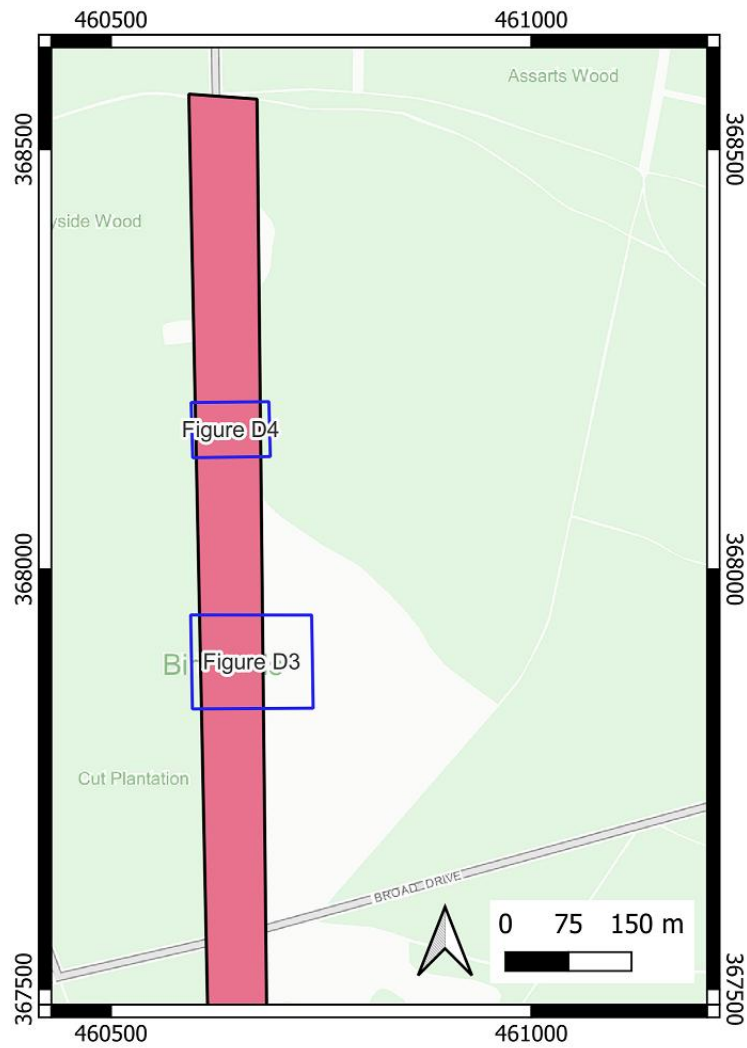


Figure D2: Locations of Figures D3 and D4 in relation to the Neutral Ground Study area. Contains OS data © Crown copyright [and database right] 2023.

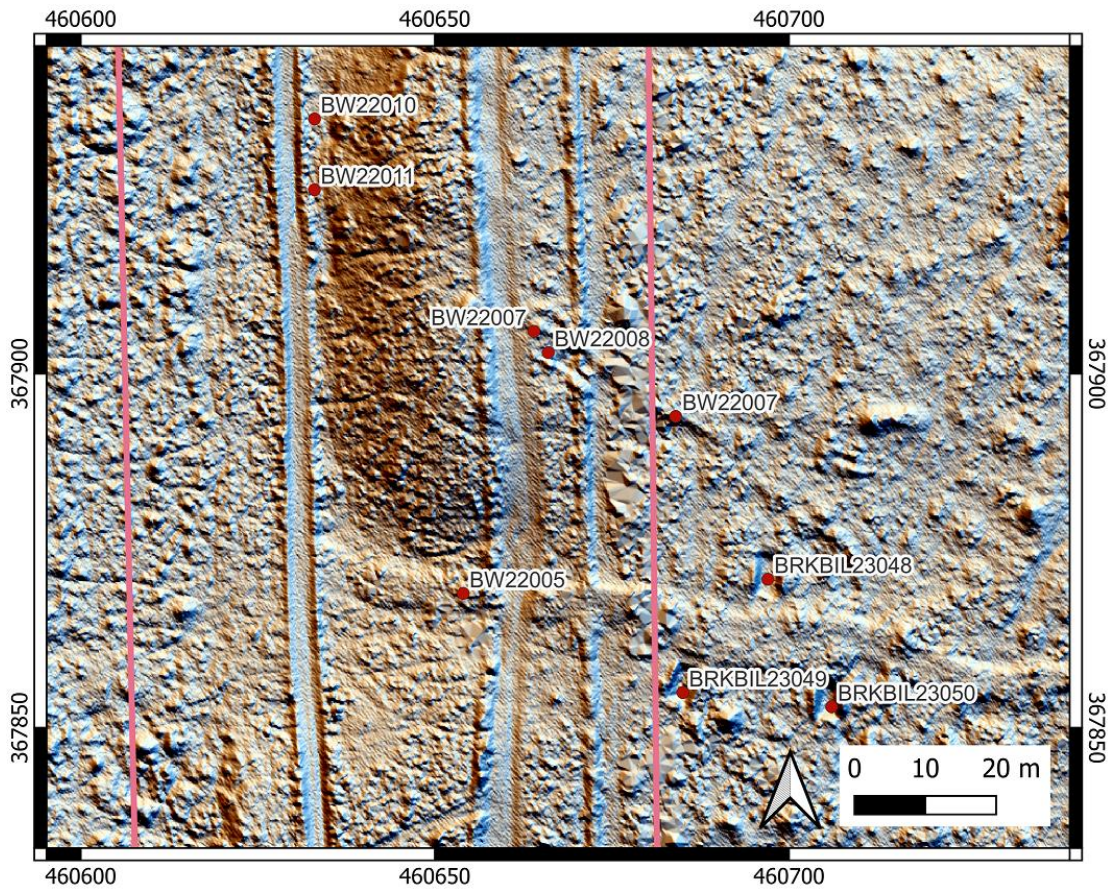


Figure D3: Example archaeological features recorded in the Neutral ground area (between pink lines). LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

Figure D3 shows the location of two former buildings [BW22010] and [BW22011] cut into the slope to their East, and orientated parallel to the trackway with their long axis north-south. The figure also shows military bunker pits in Birklands nnr [BRKBIL23048], [BRKBIL23049], and [BRKBIL23050]. These pits lie either side of a shale railway embankment. The embankment can clearly be seen extending west out of Birklands NNR to cross the Neutral Ground turning northwards at its western end [BW2205]. This is the first time that the railway has been shown to extend on to the Neutral ground, and suggests the buildings shown in the aerial photograph in figure D5 were situated long the line of the railway. It is now interpreted that the railway ran north up the Neutral Ground before turning East back in to Birklands nnr area at the northern end of the Ride, creating a circuit for the railway.

The remains of five further buildings can be seen in figure D4 below [BW23004], [BW23005], [BW23006], [BW23007], and [BW23024].

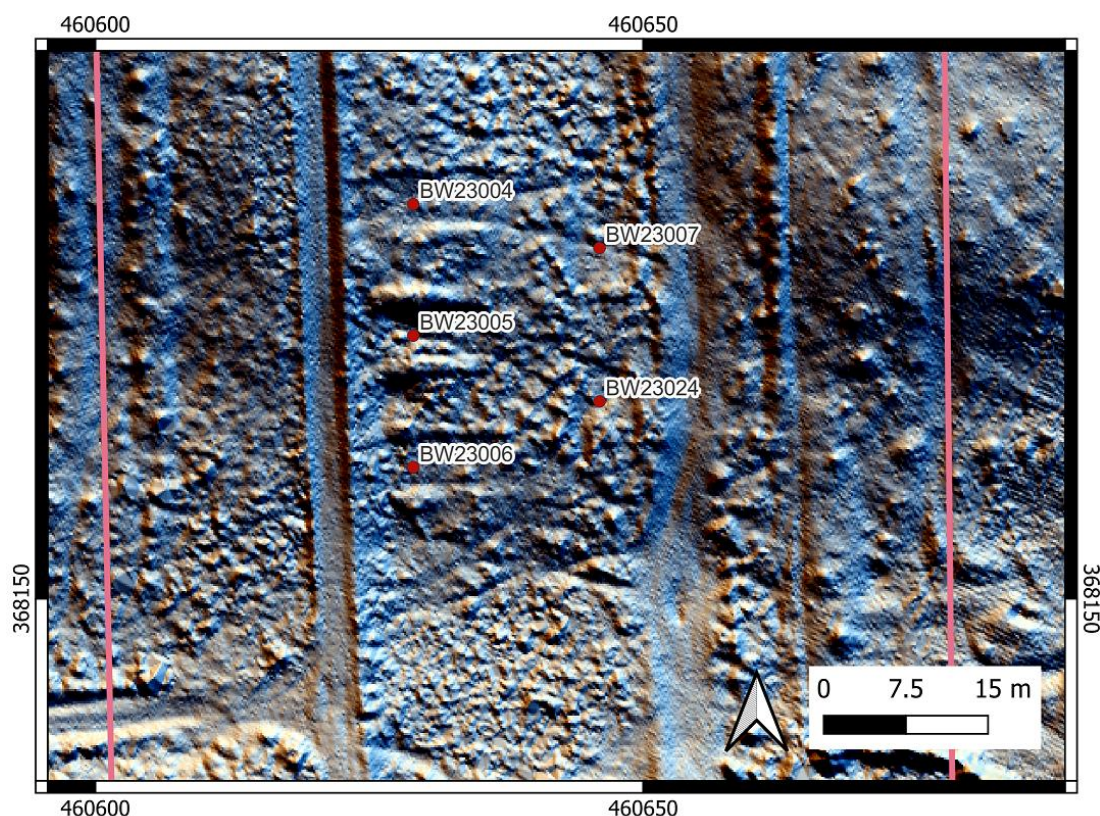


Figure D4: Example archaeological features recorded in the Neutral ground area (between pink lines). LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

Figure D4 shows the LiDAR data results for the area of three very prominent building platforms with earthen blast-banks on either side [BW23004], [BW23005], and [BW23006]. These building platforms were confirmed and recorded on the ground in April 2023 during the Level One Survey of the Neutral Ground. The buildings are visible on the aerial photograph from 1953 in Figure D5 below, and are all three orientated perpendicular to the trackway, indicating they were to be accessed from the track side. The Level One survey also confirmed and recorded the presence of two rectangular platforms (without corresponding earthen blast-banks) [BW23007], and [BW23024]. The possible former building locations were orientated parallel to the track way, all of which suggested the function of the buildings was different to the previous three. Buildings [BW23004], [BW23004], and [BW23004] with blast-banks may have formed ammunition stores similar to the bunker-pits with embanked sides which line the railway system in Birklands nnr, and the railway system is now interpreted as running North-South along the Neutral Ground to to rejoin the Birklands nnr system to the north, and this would fit with this interpretation (see sections 6 Conclusions and Discussions below).



