Forest of Dean Archaeological Survey Stage 3B

Survey for management of lidar-detected earthworks in Forestry Commission woodland

Project Number 5291 SURV

Phase 1: Rapid field validation and scoping analysis for characterisation of archaeology in woodland

Project Report Volume 1: Methodology, Results, and Discussion

Version 0.2

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Project details

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Summary

The following document is a report on the rapid field validation of selected lidar-detected earthworks in the Forest of Dean and pilot investigation of suitable methodologies for the rapid characterisation of the heritage resource in woodland. The field survey was undertaken in February and March 2010, and a scoping analysis for the characterisation was undertaken in July 2010. Both these operations were undertaken as Phase 1 of Stage 3B of the Forest of Dean Archaeological Survey (Project Number 5291 SURV); a survey for management of lidar-detected earthworks in Forestry Commission woodland in the Forest of Dean, Gloucestershire.

The following elements of Phase 1 of the survey have been completed and are reported on in this report:

- *Development of methodologies for validation and survey of features identified by lidar in a woodland environment.*
- *Rapid field survey of selected lidar-detected earthworks within Forestry Commission woodland.*
- *Scoping analysis to investigate suitable methodologies for the rapid characterisation of the heritage resource in woodland to inform management strategies for woodland landscapes.*

The final element of phase 1 of the project will consist of the production of an updated project design (UPD) identifying a suitable subset of features for further more intensive fieldwork and proposing suitable methodologies for this work. It is currently envisaged that this phase of the project will comprise the following:

- *Further investigation of a sub-set of features by means of techniques such as more detailed earthwork survey, small-scale excavation, environmental sampling or geophysical survey.*
- *Finalisation of characterisation methodology, extending it the remainder of the Forestry Commission woodland in the Forest of Dean.*

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1 Introduction

The following document is a report on the rapid field validation of selected lidar-detected earthworks in the Forest of Dean and pilot investigation of suitable methodologies for the rapid characterisation of the heritage resource in woodland, undertaken as Phase 1 of Stage 3B of the Forest of Dean Archaeological Survey (Project Number 5291 SURV).

The project was undertaken in accordance with the specifications set out in the project design (Hoyle 2009) and the variation to the project set out in the variation request submitted to English Heritage in January 2010 (Hoyle 2010). This consisted of:

- Development of a methodology for the validation and survey of selected features identified by the 2006 lidar survey of the woodland in the Forest of Dean.
- Rapid field survey of selected lidar-detected earthworks within Forestry Commission woodland.
- Scoping analysis to investigate suitable methodologies for the rapid characterisation of the heritage resource in woodland to inform management strategies for woodland landscapes.
- The production of this report summarising the results of this phase of the survey.

The project was jointly funded by*:*

- English Heritage's Historic Environment Enabling Programme (HEEP).
- The Forestry Commission.
- Gloucestershire County Council.

Full details of the financial and non-financial contributions made by these bodies are contained in the project design to Phase 1 of the survey (Hoyle 2009, section 16).

1.1 Scope of the project

1.1.1 Rapid field survey

One of the objectives of this phase of the project was identified as 'To verify, characterise and assess selected archaeological sites or features previously identified as a result of the 2006 lidar survey undertaken as Stage 3A of the Forest of Dean Archaeological Survey' (Hoyle 2009, 3.2, Objective1). This was achieved by a phase of rapid field survey undertaken in February and March 2010, and targeted 45 lidar-detected earthwork features which had been identified in Forestry Commission woodland during the transcription of the 2006/07 lidar survey.

These had been categorised as the following feature types in the 2006/07 survey:

Table 1: Pre-survey: Feature types

Feature type	Number of examples
Subcircular enclosure	3
Subrectangular enclosure	9
Mound	8
Earthwork system	25

Details of these features can be found in Appendix A. These feature types did not represent the full range of archaeologically significant features identified by lidar in Forestry Commission woodland and the reasons for selecting these features is set out in the Project Design (Hoyle 2009, 5.1.1).

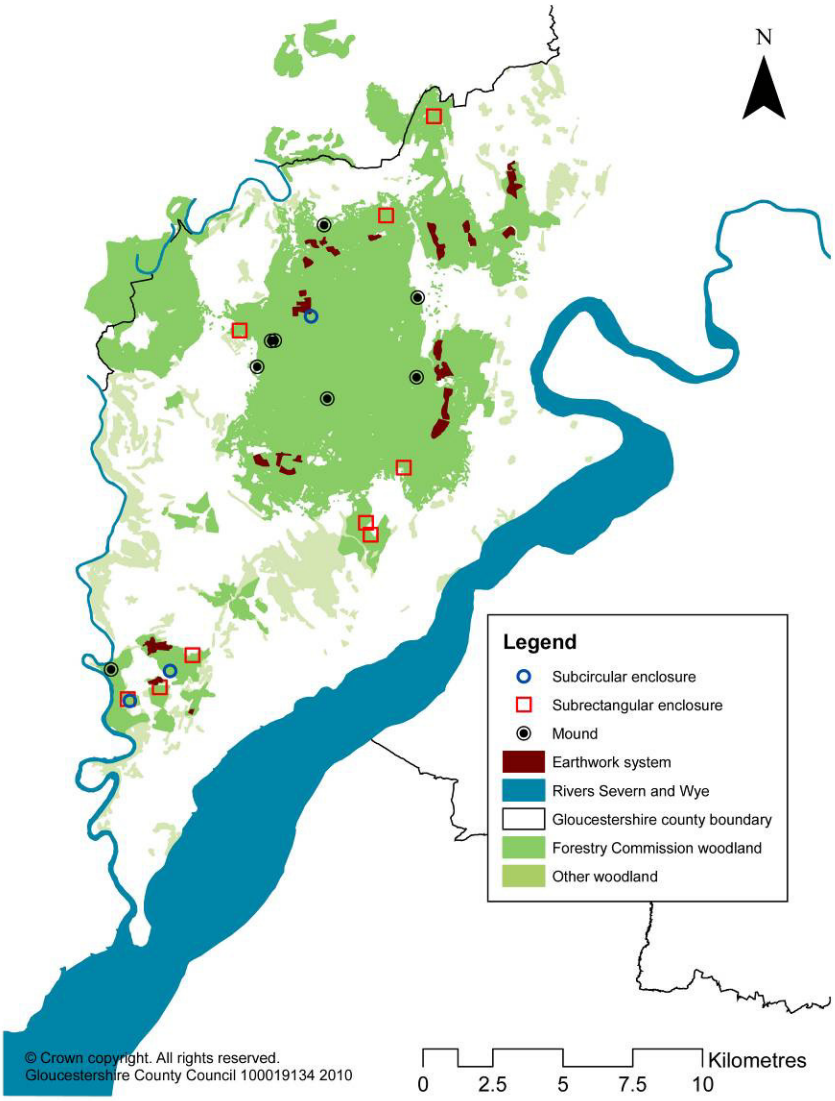


Figure 1: All earthworks surveyed in 2010: Pre-survey designations

Details of the field survey methodology are set out more fully in 2 below, but survey and recording were relatively rapid and met the following limited objectives as stated in the project design (Hoyle 2009, 2.1.3.2):

- To verify the existence, or otherwise of selected lidar-detected earthworks.
- To make a rapid record of the form of selected earthworks. This will primarily consist of verifying that the form portrayed on the lidar hillshaded images is accurate, and making a record of the height, profile and composition of surviving earthworks
- To make a rapid record of any associated or contiguous features, and where possible record any stratigraphic relationships with these or with modern features.
- To record, where possible, the physical condition of selected earthworks and identify any general management needs or obvious risks.

To make a rapid record of the form of selected earthworks.

1.1.2 Scoping analysis for woodland characterisation

A scoping analysis of the characterisation of the heritage resource within woodland was undertaken in July 2010, following discussion with Tim Yarnell and Ben Lennon of the Forestry Commission concerning what outputs the Forestry Commission were anticipating.

The characterisation contributes to the principal aim of the project which is **to inform and improve the management of the archaeological resource within the woodland of the Forest of Dean.** (Hoyle 2009, section 3.1.1), and the SHAPE primary driver is Corporate Objective 3A: 'Promote better legislation, policies, guidance and good practice to improve the system of protection.' (Hoyle 2009, section 4.1.1).

1.1.2.1 Purpose and scope of the characterisation

The Forestry Commission already has a system, based on the Gloucestershire County HER, which provides them with the location, identification and a basic grading of the significance of and management recommendations for all known archaeology within their landholdings (see 4 below).

The 2006 lidar survey added enormously to knowledge of the extent of the heritage resource within the Forest of Dean and within Forestry Commission woodland as a large number of archaeological features have been identified by lidar over extensive areas of Forestry Commission woodland (Hoyle 2007 and forthcoming, 4.2.2, Table 2). This does not necessarily mean that the existing system of assigning sites a broad-brush management category is redundant as the existing system is adequate to inform their forestry operations on the ground (Ben Lennon, Forestry Commission pers. comm.). This data-set is, however, too complex to provide an overview of the heritage resource within their land and a more generalised characterisation, in which a landscape is subdivided into areas which share certain pre-determined attributes, has been identified as a requirement to inform forestry management at a more strategic level.

The characterisation was designed to identify areas of distinctive heritage character to:

- Assist with the strategic management of the heritage resource by:
  - Providing an information base to contribute to the conservation of areas with distinctive heritage character.
  - Identifying areas characterised by clusters or combinations of heritage assets with significant 'group value'.
  - Enabling the Forestry Commission to recognise cues, informing future landscape management options.
  - Providing information which could tie into and augment existing and future landscape character assessments.
- Assist with future research by:
  - Identifying areas characterised by clusters or combinations of heritage assets with significant potential for future study.
  - Providing an interpretative framework within which individual or groups of heritage assets can be better understood.

A scoping analysis to test methodologies for and the efficacy of characterisation was undertaken as part of the 2010 survey. This was not intended to produce detailed maps of the known heritage resource within the Forest of Dean, but to provide information which was meaningful at scale of 1:10,000 or above. It was undertaken in the following way:

- **Step 1:** Characterisation was based on existing HER information. The HER database was sorted and aggregated into broad categories of heritage assets which shared similar characteristics. The sorting process divided heritage assets by both date and type (see Appendix H).
- **Step 2:** Maps were generated from the sorted database information to identify the spatial extent of the broad categories of similar heritage assets. Where a number of these were in close proximity these were combined to form single areas (see 4.2.2 below). The end result of this was a series of shape file layers each defining Heritage Character Components which aggregated heritage assets of a similar date and category. The extent of these was determined by that of the known heritage assets, and different Heritage Character Components could overlap or share the same location.
- **Step 3:** The Heritage Character Component maps were then combined on the GIS to identify Heritage Character Areas. These could consist of a single Heritage Character Component or be made up of any combination of these, depending on the extent to which the areas of the Heritage Character Component overlapped.

Although the characterisation is targeted towards a better understanding of the heritage resource within Forestry Commission woodland, it was not limited solely to these areas, but included a buffer

zone of 0.5km of adjacent areas. It is not the intention to undertake characterisation with respect to existing Forestry Commission boundaries such as Forest Design Plan areas or Forestry Compartments, but for practical purposes the scoping analysis undertaken as part of this phase of the project targeted two areas defined by Forest Design plan boundaries (Figure 2). These were:

- The area of Flaxley, Welshbury and Chestnuts Woods – Forest Design Plan area 23.
- The area of Sallowvallets Inclosure, Worcester Walk and Whimberry Slade – Forest Design Plan area 40.

These areas covered 1050ha, representing *c*. 10% of the total area of Forestry Commission woodland in the Forest of Dean survey area.

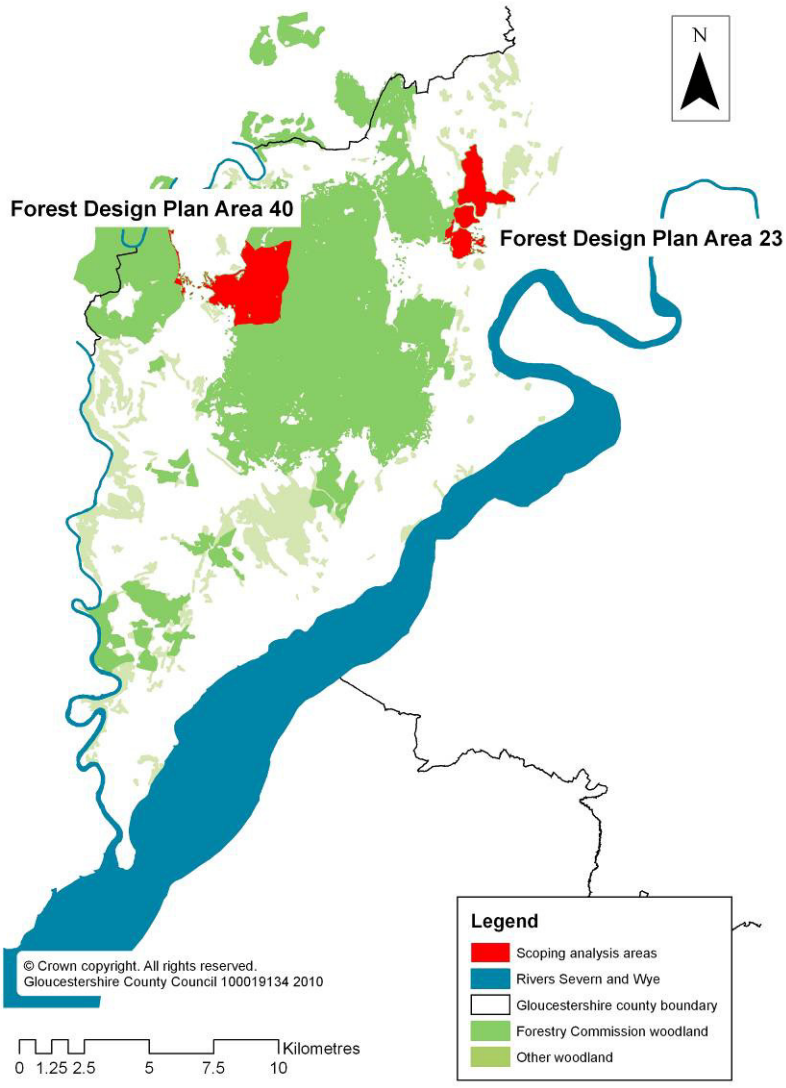


Figure 2: Woodland characterisation scoping analysis areas

The scoping analysis is discussed more fully in section 4 below and a detailed methodology can be found in Appendix H.

2 Field survey methodology

2.1 Earlier methodological approaches and influences on the methodology

The project design recognised that prior to the 2010 survey there had been very little systematic validation of lidar-detected earthworks in a woodland environment (Hoyle 2009, 12.1.2), and consequently the methodology adopted for the 2010 survey drew heavily on that used for the Stage 2 of the Forest of Dean Archaeological Survey, where a rapid, but systematic record (using a dedicated pro-forma record sheet) was made of the presence, form and dimensions of all lidar-detected earthworks in an area of woodland (Hoyle 2008b, sections 4, 7.6).

In addition Jon Hoyle discussed suitable survey and recording methodologies with Adam Mindykowski (Worcestershire Historic Environment and Archaeological Service) who is currently undertaking lidar validation using volunteers in the Wyre Forest, Worcestershire.

2.2 Logistics of field survey

In order to minimise unnecessary travel the survey area was divided into seven zones (Zone 1 – Zone 7), each of which contained between four and eight lidar-detected features of varying types. Features were assigned to a zone on the basis of the location rather than their type.

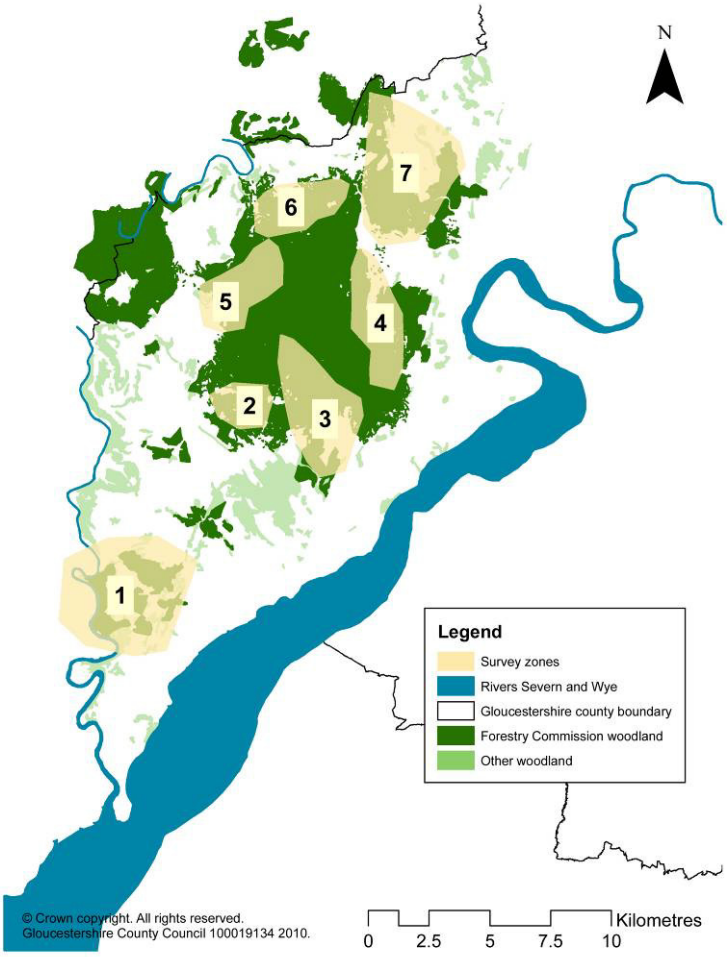


Figure 3: Field survey zones

As a general rule, all specified features were surveyed in one zone before the field team began work on the next, and the zones were targeted in numerical order.

2.3 Timing and team make up

The field survey was undertaken in February and March 2010 when groundcover in the woodland was at its lowest, allowing optimal conditions for access and visibility of features.

The field survey was undertaken by a single team of two people in accordance with the specifications set out in the project design (Hoyle 2009, section 12.1.3.2). A single two-person team conformed to the health and safety requirements for woodland working (Hoyle 2009, 9.3) and ensured:

- A methodical, consistent and efficient approach to the survey.
- Consistency of feature recognition.
- Consistency of feature recording.

2.4 Methodology

The fieldwork methodology can be separated into the following three stages:

- Pre-fieldwork preparation.
- Fieldwork recording.
- Post-fieldwork database organisation and checking.

2.4.1 Pre-fieldwork preparation.

2.4.1.1 Pre-fieldwork data

As part of the preparation for the fieldwork a brief statement about each lidar feature was prepared to provide the field team with information on any research questions, relevant health and safety issues or any other practical considerations and constraints relating to the feature. These data ensured that field surveyors were absolutely clear about the research aims of each survey and that the survey was undertaken in a logistically efficient manner. Typically these information sheets included the following:

- A brief statement of the known archaeology and research aims based on the following information where appropriate:
  - The Gloucestershire HER.
  - Mapped information from the Gloucestershire County Council GIS where appropriate.
- A brief statement of the known site conditions and constraints based on the following information:
  - Information from the Gloucestershire County GIS including geological, topographical and woodland type information, and also information on vehicular access.
  - Information from the Forestry Commission on any forestry issues. The Forestry Commission were contacted in advance of the survey to identify any areas in which forestry operations were scheduled.
  - Information on any other environmental constraints derived from the Gloucestershire County Council GIS.
- The following printed paper sheets (generally at A4):
  - Location of the feature (generally at 1:10,000) indicating any known access issues.
  - Hillshaded images of the feature illuminated from both the northwest and northeast
  - Digitised transcription of the hillshaded images produced from the lidar survey where appropriate (generally this was restricted to earthwork systems).

2.4.1.2 Preparation of database and training

From the outset it was envisaged that field survey recording would be a completely digital exercise with records made on hand-held data loggers (Hoyle 2009, 12.1.3.2). Although it was originally envisaged that a Trimble Geo XT handheld data logger would be used (Hoyle 2009, 12.1.3.2) this was modified to a Magellan Mobile Mapper GX with Digiterra recording software in order to provide compliance with the equipment requirements of the HEEP funded Severn Valley Rapid Coastal Zone Assessment (RCZA) project (Hoyle 2010, 3.2).

As part of the pre-fieldwork preparation the project team all undertook a 1 day training course in the use of these data loggers and the Digiterra software, subsequent to which Jon Hoyle devised a dedicated database for the project. Full details of the database are set out in Appendix C; it included separate records for the following categories of information:

- Whole feature information.
- Components of feature information (this comprised separate records for point line and polygon information).
- Finds.
- Photographs.

In addition to information about the feature itself, the database was flexible enough to allow records to be made of:

- Woodland type and density, including veteran trees or early coppice.
- Undergrowth density and feature visibility.
- Access issues.
- Visible erosion or damage and comments on management.
- Relationships with other features of interest.

2.4.2 Rapid field survey

The following is a summary of the methodology adopted and a detailed methodology can be found in Appendix B).

A designated methodology was adopted for the field survey. This was consistent with the standard of English Heritage level 2 recording (English Heritage 2003, 23) which is defined as 'the mapping and preliminary analysis of an area' the purpose of which is not 'to map and record each individual archaeological component in detail, but to survey each element accurately … in outline, produce a short written description and attempt an overview. The spatial relationships between archaeological features can be determined and in some cases, a relative chronology established' (Bowden 1999, 75).

The survey:

- Verified the existence, or otherwise of selected lidar-detected earthworks.
- Made a rapid record of the form of selected earthworks. This mainly consisted of verifying that the form in plan as portrayed on the lidar hillshaded images was accurate and recording those elements e.g. height and profile shape, which were not immediately discernable through the hillshaded images.
- Made a rapid record of any associated or contiguous features where appropriate. This included assessment of the stratigraphic relationships between features where this could be discerned.
- Made a record of the physical condition of selected features and identified any general management needs or obvious risks.

2.4.2.1 Database

A dedicated project database was created for the survey and loaded onto the Magellan. Detailed specifications for the database are set out in Appendix C, but the basic structure can be summarised as follows:

The database was divided into six separate records, each of which contained a varying number of fields which were a combination of free text fields, Yes/No tick boxes or pick list selections as appropriate. The records were created as .tab files in Digiterra and can be summarised follows:

- Feature.tab – This record was used to record general information about the feature as a whole. This included landuse and access information, general conditions, damage and management issues and also whole feature interpretation.
- ComponentP.tab – This record was used to record information about an individual component where this was mapped as a point. This included information about the form of the component, the extent to which it was accurately reflected on the lidar hillshaded images, interpretation and any specific damage which affected it.

- ComponentL.tab – This record was used to record information about an individual component where this was mapped as a line. This included information about the form of the component, the extent to which it was accurately reflected on the lidar hillshaded images, interpretation and any specific damage which affected it.
- ComponentA.tab – This record was used to record information about an individual component where this was mapped as a polygon. This included information about the form of the component, the extent to which it was accurately reflected on the lidar hillshaded images, interpretation and any specific damage which affected it.
- Finds.tab - This record was used to record information about any finds recovered in the survey. This included information about the type and date of the finds or if they were retained. NB This field was not actually used during the 2010 survey as no finds were identified.
- Photographs.tab - This record was used to record information about any photographs. This included information on the frame number of the photograph, its subject matter, view direction and scale.

These .tab files were directly linked to the .map files used for mapping (see 2.4.2.2 below). The three Component records were identical except that the structure of the Digiterra software required separate records for items mapped as points, lines or polygons.

During the field survey paper versions of recording forms were carried against the event of systems failure. These were used during the survey in one area only (Zone 1, feature st5499/02) where the features were recorded to test the basic methodology before the digital recording equipment had been fully set up. These records were subsequently transferred into the Digiterra digital recording system.

2.4.2.2 Mapping

For mapping purposes each lidar-detected feature was divided into components (e.g. a bank, ditch, or any other point of interest) which was then separately mapped in a schematic fashion. Discrete features mapped as points or polygons (if larger than *c.* 10 -15m across) and linear features were mapped as lines. Large area components, e.g. extensive areas of dense undergrowth or areas where access was impossible were also mapped as polygons. The location of photographs was mapped as points. All components were assigned a unique number linking them to the project database.

All mapping was undertaken on a Magellan Mobile Mapper CX handheld data logger on a series of .map layers created within the Digiterra software. These layers, which were selected as appropriate, were:

- Feature.map – This layer was used to record general information about the feature as a whole. For recording purposes this was mapped as a single point.
- ComponentP.map – This layer was used to map point information about an individual component.
- ComponentL.map - This layer was used to map line information about an individual component.
- ComponentA.map - This layer was used to polygon information about an individual component.
- Finds.map - This was a point layer to map the location of any finds recovered in the survey.
- Photographs.map - This was a point layer to record the location of any photographs taken.

When complete, these layers were converted from Digiterra to Esri Shapefiles and transferred to the Gloucestershire County Council GIS.

The map base used by the survey was georeferenced jpegs (geojpegs) of the hillshaded images of individual features which were loaded onto the Magellan. These were generally produced at a scale of 1:3000 and were illuminated from the northwest. Monochrome images lit from one direction only were preferred to the polychrome images lit from between four and eight directions as these proved difficult to comprehend on the small (7.8 x 5.9 cm) screen of the data logger.

The data logger was fitted with a mapping-grade differential GPS with four ‘Environment Type’ settings:

- Open Sky.
- Tree Canopy.
- Urban Canyon
- Custom

When tested in open conditions the GPS appeared accurate (although this was only tested visually by standing at a known point depicted on the lidar hillshaded image and checking the location of the GPS location indicator). In some areas of open woodland the GPS, when set on the 'Tree Canopy' setting also attained an acceptable level of accuracy (again this was tested by visual correspondence between the GPS location indicator and feature visible on the hillshaded images). However, under most woodland conditions encountered in the Forest of Dean, the GPS location indicator tended to hover around the general location of the position and was not considered stable enough to use as a mapping tool, although it did prove invaluable as an indicator of approximate location in areas of woodland devoid of any other fixed points.

In order to maintain consistency in the mapping process, the decision was made to undertake all mapping by direct tracing over the lidar hillshaded images onto the dedicated Digiterra .map layer. This contingency was identified in the project design (Hoyle 2009, 12.1.3.2) and was considered accurate enough for this level of survey as lidar hillshaded images are rectified to the Ordnance Survey grid and accurate to a factor of plus or minus 0.10-0.15m (Bernard Devereux, Director University of Cambridge Unit for Landscape Modelling, pers. comm.; web: Unit for Landscape Modelling.).

Given the size of some of the earthwork systems, the project design specified that it was not necessary to survey them in total, but that a minimum sample of 25% should be surveyed. In order to record which elements of these had been seen in the 2010 survey it was envisaged that this would be recorded on the trackplot facility of the hand held data logger to produce 'snail trails' recording those areas which the field team had visited (Hoyle 2009, 12.1.3.2). Given the difficulties of accurate GPS readings under woodland cover (see above), the decision was made not to use this facility, but for fieldworkers to only record those elements of earthwork systems which they had seen. This had the potential to create difficulties in ensuring a clear record of the difference between features which were simply not surveyed and those which were not visible, or which suddenly terminated, however field surveyors were made aware of this issue and made records as appropriate. This also had the disadvantage that the plans produced during the survey do not necessarily represent the actual extent of the surviving earthworks and can be superficially misleading if this methodological approach is not taken into account.

Similarly the aspiration to record the location of photographs using the GPS facility on the Ricoh 600SE camera which could be linked by Bluetooth to the GPS on the Magellan was also modified to direct tracing over the lidar hillshaded images as anticipated in the project design (Hoyle 2009, 12.1.3.2).

Gridded drawing film was carried during the field survey to enable features to be mapped manually in the event of systems failure. This was undertaken in only one area (Zone 1, feature st5499/02) where features were recorded to test the basic methodology before digital recording equipment had been fully set up. These records were subsequently transferred into the Digiterra digital recording system.

The gridded film also allowed for the detailed mapping of any elements of the feature if this was thought appropriate. In the event this was not undertaken during the survey.

2.4.2.3 Profiles

Basic profile information was recorded as part of the text database, but sketch profiles were also drawn of selected features to provide a visual record. These were generally recorded at scale 1:50 on A4 sheets of gridded paper. These have subsequently been scanned and form part of the project archive. The location of profiles was recorded as part of the photographic record as a photograph was always taken where a profile was drawn

2.4.2.4 Photographs

Digital photographs were taken as appropriate. The location of these was mapped, and basic information recorded on the project database (see 2.4.2.1 and 2.4.2.2 above). The photographs form a continuous numbered system, but the first photograph of each feature consisted of an information board with date and feature number. Subsequent to the field survey, all photographs have been sorted by feature number.

2.4.2.5 Extent of features surveyed

The project design specified that discrete earthworks such as mounds or enclosures should be surveyed in their entirety, but that it would be sufficient to sample *c.* 25% of earthwork systems (Hoyle 2009, 12.1.3.2).

The decision to map only the extent of features of earthwork systems which were actually seen during the survey (see 2.4.2.2 above) allowed for a rapid visualisation of coverage, indicating that this varied from approximately 40% to 100% depending on the size and complexity of the earthwork system.

3 Results of the rapid field survey

The following section summarises the results of the rapid field survey. More detailed information on these features can be found in Appendix D. Features are discussed by type.

3.1 Mounds

The survey investigated eight features which had been identified as mounds during the rapid transcription of the 2006 lidar data (Figure 1). An additional seven mounds were recorded as components of other features.