Figure D5: Extract from Aerial photograph 14th August 1953. RAF/ 58/1210 Frame 0067, Camera- P21. Showing The Neural Ground. White rectangles can be seen on either side of the trackway running north-south along the ride (red circles include the features in figure D3, and D4, and yellow circles the remainder). These rectangles appear to be buildings.

Also visible in the centre left of the aerial photo from 1953 in figure D5 is a compound on the south side of the East- West road way running west from the Neural Ground (green circle on figure D5) Surveying of the site suggested it had been used for the decommissioning and possible previous storage of munitions, including tank propulsion canisters.

Other possible small features visible in the bottom left quarter of figure D5 (annotated within blue circles - in the form of clusters of white 'speckles' possibly representing former buildings across the area of West Birklands) were not discovered in the LiDAR data or the Level One Survey. Unfortunately extensive post-war planting ridges for pine plantations appear to have removed any more ephemeral structures from the area.

One thing that may have affected the difference in land-use on either side of Birklands could be the amount of tree cover available at the time. What is striking from the aerial

photograph is the lack of tree cover in much of West Birklands, in comparison to the area on the right of the picture in the current Birklands nnr area.

5.5 Area E - Edwinstowe former POW, and Displaced persons Camp, Level One Survey.

The area to the north of Edwinstowe Cricket Pitch, stretching either side of the Budby Bridleway was converted into a Prisoner of War camp. "Post-war security for munitions being withdrawn the camp was converted first to a Prisoner of War (PoW) when it was forcibly closed as it was in such poor condition... The camp was the converted to a "Displaced Persons Camp 1948-1953. The German Prisoners of War were brought here to work on the farms... All the Germans had been sailors (U-boat/submarine prisoners) They were let out at night", they could not get away as there was nowhere to go. The lads in the village, who had been in the navy during the war, used to sit on the wall on the corner, opposite the Royal Oak-near the Forest Lodge. The Germans would come walking by and the village lads used to talk to them about where they had been and when had they been taken prisoner. (<https://edwinstowehistory.org.uk/local-history/war-years/second-world-war/sherwood-forest-during-and-after-ww2/>)

A map of the Prisoner of War Camp survives in Nottinghamshire Archives. It has not been possible to accurately locate the map on the ground, at this stage, but the map and data derived from it will be produced in GIS for the final archaeological report.

Survey of the area of the camp produced very few features such as former hut platforms which survive at other POW sites such as at Carbuton camp (Gaunt 2018b). Mainly surveyed remains were in the form of areas of clinker and other evidence of occupation. It is hoped that future work may reveal remains that could enable the map from the war time camp to be accurately located, and then the location of all the buildings be accurately positioned, thus allowing further exploration of those locations. The work so far here has suggested more work is needed, hopefully in a future phase of survey.

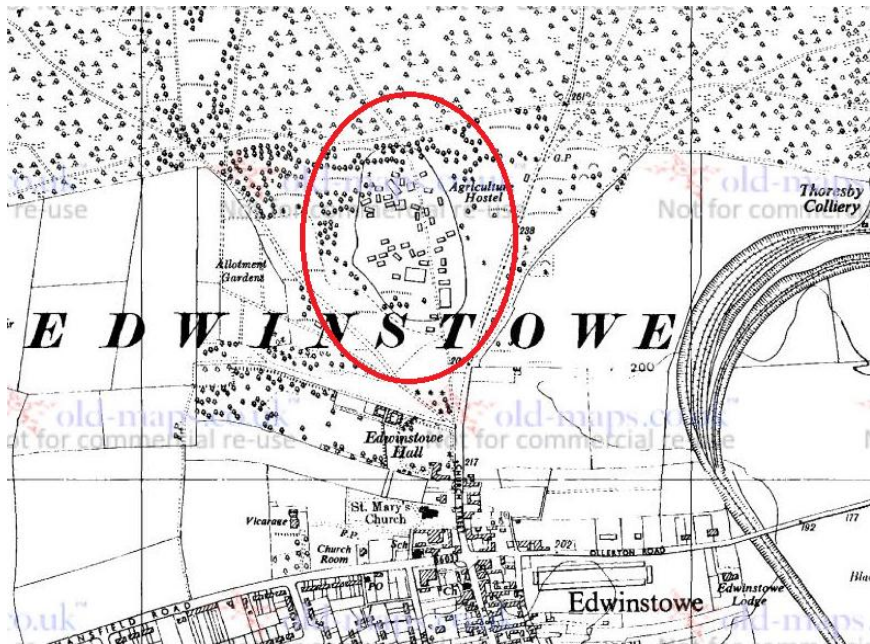


Figure E2: Ordnance Survey 1, 2500 Map of 1955 showing the site of the former displaced persons camp and previous POW camp in Edwinstowe. The boundary of the 'rugby-ball' shaped enclosure is shown within the red oval. Contains OS data © Crown copyright [and database right] 2023



Photograph E_1: Volunteers surveying in the former POW and displaced persons camp, Edwinstowe.

The Spirit of Wartime Sherwood Forest Archaeological Survey
End of Project Report



Photograph E_2: Tree-throw, revealing clinker, and concrete remains within and under the roots. In the former POW and displaced persons camp, Edwinstowe.



Photograph E_3: Volunteers surveying in the former POW and displaced persons camp, Edwinstowe.



Photograph E_4: Iron Military container, dating from WWII. In the former POW and displaced persons camp, Edwinstowe.



Photograph E_5: Concrete feature- probably remains of part of a building, dating from WWII. In the former POW and displaced persons camp, Edwinstowe.



Photograph F_1: Volunteer Robin Orr helping to highlight possible tank/vehicle tracks across land outside the former northern boundary of Bilhaugh wood.

In addition to the fieldwork undertaken Mercian are also producing map layers in the form of Geographic Information System (GIS) vector files. To the East of Old Oaks lies the former site of Proteus Camp. A map dating from 1942 - Ma 5 P 17, shows the location of buildings and infrastructure which has been georeferenced to modern mapping. Outlines of features have been recorded as polygons with attributes pertaining to details given on the map such as the use of buildings. It is hoped that this information in association with the 16cm LiDAR data can provide the basis for future fieldwork at the site.

This information in table and map form is included in the forthcoming full archaeological report.

5.7 Area G - Thoresby South Woods, 'Spotter' Survey.



Figure G1: Location of Thoresby South Woods. Contains OS data © Crown copyright [and database right] 2023

Following the initial request for 'spotters' to send in photographs of site in the area, features within Thoresby South Woods were sent in to the project. Unfortunately there was not chance during the life-cycle of this project to undertake a ground-truthing Level One Survey.

However a number of the features recorded are shown here and will be presented with annotated location maps, and LiDAR analysis, in the full archive report.



Photograph G_1: Remains of a large building with concrete base, front wall with concealed entrances, and earthen last-banks to the sides. South Woods, Thoresby Estate.



Photograph G_2: Remains of another large building with concrete base, front wall with concealed entrances, and earthen last-banks to the sides. South Woods, Thoresby Estate.