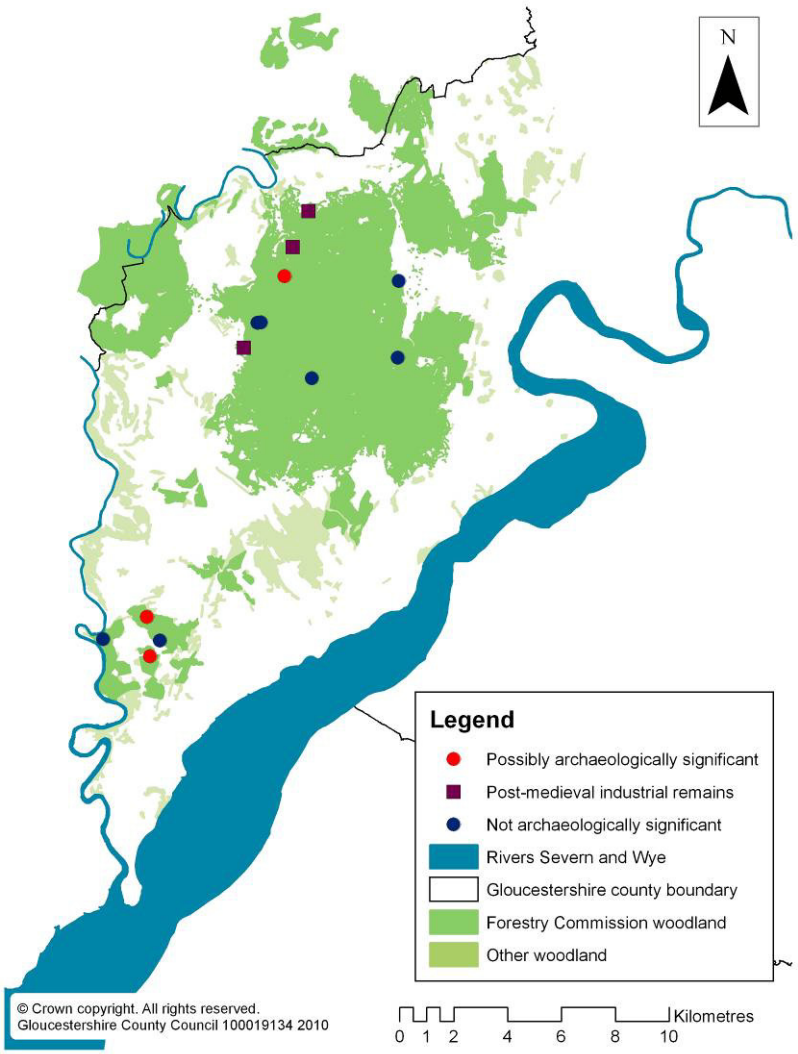


Figure 4: All mounds

3.1.1 Mounds which are not archaeologically significant or relate to post-medieval industrial activity

Seven mounds did not appear to be archaeologically significant. These ranged from upcast from levelling for the foundations of a radio mast (so5300/04, component 01), the creation of a turning area (so6413/09, component 01) or other landscaping operations (so6109/05, component 01; so5911/02, feature 23, component 01 and feature 27, component 01 (so5911/02 consisted of two mounds which were divided into two separate features for survey purposes) or dumped logs from forestry operations (so5500/05, component 03). A further mound, (so6410/09, component 01) was at the junction of forestry tracks and, although there were no specific indicators of its origin, may be upcast from their construction.

A further five (so5911/11, component 01 and component 02; so6116/01, component 01; so6014/13, component 04 and component 05) were associated with evidence of post-medieval coal mining activity and can be interpreted as waste material from that.

3.1.2 Mounds of potential archaeological significance

Three mounds (so5500/12, component 15; st5999/06, component 07; so6013/07, component 06) could not be easily assigned a post-medieval or modern date.

All three were associated with other features (either earthwork systems or possible enclosures) and may represent clearance cairns, although only one (so5500/12, component 15) was described as a rubble mound. This was also the smallest of the mounds (only *c*. 0.75m high and *c.* 4m in diameter) and was found in an area of linear rubble boundaries which were part of the so5500/12 enclosure system (see 3.4 below).

The remaining two mounds (st5999/06, component 07; and so6013/07, component 06) were roughly circular or oval, *c.* 1m high and *c.* 8-10m in diameter.

All three mounds were sited in elevated positions, although not on the highest points, and if the surrounding woodland were removed would have commanded views of, and been visible from, parts of the surrounding countryside. It may be noted that the southern two mounds (so 5500/12, component 15; st5999/06, component 07) were in the vicinity of the Soldiers Tump Bronze Age round barrow (Glos HER 5012) and a number of other undated mounds which may also represent round barrows. All three are in the same topographical zone as known and possible Bronze Age barrows and standing stones on the high ground at the edge of the Wye Valley (Hoyle 2008a, section 4.4, Fig 8; see also Figure 7), and also the possible Bronze Age ritual monument so5500/05 (see 3.2.2.2 below).

3.2 Subcircular enclosures

The survey investigated three features which had been identified as subcircular enclosures during the rapid transcription of the 2006 lidar data (Figure 1). An additional seven mounds were recorded as components of other features.

3.2.1 Subcircular enclosures which are not archaeologically significant

One subcircular enclosure (so6012/03) was not archaeologically significant and was created by modern drainage channels.

3.2.2 Subcircular enclosures which may be archaeologically significant

3.2.2.1 Possible curvilinear boundary: st5499/03

This feature survived as two sections of shallow rubble bank (component 01 and component 05) comprising unbonded rubble blocks ranging in size from 0.2x0.2m to 0.7x0.7m, and each between 1.5-3m wide and *c.* 0.5m high. The two sections did not connect but appeared to form two sides of a large amorphous/subcircular enclosure which would have measured *c.* 85m in diameter. The eastern arm of this feature clearly pre-dated a disused boundary (component 04) which was marked on the Ordnance Survey map of 1881 (OS 1880) but not on the Tidenham tithe map of 1845 (Gwatkin 1995). The precise status or function of these banks is unclear but a short stretch of similar material was identified *c.* 23m to the northwest, springing from the southwestern corner of rectilinear enclosure st5499/03 (st5499/03, component 05). This enclosure is discussed more fully below (see 3.3 below), but may be that st5499/03 represents the remains of boundaries associated with the enclosure (Figure 5).

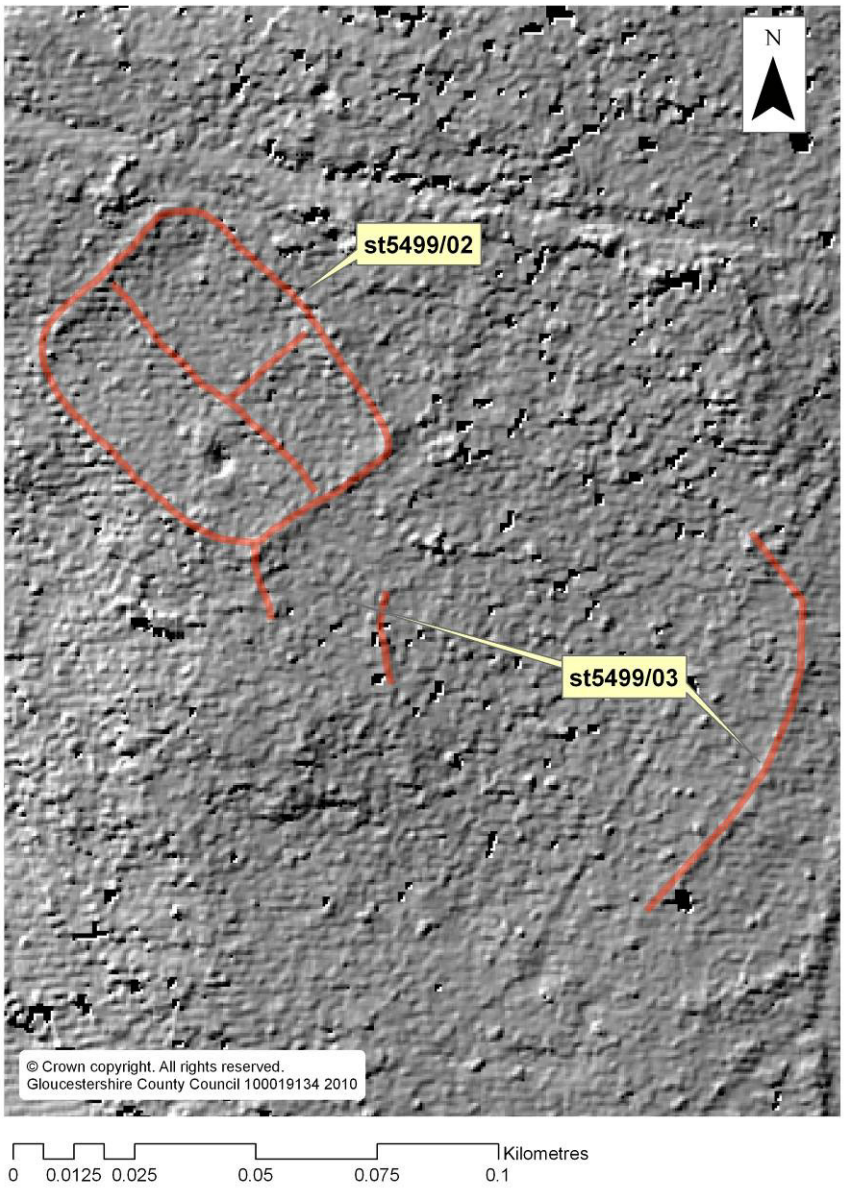


Figure 5: Possible curvilinear boundary st5499/03 and subrectangular enclosure st5499/02
Lidar image © Forest Research

3.2.2.2 Possible Bronze Age ritual monument: so5500/05

This feature was visible on the lidar as a circular enclosure, *c.* 25m in diameter. A roughly circular mound*, c.* 7m in diameter, was visible in the centre of the enclosure.

When visited in 2010 the enclosure was formed by a low, rounded bank between 5m and 6.5m wide at its base and 0.75m to 2m high. There were no visible signs of a ditch (either internal or external) or an entrance, although parts of the bank had been slighted by earlier forestry tracks. Much of the bank (particularly its northwestern and northeastern quarters) comprised sandstone and limestone rubble ranging in size from 0.2m to 0.5m in diameter (the site overlies a solid geology of Oolitic Limestone but is within *c.* 300m of Cromhall Sandstones).

Ten possible small standing stones were recorded in the surface of the bank (Figure 6). These were assigned a component number (component 05-component 14) and also numbered from 1-10 working clockwise from the northernmost stone. All of these stones were made up of white limestone slabs between 0.07m and 0.26m thick, and ranging from 0.31m to 0.82m in horizontal length; their heights

ranged from 0.20m to 0.50m (see Table 20). In places, particularly in areas where much visible rubble was evident on the banks, the status of the stones was less clear than in those areas where there was less visible rubble.

Table 2: so5500/05: Standing stone dimensions

Stone No.	Component Id	Height (m)	Horizontal length (m)	Thickness (m)
1	05	0.30	0.35	0.15
2	06	0.46	0.48	0.20
3	07	0.31	0.33	0.11
4	08	0.50	0.52	0.26
5	09	0.35	0.60	0.18
6	10	0.30	0.52	0.13
7	11	0.23	0.46	0.07
8	12	0.20	0.31	0.06
9	13	0.37	0.82	0.26
10	14	0.25	0.54	0.15

Photographs of all stones can be found in Appendix F.

The mound within subcircular enclosure so5500/05 (so5500/05, component 03), was not visible as an earthwork, but appeared to correspond with a pile of cut branches presumably derived from forestry operations.

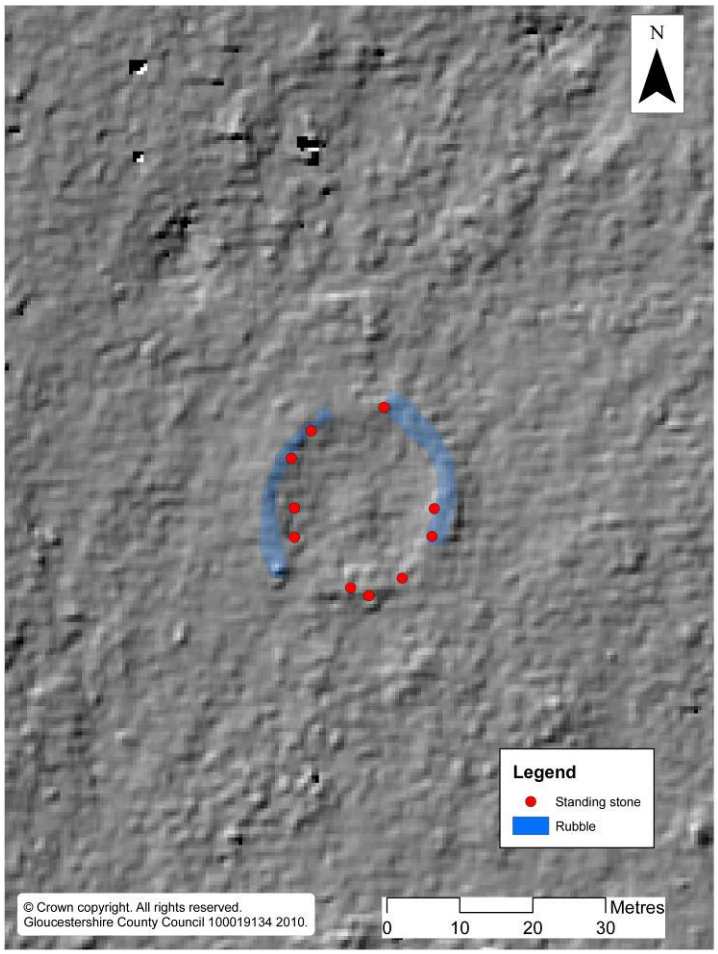


Figure 6: so5500/05: Standing stones and rubble spreads

Lidar image © Forest Research

Discussion

Enclosure so5500/05 can tentatively be interpreted as a Bronze Age ritual enclosure, perhaps a ring cairn or an embanked stone circle. The features identified in 2010 broadly conform to those recognised in this class of feature (English Heritage 1989, 1990), and it is sited within an area of known or possible Bronze Age ritual activity (Figure 7). This interpretation raises the question as to whether the interpretation of the central mound was the product of forestry detritus as originally thought. Central mounds are a recognised feature both of ring cairns and small stone circles (English Heritage 1989, 1990).

A number of 'ghost' features were also identified as part of the survey of earthwork systems (see 3.5.2 below) and the possibility remains that a genuine archaeological feature may survive as a low mound and masked by the pile of forestry detritus which was recorded here in 2010.

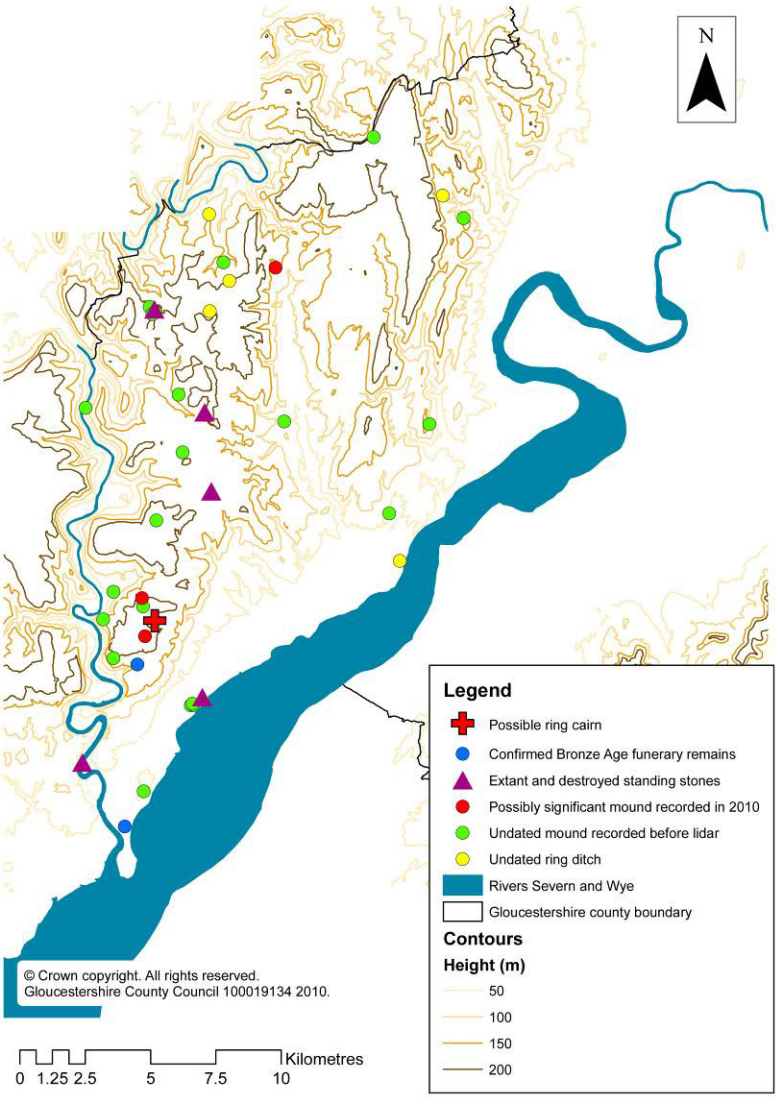


Figure 7: Selected known and possible Bronze Age ritual monuments and undated mounds recorded in 2010 (after Hoyle 2008, fig 8)

3.3 Subrectangular enclosures

The survey investigated nine features which had been classed as subrectangular enclosures during the rapid transcription of the 2006 lidar data (Figure 1).

3.3.1 Subrectangular enclosures which are not archaeologically significant, or which do not appear to be enclosures

One subrectangular enclosure (so5600/08) was not archaeologically significant and appeared to have been created by the disposition of modern/post-medieval quarrying activity. It should be noted that this features was only given a feature interpretation confidence level of 'medium' during the rapid transcription of the 2006 lidar data.

3.3.2 Subrectangular enclosures which may be archaeologically significant

Eight of the subrectangular enclosures were considered to be archaeologically significant.

3.3.2.1 Standard subrectangular enclosures.

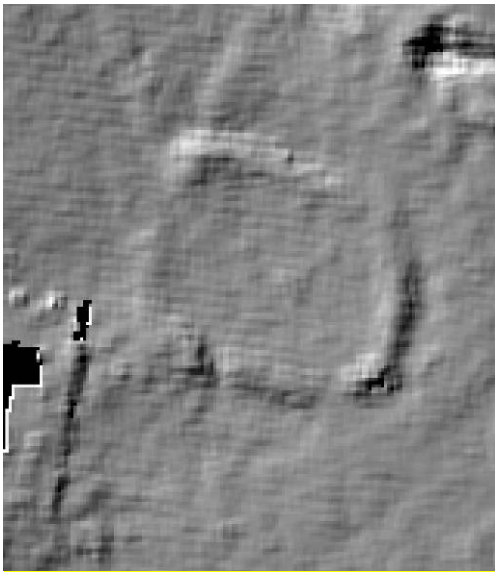
The rapid analysis of the 2006 lidar data identified five features which, on account of their similarity of form and size, were classed as 'standard' enclosures (Hoyle 2007 and forthcoming, 3.1.1.2, Figs 12, 13 and 14).

As a result of the 2010 field survey this figure was revised to include four of the subrectangular enclosures: so6407/01, so5812/02, so6316/07, so6519/18 (Figure 8 and Figure 14).

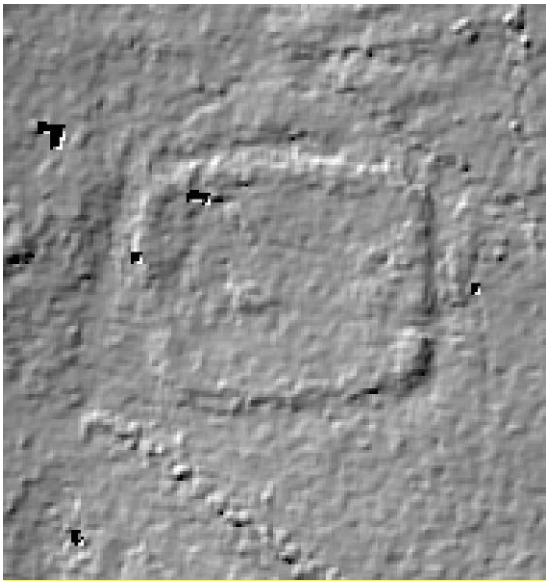
These were all broadly similar in shape and size (see Figure 8). All were essentially low earthen banks (although some rubble was recorded within the bank of so6316/07) enclosing a subrectangular enclosure of varying degrees of regularity. All had evidence for ditches, although none (with the possible exception of so6306/07) had clear evidence for entrances which were not associated with modern tracks (see Table 3).

Table 3: Standard subrectangular enclosures: dimensions and elements

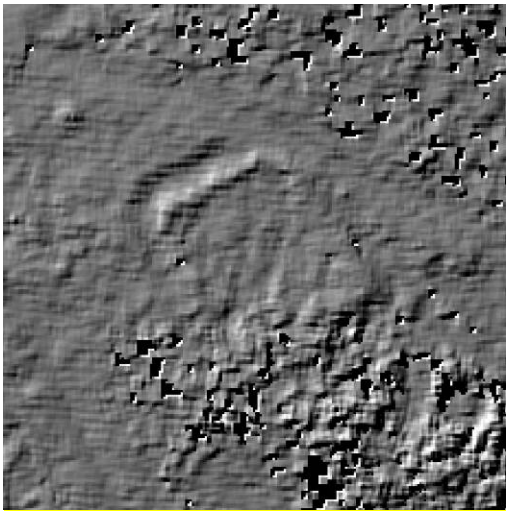
Feature	Width (m)	Length (m)	Area (m^2)	Bank height (m)	Slope of bank (degrees)	Ditch present	Entrance present
so6407/01	27	34	918	1-1.5	10-40	Yes	Not clear, bank cut by recent tracks which may use existing entrances
so5812/02	31	39	1209	0.5-1	40	Yes	Bank cut by a number of modern tracks, but possible entrance on eastern side
so6316/07	27	36	972	0.5–0.75	15-20	Yes	No entrance visible, but southeastern section could not be accessed due to dense young conifer
so6519/18	24	32	768	0.2–0.7	40-60	Yes	None visible



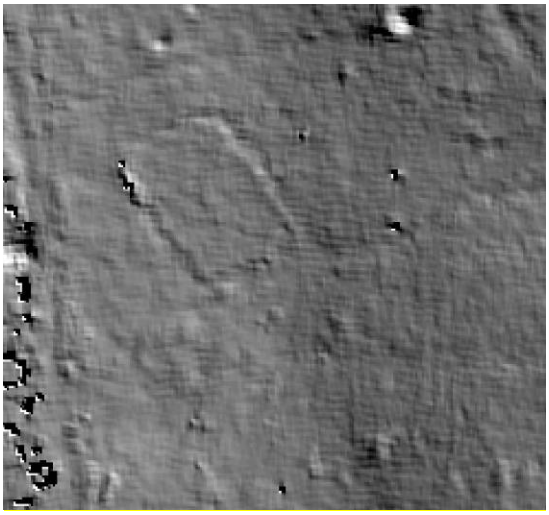
so6407/01



so5812/02



so6316/07



so6519/18

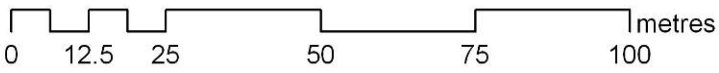


Figure 8: Standard subrectangular enclosures: lidar images

Lidar image © Forest Research

Two of these features (so5812/02 and so6519/18) may have been associated with linear hollows in the immediate vicinity, although this association was not clear.

3.3.2.2 Other subrectangular enclosures

The remaining subrectangular enclosures investigated in 2010 were less uniform.

Rubble-walled enclosure st5499/02

This was the fifth subrectangular enclosure which was regarded as a 'standard' enclosure in 2010 (Hoyle 2007 and forthcoming, 3.1.1.2, Figure 14), although it was larger than those discussed in 3.3.2.1 above, measuring *c.* 60m x 50m. Its boundaries (component 01) were made up of linear rubble spreads (which may have been collapsed walls) and there was no visible evidence of a ditch. The interior of the enclosure was divided by two further rubble spreads which may also have been collapsed walls. One of these (component 02) cut the enclosure in half longitudinally, whilst the other (component 03) divided the northeastern part of the enclosure into two more or less equal portions. A possible entrance (component 06) was cut through the bank in the southern part of the enclosure's southeastern boundary. A short stretch of linear rubble (component 05) sprang from the enclosure's southeastern corner. This may also represent the remains of a collapsed wall or rubble boundary, but could only be traced for *c.* 13m. It may represent the remains of a linear boundary contiguous with the enclosure.

Figure 9: Subrectangular enclosure st5499/02

Lidar image © Forest Research

Polygonal enclosure so6205/06

This enclosure was classed as subrectangular even though it is actually polygonal, consisting of a rectangular area measuring *c*. 47m x 34m with a small rectangular extension or annex, measuring *c.* 13m x 18m, attached to its southeastern side.

The enclosure survived as low earth banks or terraces measuring between *c*. 0.40m and 0.6m high. The southwestern corner of the enclosure was not visible as an earthwork, although in this area the lidar is much more amorphous and dense brambles may have obscured visible features. There was also no recorded division between the main area of the enclosure and the annex. Nor was there any indication that the annex represented part of an internal division within a large enclosure (which would have measured *c.* 46m x 54m) although evidence for this may have been obscured by dense bramble undergrowth.

There was no sign of an entrance, although it was crossed by a modern path which ran from its northeast corner to the middle of its southern side, and an entrance may originally have been sited in one of these locations.

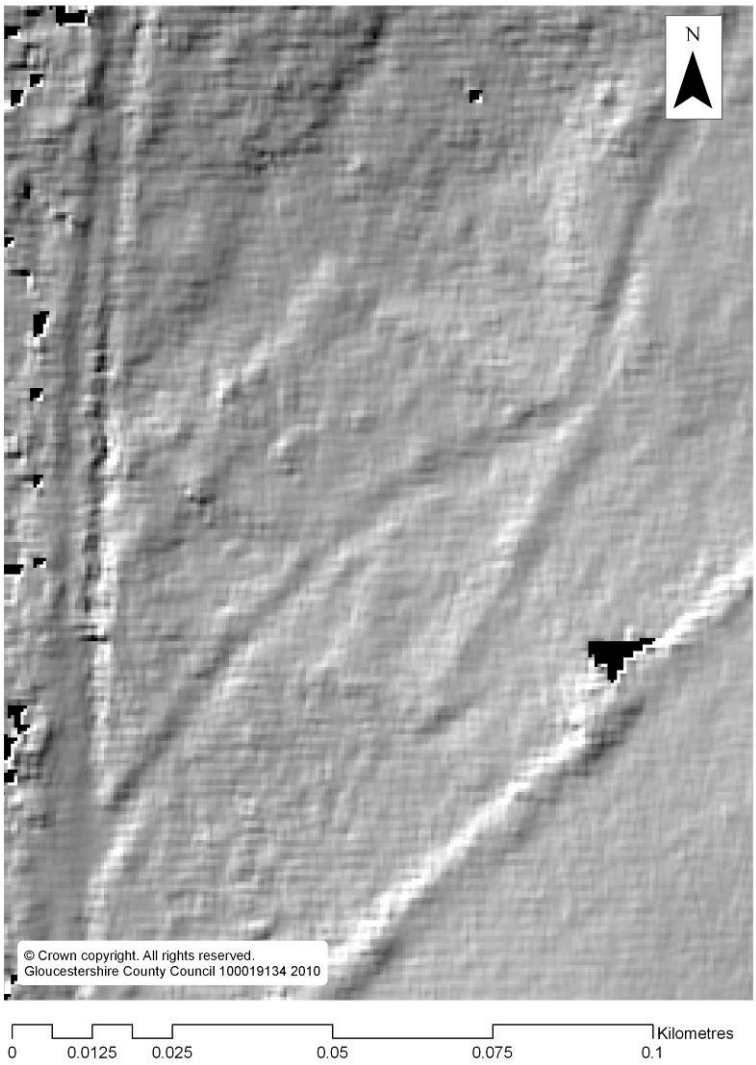


Figure 10: Polygonal enclosure so6205/06

Lidar image © Forest Research

Bivallate enclosure so6305/06

This was visible on the lidar as two sides of a rectilinear feature which appeared to consist of two parallel banks.

Only the northern arms and a small section of the western returns of these could be seen in 2010 as the rest of the feature was obscured by dense brambles, although the earthworks did appear to continue into this area as suggested by the lidar hillshaded image. These earthworks consisted of two low (c. 0.60m) rounded-topped banks (component 01 and component 02) with faces of between 20° and 30°. It was not clear if these were separated by a ditch, or if there was a ditch on the outer side of the outer bank. There was no clear sign of the northern arm of the enclosure continuing beyond its limits as depicted on the lidar hillshaded image and there was no sign of any continuation into the grassy field to the northeast.

There was also no sign of eastern or southern boundaries although to the south the earthworks appeared to terminate just short of the edge of a steep natural slope. A forestry track in this area (component 10) may have obscured any earthworks which originally survived along the brow of this ridge.

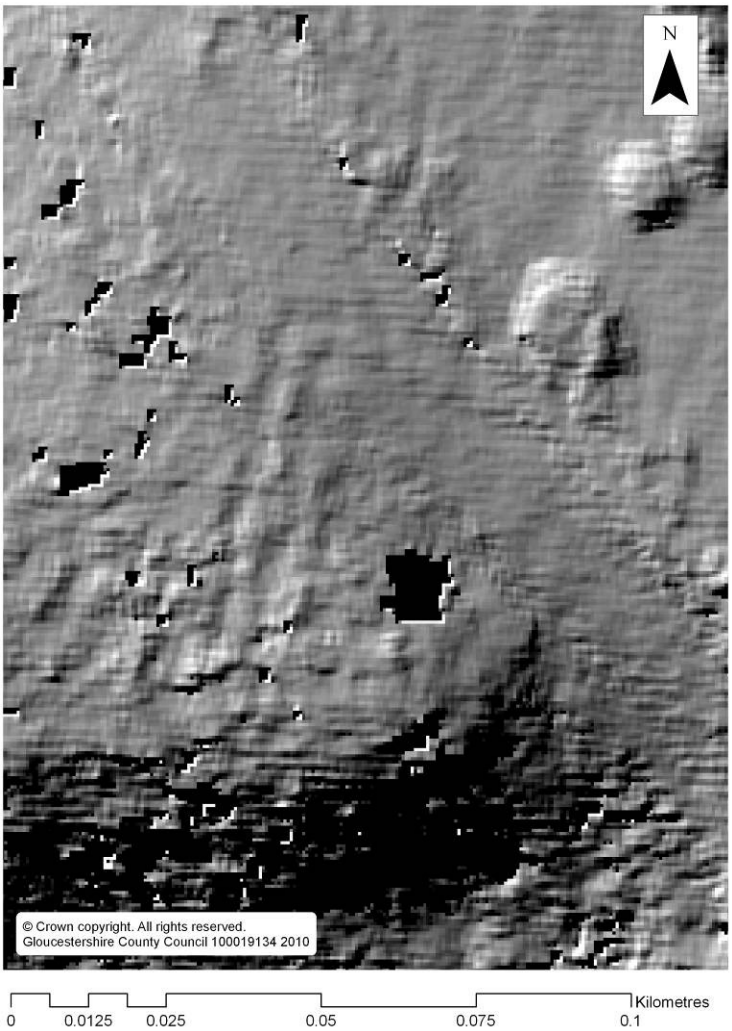


Figure 11: Bivallate enclosure so6305/06

Lidar image © Forest Research

Possible subrectangular enclosure st5599/06

The status of st5599/06 as an enclosure remains problematic. Its possible eastern boundary could not be surveyed due to an area of dense undergrowth (component 06) and part of its southern boundary (component 05) could also not be seen due to dense undergrowth and the lidar anomaly which corresponded to this may have been created by the recent forestry track which formed the feature's southern edge. In addition to this the northern boundary of this feature (component 01) may have continued eastwards beyond the limits of the enclosure (component 08), although this was not clear due to dense undergrowth. However, both the northern and western boundaries of this feature (component 01, component 04) which survived as terraces 1.3m and 1.6m high respectively appeared to have returns which would have linked them to the 'missing' southern and eastern boundaries. This enclosure would have measured *c.* 120m x 74m making it considerably larger than the other enclosures surveyed in 2010, and although it has been interpreted as a subrectangular enclosure of indeterminate data and function, it remains possible that it is, in fact, a rectilinear section of an earthwork system, perhaps part of earthwork system st5599/10 which is on a similar orientation *c.* 150m to the north.

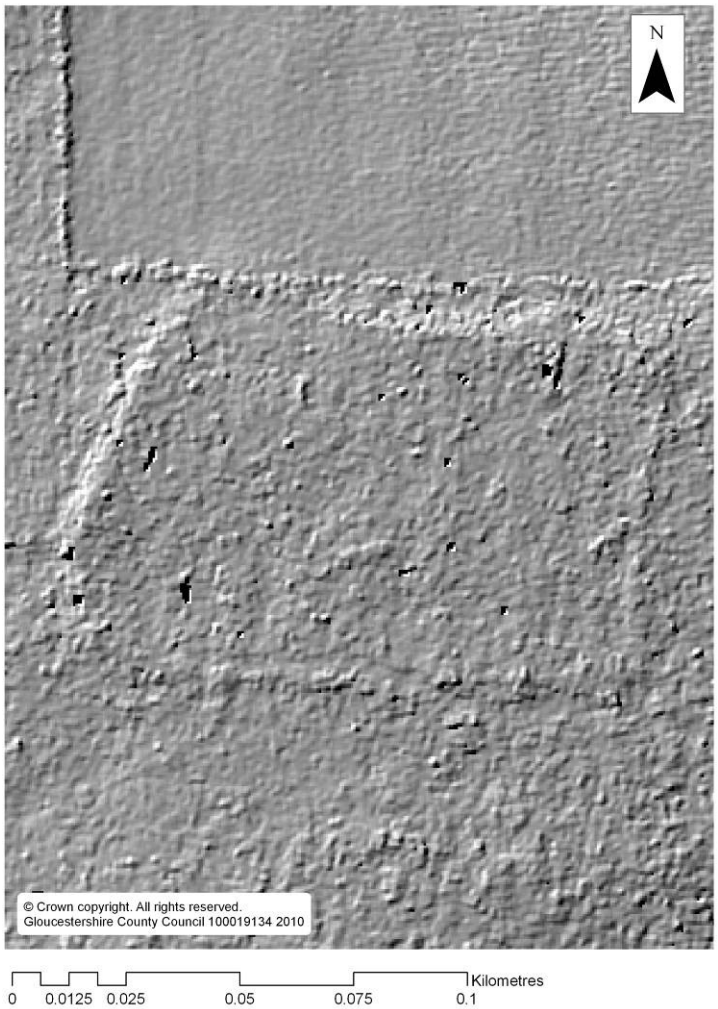


Figure 12: Possible subrectangular enclosure st5599/06

Lidar image © Forest Research

Additional possible subrectangular enclosure

Another possible rectilinear enclosure was identified within earthwork system so6115/04 (component 07). This feature survived as two sides of a possible rectilinear enclosure which would have been at least 47m x 43m. A possible northern return visible on lidar may have been formed by quarrying activity, and its eastern side would have been levelled by development associated with modern housing. The two surviving sides survived as a bank/terrace *c.* 0.5m high and with a face of *c*. 15-20^{o}. No evidence for a ditch was recorded in 2010, although this feature was recorded as a shallow rectilinear hollow (B223, B226) during rapid walkover survey in this area undertaken as part of Stage 2 of the Forest of Dean Archaeological Survey (Hoyle 2008b, Table 15), and the lidar would suggest a slight hollow in this area. Given the slight nature of these earthworks this discrepancy can be explained by different elements of the feature being more visible in different ground conditions. The status of this feature as the remains of a rectilinear enclosure is far from clear, although there is a possible connection between this site and the 'Great Berry' (Glos HER 25426) and 'Aconbury' placenames (Glos HER 25382) which were associated with this site.

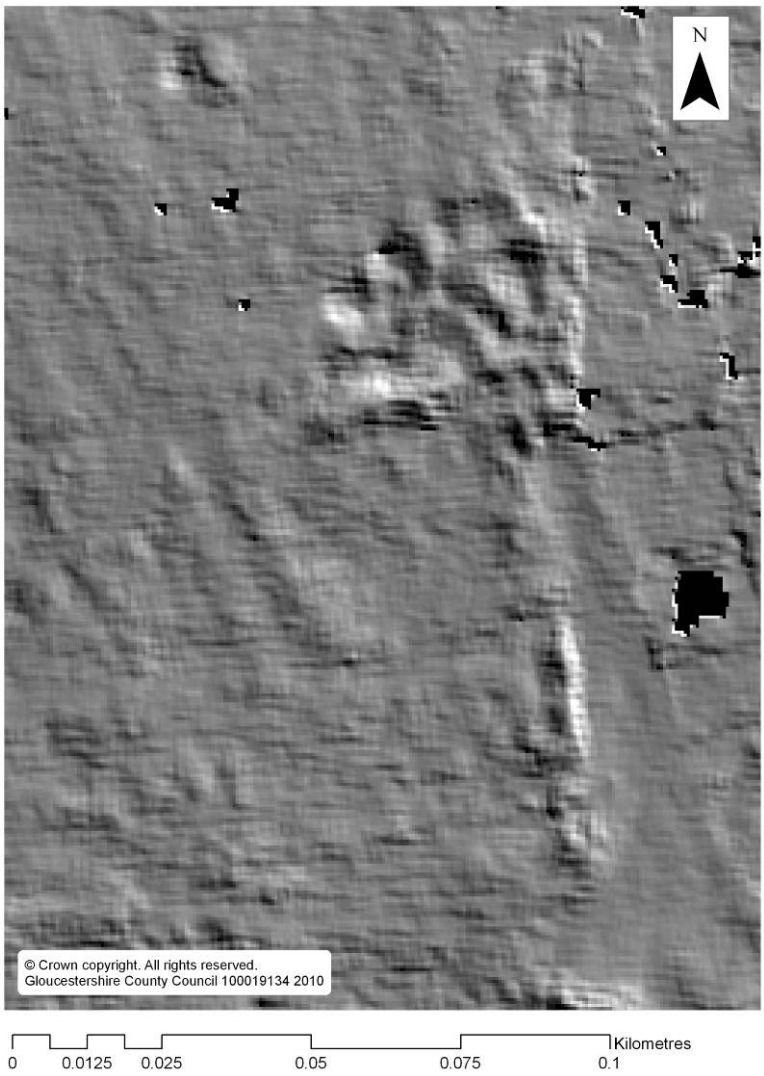


Figure 13: Possible subrectangular enclosure within earthwork system so6115/07

Lidar image © Forest Research

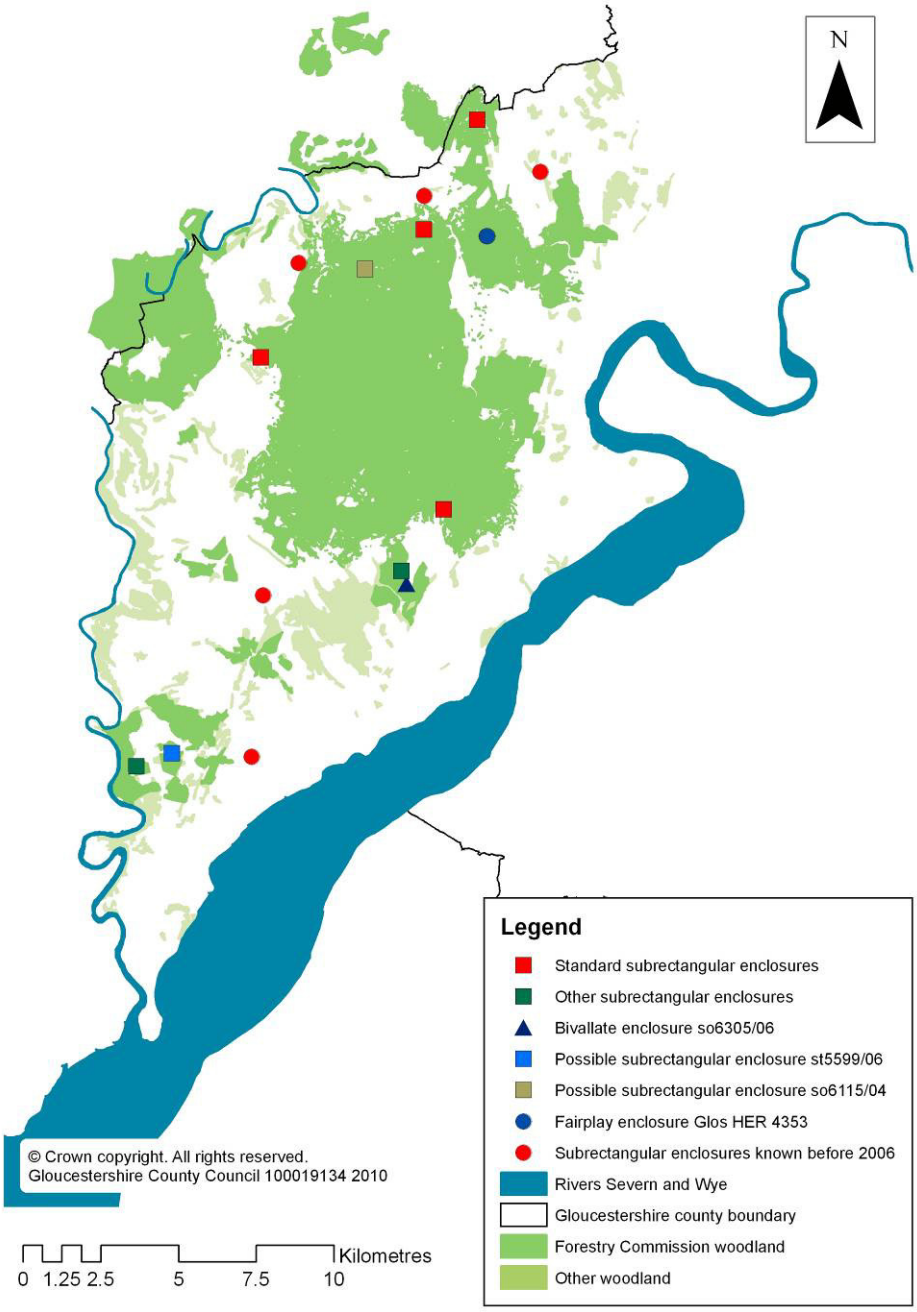


Figure 14: All subrectangular enclosures

3.3.3 Discussion of subrectangular enclosures

All of the subrectangular enclosures surveyed in 2010 occupied positions (often above or just below 200m AOD) which would have commanded views over the surrounding countryside; a position shared with many of the six subrectangular enclosures within the Forest of Dean Survey area which were known prior to the 2006 lidar survey (Hoyle 2008a, 4.6.3.3, Fig 14; Figure 14).

Two of the 'standard' enclosures may be associated with placename evidence suggesting early earthworks, although this association was far from clear as the earthworks were sited *c.* 1km from the HER record for the placename (although in both cases the precise location to which the placename referred is unclear. A closer association with placename evidence was found in the case of possible rectilinear enclosure so6115/07 (component 07) (see 3.3.2.2 above and Table 4).

Table 4: Subrectangular enclosures and place name evidence

Lidar No.	Placename	HER
so5812/02	Whimberry Berry Hill	25387 25389
so6407/01	Wimberry	25372
so6115/07 (component 07)	Great Berry Aconbury	25426 25382

The precise status and date of these features remains unclear and at this stage it is only possible to suggest that the similarity in form of the four 'standard' enclosures could indicate they are of a similar date and function.

Six subrectangular enclosures were known in the Forest of Dean Survey area prior to the 2006 lidar survey (Hoyle 2008a, section 4.6.3.3). The majority of these were either different in shape, such as the enclosure at Edge Farm, Woolaston (Glos HER 6386), which measures 98m x 27m, or considerably larger than the enclosures surveyed in 2010. This category would include the square enclosure known from cropmarks at Close Turf Farm, St Briavels (Glos HER 4053) which measures 125 x 125m, and the rectilinear ditched enclosure, also known from aerial photographs, at Ruardean (Glos HER 22703) which measures 70m x 70m.

One of these, however, although larger than the examples recorded in 2010 is broadly similar in shape, size and geographical and topographical position. This enclosure, within woodland at Fairplay (Glos HER 4353) measures 53m x 53m and survives as a low rectilinear banked enclosure with an outer ditch and possible counter scarp bank. Geophysical survey undertaken as part of Stage 2 of the Forest of Dean Archaeological Survey did not identify any internal features which aided the interpretation of this feature (Hoyle 2008b, section 6.2, Appendix Qi).

The form of the subrectangular enclosures identified by lidar in 2006 and surveyed in 2010, and also of many of the subrectangular enclosures identified before the 2006 lidar survey (see Hoyle 2008a, 4.6.3.3), is consistent with a variety of features which range in date from the prehistoric to the medieval periods. Their general size and shape is consistent with that of small Roman fortlets (Adkins & Adkins 1982, 100; Breeze 1982, 101), and these could represent evidence of early Roman military expansion and consolidation of the Forest of Dean area from the mid 1st century AD.

These features are also consistent in size and shape with medieval hunting lodges recorded in the New Forest, Hampshire (Smith 1999, Fig 4), and may represent the same phenomenon in the Forest of Dean. The majority of these are sited within *c.* 1km of the modern boundaries of the Statutory Forest, and they may also relate to medieval Forest administration in some way. The system of forest lodges constructed following the Dean Forest Reafforestation Act of 1668 is well documented (Jurica 1996) and has been the subject of recent research (Waygood 2003; 2004). Physical evidence of the administration of the crown woodland prior to this, however, is not currently known.

The two subrectangular enclosures in Zone 1 (st5599/06 and st5499/02), neither of which fall neatly into a recognised type, may relate to late 13th century assarting recorded in Tidenham Chase (Herbert 1972, 51; Hoyle forthcoming, section 3.1.3.2), perhaps representing the site of farmsteads. This interpretation may be supported by the fact that both are in the vicinity of features which have been interpreted as boundaries or boundary systems (st5599/06 is in immediately south of earthwork system st5599/10 and st5499/02 is immediately south of curved rubble bank st5499/03).

3.4 Earthwork systems

The 2010 survey investigated 25 features which had been classed as earthwork systems during the transcription of the 2006 lidar survey.

This category of feature was extremely diverse and most contained some components which appear to represent archaeologically significant features and others which are not in varying proportions. Additionally many of them contained some elements which appeared to represent linear features on the hillshaded images, but which were not clearly visible on the ground (these are discussed

separately in 3.5.1 below), whilst in others it was not clear if the lidar anomalies were the result of natural or archaeological processes. Details of individual earthwork systems can be found in Appendix D and Appendix E, but for discussion purposes they can be divided into six broad categories (Figure 42).

3.4.1 Type 1: Earthwork systems which predominantly consist of a coherent arrangement of interrelated boundaries.

This type of earthwork system can be further subdivided into two broad sub-categories based on their predominant disposition of their components, although it is not clear if this distribution represents an actual difference in function or date.

3.4.1.1 Type 1a: Earthwork systems which predominantly form a rectilinear boundary system

so6013/04 and so6013/07

Earthwork systems so6013/04 and so6013/07 can be interpreted as part of the same system. These consisted predominantly of terraces, which ranged in height from *c.* 0.5m to 2m and formed large rectilinear enclosures. The dimensions of these varied, and they were not uniform in size, but recognised boundaries were generally more than 60m to 70m apart. In general these terraces crossed slopes, following the contours of the hillside, although where they ran up or down slopes (e.g. so6013/04, component 06) they tended to be lower, perhaps suggesting colluvial action.

Figure 15: Earthwork systems so6013/04 (southern) and so6013/07 (northern)
Lidar image © Forest Research

so6815/03

A further earthwork system which could be included in this category was so6815/03 which tended to consist of terraces or low banks which may have formed large rectilinear enclosures similar in size to those discussed above. The status of this system was less clear as some of the recorded terraces could not easily be distinguished from the natural break in slope.

Figure 16: Earthwork system so6815/03

Lidar image © Forest Research

3.4.1.2 Type 1b: Earthwork systems which predominantly define parallel linear enclosures

so6509/05 and so6013/26

Two of these (so6509/05 and so6013/26) consisted of parallel terraces, or occasionally broad banks (so6509/05, component 11), generally spaced between 40 and 70m apart and defining broad linear areas. The heights of these terraces ranged from 0.5m to 1.2m and were generally orientated slightly obliquely, but along the line of the slope and may, perhaps, have been created or augmented by colluvial action.

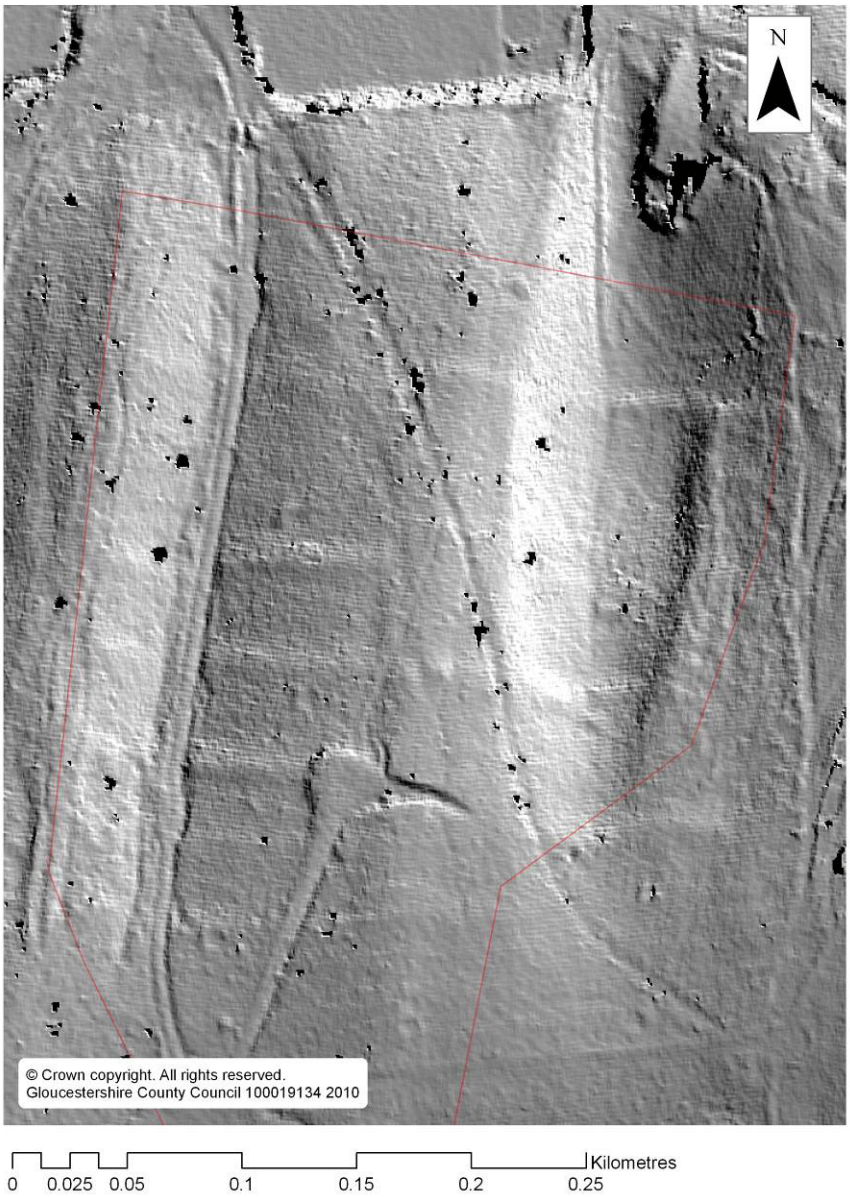


Figure 17: Earthwork system so6509/05

Lidar image © Forest Research

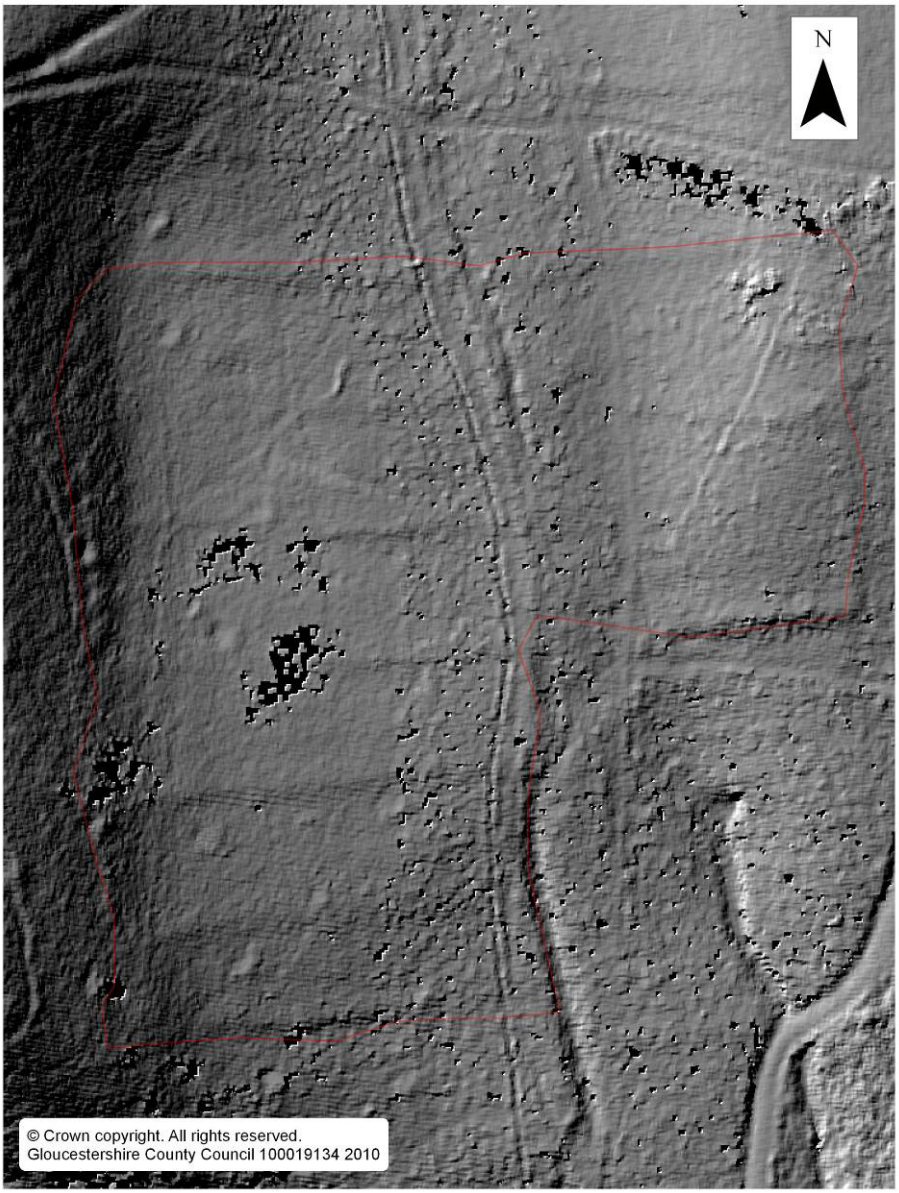


Figure 18: Earthwork system so6013/26

Lidar image © Forest Research

so6315/01

A third system in this category (so6315/01) consisted of three large (1.2m to 2.2m) terraces between 70m and 80m apart which ran east/west following the contours of the natural hill slope. Some isolated linear features identified during the 2006/20007 lidar transcription (so6215/06, so6315/05) had been identified in this area in a similar disposition and may represents isolated elements of the same system of earthworks. The eastern part of the central terrace (component 02), to the east of the Forestry Commission woodland was in use as a boundary in 2010.

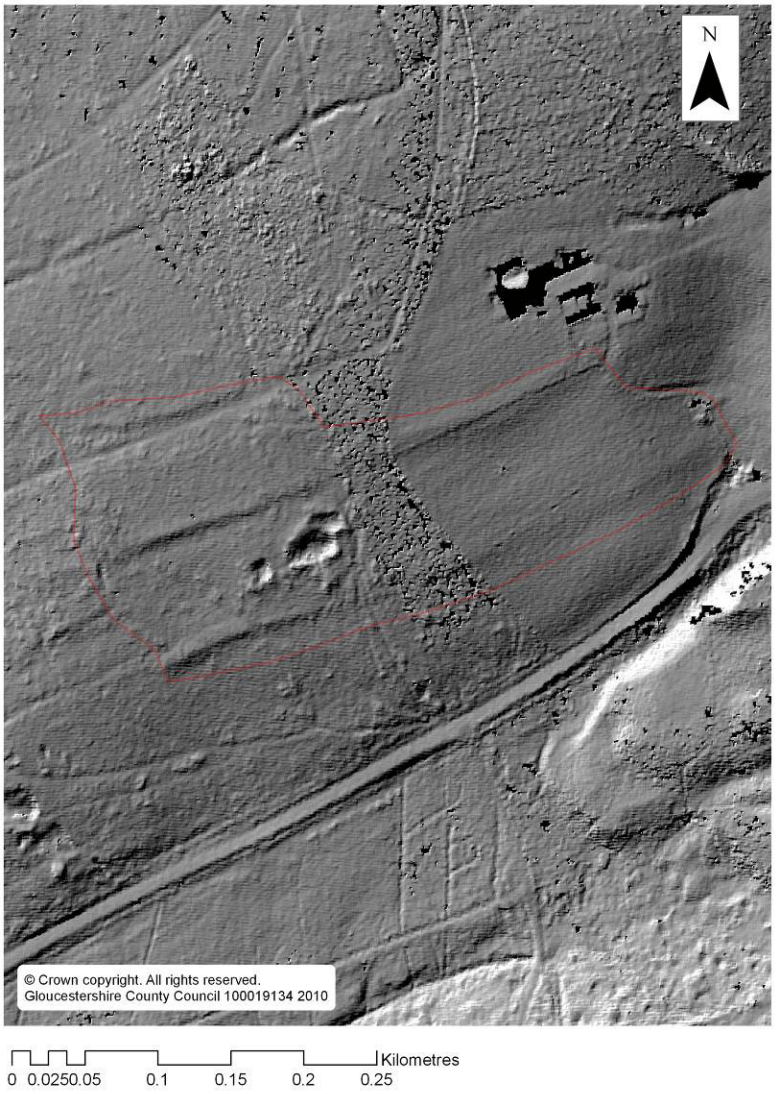


Figure 19: Earthwork system so6315/01

Lidar image © Forest Research

so6115/04

Approximately 1km to the west of so6315, another earthwork system (so6115/04) in Great Berry Wood contained broadly similar features in a broadly similar disposition, but with some elements running along a different orientation following changes in the natural topography. This system had partly been recorded in 2005 as part of Stage 2 of the Forest of Dean Archaeological Survey (Hoyle 2008b, section 3.3) and predominantly comprised three long low banks/terraces 0.6m to 2m in height spaced at between 50m and 80m apart, which ran east/west following the contours of the southern side of the natural hillside. Further terracing of similar dimensions was recorded at the western edge of Great Berry Wood. This ran approximately north/south and followed the slope of the natural hillside which turned northwards at this point. The relationship between the two sets of terracing was not clear, but their disposition suggested they formed part of the same system. Other vague lidar anomalies which also ran north/south (component 05, component 06) were not visible on the ground in 2010.

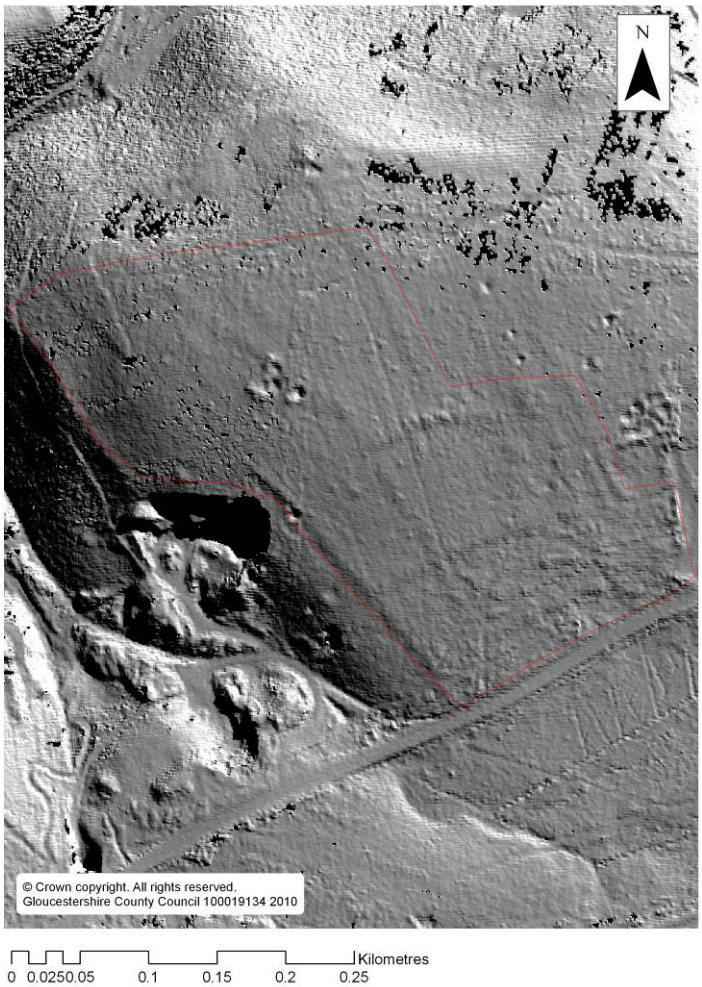


Figure 20: Earthwork system so6115/04

Lidar image © Forest Research

so6615/02

The fifth system in this category (so6615/02) also consisted of three parallel linear boundaries between 60m and 70m apart. It differed from those above, however, in that one of its boundaries (component 05) was a broad rubble bank rather than a terrace and all three boundaries, which were orientated approximately east/west across rather than along the natural slope, could not have been formed by colluvial action. An additional terrace (component 02), *c.* 1.2m high, ran at right angles, and to the north of the main group along the natural hill slope.