5.8 Area H - Thoresby Ollerton Squares, 'Spotter' Survey.

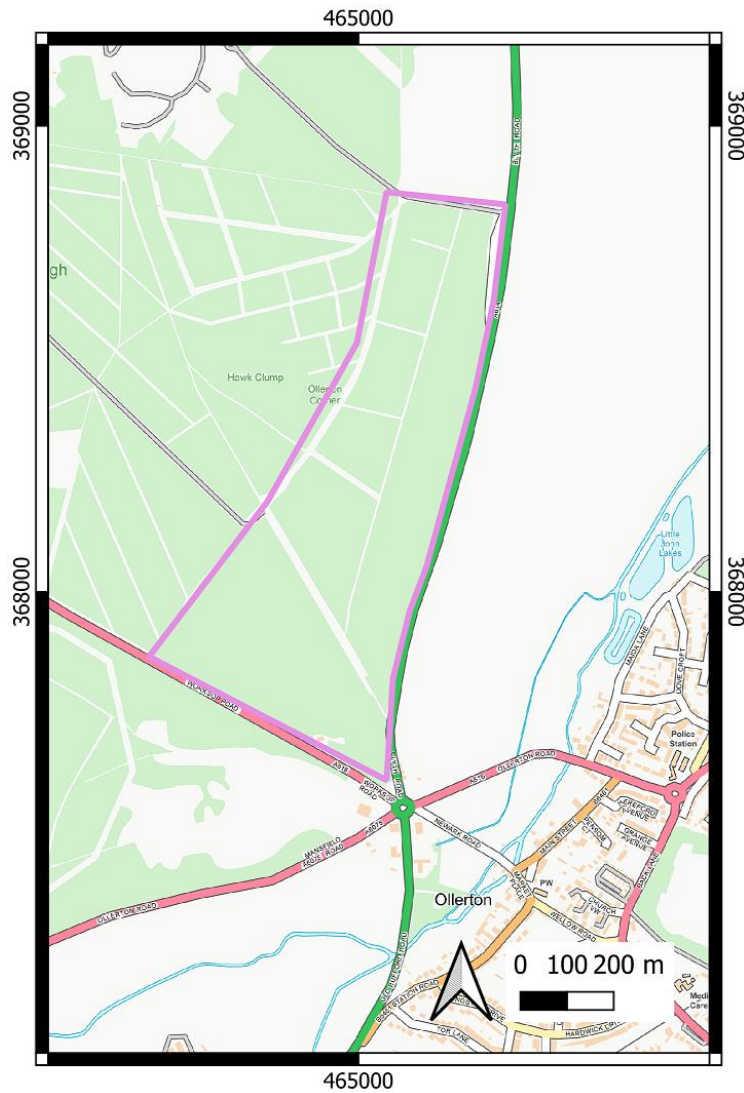


Figure H1: Location of Ollerton Squares Railway. Contains OS data © Crown copyright [and database right] 2023

The area of woodland (private land) to the north of Ollerton roundabout, and west of the A614, is part of Thoresby South Woods, known as Ollerton Squares (see figure 1_1 for full location). The strip of plantation adjacent to the A614, was originally outside of the medieval boundaries of Bilhaugh wood. The area contains a very well

preserved railway track system complete with shale linear banks, connecting various stone and concrete built railway platforms. The system was originally connected to the national railway system via Ollerton, and may have acted as the initial hub where munitions entered the system to be distributed to the ammunition sites shown on the requisitions map in figure 1_3. In particular, the rail systems in Birklands NNR, Thoresby North and South Woods.

It was originally hoped to undertake a Level Two survey of the site, but access was not possible during the life-cycle of the project.

The site is shown complete with rail network on the 1:2,500 Ordnance Survey map from the 1955.



Figure H2: Railway system shown on 1950s Ordnance survey map. On right side of the map north of 'Beech Avenue' and west of 'Blyth Road'. Contains OS data © Crown copyright [and database right] 2023



Photograph H_1: Brick and concrete railway platform. Photograph facing north.



Photograph H_2: Railway platform marking the terminus of to different tracks. Located in the southern end of the woods. Photograph facing north-west.



Photograph H_3: Volunteer stood on top of a linear shale embankment running north-south on the eastern side of the wood. The hedgerow to the right of the picture is adjacent to the A6a4. The photograph is taken facing north.

5.9 Area I - Thoresby Hall, 'Spotter' Survey.

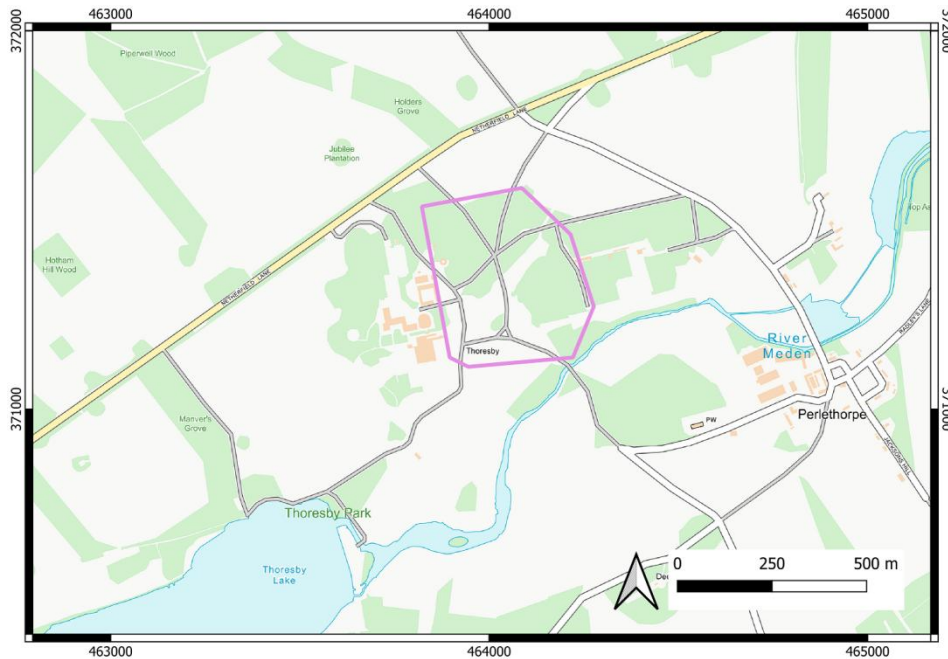


Figure I1: Location of Thoresby Hall survey 'camp' (pink polygon). Contains OS data © Crown copyright

[and database right] 2023

The area immediately East of Thoresby Hall was requisitioned as a 'Camp' (Figure 1_3). A walkover by a local resident provided information about metalled roadways and areas of concrete hard-standing, which formed part of this military camp. A few photographs are included here to give an impression of what exists. A full Level One Survey would be beneficial in any future project opportunity.



Photograph I_1: Concrete hard-standing, in the area marked 'camp' on the requisitions map in figure 1_3. The feature is 100m east of Thoresby Hall, and the photograph is taken facing south-east.

5.10 Area J - Thoresby North Woods, 'Spotter' Survey.

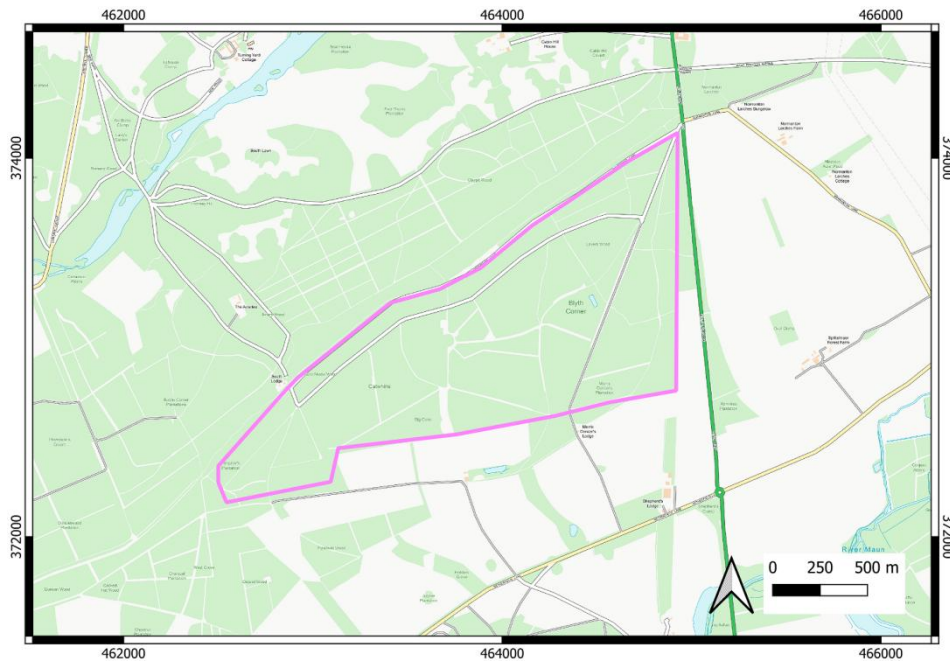


Figure J1: Location of Thoresby North Woods. Contains OS data © Crown copyright [and database right] 2023.

The area of Thoresby North Woods north of Piper Well Wood and Morris Dancers Plantation is marked on the Thoresby Estate requisitioning map in figure 1_3 map, as “Ammunition Site”. The area contains the remains of an extensive World War II military narrow-gauge railway system complete with surviving brick and concrete built platforms and the remains of associated buildings.

The site is on private land and the location of World War II remains and photographic evidence was provided in the preliminary stages of the project by one of our team of spotters.

This railway system is likely to be linked to the system in Ollerton Squares (Area H) discussed below. This area would benefit from further ground-truthing and recording and perhaps from higher levels of recording in any possible future phase of works.



Photograph J_1: Remains of a brick and concrete military building railway platform. In Thoresby North Woods, former ammunitions store. Part of a railway system for transporting ammunition.



Photograph J_2: Remains of a brick military building, internally rendered in mortar, in proximity to the railway platform above in photograph J_1. In Thoresby North Woods, former ammunitions store.

5.11 Area K - Kings Wood

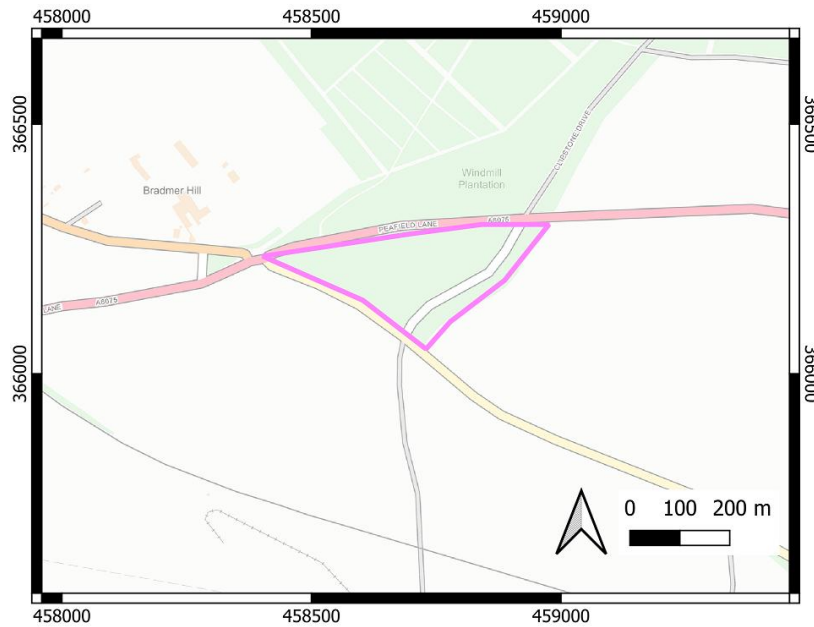


Figure K1: Location of Kings Wood. Contains OS data © Crown copyright [and database right] 2023



Figure K2: Location of military pits in Kings Wood. Contains OS data © Crown copyright [and database

right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

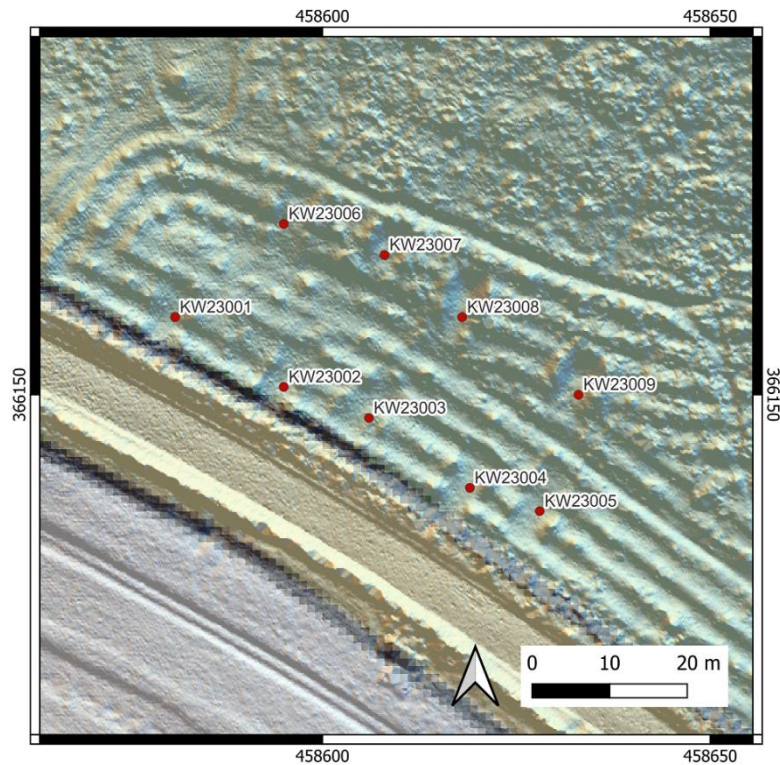


Figure K3: Location of military pits in Kings Wood. Contains OS data © Crown copyright [and database right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

Kings Wood is located near to Windmill Hill in Warsop. The wood is located in Clipstone, and is privately owned by Lynda Mallett who kindly granted access for surveying. The woodland is planted with Sweet Chestnut, but in medieval times was known as the 'Hollins'. This was an area of Holly wood kept for fodder for the deer in the park at Clipstone. The wood contains earthworks, some of which may be the remains of a 'Deer Leap' for the park.

In the Second World War the wood lay at the very southern end of the West Birklands ammunition store. While surveying in the site for Merican's annual topographic survey training course in October 2023, the LiDAR data being used in that survey showed the remains of military pits on the south-western side of the wood. It was decided to survey these pits for inclusion in the Spirit of Wartime Sherwood Forest project.

5.12 Area L - Meden Colliery, 'Spotter' Survey.

This is the former location of Welbeck Colliery at Meden Vale (the name for the area in the survey combines these two elements). The site lies along the route of Cavendish Drive as it passes north out of West Birklands and crosses the Warsop Road. Information about the site was provided by a number of 'spotters' including photographs. Also Steve Horne of the Friends of Thynghowe and the Old Warsop Society provided documentation and historical research.

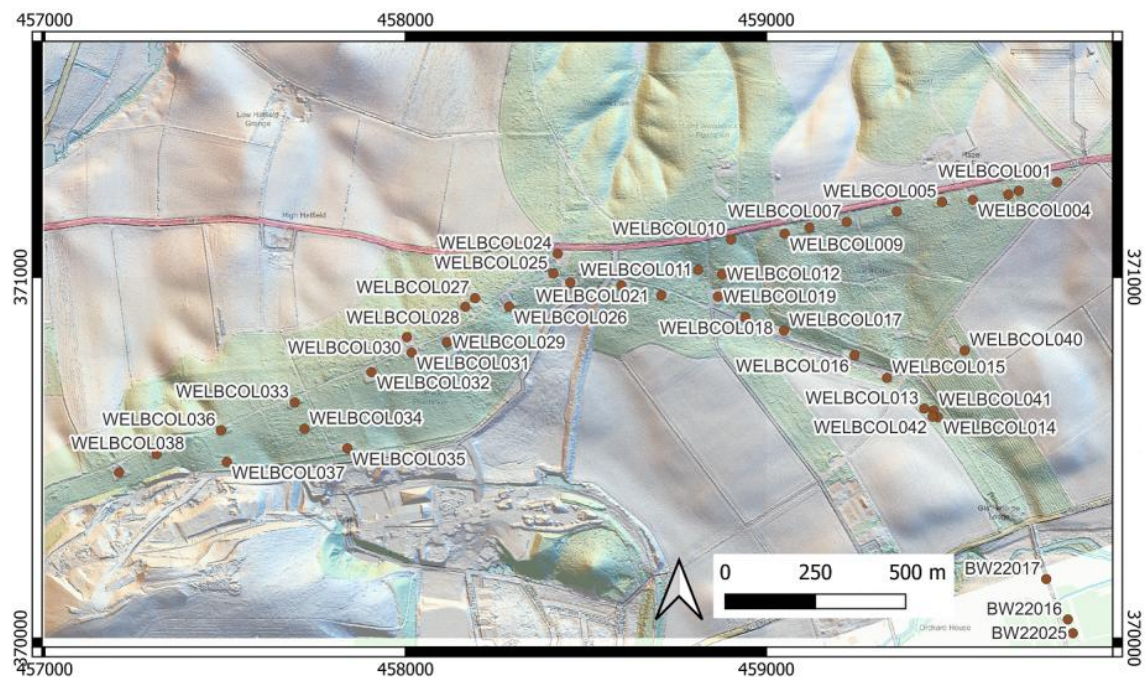


Figure L1: Location of archaeological features in the 'Meden colliery' area, derived from LiDAR. . Image produced by Mercian from original 25cm resolution LiDAR data provided by Bluesky. Contains OS data © Crown copyright [and database right] 2023

Located on lands owned by the Welbeck Estate, the site was requisitioned during the war to function as RAF Cuckney Maintenance Unit MU66.

"MU66 was a Ground Equipment Depot responsible for supplying tools, MT

(Mechanical Transport) spares, paints, dopes, ropes and all manner of general items to RAF bases in the area... Accounts from local women who worked there describe garages, workshops, forges, canteen, and living accommodation. Some of the huts has well kept gardens... The disposal sale advertisements for MU66 from 1947-8 listed examples of the equipment that had been stored there. They include hand tools, soldering irons, paint, varnish, paint brushes, riveting tools, sledgehammers, spirit levels, crowbars, brass, steel, aluminium, 115,000 yards of asbestos webbing and 40,000lbs of glue powder.” (Old Warsop Society - Warsop in World War II (booklet))

Over 40 features have been, mapped from LiDAR data including 25 large rectangular building platforms, running either side of the trackway through the site, and 13 brick huts located along the southern side of the Budby to Cuckney road, at the northern edge of the site.

Mercian will be running a Level One survey and LiDAR ground-truthing session in late 2023, to properly record these features. The results will be provided to this project by Mercian for inclusion in the final archaeological report.



Photograph L_1: Concrete building platform.



Photograph L_2: Circular concrete structure.