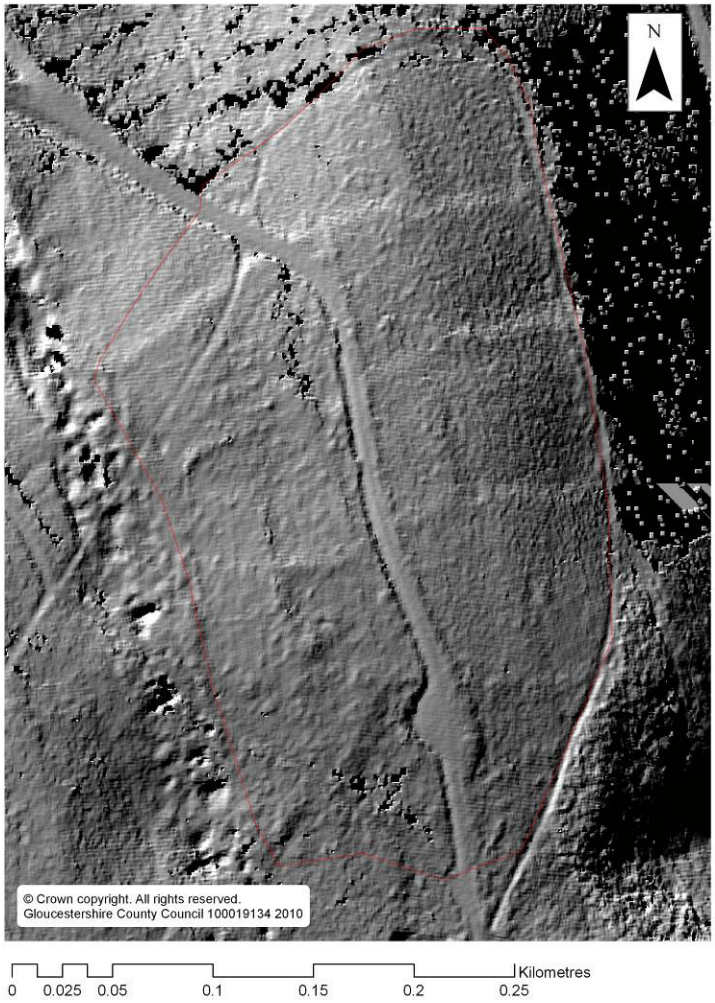


Figure 21: Earthwork system so6615/02

Lidar image © Forest Research

3.4.2 Type 2: Earthwork systems which contain elements of a coherent arrangement of interrelated boundaries.

As with Type 1, these can be further subdivided into two broad sub categories based on the predominant disposition of their components, although it is not clear if this represents an artificial distinction or not.

3.4.2.1 Type 2a: Earthwork systems which contain elements of a rectilinear boundary system

Seven of the earthwork systems surveyed in 2010 contained a number of boundary features which appeared to form part of a coherent and interrelated rectilinear system, although in all cases field survey suggested that these were not as extensive (or at least not as visibly extensive – see 3.5.1 below) as the 2006/2007 transcription of the lidar survey had suggested.

st5599/10

Earthwork system st5599/10 comprised a rectilinear group of terraces (component 02, component 03, component 04) which ranged in height from 0.5m to 2.5m. The higher terraces (component 02, component 04) ran approximately parallel to each other, *c.* 58m apart, and crossed the natural slope of the hill side. The lower terrace (component 03) ran down the slope. An additional bank/terrace (component 01), recorded *c.* 130m to the west, was of similar dimensions and on a similar alignment to component 03. This may have been part of the same earthwork system, although it was not contiguous with any recognised banks or terraces. This earthwork system is in an area where assarting, to convert woodland to agricultural use, was recorded in 1282 (Herbert 1972, 51, Hoyle forthcoming, section 3.1.3.2) and it is likely that some of these boundaries relate to that activity. An additional rubble bank (component 08) was recorded in the northwestern part of the area. This was a separate lidar feature (st5999/09, Glos HER 25394) and not part of earthwork system st5599/10.

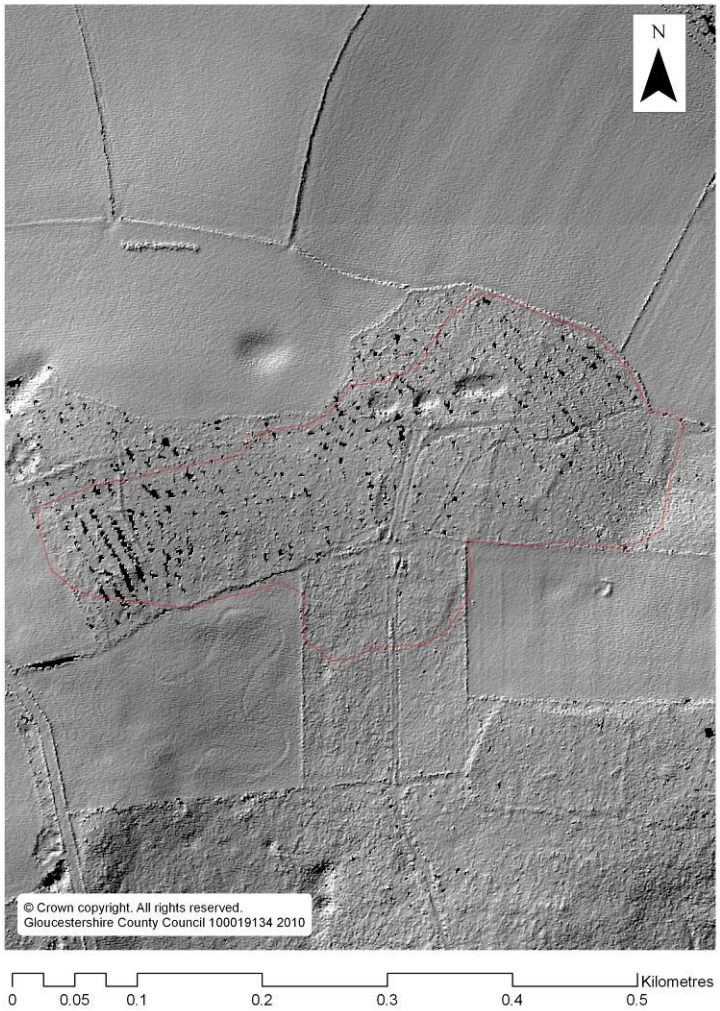


Figure 22: Earthwork system st5599/10

Lidar image © Forest Research

st5698/22

Earthwork system st5698/22 comprised two banks (component 01, component 02) set at right angles to each other and measuring 0.7m and 0.4m high respectively. These were the only earthwork features visible in this immediate area, although a number of isolated linear and rectilinear lidar-detected earthworks had been recorded between 300m and 350m to the south (st5698/07, st5698/08, st5698/11, st5698/15) in an area outside Forestry Commission woodland. These possible earthworks, which were recorded as part of the 2006/2007 lidar transcription, have not been visited and it remains unclear if they relate to st5698/22 in any way. The linear anomaly in the field to the west of these earthworks corresponds to a field boundary recorded on the 3rd Series Ordnance Survey map (OS 1925).

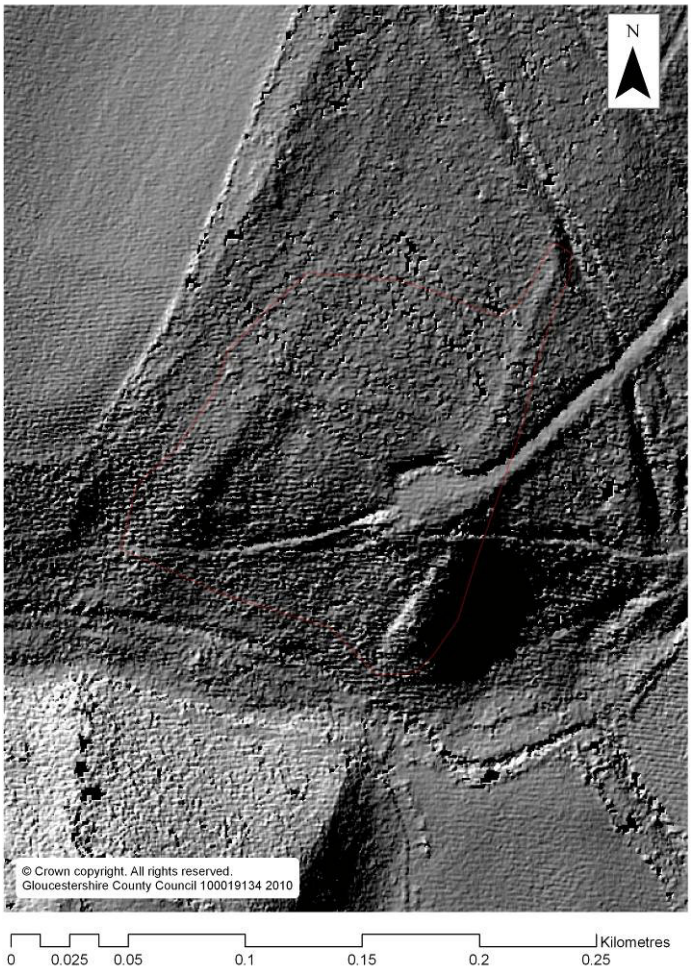


Figure 23: Earthwork system st5698/22

Lidar image © Forest Research

so6511/08

Earthwork system so6511/08 comprised a long linear bank *c.* 2m high (component 04) the southern side of which was abutted by the southern and eastern sides of a rectilinear terrace (component 03). This terrace was *c.* 1.2m high and enclosed an area measuring *c*. 79m x 29m. It is not clear if there was ever a western edge to this enclosure, but none was recorded in 2010 and the natural hillside began to slope very steeply from this point. The status of a shallow (c. 0.2m high) ridge (component 05) to the north of component 04 was not clear whilst a steep bank, c 3.5m high, to the south (component 08) can be interpreted as a linear ridge representing an outcrop of the Tintern Sandstone and was not an archaeological feature. The linear terrace (component 04) was clearly cut by a post-medieval forestry enclosure boundary (component 01). The precise date of this feature is unclear but features of this class have a date range from the late 17th to the early 19th centuries (Herbert 1996, 288; Hart 1995, sections IX, X, XI).

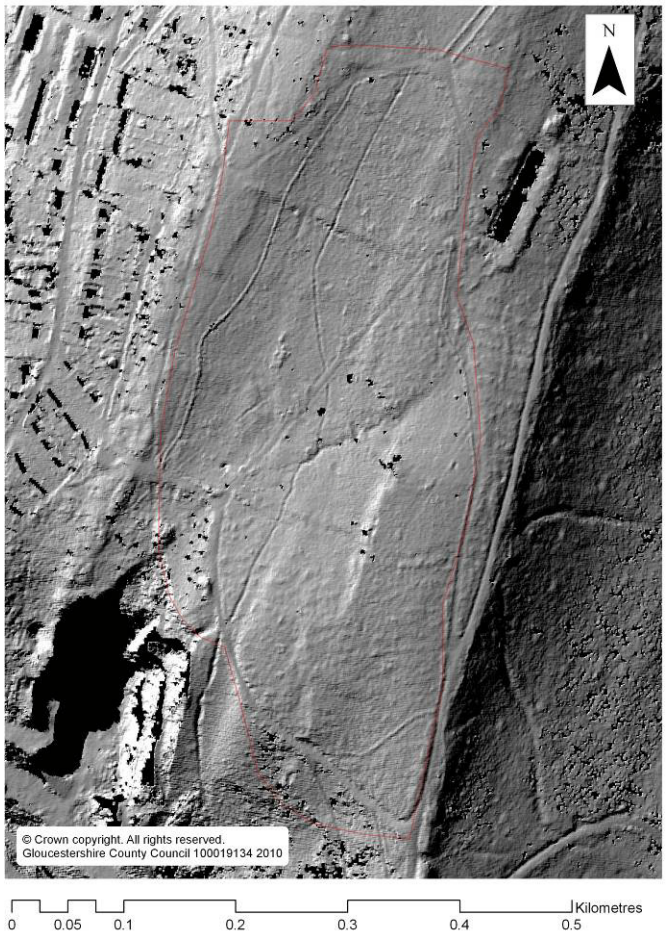


Figure 24: Earthwork system so6511/08

Lidar image © Forest Research

so6014/13

Earthwork system so6014/13 appeared on the hillshaded images to comprise a series of four linear and rectilinear boundaries which demarcated large areas *c.* 100m across. When surveyed in 2010 these features were revealed as terraces, although their status as archaeological features was not altogether clear. Three of these (component 01, component 09, component 08) were between 1.6m and 2m high with faces of between 20^{o} and 30^{o} and were interpreted as of probable archaeological origin. All of these crossed the slope of the natural hillside in this area and were either contiguous with, or appeared likely to have formed returns with, other terrace features (component 02, component 11, component 07, component 06) which were shallower and much less clear as archaeological features, and appeared to merge with natural hill slope. A further shallow terrace (component 12) in the northeastern part of the area crossed the natural hill slope but was low (0.5m) and shallow-faced (10^{o}) and its status remains unclear. There appeared to be no relationship between these features and two linear features identified in 2006/2007 (so6014/12, so6014/20) between 100m and 300m to the west as these ran north/south on an entirely different orientation to the earthworks of so6014/13. A series of irregular mounds to the southeast of the terraces (component 13) is likely to represent evidence for post-medieval (but probably pre-19th century) coal mining activity.

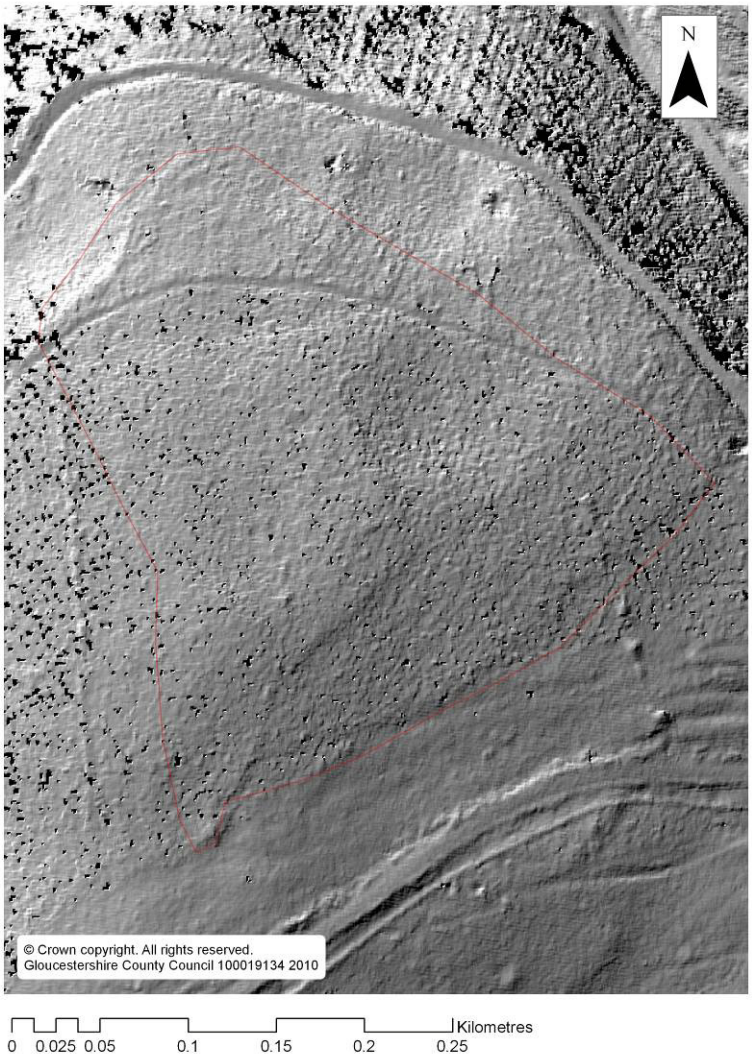


Figure 25: Earthwork system so6014/13

Lidar image © Forest Research

so6115/03

Earthwork system so6115/03 comprised three linear terraces (component 01, component 03, component 04) which ranged in height from 0.7m to 1.2m and had faces of between 15° and 20°. These demarcated subrectangular areas (c. 70m to 100m across) within a broad ledge on the natural hillside between two steep slopes to north and south. These appeared to predate the modern forestry track which ran along the ledge and also possibly a number of holloways which ran directly up the slope from the south. These features may be associated with late 19th century colliery known as the Pludds (Glos HER 10526) or post-medieval quarries (Glos HER 22698) *c.* 200m to the west although there is no evidence, other than proximity, to suggest this link.

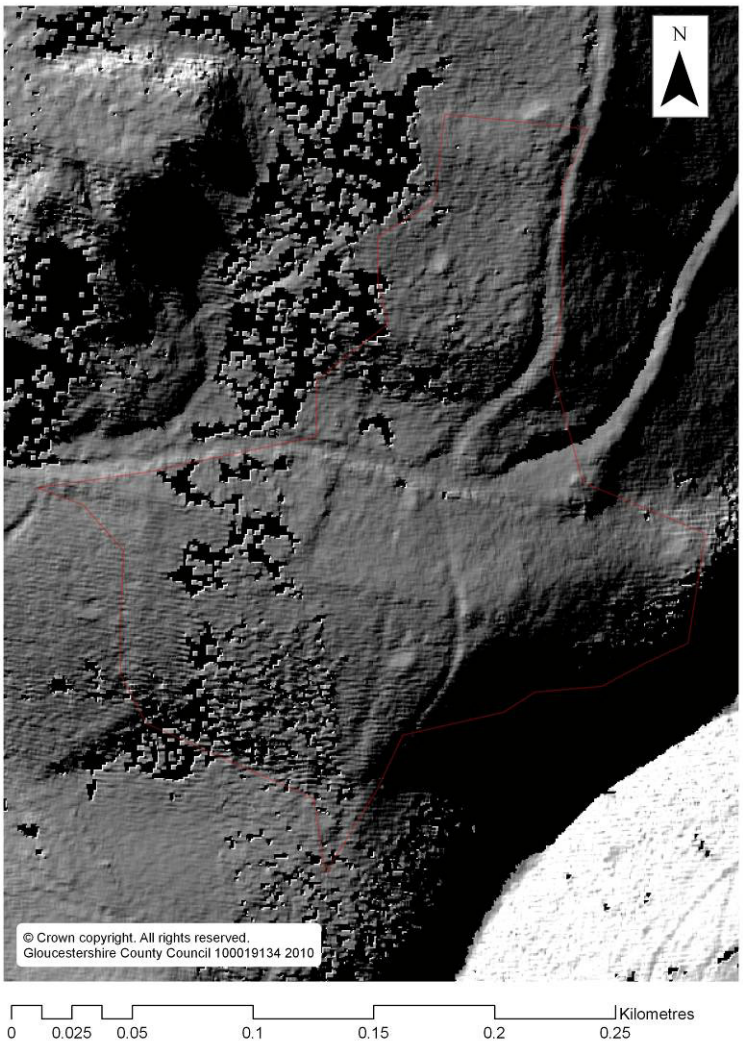


Figure 26: Earthwork system so6115/03

Lidar image © Forest Research

so6615/03

Earthwork system so6615/03 comprised a rectilinear terrace (component 07) which measured *c.* 1m high. This may have been associated with a low bank (component 08) which was only *c.* 0.35 m high and demarcated a subrectangular area *c.* 78m across. A further terrace immediately to the north (component 09) was considerably higher and broader than component 07 and was interpreted as the natural break in slope on the side of the hill. Additional terrace and bank features to the south (component 01, component 03) may also have represented natural breaks in slope or geological outcrops rather than archaeological features, but this interpretation was not clear.

Figure 27: Earthwork system so6615/03

Lidar image © Forest Research

so6818/08

Most of the earthworks recorded within earthworks system so6818/08 (component 01, component 02, component 03, component 04) were relatively low linear banks or terraces which may be surviving elements of earlier ridge and furrow. The single feature within the woodland (component 05) was a rectilinear terrace *c.* 2m high and had a face sloping at 30^{o} - 40^{o}. It appeared to be a continuation of similar features to the south (so6817/01, component 04, component 09) and may, therefore, be of potential archaeological significance.

Figure 28: Earthwork system so6818/08

Lidar image © Forest Research

so6510/01

An earthwork system which was difficult to interpret (so6510/01) may also fall into this category, although this is less clear as much of it could not be surveyed and many of the visible features were difficult to define. The western part of this system, which may have been an area of former quarrying, was inaccessible due to dense young trees (component 07) and many of the earthworks in the southern part of this system were not in Forestry Commission land, but appeared to consist of large linear and rectilinear banks/terraces. Similar banks/terraces ranging in height from 2.5m to 3.5m (component 02, component 06) were recorded within Forestry Commission land. These were found on relatively steep ground running north/south, perpendicular to the natural slope, whilst those on shallower ground were lower (generally 2m to 2.2m). Other banks/terraces which ran east/west, following the natural slope (component 01, component 04) were lower (0.4m - 0.5m) whilst some faint east/west orientated lidar anomalies (component 10) were not visible on the ground in 2010. Two of the east/west banks/terraces (component 01, component 04) were cut by a later boundary, which although recorded on modern Ordnance Survey maps was made up of large moss-covered stone blocks bordering a shallow ditch, and was clearly not a recent feature. The interpretation of these features as boundaries was not always clear as the area appears to have been subject to extensive quarrying activity (areas of rubble were recorded littering the surface here) and a number of the terraces (component 08, component 03, component 09) appeared to be related to this activity. It was not, however, clear whether these were the result of quarrying or whether quarrying had respected earlier features, and despite interpretative difficulties this system may predominantly represent a single coherent system of earthworks.

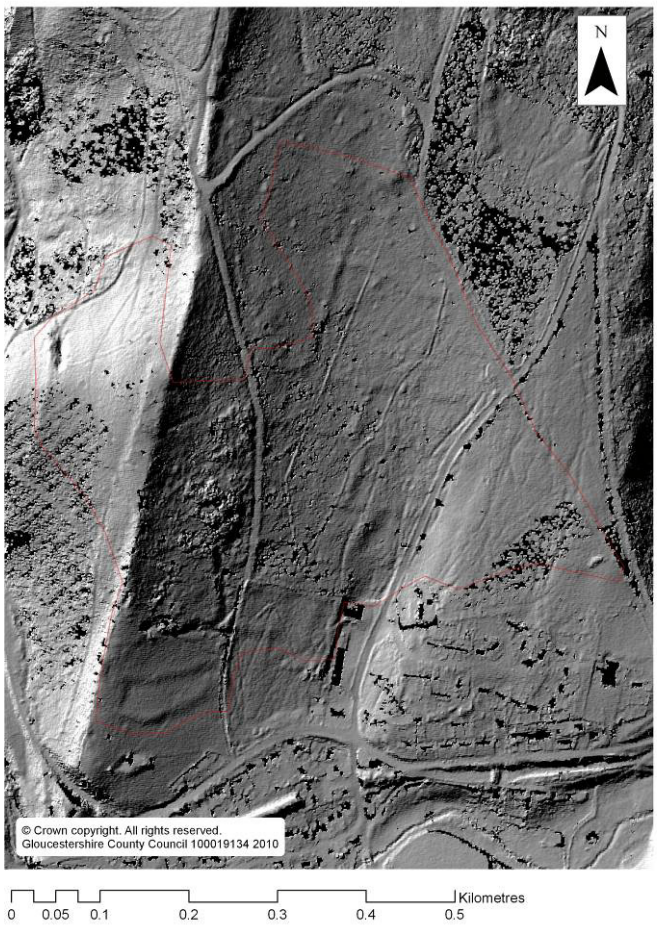


Figure 29: Earthwork system so6510/01

Lidar image © Forest Research

3.4.2.2 Type 2b: Earthwork systems which may contain elements of linear boundaries

so6007/02

The only feature within earthwork system so6007/02 which appeared to be of potential archaeological significance was a single linear terrace at the western edge of the system as defined in the 2006/2007 lidar transcription (component 03). This ran across the slope of the natural hillside here and measured 1.5m high with a face at 30°. A mineshaft (not recorded on the Gloucestershire HER) was sited on the crest of the terrace at approximately 359917 207387. The status of this terrace was not clear and a further short stretch of terrace (component 09) *c.* 90m to the east was interpreted as natural, or the results of shallow extraction. A further linear anomaly to the east, which was visible on the lidar hillshaded image (component 01) was not visible on the ground in 2010. The other features in this system were either not visible on the ground in 2010 or appeared to have been caused by modern tracks or quarrying.

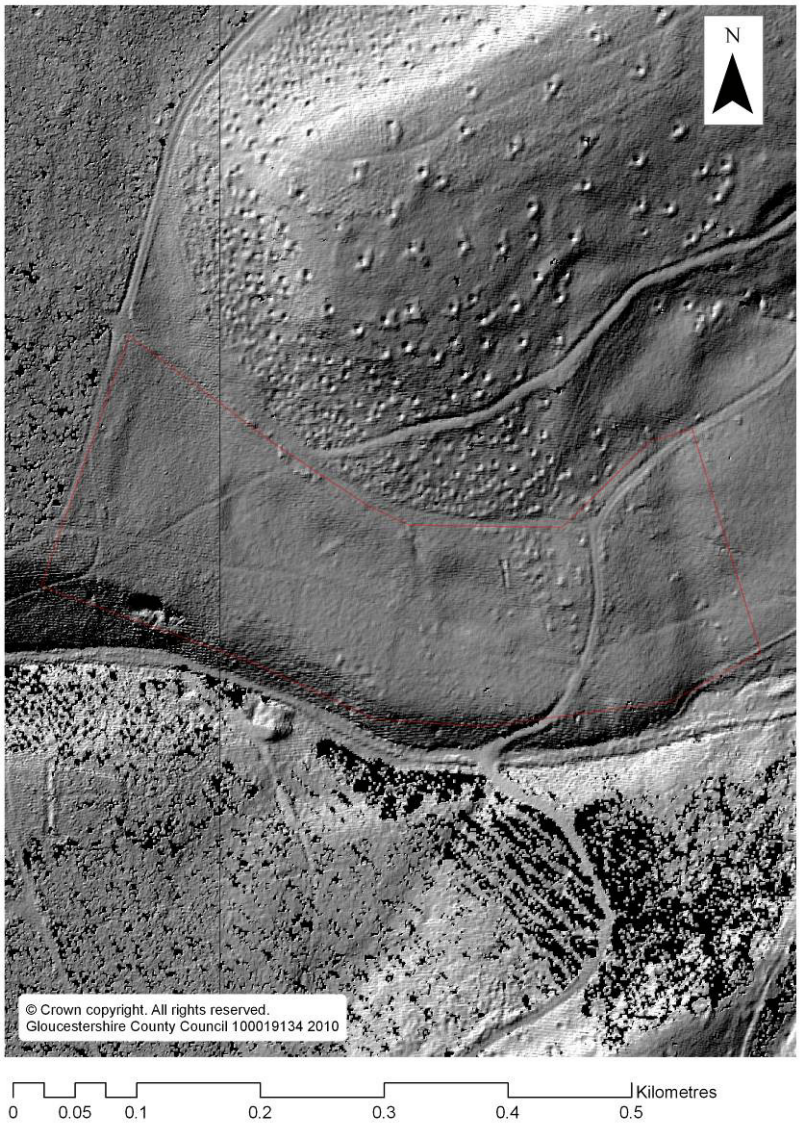


Figure 30: Earthwork system so6007/02

Lidar image © Forest Research

so6508/01

The only clearly significant feature within earthwork system so6508/01 was a single short stretch of terrace in the southwestern part of the area as defined in 2006. This feature (component 08) crossed the slope of the natural hillside and was *c.* 1.8m high with a face at *c.* 45°. It appeared to be constrained to north and south by two linear holloways/tracks which ran up the hillside (component 04, component 06) and could not be discerned as a clearly artificial feature beyond these. A vague relatively shallow terrace (component 05) which ran parallel to component 08 and *c.* 35m to its west may have been an artificial feature but could not easily be differentiated from the natural hill slope. A further possible archaeological feature also crossed the line of the natural hill slope approximately 70m to the northwest, and downslope of component 08. This feature (component 07) was recorded as a bank/terrace *c.* 1.5m high which represented a linear break in slope forming a narrow (c. 2m wide) level area, perhaps a routeway running along the valley side. A number of other linear features, which were visible on the lidar hillshaded images, could not be differentiated from natural slopes in 2010 (component 01, component 09, component 13). Most notable of these was component 09 which ran northeast/southwest in the northwestern part of the area. This appeared to be a northeastern continuation of the clearly artificial terrace component 08, and which appeared to be a strong anomaly on the hillshaded images. In 2010 no distinct feature was visible here and the anomaly appeared to have been caused by the natural break in slope along at the edge of the hillside. Other features (component 01, component 13) were also interpreted as variations in the natural topography, although both of these had appeared as relatively amorphous and indistinct anomalies on the hillshaded images.