Photograph L_3: Brick Hut remains

5.13 Area M - Ransom Wood

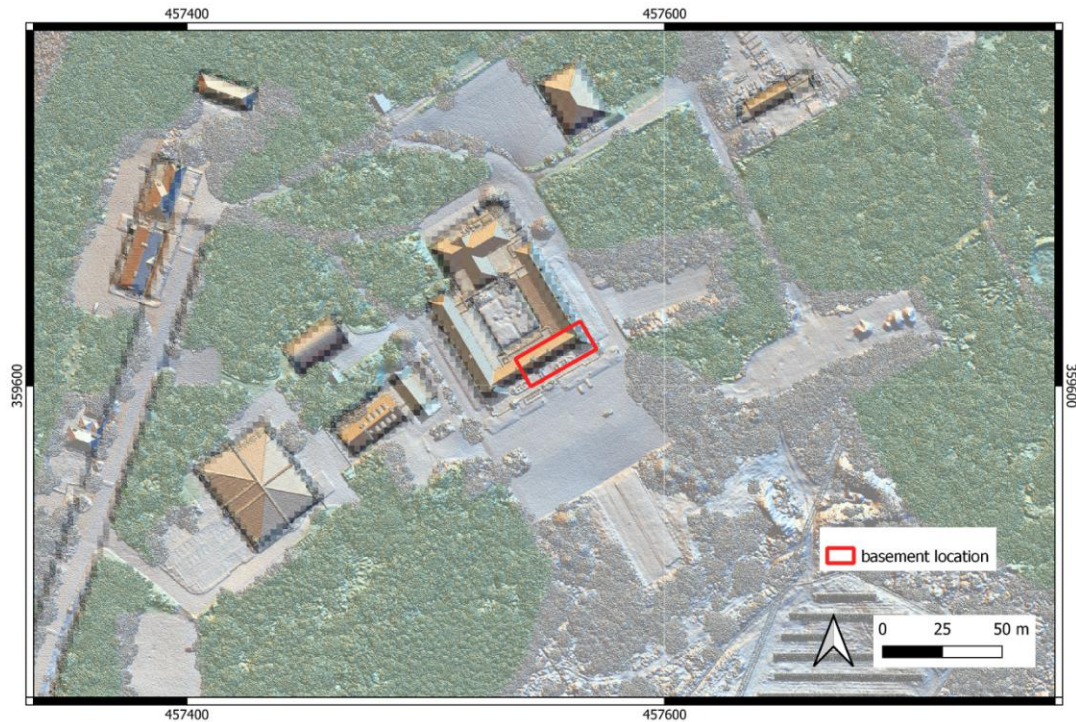


Figure M1: Location of basements in Ransom Wood Hospital main building. Contains OS data © Crown copyright [and database right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

The Site of Ransom Wood Hospital is now a Business Park. The main building of the site and hospital is Ransom Hall. One of the owners of the site, Mr Charles Cannon, made Mercian aware of basements under the main building (during the initial outreach for this project) which had served as a communications hub. It was intended it could become a local control centre should other sites be destroyed (Charles Cannon pers comm 2022).

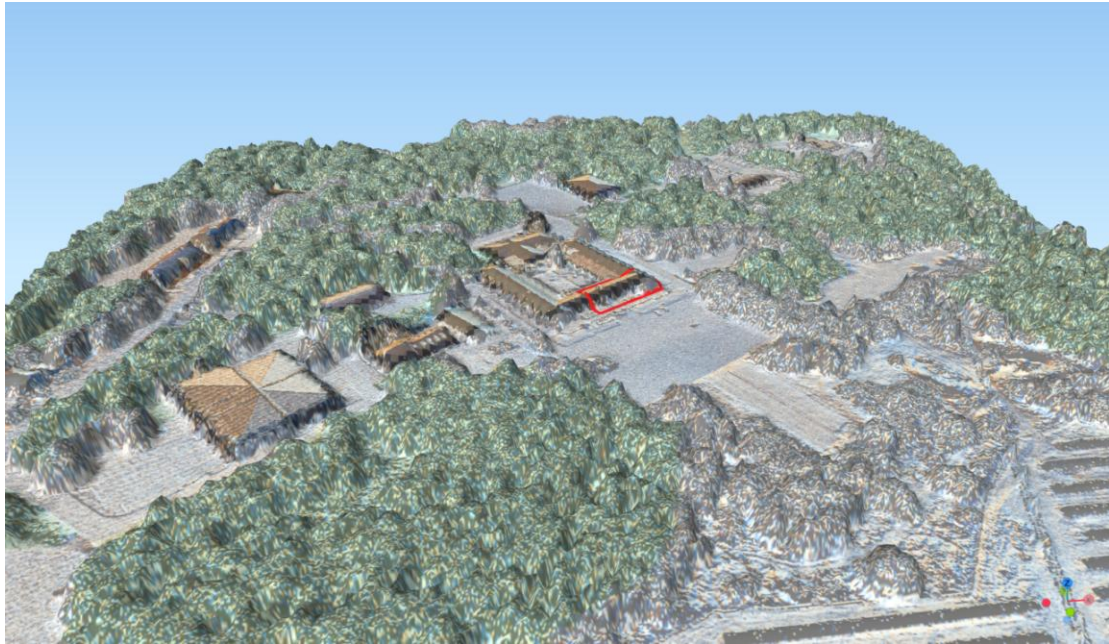


Figure M2: Location of basements in Ransom Wood Hospital main building. Contains OS data © Crown copyright [and database right] 2023. LiDAR images created from data originally acquired in Miner2Major Veiled Landscape Project (2021)

Mercian and volunteers undertook a Level Two survey of the site to construct a plan of the basements. A level One survey of the basements was also undertaken to locate features dating to the Second World War.



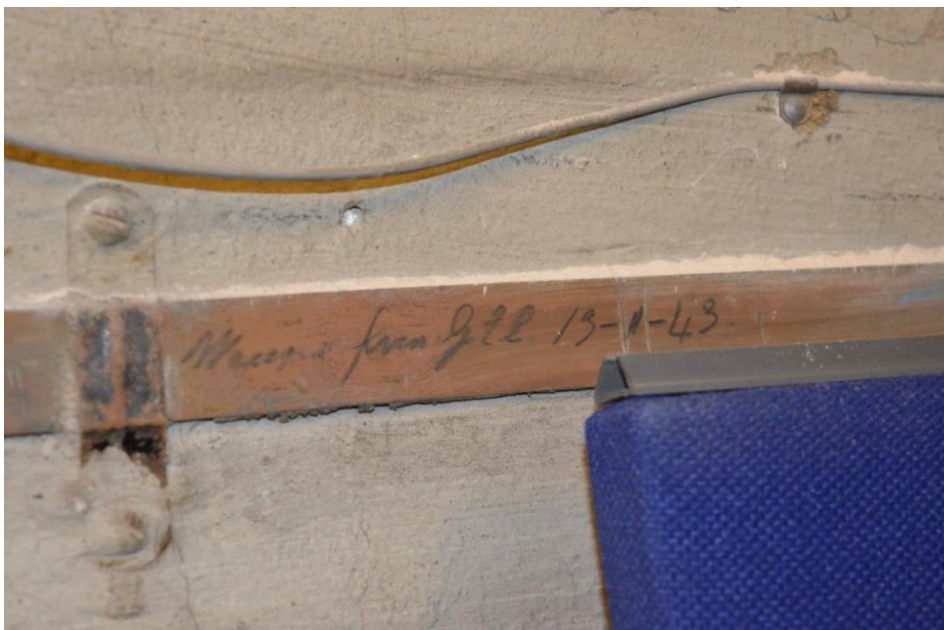
Photograph M_1: Ransom Hall, former Hospital. The basements are situated under the building shown,

The Spirit of Wartime Sherwood Forest Archaeological Survey
End of Project Report

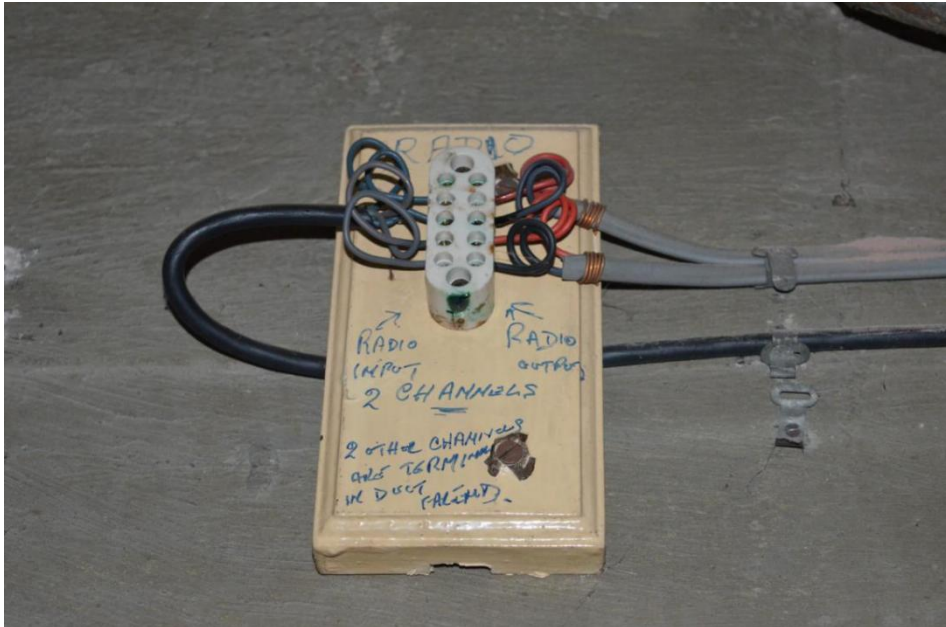
to the right of the sign.



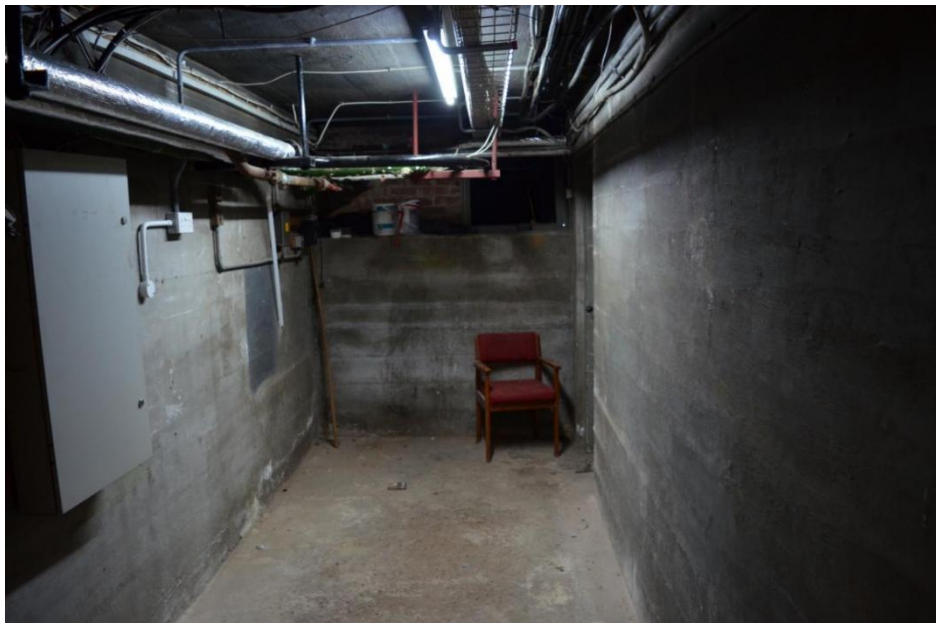
Photograph M_2: Volunteers learning to use EDM Total Stations to survey the exterior of Ransom Hall.



Photograph M_3: Earthing strip labelled 13-1-43, dating from the war, located in the basement of Ransom Hall.



Photograph M_4: Wiring for Radio inputs. Ransom Hall basements.



Photograph M_5. Interior of Basements. Ransom Hall.

It was also suggested that a grove of Beech trees which dated from the period of the war contained bullet marks and graffiti. These were also surveyed and subject to a photogrammetric survey. These results are to be presented in the final archaeological report.



Photograph M_6: Graffiti on trees at Ransom Wood.

In summary, the survey has helped record the feature in its present condition, and this will hopefully help in its future management, The survey also has helped give an understanding of the construction of the feature, which was not previously understood, and has helped to show that it was de-commissioned as an Immersion Tank in 1948, which means it was exclusively used during the years of the Second World War, which may make this site nationally significant.

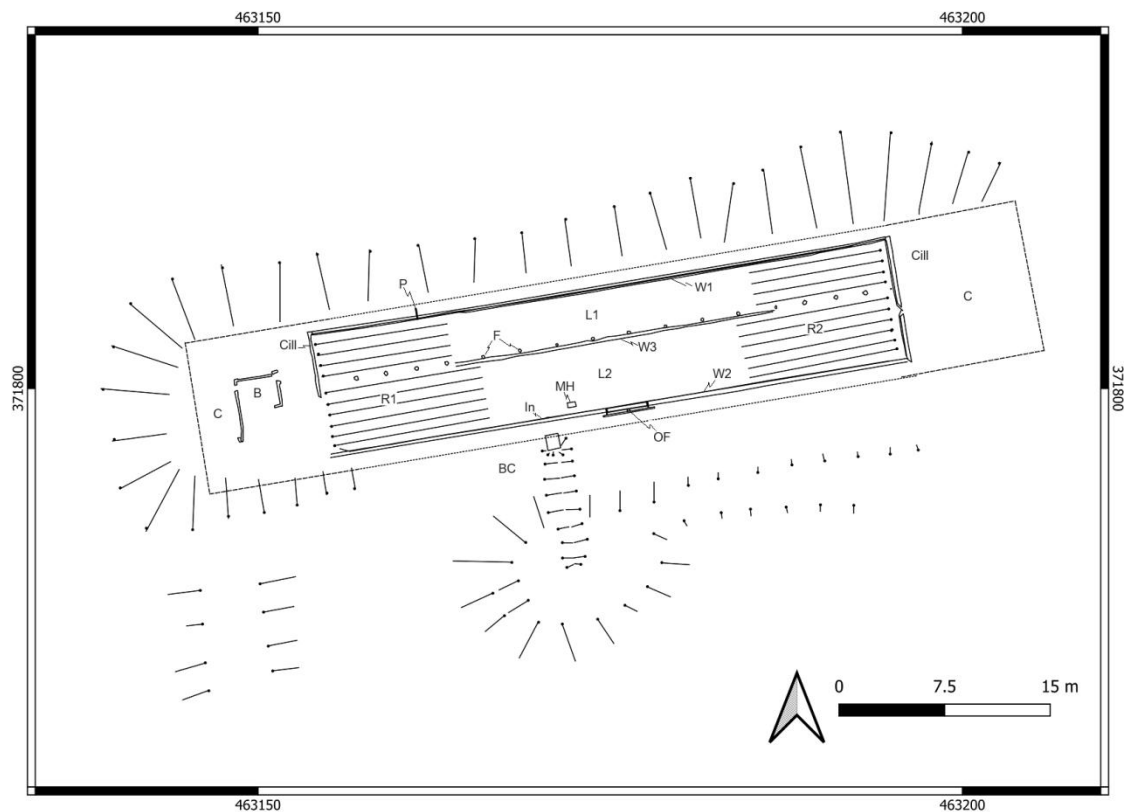


Figure N2: Survey Hachure plan of the brick and concrete military Immersion tank, known locally as the 'Tank Wash'.

The feature consists of a concrete and brick chamber approximately 40 metres in length, and 20 metres in width. Vehicles were driven down the ramps - most likely from the eastern end of the system. Inside the tank was a split level with a lower, and higher level. The lower side ('L2' in Figure N2) was on the southern part of the chamber, the higher level ('L1' in Figure N2) on the northern side. The two levels were separated by a metal fence embedded into the concrete floor, which ran the length of the chamber (example of in-filled fence post locations labelled 'F' in Figure N2). This would prevent vehicles falling off from the top to bottom levels.

The site was located within an area of Tank training- as shown on the map in Figure 1_3. This area was heath prior to the war. A large rectangular hollow was first dug,

and the concrete ramps which lead down into the chamber were constructed, along with the base ('C' in Figure N2).

The walls (W1 and W2 in Figure N2, photograph N_1) were constructed of brick and concrete on either length of feature to create the chamber. Header Bricks act as capping to the double-brick thick interior wall on the left of the picture. A 35cm thick fill of concrete is then lined with a single skin of bricks on the exterior side. Earth was then back-filled behind the exterior of the walls to increase strength. The chamber was fed by an inlet valve on the southern side ('In' in Figure N2, Photograph N_7), with access provided from a brick-lined chamber ('BC' in Figure N2, Photograph N_8), and drained via an outlet beneath an iron man-hole cover ('MH' in Figure N2, Photograph N_6). An integrated overflow system was constructed on the southern side of the chamber in the wall ('OF' in Figure N2, and Photographs N_2 and N_3). A Pipe ('P' in Figure 2) is built through the wall and may have provided water to a hose for washing the tank tracks etc.

When decommissioned as an Immersion Tank, the system was converted into a swimming pool and used by local children (photographs N_12, N_13, N_14, and N_15). Concrete cills were added at the top of the two ramps into the chamber to prevent dirt and debris washing in and to retain the water in the pool at a higher level. The cill across the Eastern side has the year 1948 scratched into the cement while still wet, providing a Terminus Ante Quem for the use of the feature by the military ('Cill' in Figure N2, Photographs N_4 and N_5). The fence was removed by cutting the posts at the abase and in-filling with the same concrete mix as the cills (example of in-filled fence post locations labelled 'F' in Figure N2). A changing hut was also constructed at the western end ('B' in Figure N2, photograph N_15).



Photograph N_1: Northern wall of Immersion tank. Cleared to show construction. Header Bricks act as capping to the double brick this interior wall on the left of the picture. A 35cm thick fill of concrete is then lined with a single skin of bricks on the exterior side.



Photograph N_2: Overflow system. Southern wall of Immersion tank. Cleared to show construction. Header Bricks act as capping to the double brick this interior wall on the left of the picture. A 35cm thick fill of concrete is then lined with a single skin of bricks on the exterior side. A mortared channel drains into a grate in the centre. Photo facing West.



Photograph N_3: Overflow system. Southern wall of Immersion tank. An integrated mortar channel sloping from left and right into a grate in the centre.



Photograph N_4: When decommissioned as an Immersion Tank, the system was converted into a swimming pool and used by local children. Concrete cills were added at the top of the two ramps into the chamber to prevent dirt and debris washing in and to retain the water in the pool at a higher level. These cill across the Eastern side has the year 1948 scratched into the cement while still wet, providing a Terminus Ante Quem for the use of the feature by the military.



Photograph N_5: Close up of Cill. When decommissioned as an Immersion Tank, the system was converted into a swimming pool and used by local children. Concrete cills were added at the top of the

two ramps into the chamber to prevent dirt and debris washing in and to retain the water in the pool at a higher level. These sill across the Eastern side has the year 1948 scratched into the cement while still wet, providing a Terminus Ante Quem for the use of the feature by the military.



Photograph N_6: Iron Manhole cover for draining the system. Located in the centre of the system east to west, on the southern side of the chamber.



Photograph N_7 Blocked-up (mortared) inlet hole in southern wall of chamber



Photograph N_8: Brick-lined access chamber- south of inlet on exterior side of wall.



Photograph N_9: Volunteers drawing brick work on the interior of the northern wall of the chamber.