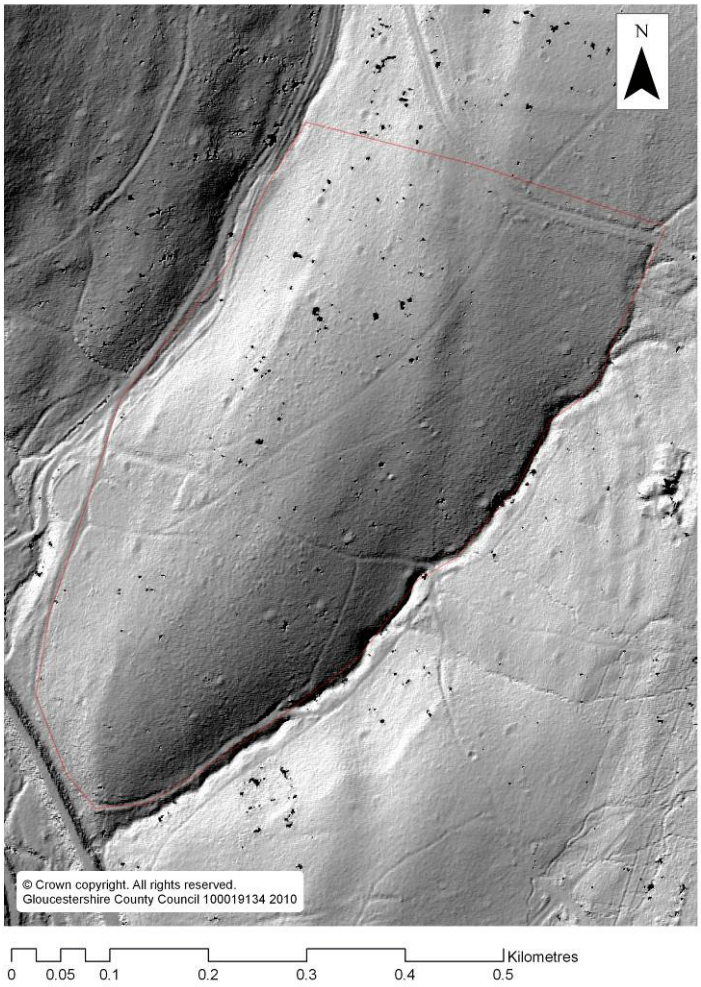


Figure 31: Earthwork system so6508/01

Lidar image © Forest Research

3.4.3 Type 3: Earthwork systems which predominantly consist of boundaries conforming to no discernable patterns and may represent several phases of boundary systems

Three earthwork systems fell into this category:

so5500/12

Earthwork system so5500/12 was made up of a series of earth banks and terraces and rubble banks which ranged in height from *c.* 0.5m to *c.* 2.5m. Some, but not all, of the linear rubble boundaries (component 05, component 06), and possibly also terraces (component 20 and component 08), may correspond to boundaries recorded on the Tidenham tithe map of 1845 (Gwatkin 1995). The remaining boundaries do not appear to form a coherent system and, whilst it is possible to suggest that some components may relate to each other (e.g. terrace component 10 and bank component 06 have a parallel alignment), the majority of these features are difficult to interpret as a single system of interrelated boundaries. They appear to represent a series of boundaries of different dates and purposes which would require further research to disentangle.

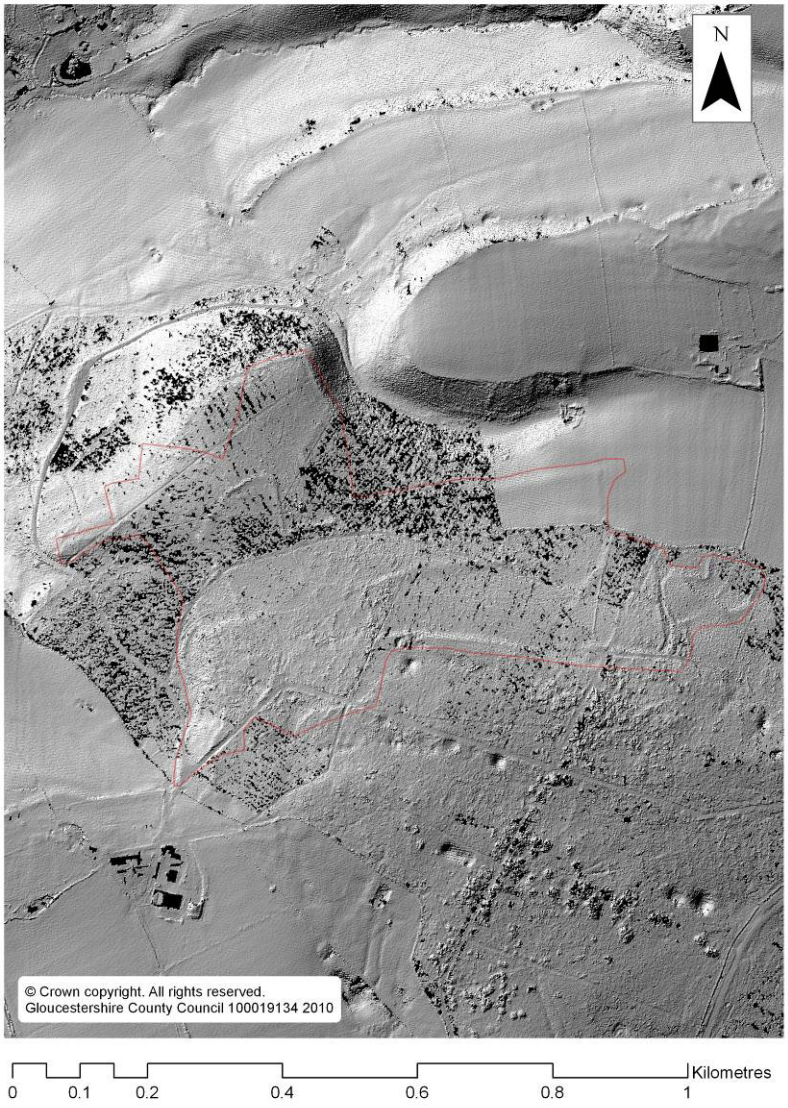


Figure 32: Earthwork system so5500/12

Lidar image © Forest Research

so6817/01

Earthwork system so6817/01 was the northern continuation of a series of lidar-detected earthworks investigated in 2005 as part of Stage 2 of the Forest of Dean Archaeological Survey (Hoyle 2008b, section 4.5). In general, the results of the 2010 survey of so6817/01 were consistent with those of 2005 in that the predominant feature type consisted of terraces ranging in height from 0.75m to 5m but were generally between 1m and 2.5m, which tend to run across the natural slope of the hill. Few of these features, however, were contiguous and the extent to which they are part of a coherent and interrelated system was not clear. This earthwork system is in an area where assarting, to convert woodland to agricultural use, was recorded in 1282 (Herbert 1972, 51, Hoyle forthcoming, section 3.1.3.2), and it is likely that some of these boundaries relate to that activity.

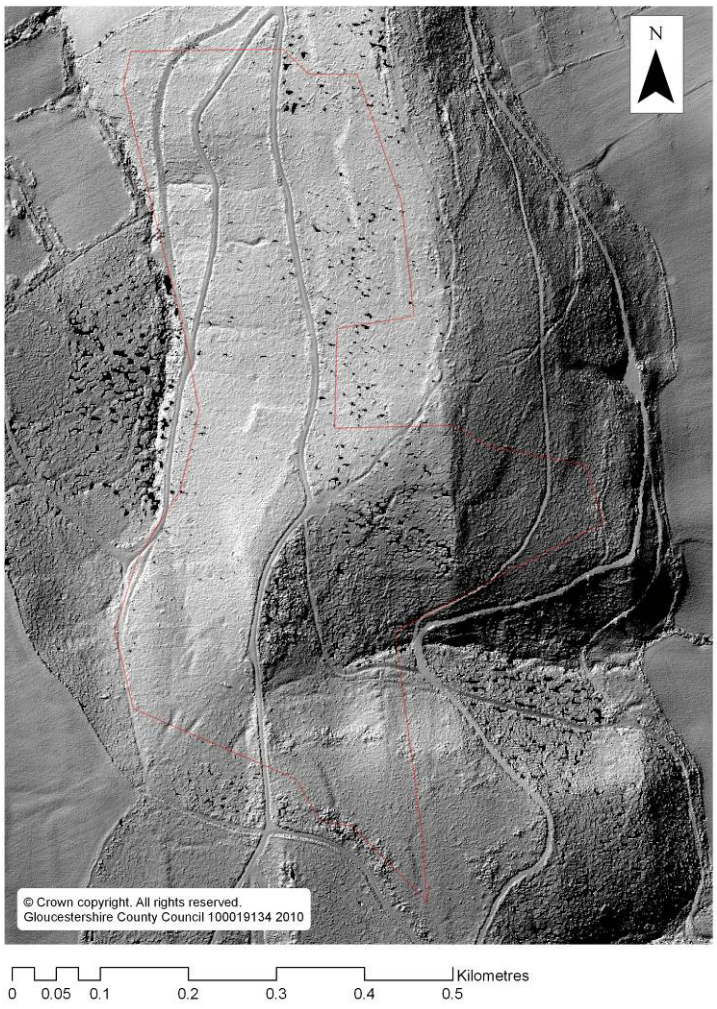


Figure 33: Earthwork system so6817/01

Lidar image © Forest Research

Type 4: Earthwork systems which were interpreted as not archeologically significant.

Six earthwork systems fell into this category

so5907/01

The features recorded as part of so5907/01, consisting mainly of a narrow bank (component 01, component 02) and a short stretch of terrace (component 04), were considered to be relatively recent, perhaps associated with industrial activity. Other features (component 05, component 06) were vague anomalies on the hillshaded images and were interpreted as natural topographical variation. Much of the southern part of this area, however, was inaccessible as it had been fenced off to protect new plantations.

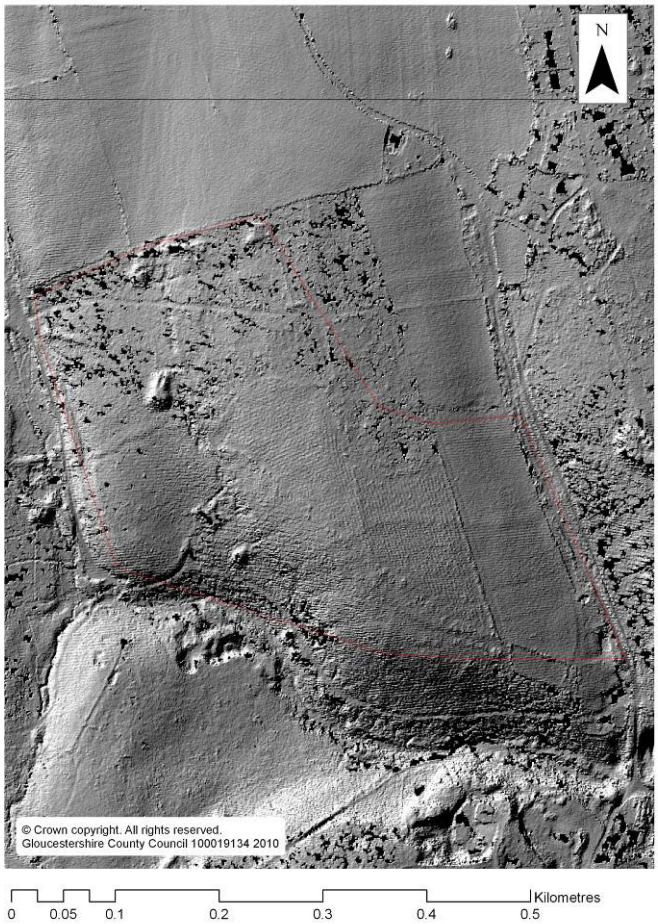


Figure 34: Earthwork system so5907/01

Lidar image © Forest Research

so5907/05

Earthwork system so5907/05 appeared to be a long linear boundary on the lidar hillshaded images. This feature, which crossed the natural slope of the hillside, could not easily be discerned in 2010, although it appeared a fairly strong and discrete anomaly on the hillshaded images. It was interpreted as the result of a natural break in slope of the hillside. Other linear features which were associated with this lidar anomaly were visible as forestry tracks and holloways in 2010.

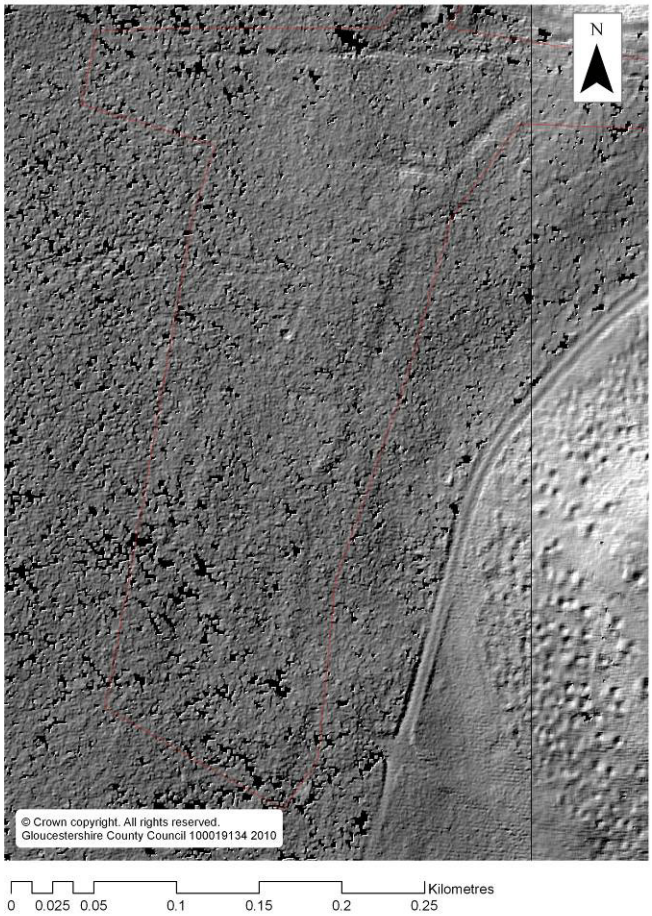


Figure 35: Earthwork system so5907/05

Lidar image © Forest Research

so6007/01

Earthwork system so6007/01 was interpreted as the result of quarrying activity (component 04, component 05) rather than features which may represent a boundary system. A linear anomaly running along the crest of the slope in this area (component 02) which had appeared as a fairly vague anomaly on the hillshaded images, was interpreted as the natural break in slope along the edge of the hill. Not all of this area could be surveyed due to the presence of fenced young conifer plantation.

Figure 36: Earthwork system so6007/01

Lidar image © Forest Research

so6515/01

This earthwork system was visible on the hillshaded images as a series of vague, and discontinuous linear anomalies which ran across the slope along the edge of a fairly steep hillside. In 2010 the majority of these (component 04, component 03, component 10, component 09, component 08, component 12, component 15, component 11) were recorded as terraces, although with the exception of component 03 and component 08 these were all interpreted as possibly natural in origin. In addition a number of other features (component 06, component 05.component 01, component 13) could not be discerned on the ground and it was suggested that the lidar response was caused by the natural break in slope along the edge of the hillside at this location.

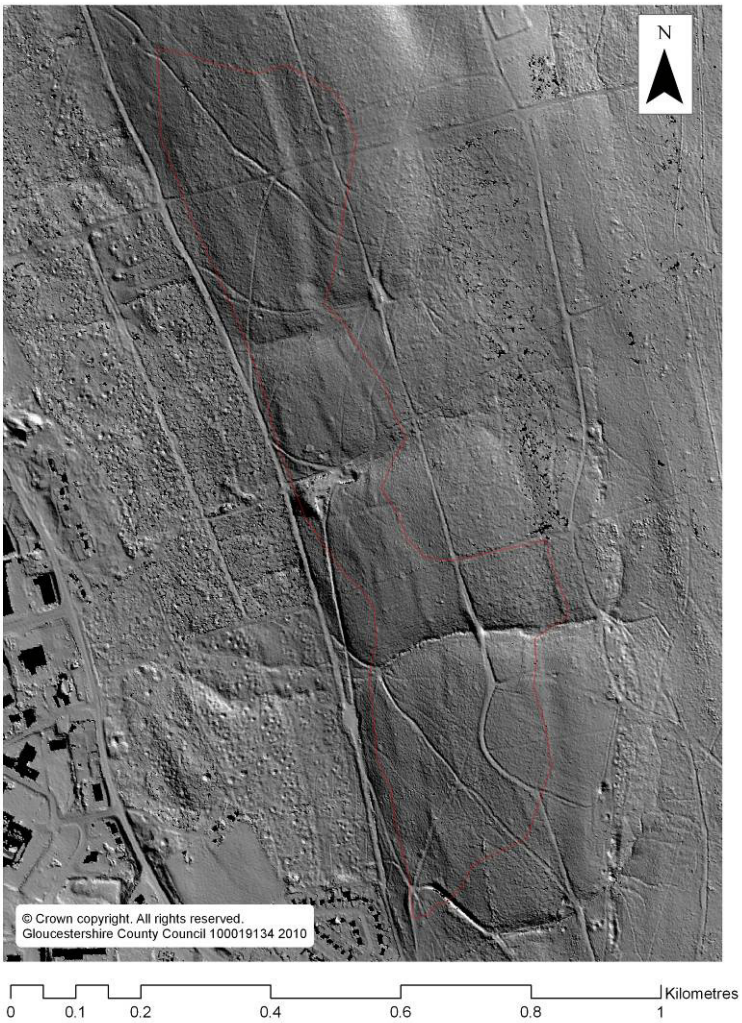


Figure 37: Earthwork system so6515/01

Lidar image © Forest Research

so6015/05

Earthwork system so6015/05 was not interpreted as a boundary system. The lidar anomalies visible on the hillshaded images were interpreted as breaks in slope on the natural hillside which was very steep in this area (component 01, component 04, component 08, and also possibly component 03), and holloways (component 02, component 07) or terracing (component 05, component 06) which may have related to post-medieval quarrying operations (Glos HER 22698) immediately to the north. It should, however, be noted that the two terrace features (component 05, component 06) which were between 1.2m – 1.5m high with faces at 20^{o} - 25^{o} were in a similar topographical position and *c.* 350m to the west of earthwork system so6115/03, and may, therefore, be of similar origin.

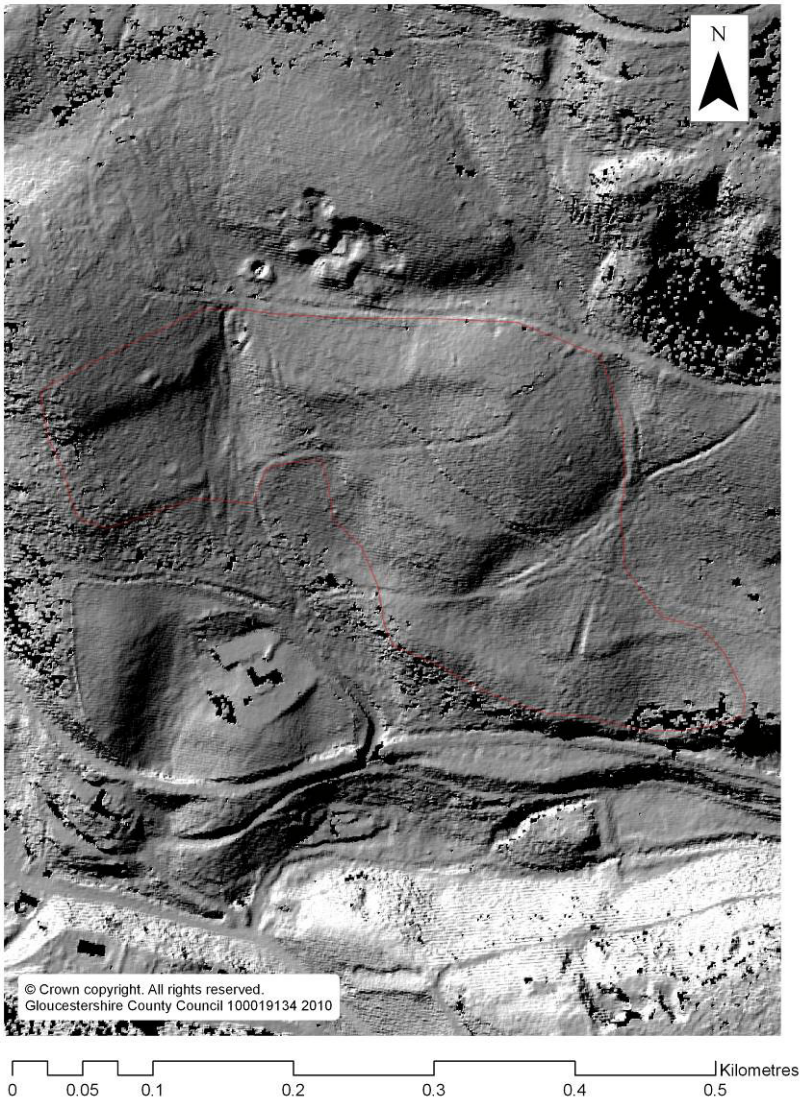


Figure 38: Earthwork system so6015/05

Lidar image © Forest Research

3.4.4 Earthwork systems not surveyed in 2010

3.4.4.1 Earthwork systems already surveyed

Four earthwork systems were not surveyed in 2010. These were:

- Welshbury Wood, so6715/12.
- Chestnuts Wood, so6714/13.
- Flaxley Wood, so6816/02 and so 6816/03.

The earthwork systems in Welshbury and Chestnuts Woods had been surveyed or recorded by rapid reconnaissance prior to the 2004 pilot lidar survey of Welshbury and Flaxley Woods (McOmish and Smith 1996, Hoyle 2008b, section 3.1, section 3.2), although both were revisited subsequent to that survey as part of Stage 2 of the Forest of Dean Archaeological Survey (Hoyle 2008b, section 4.3, section 4.4). The earthworks in Flaxley Wood were also recorded during Stage 2 of the Forest of Dean Archaeological Survey to check the efficacy of the 2004 pilot lidar survey (Hoyle 2008b, section 4.5).

These earthwork systems can be characterised as follows:

Welshbury Wood, so6715/12. Glos HER 5161, Type 1a

The earthworks in Welshbury Wood can be characterised as Type 1a and consisted of a number of terrace features enclosing rectilinear areas ranging in size from 68m x 55m (0.37ha) to 115m x 63m (0.72ha). These features have been interpreted as a late Bronze Age field system on account of their relationship with the ramparts of Welshbury Hill Iron Age hillfort, Glos HER 5161 (McOmish and Smith 1996).

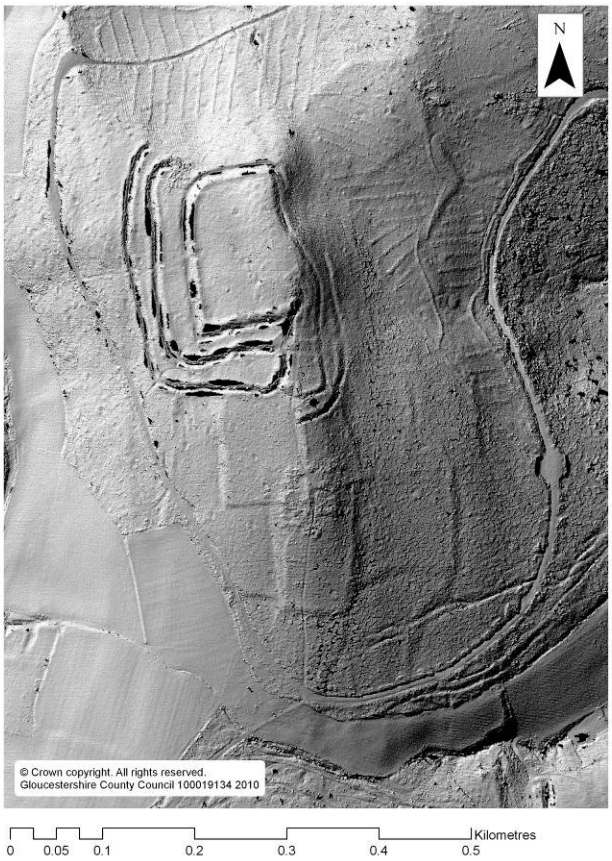


Figure 39: Earthwork system so6715/12, Welshbury Wood

Lidar image © Forest Research

Chestnuts Wood, so6714/13, Glos HER 22053, Type 1a/2a

The earthworks on Chestnuts Hill consisted of a number of terrace features which predominantly formed a parallel linear system (Type 2a) running approximately north/south across the natural slope of the hill, and demarcating areas *c.* 73m to 95m wide. A number of terraces were also set at right angles to these main north/south terraces, particularly on the lower eastern slopes of the hill. These demarcated areas which measured 65m x 107m (0.69ha) to *c.* 88m x 119m (1.04ha). These were predominantly short straight terraces which appeared to represent subdivisions within a parallel linear system (Type 2a), rather than the Type 1a systems which were made of a series of rectilinear earthworks (Hoyle 2008b, section 4.4).

Figure 40: Earthwork system so6714/13, Chestnuts Wood
Lidar image © Forest Research

Flaxley Woods, so6816/02 and so6816/03, Type 1a/2a

Flaxley Woods contained two earthwork systems (so6816/02 and so6816/03) which were investigated in 2005 as part of Stage 2 of the Forest of Dean Archaeological Survey (Hoyle 2008b, section 4.5).

The southern part of earthwork system so6816/02, in the southern part of Flaxley Woods, consisted predominantly of parallel linear terraces (Type 2a) which ran across the slope of the natural hillside and demarcated areas *c.* 81m wide. The northern part of this system, however, appeared more like a rectilinear system (Type 1a) enclosing areas of *c.* 0.5ha to 1.2ha, although the validity of the earthworks in this area was less clear as they appeared to incorporate some elements of linear geological outcrops (Hoyle 2008b, section 4.5.3.4, Figure 29).

Earthwork system so6817/03, to the north, also appeared to make use of, or at least respond to, possibly enhanced geological outcrops which ran north south across the slope of the hill. At right angles to these, a series of low terraces, running up the natural hill slope, demarcated areas 80m to 90m wide (Hoyle 2008a, section 4.5.3.4, Figure 29). A sub circular ditched enclosure was also incorporated into this earthwork system (Hoyle 2008a, section 4.5.3.6, Figure 29).

Figure 41: Earthwork systems so6816/02 and so6816/03, Flaxley Woods

Lidar image © Forest Research

3.4.4.2 Earthwork systems never surveyed

A further 31 earthwork systems, which had been identified in Forestry Commission land during the 2006/2007 lidar transcription, were not surveyed in 2010 and had not been surveyed or validated prior to that (Figure 42). All of these were relatively small and had been assigned either a low or medium interpretation confidence level in 2006/2007 (see Appendix I.iii and Hoyle 2008).

As many of these represented vague lidar anomalies and have not been surveyed they have not been assigned a type.

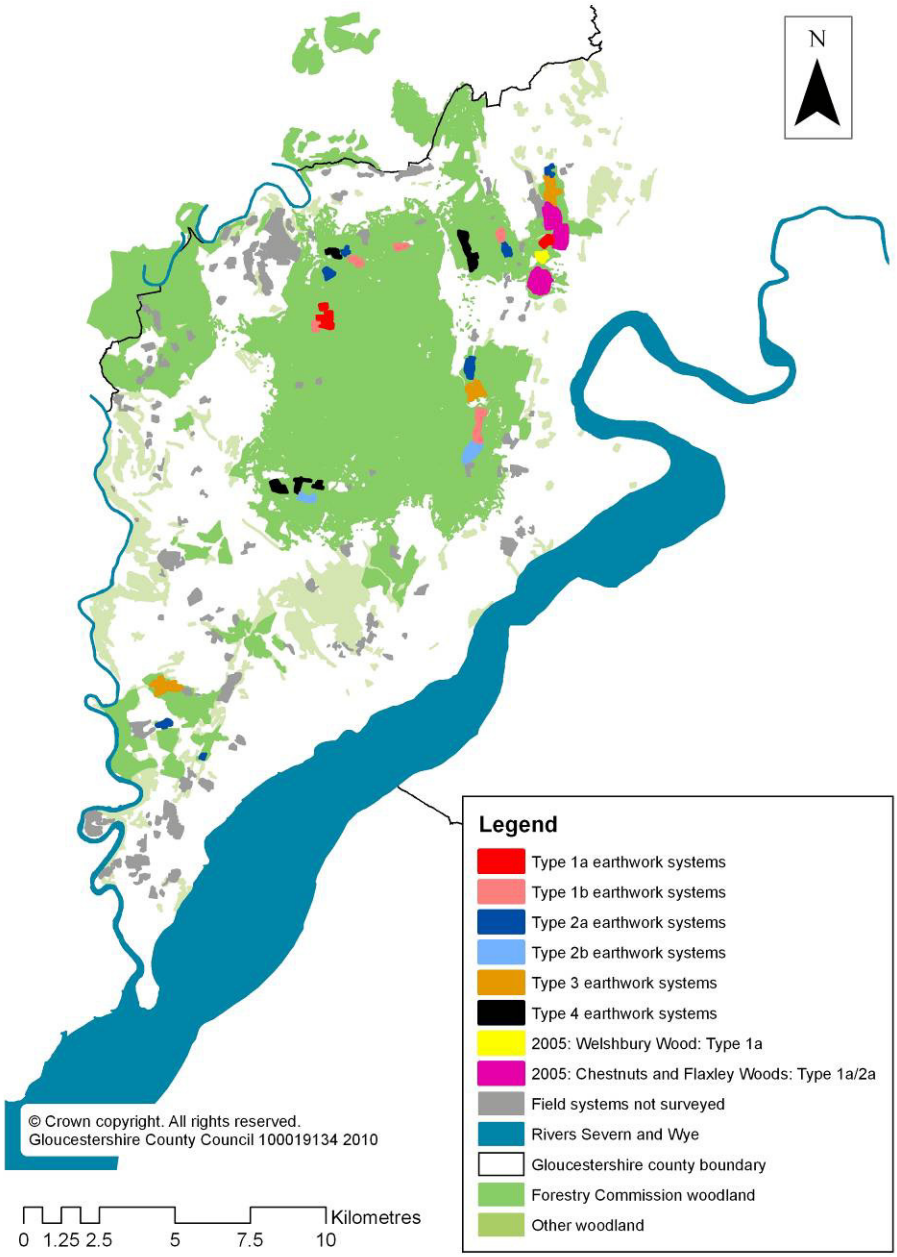


Figure 42: All earthwork systems by type, including those not surveyed in 2010

3.4.5 Discussion of earthwork systems

The 2010 survey of earthwork systems identified a number of difficulties in the interpretation of the status of individual components of earthwork systems (see 3.5.1 below) and it was clear that not all of these systems were as extensive or as clearly part of a single interrelated system as the initial transcription may have suggested.

Notwithstanding this, the 2010 survey did identify that the majority of the earthwork systems in Forestry Commission land identified in the 2006/2007 lidar transcription, do contain earthwork features which may be of archaeological significance, and the majority appeared to form, or contain elements of either large (c. 70m – 80m) rectilinear boundary systems or parallel boundary systems, at spacings of 50m to 80m .

What the 2010 survey was unable to do was offer any clear insight into the date or function of these features. Comparative dating evidence was rare and tended to be limited to demonstrating that earthworks predated features which were either undated, such as charcoal platforms (e.g. so6013/04), or pre-modern boundaries (e.g. so6510/01), or which are known to be post-medieval in date (e.g. so6511/08 which predated a post-medieval forestry enclosure boundary).

A possible correlation between a number of earthwork systems identified in 2006/2007 was made with historical records for medieval or early post-medieval assarts or coppice enclosures (Hoyle 2007 and forthcoming, section 3.1.3.2).

Fourteen of the earthwork systems surveyed in 2010 fell within this category (see Table 5), although many of these earthwork systems which appeared to correlate with the recorded location of assarts or coppice proved to be either of little archaeological significance or unconvincing as integrated earthwork systems.