The Spirit of Wartime Sherwood Forest Archaeological Survey
End of Project Report



Photograph N_10: Volunteers exploring the chamber during the survey.



Photograph N_11: Volunteers undertaking Level Two survey with an EDM Total Station.



Photograph N_12: Local children using the Tank Wash swimming pool- post-conversion in the 1950s.
Courtesy of Catherine Langstaff. Photo facing South-east.



Photograph N_13: Local children using the Tank Wash swimming pool- post-conversion in the 1950s.
Courtesy of Catherine Langstaff. Photo facing South-east.



Photograph N_14: Local children using the Tank Wash swimming pool- post-conversion in the 1950s.
Courtesy of Catherine Langstaff. Photo facing East.



Figure N_15: The Tank wash converted to a swimming pool complete with newly constructed changing hut on the western end. Photo facing South-west.

5.15 Additional Sites - Budby Crater



Photograph BC_1: Showing an explosion crater on the eastern side of the road north of Budby village.

6. Conclusions & Discussion

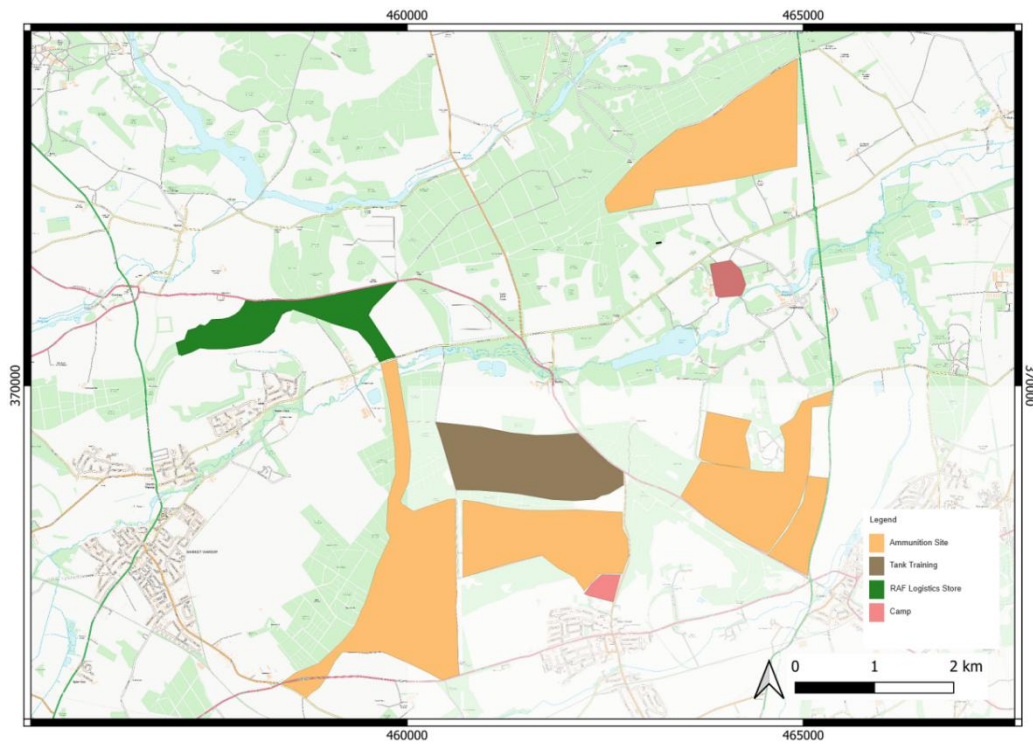


Figure 6_1: Land-use during World War II for areas survey in the Spirit of Wartime Sherwood Forest Project. Contains OS data © Crown copyright [and database right] 2023

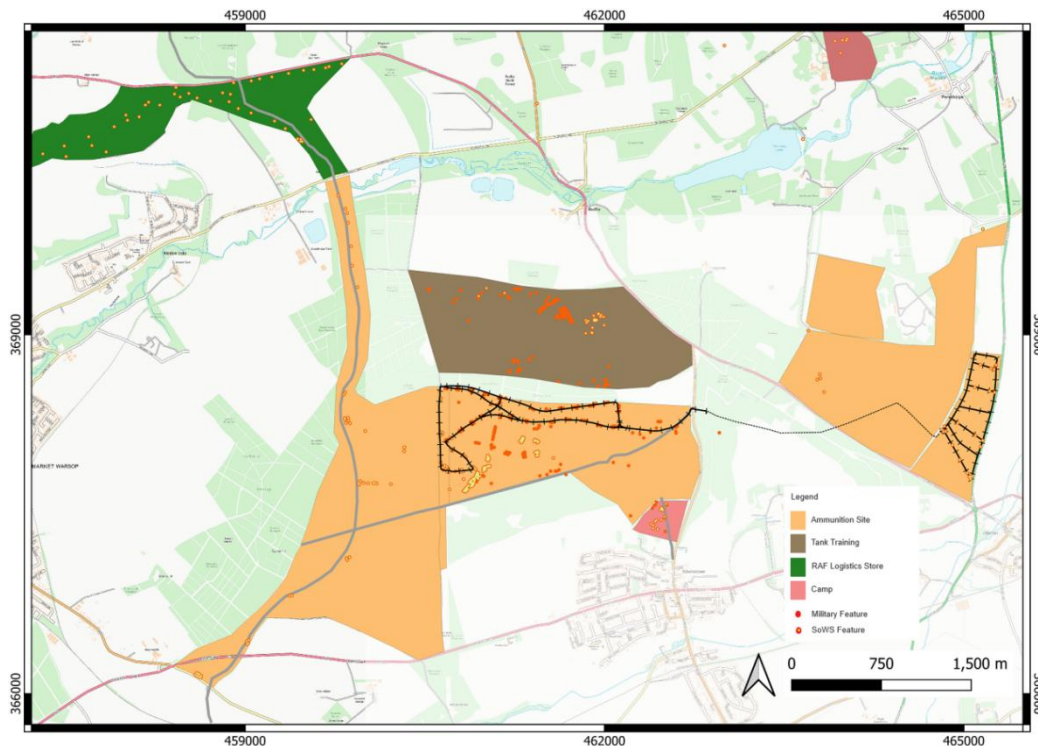


Figure 6_2: Interpretative Plot of World War II landscape features in survey area including location of surveyed features, route-ways of significance and railway systems. Contains OS data © Crown copyright [and database right] 2023

The Archaeological work undertaken in the Spirit of Wartime Sherwood Forest has been a great success. It represents the first landscape scale attempt to understand the use of the landscape of northern Sherwood Forest during World War II. As previously stated Mercian have been undertaking surveys across this landscape for many years, and other organisations have also undertaken work at the local level and in particular Birklands wood has received previous attention in the form of surveys in both the Forestry England and RSPB controlled areas. But no previous survey has attempted to investigate the landscape on this scale, concentrating solely on understanding the archaeology from the war period.

The following discussion represents preliminary conclusion, which are as always open to further interpretation and refinement. They are by no means all that has been discovered, but help to show that the project has already brought forward many new ideas and findings.

For the first time it has been possible to see the different nature of the archaeological resource across sites, and to interpret from this what the nature of the use of each site was at the time. It has also been possible to see the relationships between sites.

Some of the key findings at the landscape scale are that there appears to be a relationship between woodland and ammunitions sites, and likewise between heathland and Tank training areas (See Figures 1_3, 6_1 and 6_2). Interestingly this

could give something of a window into the inherited landscape from the medieval Forest, and this will be explored and discussed further in the final report .

At the level of the relationships between the different sites, it is apparent that West Birklands and the eastern side of Birklands (Birklands nnr), both in different ownerships at the time (and to this day) were, although both used for ammunition storage, used differently, and it would appear, almost completely separately from each other.

If there was any movement or transport links between the two sides, they likely occurred along the Broad Drive/ Green Drive route, but the archaeology doesn't really suggest there was much if any linkage.

On the West Birklands side, access and movement appears primarily north to south in orientation, with Cavendish Drive being the main communication route (see figure 6_2). Five large ammunition storage buildings were constructed along this route. Access was from the southern and northern ends of this route-way, and the remains of a circular sentry post have been surveyed at the northern end of this route, presumably guarding access, and also military trench systems have also been surveyed on the hill-slopes in the vicinity of this which, may also have protected the route-way into and out of West Birklands. There appears to have been little movement East to West across the site. Although aerial photography may indicate that some features in the eastern part may have been destroyed by later tree plantations, so some caution regarding absence of evidence not being the same as evidence of absence needs to be employed.

To the north of West Birklands lay the MU66 RAF logistics store which itself lay on, and to the side of, the same route-way, as it carried on Northwards towards Welbeck Estate. It should be noted that if this route was followed further north again, then it would lead to Norton Prisoner of War camp which lay just inside the southern boundary of Welbeck Park. It does seem that much of the requisitioning of the southern parts of Welbeck Estate centred on this route-way between Cavendish Lodge in Clipstone and Welbeck Park. Cavendish Drive also extends southwards out of West Birklands into Kings Wood, and it has been shown by this survey that military pits were also present in that wood too, adjacent to the roadway.

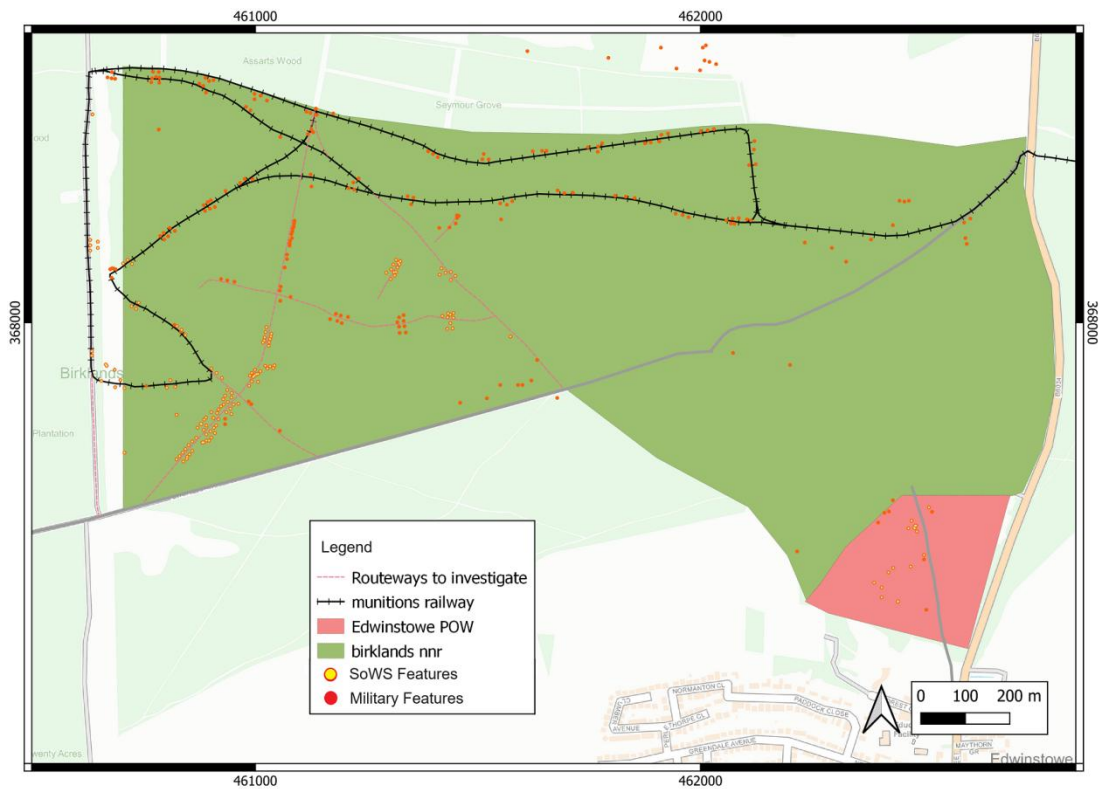


Figure 6_3: INTERpretation plot of military features including the likely route of parts of the munitions railway system, and route-ways which require further research. Contains OS data © Crown copyright [and database right] 2023

To the east of West Birklands, this survey has revealed that the Neutral Ground was not linked to West Birklands, but in-fact appears to have formed part of the railway system which existed in Eastern Birklands (Birklands NNR).

By combining the new information from the Neutral Ground with the surveys in Birklands nnr it has been possible to attempt a reconstruction of at least a part of the munitions railway system (figure 6_3). Although future work will be required on the track-ways (discussed below) to determine if more of the system can be deciphered.

It would appear that the railway system was fed from the eastern side. Most likely via track-ways which have since been buried under the northward expansion of Thoresby Colliery Pit tip in the Post-War era. If, and how, this railway system was linked to the railway platforms and embankments in Ollerton Squares, and indeed if that system was linked to the platforms and embankments in Thoresby North Woods, has not be proven as of yet.

Fantastic contributions from community 'spotters' have demonstrated the extent of remains in these areas, and this combined with LiDAR research has helped to show that there is great potential for further investigation in these areas in the future.

Also terms of future works, the project has helped to answer many questions, but

inevitably has raised many more. The route of the Birklands munitions railway has been interpreted on a much larger scale than previously. However, there is a strong possibility that further survey of the track-ways highlighted in figure 6_3, will reveal further sections, and also help in the understanding of which areas were served by rail and which by road. Metalled surfaces - not really mentioned in this End of Project Report have been mapped in places, but further work on this front - and into which materials were in use by the military could shed further light on this. For instance, Mercian's Finds Specialist and Company Director has identified Blast Furnace Slags as one of the materials used in the construction of military era track-ways in the Edwinstowe POW camp (pers comm, April 2023). Understanding which surfaces are military and which are from later forest management, or earlier carriageways, will be crucial in understanding how the system operated as a whole.

In conclusion, the Spirit of Wartime Sherwood Forest Project archaeological survey has helped advance our understanding of the military landscape of Sherwood Forest. It has helped train, educate, and enthuse many dozens of volunteers from a wide range of ages, and backgrounds, and has provided a platform for engaging many more with the excellent results and interpretation of the heritage. It could, and hopefully will, provide a platform for future projects, to expand on what has been found, and help to further understand the incredible legacy of wartime Sherwood in the landscape.

7. Bibliography

- Bettess, F. 1990. *Surveying for Archaeologists*. Penshaw Press: University of Durham.
- Bowden, M. 1999. *Unravelling the landscape. An inquisitive Approach to Archaeology*. Tempus, Stroud.
- Chapman, H. 2006. *Landscape Archaeology and GIS*. Tempus.
- Cignoni P, Callieri M, Corsini M, Dellepiane M, Ganovelli F and Ranzuglia G, 2008. 'MeshLab: an Open-Source Mesh Processing Tool'. In V Scarano, R De Chiara and U Erra (Eds) Eurographics Italian Chapter Conference.129-136.
- Gaunt, A. 2022. Sherwood Forest Archaeology Survey 2022. Interim Report. In King, C. Archaeology in Nottinghamshire. Transactions of the Thoroton Society volume 126.
- Gaunt, A. 2021. Sherwood Forest Archaeology Survey 2021. Interim Report. In King, C. Archaeology in Nottinghamshire. Transactions of the Thoroton Society volume 125.
- Gaunt, A. 2020. Sherwood Forest National Nature Reserve Survey 2020. Interim Report. In King, C. Archaeology in Nottinghamshire. Transactions of the Thoroton Society volume 124.
- Gaunt, A. 2019. Sherwood Forest National Nature Reserve Survey 2019. Interim Report. In King, C. Archaeology in Nottinghamshire. Transactions of the Thoroton Society volume 123.
- Gaunt, A. 2018a. Sherwood Forest National Nature Reserve Survey 2018. Interim Report. In King, C. Archaeology in Nottinghamshire. Transactions of the Thoroton Society volume 122.
- Gaunt, A. 2018b. *A Desk-based Assessment of Budby South Forest, Sherwood Forest National Nature Reserve. Budby, Nottinghamshire. Part of the Sherwood Forest National Nature Reserve Archaeology Survey*. Open Series Report MAS039. Mercian Archaeological Services CIC.
- Gaunt, A. & Gillott, E. 2011. *Birklands and Bilhaugh: Sherwood Forest National Nature Reserve*. In Challis, K (Ed.). *Archaeology in Nottinghamshire*. Transactions of the Thoroton Society volume 115.
- Historic England. 2017. *Understanding the Archaeology of Landscape: A Guide to Good Practice Second Edition*.
- Historic England. 2003. *Where on Earth are We? The Global Positioning System (GPS) in archaeological field survey*.
- Historic England. 1991. *Management of Archaeological Projects (MAP2)*
- Howard, P. 2007. *Archaeological Surveying and Mapping*. Routledge, Oxford.

IFA, 2012, By-laws. *Code of Conduct*, Institute of Field Archaeologists, Reading.

Knight, D., Vyner, B. & Allen, C. 2012. *East Midlands Heritage- An Updated Research Agenda and Strategy for the Historic Environment of the East Midlands*. University of Nottingham and York Archaeological Trust.

Lutton, S. 2003. *Metric Survey Specifications for English Heritage*. English Heritage.

Malone, S. 2018. *Sherwood Country Park, Nottinghamshire, Conservation Management Plan PA2a: Archaeology*. TPA Report 110.2/2018. Trent and Peak Archaeology.

Muir, R. 2004. *Landscape Encyclopaedia: A reference guide to the Historic Landscape* Windgather Press.

National Monuments Record Thesauri. © English Heritage 1999 National Monuments Record Centre.

8. Disclaimer

©Mercian Archaeological Services CIC 2019.

Mercian Archaeological Services CIC and the individual authors retain copyright on all reports and documentation produced as part of the project under the Copyright, Designs and Patents Act 1988 with all rights reserved. However, they will provide license for the client to use the documents and reports for matters related to the project.

License is also granted for the document to be included in the County Historic Environment Record, where it will be publicly accessible.

Mercian Archaeological Services CIC must always be credited when references or images are used and permission to reproduce this document in whole or part can be sought from the authors.

Mercian Archaeological Services CIC is a limited company registered in England and Wales. Company Registration No. 08347842.

9. Acknowledgements

Mercian Archaeological Services CIC would like to thank:

RSPB Sherwood Forest, Including Chloe Ryder, Jessica Doumlin, Gemma Howarth, and Izi Banton.

Gregor Pierrepont, Rowan McFerran, Robin Orr (Thoresby Estate), .

Forestry England, in particular Amy Chandler,

Lynda Mallett (Kings Wood),

Charles Canon (Ransom Wood),

Steve Horne (Old Warsop Society & Friends of Thynghowe),

The National Lottery Heritage Fund for sponsoring the project,

The Sherwood Forest Trust, including Patrick Candler, Susie Johns, and Ian Major

The Friends of Thynghowe,

Old Warsop Society,

All the wonderful volunteers who helped with the surveys, and project as a whole.