Table 5: Earthwork systems surveyed in 2010 and historic records of assarts or coppice

Lidar number	Possible association	Remarks
so5500/12	Late 13th century assarting in Tidenham Chase	Terrace and rubble banks which do not form a coherent system and appear to contain elements from different periods.
so5907/01	Mid 14th century assarting at Elwood	Did not contain earthwork features thought to be of archaeological significance
so5907/05	Mid 14th century assarting at Elwood	Did not contain earthwork features thought to be of archaeological significance
so6007/01	Mid 14th century assarting at Elwood	Did not contain earthwork features thought to be of archaeological significance
so6007/02	Mid 14th century assarting at Elwood	Only one linear terrace may have been of archaeological significance
so6508/01	Mid 16th century coppice	Few visible earthworks were identified. These tended to be terraces and there was no indication that they formed an integrated system (but see discussion of features not visible on the ground in 3.5.1 below)
so6509/05	Mid 16th century coppice	Parallel linear terraces identified in this area. These appear more like cultivation terraces than coppice boundaries.
so6510/01	Coppice in Abbot's Wood recorded in 1656 and 13th century grant of land in Abbot's Wood to Flaxley Abbey	Terraces were identified in this area but these were difficult to interpret as an integrated system with any degree of confidence.
so6511/08	13th century grant of land in Abbot's Wood to Flaxley Abbey	Two terraces, one of which was rectilinear, could represent evidence for medieval assarting in this area.

Lidar number	Possible association	Remarks
so6014/13	Coppice at Morestoke (Myreystock) recorded in 1634	Rectilinear terraces were recorded, although the status of these was not always easy to determine (see 3.5.1 below) The association of these with 'Myreystock' is also not clear
so6817/01	Coppice in Flaxley Woods recorded in 1656 and 13th century grant of land to Flaxley Abbey	Outside of the woodland the earthworks recorded in this area may have been relict ridge and furrow. Inside the woodland, one rectilinear terrace may have been part of the same system as terraces found in so6818/08 (below).
so6818/08	Coppice in Flaxley Woods recorded in 1656 and 13th century grant of land to Flaxley Abbey	The earthworks in this area consisted largely of terraces. The extent to which these formed an integrated system was not clear.
so6815/03	13th century grant of land to Flaxley Abbey	A series or rectilinear terraces appeared to form enclosures in this area. Note that these may also be the remains of prehistoric field boundaries associated with Welshbury Hillfort (Glos HER 5161).
st5599/10	Late 13th century assarting in Tidenham Chase	Rectilinear terraces which contained elements of a coherent system.

This does not preclude the possibility that some of the features not associated with historical records fall into these categories.

Possible assarts

Assarts represent illegal encroachment into the edges of areas of woodland or waste to convert the land into cultivation. These often survive as irregular enclosures generally lacking common boundaries, and of variable size and shape (Hoyle 2006, section 3.3.4), although more regular encroachment enclosures have been recorded in the New Forest, Hampshire (Smith 1999, p 33). The physical form of boundaries can also be variable and assarts may also contain evidence of earlier cultivation such as ridge and furrow or lynchets. Consequently those features associated with possible assarting, even where they contain few features thought likely to be archaeologically significant, could be interpreted as possible evidence of this activity. Many of the other earthwork systems, particularly those which formed clear rectilinear boundary systems or which appeared similar to cultivation terraces (see 3.4.1.1 above and 3.4.1.2 above), could perhaps be interpreted as medieval assarting into the Crown woodland of the Forest of Dean, although the date and function of none of these could be established in 2010. Against this interpretation is the fact that few of these features are sited at the edge of the Forest where assarting would be most expected. The majority, however, are within *c.* 1km – 1.5km of the edges of the modern woodland, or the boundary of the Statutory Forest, which is thought to equate approximately with the area of Crown land during the medieval period (Herbert 1996, 285). Given that neither the boundary of woodland nor that of Royal Demesne during the medieval period can be established with any certainty, all of these could represent evidence for medieval assarting.

The two earthwork systems in Zone 1 (so5500/12 and st5599/10) which were surveyed in 2010 are more likely to represent evidence of assarting recorded in the late 13th century (Herbert 1972, 51; Hoyle forthcoming, section 3.1.3.2) although one of these (so5500/12) did not appear to form a single unitary system and may have contained boundary features of different periods.

Possible coppice enclosures

Coppice enclosures are a feature of some medieval and later woodland management regimes where they are used to protect coppice from browsing animals, and facilitate the management of coppice rotation systems. Medieval coppice enclosures defined by hedges were recorded at Wroughton, Overton and Enford in Wiltshire (Harrison 1995, 5), but they more commonly survive as low wide banks (Rackham 1995, 126; Fig 6.3; Simco 2003, Fig 5; Rotheram *et al* 2008, 12) often with associated ditches to impede deer leap (Smith 1999, 39, Fig 20, b). Almost all linear components of

earthwork systems were recorded as terraces in 2010, and none were similar in form to what would be expected to demarcate the boundary of a coppice enclosure.

Similarly the size of the earthwork systems recorded in the Forest of Dean in 2010 does not accord with what would be expected if these were coppice boundaries. Recorded coppice enclosures vary greatly in size. Early 19th century enclosures in Salcey Forest, Northamptonshire, ranged from 12.5ha to 44ha in area (Simco 203, Fig 5), whilst an early post-medieval example at Bolderwood Walk in the New Forest enclosed an area of *c.* 18ha (Smith 1999, 40). Medieval coppices at Monks Park, Bradfield, St. Clare in Suffolk tended to enclose about 20ha (Rackham 1995, Fig 6.3) whilst those in Hatfield Forest, Essex ranged in size from 36ha to 60ha (Rackham 1995, Fig 6.8). These, however, tended to be much larger than the enclosures identified in the Forest of Dean. The rectilinear enclosure of so6014/13, which has a possible association with coppicing at Myreystock (see Table 5) would have enclosed only *c.* 1ha, whilst other rectilinear earthwork systems would have enclosed areas ranging from *c.* 0.6ha (so6013/04) to *c.* 2.4ha (so6013/04). Consequently, it would seem unlikely that all of these earthworks can be interpreted as evidence of medieval or early post-medieval coppicing.

Other possible interpretations

Only one earthwork system in the Forest of Dean (Welshbury Hill, Glos HER 5161) is currently considered to be prehistoric in date on the basis of its relationship with the ramparts of Welshbury hillfort (McOmish and Smith 1996). This system was not surveyed in 2010, but consists of a series of rectilinear enclosure defined by terraces and enclosing areas of *c.* 1ha, a similar size range to the Type 1a and Type 2a rectilinear enclosures surveyed in 2010 (see 3.4.1.1 above). Undated earthwork features, sometimes pre-dating later coppice boundaries, have also been identified in areas of woodland outside the Forest of Dean, with examples known at Salcey Forest, Northamptonshire (Simco 2003, 3) or at Great Church Wood, Marden, Surrey (Bannister 2003, 8).

Although the earthwork systems surveyed in 2010 were not completely uniform (see 3.4.1 to 0) Types 1a and 1b (and to a lesser extent Types 2a, 2b and 3) give the impression of systems of landscape organisation which may predate the existing distribution of woodland. They have similarities with prehistoric field systems identified in other areas of the British Isles which have been interpreted as the result of increased levels of landscape organisation and control from the middle Bronze Age (c. 1300 – *c.* 900 BC) perhaps indicative of changes in the social order at that period (Cunliffe 1995, 36). The surviving remains of these features are particularly prevalent in areas of high or marginal land where agriculture was subsequently abandoned (Fowler 1983, 119-128, Figures 45-47), perhaps in response to land pressure brought about by climatic deterioration (Darvill 1987, 124), and where subsequent landuse has not obliterated all traces of them.

3.5 Lidar features which do not appear to represent archaeologically significant features

In many areas lidar features were encountered which did not appear to represent archaeologically significant features or whose validity could not easily be determined on the ground. Features of this nature were much more prevalent in the survey of earthwork systems, presumably on account of the more extensive nature of these features which contained many more components than discrete features, and consequently they are discussed in this section.

3.5.1 Lidar features not visible on the ground

The 2010 rapid survey of earthwork systems identified 240 separate components of those features which were investigated. Of these, 104 (43%) were either not clearly visible on the ground or could not be interpreted with any degree of confidence (Appendix F). This type of features broadly fell into three categories:

- Lidar anomalies for which there was no recorded surface evidence in 2010.
- Lidar anomalies which may have been caused by a combination of visible features which were not archaeologically significant
- Lidar anomalies which may have been caused by, or could not easily be distinguished from, natural topographical features, generally breaks in slope on hillsides.

3.5.2 Lidar anomalies for which there was no recorded surface evidence

Twenty-one feature components were recorded which were simply not visible on the ground in 2010, but had been visible as possible anomalies on the lidar hillshaded images. Two of these (so6014/13, component 03; so6615/2, component 04) were not actually visible as linear anomalies on the lidar hillshaded images and had been included as possible features in error. In one instance (so 6508/01, component 02) the anomaly was not visible on the hillshaded image (illuminated from the northwest) which was used as the base on the hand-held data logger and the field team were not looking in precisely the correct location. However they were in the right general location and no clearly visible earthwork feature was recorded.

The remaining eighteen were all generally weak, amorphous or irregular anomalies. Five of these (st5599/10, component 12; so6515/01, component 14; so6615/02, component 07, component 08, so6817/01, component 02) may have been masked by dense vegetation, although this was not recorded for the remaining thirteen. Two of these (so6509/05, component 10; so6013/04, component 08) appeared to be an integral part of systems which contained other earthwork features which were interpreted as of genuine archaeological significance. A possible third (so6516/01, component 14) may also fall into this category, although in this case the status of the whole earthwork system is not clear.

Lidar anomalies which are not visible on the ground raise questions about the interpretation of lidar results, particularly where these appear to be an integral component of earthwork systems which are clearly visible and which have been interpreted as of potential archaeological significance. These questions are:

- Is it possible to discount weak anomalies on the grounds that they do not represent earthwork features which can be discerned on the ground?
- Do weak anomalies indicate the very slight earthwork remains of genuine archaeological features which cannot easily be discerned on the ground, particularly in difficult ground conditions such as those experienced in woodland?:

Features visible on lidar hillshaded images, but not discernable on the ground have been identified by members of the Gloucestershire Society for Industrial Archaeology who have been using the Forest of Dean Lidar Survey results to investigate surface/shallow coal workings in Dean. During this project they investigated Oaken Hill Wood where a feature which appeared to be a linear bank on the lidar hillshaded image (GSIA 2007, feature 101) was not visible. The validity of this feature was however confirmed as it was visible on an aerial photograph taken in December 1946 (NMR 1946), and also recorded on the Forest of Dean National Mapping Programme (Glos HER 2010a) suggesting that the lidar was able to detect very slight variations in the ground surface which could not be picked out on the ground, due to undergrowth cover.

Trevor Pearson of English Heritage's Survey and investigations team has also noted the phenomenon of lidar identifying genuine features which are too faint for the naked eye to discern on the ground in areas of pasture in the Mendip region (Trevor Pearson, pers. comm.). If this occurs in areas of pasture it is reasonable to expect it will be more prevalent in the relatively difficult conditions encountered in woodland.

3.5.3 Earthworks which were not archaeologically significant

Eleven feature components were recorded as not archaeologically significant even though they were visible in 2010. All of these had been interpreted as components of earthwork systems during the 2006/2007 lidar transcription.

Nearly all of these represented weak, amorphous or irregular anomalies which perhaps should not have been included as likely earthwork features and which may have been created by natural features such as streams (so6817/01, component 03) or rutting from forestry vehicle tracks (so6509/05, component 06; so6115/04, component 02, component 06; so6817/01, component 06, component 19, component 20).

Two earthworks in this category (so6014/13, component 13; so6510/01, component 10) may, however, represent eroded or damaged parts of the earthwork systems they were within.

3.5.4 Lidar anomalies which may have been caused by, or could not easily be distinguished from, natural topographical features, generally breaks in slope on hillsides

By far the most common area of uncertainty encountered during the 2010 survey of earthwork systems was difficulty in determining to what extent lidar anomalies visible on the hillshaded images indicated evidence for archaeological boundaries or breaks in the slope of the natural hillside. Seventy-one components (30% of the total number of earthwork systems components recorded) fell into this category (Appendix F).

One of these (so6818/08, component 05) is thought unlikely to be a natural terrace and is discussed in 3.4.2.1 above, and twelve of these (so6509/05, component 01. component 02; so6015/05, component 01, component 04; so6515/01, component 11, component 12, component 17, component 18; so6815/03, component 02; so6818/01, component 01; so5500/12, component 13; so6615/03, component 03), were created by terraces in excess of 3m in height which can reasonably be interpreted as of natural origin.

The status of the remaining feature components which fall into this category remains unclear. These were found in 21 of the 25 earthwork systems surveyed, although in only eight did these represent more than 25% of the recorded linear components and were in the majority in only three cases (see Table 6).

Table 6: Earthwork systems containing equivocal features (%)

Lidar number	Zone	Recorded linear components	Linear components of equivocal status	% of linear components
so5500/12	1	23	3	13.04
so5907/01	2	6	2	33.33
so5907/05	2	3	2	66.66
so5907/01	2	5	1	20.00
so6007/02	2	3	2	66.66
so5805/01	4	13	3	23.07
so6509/05	4	16	7	46.75
so6510/01	4	11	1	9.09
so6511/08	4	8	1	12.50
so6013/04	5	9	2	22.22
so6013/26	5	13	2	15.38
so6014/13	6	13	6	46.15
so6015/05	6	8	3	37.50
so6115/03	6	6	2	33.33
so6115/04	6	7	1	14.28
so6515/01	7	15	9	60.00
so6615/02	7	9	2	22.22
so6615/03	7	7	3	42.85
so6817/01	7	22	2	9.09
so6818/08	7	5	1	20.00
so6815/03	7	7	3	42.85

Six of these earthwork systems (so5500/12, so6013/04, so6013/26, so6014/13, so6315/01, so6817/01) also contained linear components which were recorded as of likely archaeological significance, but which were also recorded as gradually fading away and apparently merging with natural hillslopes (see Appendix F). This would suggest differential survival of clearly visible earthworks within these systems, and consequently, many of the linear components whose status was deemed equivocal in the 2010 survey should, particularly where they form an integral part of a recognisable system, be considered to represent some degree of survival of archaeological features which are not immediately recognisable on the ground.

4 Scoping analysis of woodland characterisation

4.1 Existing management systems for archaeology in Forestry Commission land

As part of earlier phases of the Forest of Dean Archaeological Survey all identified archaeological sites in Forestry Commission land were assigned a management category (Hoyle 2008a, Appendix B). These categories were as follows:

- Category A, Sites, buildings and structures of national importance and their settings: generally with statutory protection - scheduled ancient monuments and listed buildings, or wider areas which contain these elements.
- Category B, Sites and structures of regional and local importance
- Category C, Other archaeological sites and structures
- Category D, Sites and structures of undetermined significance

Each category as assigned an extremely broad brush management strategy ranging from

- Category A, Consult the County Archaeologist and/or the District Conservation Officer if buildings are present
- Category B, Consult County Archaeologist or District Conservation Officer and maintain site in a stable condition
- Category C, Maintain features in their present form
- Category D, Notify the County Archaeologist if archaeological finds or features are found

This information has been passed to the Forestry Commission, added to their information systems and is now routinely used to inform all forestry at an operational level.

This system is adequate to inform their forestry operations on the ground (Ben Lennon, Forestry Commission pers. comm.), but the data-set is too complex to provide an overview of the heritage resource within their land to inform management at a more strategic level, particularly given the enormous increase in the extent of the heritage resource following the 2006 lidar survey (see 1.1.2 above; Hoyle 2007 and forthcoming, section 4.2.2, Table 2), and the need for a more generalised characterisation, in which a landscape is subdivided into areas which share certain pre-determined attributes, was identified as a requirement to inform forestry management at a more strategic level. In 2010 characterisation was undertaken in two areas of Forestry Commission woodland (Figure 2).

4.2 Characterisation methodology

The characterisation was a three step process and the following is a summary of the steps undertaken during this process. A more detailed description of the methodology can be found in Appendix H.

The scoping analysis made use only of existing Gloucestershire County Council HER information. Searches of all HER data were made and converted to Excel spread sheets which were then manually sorted and further subdivided into appropriate categories of heritage assets of similar type which shared similar dates (see Appendix H).

The use of the HER was considered appropriate for the Forest of Dean as a considerable amount of work has been undertaken to enhance and correct the HER for the Forest of Dean in recent years as part of earlier stages of the Forest of Dean Archaeological Survey and as part of English Heritage's National Mapping Programme for the area (Small and Stoerz 2006, Hoyle 2007, 2008a, 2008b, 2009, forthcoming, Hoyle *et al* 2007, Glos HER 2010a), and this allowed for a relatively rapid approach, making use of sortable digital data which could be undertaken over a large area without the need for additional research.

This approach did, however, have the following disadvantages:

- The Gloucestershire HER is an extremely complicated database which is not already subdivided in the required way. In particular the existing HER date division did not always allow for simple subdividing between the earlier and later post medieval periods (the HISTORIC and LATE POST MEDIEVAL periods in the characterisation). In general these were not insuperable problems but

the data did require a degree of manual sorting to produce the required categories. This could usually be achieved through specifications itemising the way in which existing HER categories were to be sorted and allocated to the required category for characterisation (Appendix H) and it was essential that these parameters were established before sorting began.

- This process also required a degree of further research in order to correctly allocate some entries, although this could generally be achieved through a more in-depth analysis of the HER written descriptions rather than requiring additional documentary research.
- Although the HER for the Forest of Dean is known to be reasonably up to date (see above) it is acknowledged that some categories of site are currently underrepresented. An example of this is the physical remains of post-medieval Forestry enclosure boundaries which are known to be more numerous than those currently recorded on the HER (Hoyle 2007 and forthcoming, section 3.1.9). It is recognised that no dataset of heritage assets can be fully comprehensive and must always represent a 'point in time' expression of existing knowledge, and this was not considered to be an insuperable problem as the relatively generalised scale of the characterisation process has the effect of smoothing over small anomalies or omissions in the data set and need not influence the overall characterisation.
- Although HER data was already mapped digitally, the mapping was not always appropriate for the needs of the characterisation process. Again this was not an insuperable problem as it was recognised from the outset that the process would require polygons to be drawn around the aggregated area of heritage assets to identify areas which shared a common heritage identity. Some inconsistency was identified in the way in which Gloucestershire HER in general only maps the extent of archaeological Areas (e.g. a post-medieval industrial site) and does not necessarily detail the location of individual Sites (e.g. mine shafts, mapped buildings, upstanding remains) contained within them (see Hoyle 2008a, Appendix H). This produced some slightly anomalous results, such as the area of Chestnuts Wood (Glos HER 22053) in Forest Design Plan Area 23, where the actual extent of individual feature types, such as charcoal platforms, quarries, earthwork features or holloways, were all assigned a general polygon conforming to the area of the 2003 field survey in which they were identified (see Hoyle 2003, 2007b, section 3.1). In general, this did not prove to be problematic as the majority of Sites fall within the same heritage category as the Areas within which they are contained, and any lack of definition in their extent or location was absorbed within the relatively large scale of the characterisation process and the generalised nature of the Heritage Character Components.

4.2.1 Step 1: Sorting of HER data to identify heritage assets sharing common characteristics

Step 1 of the characterisation consisted of dividing the known heritage resource into a number of predetermined attributes based on both their type (Category) and date (Period). Details of these categories are set out in Appendix H, but the categories chosen were:

Period

- PREHISTORIC – This period covered all sites known to pre-date the Roman invasion of AD43.
- HISTORIC – This period combined sites known to date to the Roman to early post-medieval periods, and numerous sites of unknown date whose form (e.g. charcoal platforms or the surface remains of shallow or piecemeal mineral extraction) suggests they are most likely to date to this period. The end of this period would broadly be categorised as the increased industrialisation of the Forest of Dean which came about following the introduction of charcoal-fired blast furnaces, deep mining and a mineral transportation infrastructure, although it is recognised that this is not a precise date distinction and there is a considerable 'grey area' of possible overlap between the end of the HISTORIC period and the beginning of the LATE POST MEDIEVAL period.
- LATE POST-MEDIEVAL - This period essentially covered the eighteenth century to the present day, but like the HISTORIC period it was not a precise date distinction (see above) but relied on a combination of known date and likely date-range of certain technologies. Consequently certain classes of undated sites (e.g. quarries and mine shafts) were assigned to this period even though their actual date is unknown
- UNKNOWN – This category was only assigned to undated earthworks whose date range could conceivably span the PREHISTORIC to HISTORIC periods.

Category

- AGRICULTURAL – This category relates to isolated farming activity which is not contiguous with, or within, contemporary settlement.
- ARTEFACTS – This category is used to identify sites where artefacts, which may indicate sites of archaeological significance, have been found. This is only used where significant artefacts are the only element of the site, and artefacts relating to sites already assigned to another category are not included.
- CHARCOAL PLATFORM – This category relates to charcoal production.
- COMMEMORATIVE – This category denotes isolated commemorative monuments which are not contiguous with, or within, contemporary settlement.
- COMMUNICATIONS – This category relates to communication routes, the precise function of which is not clear. Where these relate to known sites in a different category (e.g. industrial tramways) they have been assigned to that category.
- EARTHWORK – Sites in this category survive as earthworks, the date and function of which are not known.
- INDUSTRIAL – This category denotes industrial sites. The definition of industry is wide and these sites can relate to manufacturing, mineral extraction or industrial communications.
- SETTLEMENT – This category includes all sites which relate to domestic habitation or associated activities such as trade or commerce or in some cases agriculture (see above).
- MARITIME – This category denotes sites related to coastal or river traffic or trade.
- MILITARY - This category denotes sites directly related to military or defence activity. It is not used to denote sites (such as prehistoric hillforts or boundary dykes) which may have had a broadly defensive function.
- RECREATIONAL - This category denotes isolated recreational sites (such as golf courses or parks) which are not contiguous with, or within, contemporary settlement.
- RITUAL – This category denotes isolated ritual or religious sites which are not contiguous with, or within, contemporary settlement.

4.2.2 Step 2: Creation of maps showing Heritage Character Components

Step 2 of the characterisation process consisted of the generation of maps of Heritage Characterisation Areas which were made up of heritage assets which shared common characteristics identified during Step 1 based on their Period and Category (see Appendix H) and which were amalgamated into larger areas. These included both the aggregated extent of heritage assets with contiguous boundaries and also discrete sites which were sufficiently close (generally within *c*. 500m) to be combined with them (see Appendix H), although a degree of professional judgement was allowed in determining whether similar Heritage Character Components were close enough to allow for amalgamation.

The end result of this process was a series of shape file layers each defining Heritage Character Components which included heritage assets of a similar date and category. The extent of these layers was determined by that of known heritage assets, and different Heritage Character Components overlapped in places. This data was not intended to be a detailed map of the known archaeology of the Forest of Dean, but was intended to provide information which was meaningful at scale of 1:10,000 or above.

Sites of less than *c.* 1ha in extent were not included unless these were within *c*. 500m of similar heritage assets as these were not considered sufficiently extensive to contribute to the archaeological character of an area at the scale (1:10,000 or more) at which the characterisation was undertaken.

As part of this process certain categories of recorded site which were considered unlikely to contribute to the archaeological character of an area in any significant way were not included. Details of this are set out in Appendix H. These included:

- Discrete sites of less than *c.* 1ha in extent (unless within *c*. 500m of similar heritage assets, in which case they were amalgamated with them).
- Widely spaced discrete features, such as boundary/marker stones which are of indeterminate date (although the majority are probably late post-medieval) and, although occurring throughout the Forest of Dean, do not occur in recognisable concentrations around which a meaningful

polygon could be drawn at a scale (1:10,000 or above) at which the characterisation was intended to be understood.

Whilst it is accepted that this approach did not skew the results of the areas in which the scoping analysis was undertaken, this should be kept under continual review in any future characterisation projects.

Additional information not recorded on the Gloucestershire HER (i.e. the extent of modern settlement) recorded on the Gloucestershire Historic Landscape Characterisation (GCCAS 2010b) was included if appropriate.

As part of this process the validity of the polygons generated from HER information was given an additional check to ensure that the information on the resultant maps was meaningful and of sufficient accuracy to meet the needs of the characterisation. In practice, for the purposes of this scoping analysis, this did not have any significant impact on the digitised polygons, although occasional polygons were amalgamated (e.g. in Forest Design Plan Area 40 all the features originally designated as LATE POST MEDIEVAL AGRICULTURAL and COMMUNICATIONS were reassigned to LATE POST MEDIEVAL INDUSTRY based on a more detailed reading of their written descriptions). The specifications for re-assigning certain categories of site were amended as a result of this (see Appendix H) although it is recommended that a more rigorous assessment of the validity of the information derived from the HER and of the consistency of the categorisation process should be undertaken as the final part of Step 1, before any mapping of areas sharing common archaeological characteristics is undertaken.

During the 2010 scoping analysis polygons were not directly linked to a database, although it is recommended that in any future characterisation all Heritage Character Component polygons should be linked to a simple database identifying Category and Period to enhance their potential for manipulation to identify Heritage Character Areas as required (see 4.2.3 below).

4.2.3 Step 3: Combining maps of Heritage Character Components to identify Heritage Character Areas

This step involved overlaying and combining the Heritage Character Component map layers on the GIS to establish the Heritage Character Areas. These could consist of a single Heritage Character Component or be made up of any combination of these depending on the extent to which the areas of the Heritage Character Component overlapped and the complexity of the heritage character of a given area.

The use of GIS allows for a wide variety of combinations of Heritage Character to be assessed, ranging from its simplest characterisation, which could take the form of identifying an area containing sites of a single period, or combinations of periods, or of a single type, whilst more complicated permutations could also be achieved. During the 2010 scoping analysis, these combinations were created manually by manipulating layers on the ArcMap GIS, although the facility for manipulation would have been greatly enhanced by linking all polygons to a simple database (see 4.2.2 above).

At this stage this process was not taken any further as it was not clear, within the limited confines of the scoping analysis area, how much the combining of Heritage Character Component maps to create Heritage Character Areas will produce meaningful results across a wider area.

The combined Heritage Character Component maps created during the 2010 scoping analysis demonstrate the wide variety in the potential complexity of this operation.

Forest Design Plan Area 40 (Figure 43) divides fairly straightforwardly into Heritage Character Areas which essentially comprise discrete areas of:

- Undated earthwork features.
- Late post-medieval industrial features.
- Late post–medieval industrial features containing late post-medieval military features.
- Late post-medieval settlement.

Forest Design Plan Area 23 on the other hand, is made up of a much more complex palimpsest of Heritage Character Components, producing complex and many-layered Heritage Character Areas (Figure 44).

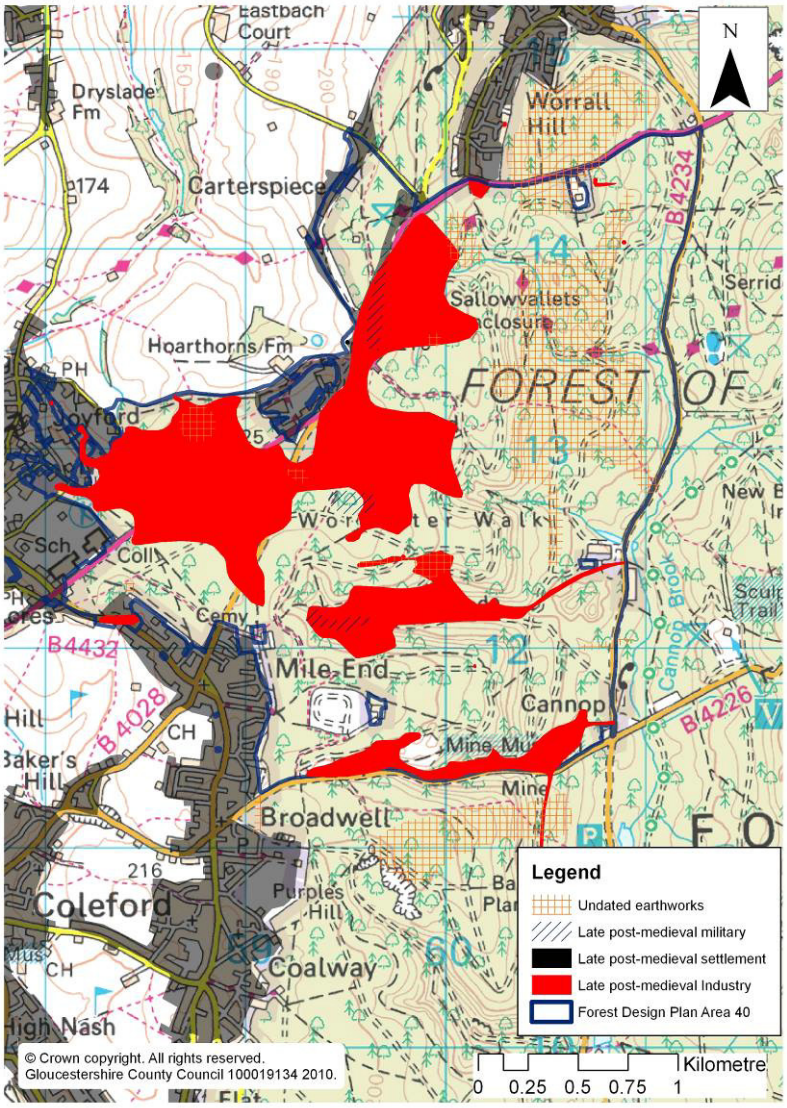


Figure 43: Forest Design Plan Area 40: Combined Heritage Character Components

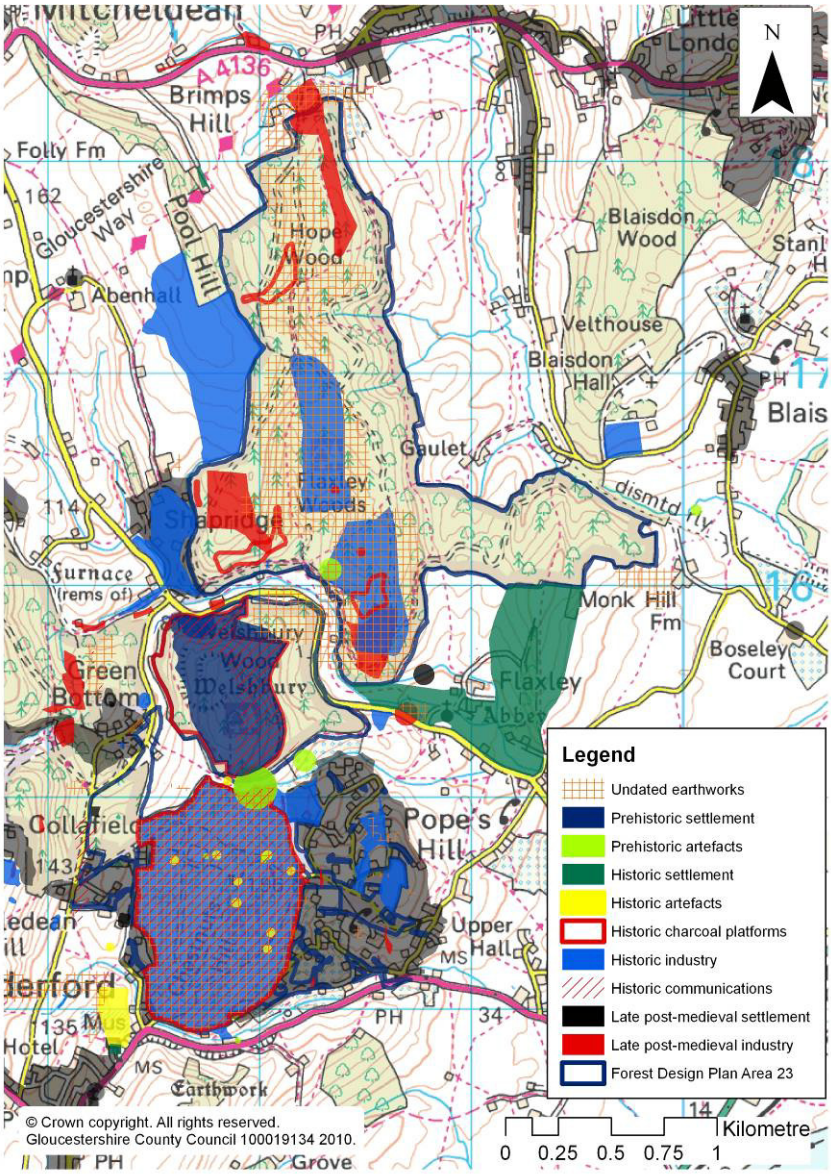


Figure 44: Forest Design Plan Area 23: Combined Heritage Character Components

4.3 Discussion of the scoping analysis for woodland characterisation

4.3.1 Identification of Heritage Character Components from HER data. Steps 1 and 2

Due to the complexity of the database structure of the Gloucestershire HER, the process of sorting heritage asset data to identify sites which could be reasonably aggregated into Heritage Character Components was not as simple as it perhaps would have been with a less complex database. A certain amount of initial sorting relied on a combination of interpretation of written descriptions of heritage assets and professional judgement to determine the correct assignment of some heritage assets sites. A procedure for this was, however, established and once this was applied the sorting process was relatively straightforward, only a few categories of heritage asset requiring special attention (see Appendix H.i below).

Similarly the mapping of Heritage Character Components was relatively straightforward once the parameters for the aggregation of discrete heritage assets which shared similar heritage characteristics was established (see Appendix H.i below).

Consequently, the scoping analysis for woodland characterisation undertaken as part of the 2010 survey did establish a workable methodology for relatively rapid identification and aggregation of heritage assets recorded in the Gloucestershire HER and the identification and mapping of Heritage Character Components.

4.3.2 Proposed changes in methodology

Following the scoping analysis, the characterisation process was discussed with Ben Lennon of the Forestry Commission who suggested the following alterations in the way in which the HER data was sorted by period.

The Gloucestershire HER has the following period categories:

- PREHISTORIC (500,00 BC – AD43)
- ROMAN (AD43 – 410)
- EARLY MEDIEVAL (410 – 1066)
- MEDIEVAL (1066 – 1540)
- POST MEDIEVAL (1540 – 1901)
- MODERN (1901 – PRESENT)
- UNKNOWN

The periods used in the scoping analysis were:

- PREHISTORIC – this was taken directly from the HER.
- HISTORIC – This was a combination of HER period divisions of ROMAN, EARLY MEDIEVAL, MEDIEVAL and POST-MEDIEVAL up to and including the 17th century.
- LATE POST MEDIEVAL - This was a combination of HER period divisions of POST MEDIEVAL, post-dating the 17th century and MODERN.
- UNKNOWN – This was only used for earthwork features, all other heritage assets of UNKNOWN date were reassigned in accordance with the specifications set out in Appendix H.i

It was felt that these divisions did not provide an accurate enough time depth to identify changes in the heritage character of the Forest of Dean over time or to identify the extent of periods which are under-represented in the historical and archaeological record.

Accordingly it is proposed to retain the existing HER period categories in all future characterisation with the exception that POST MEDIEVAL (1540 – 1901) should be subdivided into EARLY and LATE POST MEDIEVAL in accordance with the criteria for dividing POST MEDIEVAL heritage assets into HISTORIC and MODERN period categories as set out in Appendix H.i, and MODERN should continue to be amalgamated with LATE POST MEDIEVAL. .

It is recognised that this will allow for a considerable increase in the extent of Heritage Character Components of UNKNOWN date, although this will more accurately reflect current understanding of the heritage resource in the Forest of Dean.

4.3.3 Timescale

The characterisation undertaken during Phase 1 of the project would suggest that creation of Heritage Characterisation Components undertaken in accordance with the specification used for the scoping analysis could be undertaken at a rate of 3km^2 per day.

5 Discussion of the success and limitations of the survey

5.1 Aims and objectives of the survey

The aims and objectives of Stage 3B of the Forest of Dean Archaeological Survey are set out in the project design (Hoyle 2009, section 3) and can be summarised as follows:

1. To inform and improve the management of the archaeological resource within the woodland of the Forest of Dean (Aim 3.1.1).
2. To advance understanding of the landscape history of the Forest of Dean, from the earliest periods, pre-dating the establishment of the Royal Forest in the 11th century, through to the post-medieval period (Aim 3.1.2/1).
3. To develop and refine methodologies for further exploration of features identified through lidar survey in areas of woodland (Aim 3.1.2/2).
4. To gather information to contribute towards the development of a sub-regional research strategy for the Forest of Dean (Aim 3.1.2/3).

These aims were to be achieved through the following objectives*:*

1. To verify, characterise and assess selected archaeological sites or features previously identified as a result of the 2006 lidar survey undertaken as Stage 3A of the Forest of Dean Archaeological Survey (Objective 3.2/1).
2. To locate, characterise and assess any additional archaeological sites or features directly associated with the above which had not been identified as a result of the 2006 lidar survey (Objective 3.2/2).
3. To undertake more intensive fieldwork on a sub-set of selected features to determine their status, date range, archaeological significance and degree of preservation (Objective 3.2/3).
4. To develop and test fieldwork methodologies and data recording strategies for lidar-detected earthworks in woodland and assess the practicalities and logistics of future fieldwork (Objective 3.2/4).
5. To use enhanced understanding of the nature of the archaeological resource within the woodland of the Forest of Dean to inform improved management guidance (both at individual feature and landscape scale) aimed at landowners, particularly the Forestry Commission (Objective 3.2/5).

The 2010 survey was intended to be only the first phase (Phase 1) of this stage of the project (see Hoyle 2009, section 5.1.2), and consequently did not fully realise these aims and objectives. It is, however, possible to discuss the success of the 2010 survey in fulfilling objectives 3.2/1 and 3.2/2, and in contributing towards the success of objectives 3.2/4 and 3.2/5.

5.2 Success of the 2010 survey (Phase 1 of Stage 3B of the project).

5.2.1 Objectives 3.2/1

Notwithstanding the difficulties in interpreting many of the features surveyed in 2010 (see 3 above) the survey methodology was certainly successful, and set at an appropriate level, to achieve this objective when applied to discrete features such as mounds or enclosures.

As some of the earthwork systems covered extensive areas, the project design specified that it was only necessary to record a minimum of 25% of these (Hoyle 2009, section 12.1.3.2), and it may have been preferable to specify that a larger proportion, or perhaps 100%, of these were covered during the rapid survey to ensure consistency of recording across the board. Features classed as 'earthwork systems' varied enormously in size, although field surveyors tended to cover between 40-50% of these some of the smaller systems were recorded in their entirety. A specification for complete recording of all earthwork systems would have required additional resources, and may not have added greatly to the objectives of a rapid validation survey, and, generally speaking, the approach adopted by the 2010 survey was adequate for the needs of this survey. It may, however, have been desirable to do more pre-fieldwork preparation to specify precisely what coverage of individual earthwork systems was required in order to ensure consistency of recording.

5.2.2 Objectives 3.2/2

In practice very few additional features/sites were encountered which were directly associated with those features surveyed in 2010. The methodology, however, was able to incorporate them when they were encountered, and consequently this objective can be regarded as having been fulfilled.

5.2.3 Objectives 3.2/4

Phase 1 of the survey only partially addresses this objective as it is limited to rapid field survey. This phase of the project did fulfil this objective by testing data recording strategies and fieldwork methodologies in the field (see 5.2.1 above).

Phase 1 of the survey also tested the suitability of the equipment used for the survey (see 2.4.2 above). Despite some limitations in the functionality of the GPS system under tree cover (see 2.4.2.2) the equipment chosen for the survey (Magellan Mobile Mapper CX handheld data logger with Digiterra mapping software) proved to be successful.

5.2.4 Objective 3.2/5

Objective 3.2/5 was only partly fulfilled during Stage 1 of the survey and the success of the project to fulfil this objective can only partly be assessed at this stage.

The rapid field survey of lidar-detected features, although limited (see 1.1.1 above) has added enormously to the knowledge of the likely potential of individual lidar-detected features. This information will be added to the Gloucestershire HER and transferred to the Forestry Commission to inform their day to day management plans.

The scoping analysis of the woodland characterisation (see 1.1.2 above) has set up a methodology that can be more widely applied across large areas of woodland leading to a better understanding of the heritage resource in those areas to inform management at a more strategic level.

6 Recommendations

Recommendations for further investigation are included in the Updated Project Design for Phase 2 of the project which accompanies this report.

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9 Abbreviations used in the text

AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
AP	Aerial Photograph
BGS	British Geological Survey
C14	Carbon 14
cm	Centimetre
DAG	Dean Archaeology Group
DSM	Digital surface model
DTM	Digital terrain model
EH	English Heritage
EDM	Electronic Distance Measurer
EN	English Nature
GCC	Gloucestershire County Council
GCCAS	Gloucestershire County Council, Archaeology Service
GCRO	Gloucestershire County Records Office
GIS	Geographic Information System
Glos HER	Gloucestershire County Council, Historic Environment Record
GSIA	Gloucestershire Society for Industrial Archaeology
GPS	Global Positioning System
GWT	Gloucestershire Wildlife Trust
Ha	Hectare
HEEP	Historic Environment Enabling Programme
km	Kilometre
Lidar	Light Detection and Ranging
m	Metre
NMP	National Mapping Programme
OS	Ordnance Survey
PRO	Public Record Office
RCZA	Rapid Coastal Zone Assessment
SM	Scheduled Monument
SMC	Scheduled Monument Consent
HER	Historic Environment Record (Gloucestershire)
SSSI	Site of Special; Scientific Interest
TBGAS	Transactions of the Bristol and Gloucestershire Archaeological Society

Forest of Dean Archaeological Survey Stage 3B

Survey for management of lidar-detected earthworks in Forestry Commission woodland

Project Number 5291 SURV

Phase 1: Rapid field validation and scoping analysis for characterisation of archaeology in woodland

Project Report Volume 2: Appendices

Jon Hoyle
Gloucestershire County Council
Environment Department
Archaeology Service

January 2011

Appendix A Lidar–detected earthworks surveyed in 2010, organised by Zone

Zone	Lidar No	Field survey feature No	Easting	Northing	Type
1	so5300/04	45	353830	200212	Mound
1	so5500/05	4	355947	200158	Subcircular enclosure
1	so5500/12	1	355457	201036	Earthwork system
1	so5600/08	6	356739	200713	Subrectangular enclosure
1	st5499/02	7	354431	199150	Subrectangular enclosure
1	st5499/03	5	354505	199090	Subcircular enclosure
1	st5599/06	8	355574	199572	Subrectangular enclosure
1	st5599/10	2	355446	199788	Earthwork system
1	st5698/22	3	356705	198702	Earthwork system
2	so5907/01	9	359190	207646	Earthwork system
2	so5907/05	10	359891	207746	Earthwork system
2	so6007/01	11	360527	207713	Earthwork system
2	so6007/02	12	360145	207281	Earthwork system
3	so6109/05	13	361575	209877	Mound
3	so6205/06	14	362952	205436	Subrectangular enclosure
3	so6305/06	15	363113	205020	Subrectangular enclosure
3	so6407/01	16	364300	207415	Subrectangular enclosure
4	s06410/09	21	364761	210637	Mound
4	so6413/09	22	364804	213485	Mound
4	so6508/01	17	365578	208814	Earthwork system
4	so6509/05	18	365826	209707	Earthwork system
4	so6510/01	19	365706	210837	Earthwork system
4	so6511/08	20	365528	211615	Earthwork system
5	so5812/02	30	358425	212303	Subrectangular enclosure
5	so5911/02	23	359557	211940	Mound
5	so5911/02	27	359691	211953	Mound
5	so5911/11	28	359057	211009	Mound
5	so6012/03	29	360994	212817	Subcircular enclosure
5	so6013/04	24	360805	213179	Earthwork system
5	so6013/07	25	360690	213635	Earthwork system
5	so6013/26	26	360470	213008	Earthwork system
6	so6014/13	31	360861	214742	Earthwork system
6	so6015/05	32	361034	215419	Earthwork system
6	so6115/03	33	361430	215471	Earthwork system
6	so6115/04	34	361778	215146	Earthwork system
6	so6116/01	36	361454	216066	Mound
6	so6315/01	35	363243	215626	Earthwork system
6	so6316/07	37	363674	216412	Subrectangular enclosure
7	so6515/01	38	365476	215500	Earthwork system
7	so6519/18	43	365386	219948	Subrectangular enclosure
7	so6615/02	39	366548	216009	Earthwork system
7	so6615/03	40	366740	215514	Earthwork system
7	so6815/03	46	368069	215808	Earthwork system
7	so6817/01	41	368208	217520	Earthwork system
7	so6818/08	42	368148	218154	Earthwork system

Appendix B Field survey methodology

B.i Scope of the project

Features

This fieldwork phase of the project will target 44 earthwork features, representing a small sample of those identified within woodland during the 2006 lidar survey of the Forest of Dean. This sample comprises:

- Enclosures, particularly the group of rectilinear enclosures which appear to have a similar form, and perhaps, therefore, a similar function and date.
- Systems of linear and rectilinear earthworks many of which have been identified within c. 2km of the edge of modern woodland.
- Mounds or other small enclosure features.

A list of these can be found in

S:\FOD\Stage 3\Stage 3B\Stage3B-Phase 1-PROJECT 2010\FEATURES\Features to visit 2010 V2.xls

Logistics

For logistical reasons the survey area has been divided into 7 zones. Unless there are overriding logistical reasons to do otherwise all features within zone 1 will be recorded before moving onto zone 2.

Objective

The objective of the rapid field survey is:

- To verify the existence, or otherwise, of selected lidar-detected earthworks.
- To make a rapid record of the form of selected earthworks. This will primarily consist of verifying that the form portrayed on the lidar hillshaded images is accurate and making a record of those elements which are not discernable through lidar, e.g. height of surviving earthworks.
- To make a rapid record of any associated or contiguous features, and where possible record any stratigraphic relationships with these or with modern features.
- To record, where possible, the physical condition of selected earthworks and identify any general management needs or obvious risks.

Timescale

It is anticipated that the rapid field validation and recording will be undertaken in the course of a single visit to each feature or group of features, by teams of two people. It is anticipated that, on average, discrete features (enclosures or mounds) will take 0.5 days to record, whilst earthwork systems will take 1 day to record.

In order to fulfil the requirements of the project, it will only be necessary to explore a sample (*c*. 25%) of the features visible on lidar. In order to monitor this, use may be made of the trackplot facility of the GPS to produce 'snail trails' indicating the areas actually traversed during field visits.

B.ii Recording methodology

Mapping

Feature plans, mapping of feature components

As lidar hillshaded images are rectified to the Ordnance Survey grid and accurate to a factor of plus or minus 0.10-0.15m, it is not proposed to make measured plans of recorded features, but an assessment of whether the lidar hillshaded image accurately reflects the situation on

the ground must be made. Any necessary observations of discrepancies should, if appropriate, be mapped to the dedicated Shapefile layer on the Magellan.

Photographs

The location from which photographs are taken should be mapped as a point and designated a unique number (P01 etc). Details of photographs should be recorded in the project database (field 8 below). Photographs will be stored by lidar feature number - Accordingly the first photo of each feature should be of a board stating the unique ID of the feature.

Related features, erosion and other items of interest

The location of details not visible on the hillshaded images, related features, areas of erosion or any other items of interest would be as mapped as points, lines or polygons and assigned a unique number. Details of these will be recorded in the project database.

It is anticipated that digital photographs will be taken with a Ricoh 600SE camera. These will be located by Bluetooth linkage to the GPS unit and can be linked to the data and survey records for each feature. If this technology does not prove accurate enough in woodland this information will be recorded by direct tracing over the lidar hillshaded images.

Areas surveyed

Although it is assumed that discrete features (enclosures and mounds) will be viewed in their entirety, it may only be necessary to explore a sample (minimum *c*. 25%) of earthwork systems visible on lidar. In order to monitor this, a record should be made of the extend of the site visit to these areas - it is hoped that the trackplot facility of the Magellan's GPS could be used to produce 'snail trails' indicating the areas actually traversed during field visits. If this is not possible an approximate representation mapped manually (in relation to the features visible on the lidar hillshaded images) would suffice.

Other drawn records

If appropriate sketch plans, profiles or sections should be made of selected features or components of features. These should be drawn at an appropriate scale on the Archaeology Service gridded film sheets. The location of any drawn records should be mapped and assigned a unique identification number. Gridded film sheets should only contain records relevant to a single lidar feature. Any such drawings will be intended to give an impression of the feature in question and measured sketches would usually suffice.

NB – the numbering sequence for the above will only refer to the feature being surveyed. Component/erosion/other record etc numbers will begin at 01 for each feature surveyed and do not need to be unique across the whole survey.

B.iii Equipment

Survey equipment to take into the field

The field survey team will be equipped with the following:

Data recording equipment

- Magellan hand-held data logger, uploaded with the following:
  - Geotiff of lidar hillshaded image of the features to be recorded
  - Shape file of digitised lidar components (if appropriate)
  - Project database
- Spare stylus

Photographic equipment

- 1 x digital camera (preferably Ricoh 600SE camera)
- Copies of film information board for feature identification
- At least 1 x 1m ranging rod

Spare manual recording equipment

- Paper copies of feature recording sheets
- A4 ring bound file
- A4 clipboard
- Pocket notebook
- Dictaphone
- HB pencils
- Black pens
- 1 x GPS and spare batteries??

Drawing equipment

- Supply of gridded film plan sheets
- A3 clipboard
- At least 4 x bull-dog clips
- At least 1 x 8m tape
- At least 1 x 30 or 50m tape
- 6H pencils
- At least 1 ruler (preferably scale rule)
- Rubbers
- Pencil sharpeners

Other sundry equipment

- Mobile phone
- Food and Drink
- First aid kit
- Other health and safety requirements
- Identification (Shire Hall swipe card with photo is appropriate).
- Attack alarm (available from Shire Hall).
- Torch and spare batteries.
- Whistle.
- Single medium dressing.
- Space blanket.
- Flash jacket or high visibility waistcoat.
- Sensible clothing for the conditions, particularly boots which must have good grip.

B.iv Survey information to be taken into the field

Large scale maps

- 1 x 1:50,000 Landranger sheets 162: Gloucester and the Forest of Dean.
- 1 x 1:25,000 Explorer Sheet OLK 14 Wye Valley & Forest of Dean
- Map case
- Compass

Zone maps

- 1 x map of each zone at scale 1:20,000 (1:50,000 scale base)

Information relevant to individual features

Paper maps

- 1:10, 000 scale map showing location of feature (1:10,000 scale base)
- Plot of feature @1:2500 (or other appropriate scale) on lidar base (NW illumination) with Mastermap - with lidar features digitised as appropriate.
- Plot of feature @1:2500 (or other appropriate scale) on lidar base (NW illumination) with Mastermap - without features digitised.
- Plot of feature @1:2500 (or other appropriate scale) on lidar base (NE illumination) with Mastermap - without features digitised.
- Plot of feature @1:2500 (or other appropriate scale) on lidar base PCA multi-lit view) with Mastermap layers- without features digitised.
- Plot of feature an appropriate scale (1:1000 – 1:2500) of feature on lidar base (NW illumination) without Mastermap and without features digitised. This plot will have the OS grid (100m and 1000m) and the lidar layers set at 25% Transparency. This plot is for manual annotation in the event of non-digital recording.

Other information

- Data sheet for each feature to include:
  - Adjacent SMR information
  - Information on adjacent lidar features
  - Any relevant information from early map sources.
  - A brief statement of the known archaeology and research aims for individual features
  - A brief statement of the known Health and Safety issues
  - A brief statement of any known environmental constraints
  - A brief statement of any other site conditions or constraints of relevance to the field survey.
  - Forestry Commission woodland type information from the GCC GIS
  - Any known information on vehicular access.
  - Information from the Forestry Commission on any forestry issues, or other environmental constraints not held in the GCC GIS.

Other information

- Copy of health and safety policy for working in woodland (including reporting procedure).
- Copy of general risk assessment for the project.
- Copy of health and safety site visit checklists to be completed for each feature visited.

Appendix C Field survey database

C.i Digital database

The following outlines the project database. Pick lists are in black italics, explanatory notes are in red.

		Type	*Layer*
Lidar feature No		*P/L/A*	*ALL*

Record type	*Woodland/ground conditions/ access*	*P*	*1*
	General feature information	*P*	*1*
	Ecology	*P*	*1*
	Plans profiles	*P*	*1*
	Feature/component	*P/L/A*	*2*
	Erosion/damage	*P/L/A/*	*2*
	Finds	*P*	*3*
	Photographs	*P*	*4*

Layer 1: Points

Woodland/ground conditions/access

u

Woodland type	*Coniferous mature standards* *Deciduous mature standards* *Mixed mature standards* *Young conifer* *Young deciduous* *Young mixed* *Scrub* *Coppice* *Open grassland/heath* *Other*		
Woodland density	*Dense* average spacing >4m *Medium* *Light* average spacing <15m *Very light* occasional trees *Other*		
Predominant Under growth type	*Bracken* *Brambles* *Ivy* *Mixed* *Other*		

Undergrowth density	*Very dense* Above waist height - 0% of land form visible *Dense* Generally above waist height: less than 50% of landform visible *Medium* Generally between knee and waist height: 50-80% of landform visible *Fair* Generally knee height or below: more than 80% of landform visible *Light* Little undergrowth – more than 80% of landform visible		
Access	*Inaccessible due to ground conditions* *Inaccessible due to forestry operations* *Inaccessible due to landowner restrictions* *Some access difficulty due to ground conditions* *No access issues* *Other*		
Whole feature interpretation	*Quarry* *Forestry enclosure boundary* *Other boundary* *Bank* *Wall* *Fence* *Mound* *Hollow way* *Charcoal platform* *Other platform* *Enclosure* *Earthwork system* *Other earthworks* *Surface mining pit* *Drainage* *Vegetation* *Detritus* *Trackway* *Veteran Tree* *Unknown* *Not archaeological* *Not visible*		
Feature interpretation certainty	*Other* *Uncertain* *Possible* *Probable*		

Feature date	*Prehistoric* *Romano-British* *Medieval* *Post-medieval* *Modern* *Still in use* *Pre modern date uncertain* *Unknown* *Natural feature*		
Feature date certainty	*Uncertain* *Possible* *Probable*		
Feature description	*Free text field*		

General feature condition

General condition of feature	*Good* All or nearly all features of interest are well preserved for the period they represent. No sign of active damage *Fair* Some damage or part destruction of features of interest apparent, or some features of interest are obscured by more recent additions/alterations. For buildings, indicates structurally sound, but in need of minor repairs *Poor* Damage to the majority of the original features of interest is apparent, some significant features are missing. Some features of interest remain. Active damage apparent (e.g. for buildings water penetration, rot etc). *Very poor* The majority of features of interest are so damaged as to be not surveyable or are missing. For buildings, this indicates structural failure or evident instability, loss of significant areas of roofing, or damage by a major fire or other disaster *Destroyed* All features of interest have been destroyed. No further information can be gained from future investigation of the site. Includes demolished buildings unless foundations, basements etc exist which are of interest, for which use *Very poor* *Uncertain* Features of interest can not be investigated at the time of the assessment for any reason, e.g. obscured by cloud-cover, vegetation, ongoing building work, below ground services etc or the site could not be found		

Management needed	*Management regime acceptable* Use this field if there is no obvious need for management other than what is already being practised *Some management needed in long term* Use this field if there are clear signs that the feature is under threat but this does not appear to be an immediate issue (e.g. the feature is crossed by a forestry track which does not appear to be in constant use) *management urgently required* Use this field if the feature is under immediate threat		
Management comments	*Free text field*		
Ecology			
Veteran trees	*Oak* *Beech* *Yew* *Unknown* *Other*		
Pre-modern coppice	*Chestnut* *Lime* *Ash* *Beech* *Unknown* *Other*		
Other comments on ecology: (e.g. is different from surrounding)	*Free text field*		
Plans/profiles	*YES* *NO*		

Layer 2 Points Lines and Areas			
Linear component type	*Bank (earthwork)* *Bank (masonry)* *Wall/facing (masonry)* *Wall/facing (brick)* *Ditch* *Hollow* *Terrace* *Other* *Not archaeological* *Not visible on ground*		

Discrete component type	*Mound* *Pit without spoil* *Pit with spoil* *Hollow* *Platform* *Stone* *Other* *Structure (describe)* *Not archaeological* *Not visible on ground*		
Component plan form	*As lidar* *Other*		
Component profile form	*Free text field*		
Maximum width (m) **Minimum width (m)** **Length (m)** **Maximum height (m)** **Minimum height (m)** **Maximum depth (m)** **Minimum depth (m)** **Maximum angle of face (degrees)** **Minimum angle of face (degrees)**	*free text numbers up to 4 characters including decimal* *free text numbers up to 4 characters including decimal* *free text numbers up to 4 characters including decimal* *free text numbers up to 4 characters including decimal* *free text numbers up to 4 characters including decimal* *free text numbers up to 4 characters including decimal* *free text numbers up to 4 characters including decimal* *free text numbers up to 2 characters* *free text numbers up to 2 characters*		
Component interpretation	*Quarry* *Forestry enclosure boundary* *Other boundary* *Bank* *Wall* *Fence* *Mound* *Hollow way* *Charcoal platform* *Other platform* *Enclosure* *Component of earthwork system* *Component of enclosure* *Terrace* *Other earthworks* *Surface mining pit* *Standing stone* *Drainage* *Vegetation* *Detritus* *Trackway* *Veteran tree* *Unknown* *Not archaeological* *Not visible* *Other*		

Component interpretation certainty	*Uncertain* *Possible* *Probable*		
Component date	*Prehistoric* *Romano-British* *Medieval* *Post-medieval* *Modern* *Still in use* *Pre modern date uncertain* *Unknown* *Natural feature*		
Component date certainty	*Uncertain* *Possible* *Probable*		
Component description	*Free text field*		

Erosion/damage

Damage type	*No modern damage* *animal burrowing* *arable clipping* *arable ploughing* *building work* *coastal erosion* *collapse* *demolition* *deterioration due to neglect* *digging* *drainage* *drying out* *dumping* *forestry* *gardening* *info not available* *metal detecting* *mineral extraction* *natural erosion* *other (describe)* *public utilities* *rain entry* *road construction* *rot* *stock erosion* *storm damage* *vandalism* *vegetation* *vehicle erosion* *visitor erosion* *water action* *wild animal surface damage*		

Damage seriousness	*Potential* Action which may threaten a monument, e.g. proposals for development; known risks associated with the inherent instability of a structure; potential risks arising from current use or occupancy *Slight* Signs of wear and tear on a monument, e.g. slight seasonal poaching by stock; invasive light vegetation such as bracken or scrub whose root systems are likely to begin to cause damage to stratification; slight deterioration of structures caused by inadequate maintenance or the effects of wind and weather *Moderate* e.g. broken ground surfaces at pressure points on a countryside site caused by visitors or stock; damage by tree roots or windblown trees; marked deterioration of structures *Severe* Severe erosion or other damage threatening important aspects of a site, e.g. the integrity of a site or landscape threatened by actual destruction, demolition or rapid deterioration of the whole or component parts; structural collapse		
Damage description	*free text field*		

Layer 3 - Points

3: finds

Finds Type	*Pot* *CBM* *Metal* *Leather* *Charcoal* *Slag - Blast furnace* *Slag – bloomery* *Wood* *Other metalworking* *Cup stone* *Other*		

Finds Date	*Prehistoric* *Romano-British* *Medieval* *Post-medieval* *Modern* *Unknown* *Natural*		
Finds retained	No Yes		
Details of finds	*Free text field*		

Layer 4 - Points

8:Photographs

Photo Number	*free text - alpha-numeric up to 4 characters*		
Frame number	*free text - Number up to 4 characters*		
View	*free text - Letters up to 2 characters*		
Scale	*free text - alpha-numeric up to 4 characters including decimal*		
Subject	*Free text field*		

Recorded by – All layers

Recorded by	*free text - Letters up to 4 characters*		
Date	00/00/0000		

Appendix D Summary of field survey results.

Features in the following table are organised by feature type.

Zone	Lidar No	Field survey feature No	Type	Comments
1	so5300/04	45	Mound	modern upcast from installation of mast, very clayey texture, little growing on top, slightly irregular
3	so6109/05	13	Mound	steep sided, flat topped mound. solid earth? top appears to be yellow clay, could be spoil from forestry drainage works?
4	s06410/09	21	Mound	small earthen mound, grass and bracken topped, on the edge of an area of oak trees, 20-40 yrs old, also near junction of forestry tracks associated with FC work
4	so6413/09	22	Mound	levelled area, approx 15m by 10m, appears that the old embankment has been pushed through to the east to create wagon turning/parking area
5	so5911/11	28	Mound	small oval mound, fairly solid, grass covered, black sand silt exposed by animals, in area of open grassland, although near houses so may be dump from their construction (c1) - also adjacent to post-medieval Barnhill coal pit SMR 10686
5	so5911/02	23	Mound	loose dumped material on side of hill, mixture of topsoil, subsoil, sandstone and trees
5	so5911/02	27	Mound	mound made up of topsoil, subsoil and tree bases
6	so6116/01	36	Mound	large but irregular mound, in woodland but no trees growing on it, evidence of non-bloomery slag and coal below surface suggests modern origin
1	so5500/12	1	Mound within other feature	pile of stone (4mx4mx0.75) to SW of stone linear, unclear function, possible mound 10m to the se but much smaller - within earthwork system so5500/12 (c15)
1	so5500/05	4	Mound within other feature	Appears to have been created by pile of logs in centre of earthwork - Within subcircular earthwork so5500/05 (c3) - recorded as non-archaeological rather than mound
1	st5599/06	8	Mound within other feature	shallow rounded mound, covered in dense brambles, not rubbly - Within rectilinear enclosure st5599/06 (c7)
5	so5911/11	28	Mound within other feature	mound of probable slag, as seen in mole hills, likely to be waste dump possibly from ditch next to this or possibly waste from closed colliery (c2) - additional mound recorded with so5911/11
6	so6014/13	31	Mound within other feature	irregular mound, predates plantation - within earthwork system so6014/13 (C4). These may be associated with early post-medieval mining activity
6	so6014/13	31	Mound within other feature	irregular mound, predates plantation - within earthwork system so6014/13 (C5). These may be associated with early post-medieval mining activity
5	so6013/07	25	Mound within other feature	small oval earth mound, no associated features, prominent location on hilltop - within earthwork system so6013/07 (c06)

Zone	Lidar No	Field survey feature No	Type	Comments
1	so5500/12	1	Earthwork system	Appears to represent several different episodes of earthwork/walling rather than a single feature - some features recorded as Bank or Other are rubble - c05, c06 and possibly c20 and c08 may be shown on the Tidenham tithe map
1	st5599/10	2	Earthwork system	Eastern terraces may be a unitary feature (although c04 much larger and may be Park boundary) perhaps relating to subrectangular earthwork st5599/06 - Small bank/terrace c01 may be part of same system - Bank (c08) to northwest is rubble and may be an unrelated feature - Many NV features show as weak lidar response
1	st5698/22	3	Earthwork system	Western linear (c03) may be natural or result of quarrying - remaining two linears are low shallow banks of pre-modern date - although c02 may be part of natural slope???
2	so5907/01	9	Earthwork system	Does not appear to represent a unified Arch feature. Bank (c01) very narrow (modern??) and terrace (c04) may relate to nearby industrial activity
2	so5907/05	10	Earthwork system	Thought to natural break in slop rather than a linear feature
2	so6007/01	11	Earthwork system	Combination of tracks and natural break in slope - Terrace (c04) probably a quarry NB not all area checked due to young conifer
2	so6007/02	12	Earthwork system	Not a discrete system but one terrace (c03) may be archaeological (the other (c02) considered to be natural - other features not visible - weak lidar anomalies or created by hollows
4	so6508/01	17	Earthwork system	Mainly not visible or natural break in slope small area of clear terrace (c08) and vaguer bank/terraces (c05, c07) - these may relate to holloways (c04, c06)
4	so6509/05	18	Earthwork system	In northern part this appears as a line of terraces (E/W) - Tc13 and Bc11 classed as probable archaeology although c12 classed as NA and a natural break in slope, although the feature appeared reasonably convincing on the ground- remaining features to South are either NA (natural slope) or NV - these tend to be very weak signals . The exception to this is c04 which constitutes a low bank which is not clearly associated with other features in this system

Zone	Lidar No	Field survey feature No	Type	Comments
4	so6510/01	19	Earthwork system	It was not possible to survey the whole of this area as the southern part was not in Forestry Commission land. The western part was covered in dense young birch trees and appeared to largely be the result of quarrying although this area was not visited in detail. The area to the east of the Littledean/Soudley road was not investigated in detail although no obvious features were visible there. c02, 04 and 06 are recorded as banks, although they appear more likely to be terraces. c04 was very slight(0.40m not drawn in profile) and appears to be similar in general form to terraces c01 and c11 (c. 0.50m) whereas c02 and c06 were much larger (2.5 and 3.5-5 m) and appeared more akin to large terraces in the field to the south (in private hands) which were not recorded in detail (only the extreme northern edge of c06 was recorded as its southern section continued into private land). c08 and c03 seemed to form rectilinear terraces both c. 2m high as was linear terrace c09 - suggesting that they were part of the same system - although how these two features related to each other was not at all clear on the ground - and there may have been some shallow quarrying in these areas (Stone was visible on the surface in this area) . c10was not visible on the ground, although it is a faint lidar response. In addition to the lidar features a linear boundary, which ran approximately N/S through the centre of the eastern part of this system (not recorded in the survey as it was recorded on OS maps) was stone lined and appeared to be of some antiquity. This boundary (which may have been a stone-lined drain) appears to post-date c01 (although this was not recorded on site). The assessment of this area is not clear. The large terraces must be enhanced natural slope or lynchets, whilst the smaller bank/terraces are less easy to interpret, although they are present and seem to relate to each other as part of a unified system.
4	so6511/08	20	Earthwork system	Two components c02 and c06 were not visible on the ground - both of these were weak anomalies. C05 and c08 have been interpreted as non archaeological. c05 is very low (0.2m) whilst c08 is a much higher terrace (3.5m) which has been interpreted as a natural outcrop of sandstone. This more or less coincides with the junction between the intern sandstone and interbedded deposits of mudstone and limestone so this interpretation is probably correct. c07 is a short length of bank (it may continue beyond that mapped but this is not clear) the interpretation of this is not clear but it is probably not natural. The most significant features in this are the rectilinear terrace c03 and the terrace c04 which survives as a linear bank/terrace up to 2m high. This feature is definitely cut by c01 which is a post-medieval Forestry enclosure boundary. c03, which appears to abut c04 survives as a terrace forming two sides of a rectilinear platform c. 1.2m high. The western edge of this platform is not clear due to truncation form the modern track and housing in this area, although the natural slope to the west of the modern track would militate against it having originally extended much beyond the modern track - The interpretation of this platform is not clear, but it is clearly archaeological and apparently post-dates, or forms part of the same system of earthworks as c03

Zone	Lidar No	Field survey feature No	Type	Comments
5	so6013/04	24	Earthwork system	The features in the northwestern part of this system (c08, 09 - along with Feature 26/c01) are either very low/insignificant (c09, c01) or not visible (c08) and may, therefore not be archaeological (although c09 does survive as a low terrace). Also c02 which is interpreted as a natural slope has a very weak anomaly. The bulk of the remainder of the linear features in this system (c03-c05 and c07) are clearly terraces (c. 1.5-2m high) which seem to form part of a coherent system. The east/west terrace (c06) is significantly lower (c0.5m), although this feature runs against the natural slope - could the height of the other features, which run parallel to the slope suggest that these were formed by colluvial action?? c c01 in the northern part of this system was recorded as a steep terrace c. 2.5m high - although this was interpreted as unlikely to be archaeological it is not significantly different form the archaeological terraces in the southeastern part of the area. The five small mounds c25 were clearly upcast from recent track formation and are not archaeologically significant.
5	so6013/07	25	Earthwork system	The terraces in the eastern part of this system (c01-c030 are similar in size and appearance to those of so6013/04 to the south and may reasonably be interpreted as part of the same system. Those to the west (c04, c05, c07) on the other side of a small valley are less clear. c07 which runs long the crest of the hill is much less regular than the features to the east, ranging in height from 0.4-0.75m and its status as archaeologically significant is more tenuous. The two features which cut across the bottom of the valley consist of a small bank (c05) only c0.2m high and a low terrace (c04) up to 1m high. Neither of these is particularly convincing, but their position cannot be explained by natural hill creep and therefore they should be regarded as of archaeological potential, although whether they are part of the same system as the terraces to the east is not clear . A mound (c06) is discussed under mounds and has no clear association with the earthwork system.
5	so6013/26	26	Earthwork system	c01 has already been discussed as part of so6013/04, andc02 is a small holloway which appears to predate a charcoal platform. c c05 is a shallow ditch which seems to have no relation with the other features in this system.c13 was not visible on the ground. although the lidar anomaly is weak this is a continuation of a more pronounced feature (c06) to the east and may, therefore represent a very slight feature. c11 is a right angled terrace c. 1.75m high possibly part of same general system as those in so6013/04. The remaining components (c03, 04, 06, 07, 08, 09, 10, 12) represent a series of shallow south-facing terraces between 0.5-1.2m high. These cannot have been caused by natural hill creep as they run at right angles to the slope of the hill side. They do not continue westwards when the slope becomes steeper. These features were only recorded where they were seen, it can be assumed that the actual length of them mirrors that of the Lidar survey unless otherwise stated.

Zone	Lidar No	Field survey feature No	Type	Comments
6	so6014/13	31	Earthwork system	The O is c13 which is a series of mounds - probably the remains of early shallow coal workings. C10 and c13 were not visible on the ground although these represent extremely weak responses (so weak that JPH could hardly see them on screen and therefore this is unlikely to be indicative of the lidar showing something which is not visible on the ground. c02 and c06 were both recorded as not archaeological i.e. just the natural hillside, although both of these appear to be a continuation of terraces which may be archaeologically significant (c02= c01, c06=c07). three of the terrace features (c09, c11, c12) have been interpreted as natural terracing, although c09at least does seem to represent a very clear break in slope (this is from the photographs - a profile was not drawn) and so this interpretation should be seen as equivocal. THE remaining three terraces c01, c07 and c08 seem more likely, particularly c01 which is 1.6m high (c07, and c08 are about 0.6-0.75m high). The status of all these features should probably be regarded as borderline with c01, c07 and c08 being deemed slightly more plausible than c09, c11 and c12.
6	so6015/05	32	Earthwork system	This does not appear to represent an earthwork system. A number of the identified features (c01, c04, c08 and also possibly c03) are the natural hillside which is very steep here. Two holloways (c02, c07) were also identified. The remaining possible terraces (c05, c06) are more likely to relate to quarrying operations taking place to the (GSMR 22698).
6	so6115/03	33	Earthwork system	One feature (c02) was not visible on the ground and was a fairly weak anomaly interpreted as being caused by irregular ground disturbed by charcoal production. C05 was a holloway leading down the side of the valley. C06 was of equivocal status and appeared to represent either the natural slope or perhaps an irregular edged platform/terrace feature of indeterminate function. the remaining features (c01, c03, c04) may represent archaeological terraces, although their status is not clear. c01 is cut by the modern trackway. The ground in this area is generally fairly steep although this group of features are found on a relatively level plateau, perhaps relating to nearby quarrying activity (GSMR 22698)??
6	so6115/04	34	Earthwork system	c06 and c02 were not visible on the ground, c06 may have been caused by a forestry track and c02 was recorded as a slight slope but there is no reason to think these are hidden archaeology. C05 was also vehicle tracks from forestry operations. c04 was recorded as a slight bank c. 0.25m high. immediately west of this was c03 a much higher terrace feature c. 1.5m high. These probably relate to features Z18 and Z22 recorded in the Stage 2 GBW survey (At that time these features appear to have been mapped to the west/more schematically than they appear on lidar) . c01 was a small terrace. When reviewed in conjunction with the results of the Stage 2 Great Berry Wood survey this area appears to have a number of elements which are consistent with a coherent earthwork system - namely a number of linear terraces. NB c07 (the same feature as Stage 2 BGW feature B223 and B226) is a small right angled terrace/bank with some similarities with the type A enclosures recorded - this is discussed under that section.

Zone	Lidar No	Field survey feature No	Type	Comments
6	so6315/01	35	Earthwork system	This system consists of three parallel linear terraces spaced c. 70-80m apart. The southernmost two (c02, c01) are very similar (each c. 2.2m high with a 35degree face. Both of these also have modern field boundaries on them in the field to the northeast (although these boundaries seem to have been rationalised in recent times). The northern terrace (c03) is lower (1.02m)and has a shallower face (25degrees). There can be little doubt that these are a coherent earthwork system, but it is not clear what they represent. They run along the line of the slope here and on the same alignment to a number of long linear terraces recorded in Great Berry Wood (so6115/04) to the west, but the GBW examples tend to be lower
7	so6515/01	38	Earthwork system	This area had fairly weak anomalies and most were deemed to be either not visible, not archaeological or natural terracing on the side of the hill (these features follow the contours of the hill. Two terraces (c10 and c12) were deemed slightly more believable archeologically, but neither of these were entirely convincing. In all this area is thought unlikely to represent artificial features
7	so6615/02	39	Earthwork system	09 and c06) were part of a post-medieval enclosure recorded on early OS maps. One (c07, c08) was not visible on the ground, although the anomaly here may have been caused by dense brambles (c07) or a number of small mining pits (c08). One terrace (1.5m high) ran north/south in the northern part of the area (c 02) and three terraces (1.2-1.5m high) ran parallel to each other and c70-78m apart (c01, c03, c05). These terraces were not clear in all places (c04 which is the western part of c03 was not visible) but as they run at right angles to the slope of the hill it is difficult to interpret them as natural. NB similarity with so6315/01
7	so6615/03	40	Earthwork system	The eastern part of this area could not be visited due to fenced young conifer. The southwestern part was not FC land no features visible form a distant view. C06 was not visible on the ground as a separate feature - lidar anomaly may have been the result of a natural ridge. c04 was a small holloway rampantly unrelated to any other features. c01 was interpreted as probable quarrying of sandstone outcropping at edge of steep ridge. The underlying geology (c01 at the boundary between sandstone and conglomerate, and sandstone and argillaceous rock) would support this view. c03 in the southern part of the area was a very high terrace which must be natural slope (15-20m). The small ground of linear features in the northwestern part of the area (c07, c08, c09) may represent artificial features. c09 was 3m high which suggests it may have been a natural slope, although it may have been enhance. c07 is a shallow, rectilinear terrace/bank c 1m high with a face at c15-25degrees, and c08 is a small bank (0.35m high with faces at only 10-15m high) together they may represent three sides of a rectilinear enclosure c. 80m across, but this is far from conclusive.

Zone	Lidar No	Field survey feature No	Type	Comments
7	so6817/01	41	Earthwork system	c01, c02, c06, c08, c11, c21, c19 not visible on ground - These tended to be weak anomalies althoughc01 looked slightly stronger - although was wide (c20m) and ill defined. C03 was recorded as a natural stream and was clearly visible on the lidar as a negative gully whilst c20 was also a small channel (and visible as such on the lidar. c12, c17 and c18 were recorded as large natural terraces or ridges. These were visible on the lidar as steep anomalies and in the field tended to be steep terraces (or possibly ridges cf c17) These tended to trend North/south and follow the contours of the hillside, These appeared similar to features interpreted as geological outcrops during the 2005 Stage 2 survey of Flaxley woods to the south (A25, C201/47, E19, E17, E21, E32) Note that these features were considered to have been enhanced and possibly incorporated into artificial boundary systems. The majority of the remaining features in this area of woodland were terrace features (c05, c04, c07, c09, c10, c13, c14, c22, c23). one of these (c13) was 5-10 m high which suggests that it may have been a natural feature (see above) but it was suggested that it may have been enhanced and used as a boundary. Two others (c04 and c05) formed a continuous terrace in the northern part of the area. This was c. 2.5-3m high with a face at c. 30degrees. c19 was also c. 2.5 m high but was relatively shallow, with a face at c.10 degrees . Other terraces (c07, c14, c22, c23) had faces at between 15-25 degrees and were all between 1.25-1.8m high). c10 was 3m high and relatively steep (face at c. 40 degrees). this feature effectively formed a rectilinear platform (c. 40m square) which abutted (or was cut by) the linear feature discussed below (see discussion of c16) and also contained a charcoal platform in its NW corner. c16 was recorded as a platform feature which formed part of a very straight linear feature (apparently a narrow hollow perhaps defined by banks o a small embankment) recorded on the lidar running NW/SE through the woods. This feature was not recorded in the 2006/7 lidar survey as it appears to link existing Forestry Tracks was respected by current planting regimes and was assume to be the result of modern forestry. However, The feature continues to the northwest of the survey area, apparently pre-dating existing Forestry tracks and links with a linear feature identified in 2006/7 (so6717/05) recorded a very straight linear bank. It is noteworthy that this bank appears to meet with GSMR 5904 (the Dean Road) although the lidar suggests that it my continue westwards beyond it (although this is not clear). The line of this route is not recorded on any map sources (from Gwatkin to OS1961) and no road is visible on the 1777 map. AW and NW considered the angularity of the earthwork (see photo 0344 to suggest a relatively recent date for this feature, which may be supported by the fact that it is respected by modern planting (i.e. its line is left open between planting. However, this does not extend along its while route which may suggest that it represents a pre-existent feature which was re-used by more recent Forestry operations.

Zone	Lidar No	Field survey feature No	Type	Comments
7	so6818/08	42	Earthwork system	Outside of the woodland, in an area of grassland, a number of linear terraces (c 02, c03, c04) and a linear bank (c01) were recorded more or less aligned with the contours of the hillside in this area. these could not be recorded in detail, but tended to be about 0.5-0.6m high. The lidar hints at ridge and furrow in these areas (although this was not recorded in 2006) These may be the remains of ridge and furrow. A single feature within the woods c05 was recorded as not archaeological although this rectilinear terrace (c. 2m high and with a face of c. 30-40 degrees) must be a continuation of the almost identical features from so6817/01 (c04, c05) to the south).
7	so6815/03	46	Earthwork system	The earthworks recorded at Welshbury were the eastern part of the system already recorded in the 2005 walkover survey undertaken as part of Stage 2 of the FOD Arch Survey. One feature (c01) was recorded as not visible. This was in an area of dense bramble but AW and NW recorded that there was no indication of a feature here. This was a very weak anomaly and It may be noteworthy that feature appeared to be a continuation of c04 which was recorded as a very low bank (0.25 high with a face of c. 5degrees) which was also a possible continuation of Lidar Feature E checked as part of Stage 2 of the FOD survey and which could not be identified on the ground in 2004. Four terraces were identified. c03 at the eastern edge of the system was 1.5m high and had a face sloping at 10degrees. This was not a strong anomaly and AW and NW recorded it as possibly just the natural hill slope at the top of the crest. Another terrace (c07) was recorded as 1.5m high but was recorded as possibly essentially the break in slope at the edge of the hill in the northwestern part of the area - this feature is a continuation of Lidar Feature F which was recorded in 2004. Although Feature F was not identified as a clearly distinguishable earthwork, it was noted a visible terrace corresponding to c07. c05 was regarded as the most convincing terrace at 1.25m high with a face of 25 degrees although AW and NW also suggested the possibility that this was a natural feature and it does more or less follow the line of the natural contours on the hill at this point. c06 which was the northern return of c05, along the northern edge of the hill, was also thought to be a natural slope, although the possibility that this had been utilised as a boundary was suggested. Although all of the identified features in this area are equivocal as all visible terrace correspond to the contours of the natural hillside, their proximity to Welshbury Hillfort and its associated field system, however, supports the serious possibility that these represent very slight features which could not be easily discerned in the woodland conditions in 2010 which included some areas of dense brambles.
6	so6115/04	34	Possible subrectangular enclosure within earthwork system so6115/04	Status not clear on the ground – may have been crested by combination of features.
1	so5500/05	4	Subcircular enclosure	Possible ring Cairn

Zone	Lidar No	Field survey feature No	Type	Comments
1	st5499/03	5	Subcircular enclosure	Probable curvilinear boundaries - not clear that they originally formed a single enclosure, but similar in composition
5	so6012/03	29	Subcircular enclosure	circular drainage channel, linking with drainage channel system, possibly aligned/associated with earthwork bank of unknown date to east but presumed to be associated with public footpath
1	so5600/08	6	Subrectangular enclosure	not an enclosure - created by quarrying - not an archaeological feature
1	st5499/02	7	Subrectangular enclosure	Rubble ramparts may be collapsed walls - possible internal divisions - no record of ditch
1	st5599/06	8	Subrectangular enclosure	defined by low banks - not actually rectangular - appears to have an annex - no record of ditch
3	so6205/06	14	Subrectangular enclosure	Status unclear - may be remains of an enclosure of some sort but only two arms survive - does not seem to fit in with other recognised types - recorded as 2 banks no record f ditches
3	so6305/06	15	Subrectangular enclosure	defined by earthwork banks - no record of a ditch here
3	so6407/01	16	Subrectangular enclosure	defined by earthwork banks and possible ditch in places
5	so5812/02	30	Subrectangular enclosure	defined by earthwork banks and possible ditch in places
6	so6316/07	37	Subrectangular enclosure	defined by earthwork banks and possible ditch in places - recorded on 1856 map - Appears to have 300 yrs + Beech growing on bank
7	so6519/18	43	Subrectangular enclosure	defined by earthwork banks and possible ditch in places - not visited as part of survey GSMR 4353 NB geophysical survey 2005

Appendix E Selected tabulated field survey component records

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so5300/04	1		Mound	Mound	Probable	Modern	Probable	modern upcast from installation of mast, very clayey texture, little growing on top, slightly irregular
so5500/05	1	Bank (earthwork)		Bank	Probable	Prehistoric	Possible	circular bank possible small standing stones separately recorded may originally have been rubble bank
so5500/05	2	Other		Other	Probable	Pre modern date uncertain	Probable	spread of large rubble 0.2-0.5m diameter. stones are mix of sandstone and limestone mainly on sides of bank
so5500/05	3		Not archaeological	Detritus	Probable	Modern	Probable	pile of cut branches
so5500/05	4	Other		Unknown	Uncertain	Pre modern date uncertain	Probable	rubble same as c02 but more dispersed
so5500/05	5		Stone	Standing stone	Probable	Prehistoric	Possible	standing stone 1
so5500/05	6		Stone	Standing stone	Probable	Prehistoric	Possible	standing stone 2
so5500/05	7		Stone	Standing stone	Probable	Prehistoric	Possible	standing stone 3
so5500/05	8		Stone	Standing stone	Probable	Prehistoric	Possible	standing stone 4
so5500/05	9		Stone	Standing stone	Probable	Prehistoric	Possible	standing stone 5
so5500/05	10		Stone	Standing stone	Probable	Prehistoric	Possible	standing stone 6
so5500/05	11		Stone	Standing stone	Probable	Prehistoric	Possible	standing stone 7
so5500/05	12		Stone	Standing stone	Probable	Prehistoric	Possible	standing stone 8
so5500/05	13		Stone	Standing stone	Probable	Prehistoric	Possible	standing stone 9
so5500/05	14		Stone	Standing stone	Probable	Prehistoric	Possible	standing stone 10
so5500/05	15		Other	Other	Probable	Modern	Probable	shallow cut through bank probable old vehicle track
so5500/05	16		Other	Other	Probable	Modern	Probable	shallow cut through bank
so5500/05	17	Other		Other	Probable	Modern	Probable	vehicle tracks over bank disused
so5500/12	1	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	small bank or possible terrace, may be continuation of field boundary to the east, not visible on lidar area pixilated due to conifers
so5500/12	2	Bank (earthwork)		Bank	Possible	Pre modern date uncertain	Probable	bank or possible terrace, it is a large feature to west but not clearly visible to east (see drawing), west end does not appear to turn south-it just stops

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so5500/12	3	Bank (masonry)		Bank	Probable	Pre modern date uncertain	Probable	north-south orientated stone bank, stone rubble to 0.5m. links to c04, part of same feature. only seen southern end, as drawn. drawing should show the two joining
so5500/12	4	Bank (masonry)		Bank	Probable	Pre modern date uncertain	Probable	rubble bank, heads east and joins c05, but diff comp. at the west end are two large mounds of stones both c.10m diameter, and 1.8m high. bank may turn south at west end but not clear
so5500/12	5	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Possible	bank, earthwork with infrequent stone rubble on top, may be stone construction. cut by pre-modern field boundary, indicating earlier date.
so5500/12	6	Other		Other boundary	Possible	Post-medieval	Possible	field boundary, small bank and ditch visible on lidar plot and seen on ground cutting c05.
so5500/12	7	Bank (earthwork)		Bank	Possible	Pre modern date uncertain	Possible	large bank type feature unclear origin might be associated with forestry activity as seems to run parallel to current and disused track, occasional boulders
so5500/12	8	Terrace		Bank	Possible	Pre modern date uncertain	Probable	bank or terrace, southern arm is a wide gully which may be part of feature-not identified on lidar
so5500/12	9	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	linear bank/terrace bank, highlighted as two features on lidar, but on ground is single continuous feature, poorly drawn due to hand held being slow
so5500/12	10	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	v. large terrace, only viewed west end, appears to predate quarrying on west end. East end visited on 15/03/10, more irregular in places than western end, but appears to be clear continuation
so5500/12	11	Bank (earthwork)		Bank	Possible	Pre modern date uncertain	Probable	rubble bank, large blocks (up to 1m diameter),
so5500/12	12	Other		Other	Uncertain	Pre modern date uncertain	Probable	trackway, on north side small raised stone bank, before sloping from this down to north for 2m. level trackway 3.5m wide with small drainage ditch running along southern edge. old road/trackway?
so5500/12	13	Terrace		Terrace	Possible	Pre modern date uncertain	Uncertain	top of natural hill side with a possible terrace behind, possibly caused by using top of natural hill as a boundary, ?modern field c.5m behind edge of terrace
so5500/12	14	Not visible on ground	Not visible on ground	Not visible	Probable	Natural feature	Probable	not visible
so5500/12	15		Mound	Mound	Probable	Pre modern date uncertain	Possible	pile of stone to SW of stone linear, unclear function, possible mound 10m to the se but much smaller
so5500/12	16	Other		Other	Uncertain	Pre modern date uncertain	Possible	an irregular line of stone which may be the result of either quarrying an outcrop of stone or a tumbled wall/bank on the steep hillside
so5500/12	17	Terrace		Terrace	Probable	Unknown	Probable	short length of terrace, may be natural as running diagonally across side of a steep hill
so5500/12	18	Terrace		Terrace	Probable	Unknown	Probable	shallow terrace, may be natural hill side, may be related to c18 though it is unclear under all the brash

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so5500/12	19	Terrace		Terrace	Possible	Unknown	Probable	even less convincing terrace than c18 but may be part of one feature, unclear under the brash
so5500/12	20	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	medium sized steepish terrace in hillside, so not enclosing obvious area but maybe associated with quarrying in vicinity, large amount of stone in area
so5500/12	21	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	small terrace, medium to steep slope, at northern end becomes more bank like with stone rubble, while at southern end becomes smaller and more ephemeral before disappearing
so5500/12	22	Other		Other	Probable	Pre modern date uncertain	Probable	hollowway? banked each side much sandstone in/on old OS boundary across top unclear relationship with c12 to s, end there, but not contiguous
so5500/12	23	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	wide shallow bank, on se-NW orientated slope, bank has same drop as rest of slope, falling steeply NE-SW. rubble evident along length
so5500/12	24	Terrace		Other	Probable	Pre modern date uncertain	Probable	terrace/hollow dropping away west to east and south to north, stone rubble present all along edge. may be result of extraction rather than build up, function uncertain
so5600/08	1	Other	Pit without spoil	Quarry	Possible	Pre modern date uncertain	Probable	quarry depression, in area of quarrying, leaving ridge picked up on lidar
so5600/08	2		Pit with spoil	Quarry	Probable	Pre modern date uncertain	Probable	area of quarrying, some loose stone around edge.
so5600/08	3		Pit with spoil	Quarry	Probable	Pre modern date uncertain	Probable	small area of quarrying
so5600/08	4		Pit without spoil	Quarry	Probable	Pre modern date uncertain	Probable	large open quarry pit
so5600/08	4		Pit without spoil	Quarry	Probable	Pre modern date uncertain	Probable	large open quarry pit
so5600/08	5	Terrace		Other	Possible	Pre modern date uncertain	Probable	raised terrace, may be result of quarrying/waste. but uncertain
so5600/08	6		Pit with spoil	Quarry	Probable	Pre modern date uncertain	Probable	small quarry pit
so5812/02	1	Bank (earthwork)		Enclosure	Probable	Pre modern date uncertain	Probable	sub-rectangular enclosure, unclear relationship with features to north, possible banks survive on east and west side
so5812/02	2		Other	Component of enclosure	Probable	Still in use	Probable	3m wide gap in c01 which may have formed a possible entrance
so5812/02	3	Ditch		Component of enclosure	Probable	Pre modern date uncertain	Probable	shallow ditch on south side of c01
so5812/02	4	Other		Not archaeological	Probable	Still in use	Probable	footpath

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so5812/02	5	Ditch		Component of enclosure	Probable	Pre modern date uncertain	Probable	shallow ditch truncated to south by c04, does not curve around to north of enclosure but may continue northwards
so5812/02	6	Ditch		Component of enclosure	Probable	Pre modern date uncertain	Probable	shallow ditch, does not appear to continue to east or west to form continuous ditch around enclosure
so5812/02	7	Ditch		Component of enclosure	Probable	Pre modern date uncertain	Probable	shallow ditch visible north of c02 and ?truncated by c08
so5812/02	8	Other		Trackway	Possible	Pre modern date uncertain	Probable	shallow linear hollow, possible trackway, ends at pathway to west, appears to be later than enclosure as slightly cuts ditch
so5812/02	9	Hollow		Unknown	Probable	Pre modern date uncertain	Probable	linear hollow/ditch, orientated west to east
so5812/02	10	Hollow		Other	Probable	Pre modern date uncertain	Probable	linear hollow/ditch at an angle to c09, but parallel with c11. appears similar size to ridge and furrow
so5812/02	11	Hollow		Other	Probable	Pre modern date uncertain	Probable	shallow hollow/ditch roughly parallel with c10, longer than others
so5812/02	C12	Not archaeological		Vegetation	Probable	Natural feature	Probable	patch of dense brambles, giving circular lidar response
so5907/01	1	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	raised earth bank, as lidar, at southern end is a short e-w bank, part of same feature. there is a raised mound to the north of feature, which is recognised on lidar and may relate to this feature
so5907/01	2	Bank (earthwork)		Bank	Probable	Unknown	Probable	se-NW bank at terminus of c01, respects trackway, may be result of forestry route clearance
so5907/01	3	Not archaeological		Not archaeological	Probable	Modern	Possible	lidar appears to represent deer fence and boundary between trees and new planting, dense brambles within fenced enclosure
so5907/01	4	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	shallow terrace bank, terrace may be related to nearby probable mining, evident by large spoil mound to east
so5907/01	5	Not archaeological		Not archaeological	Possible	Natural feature	Probable	NMP data, appeared to be natural edge of slope, heading into valley, may be some activity from mining , trackway/holloway. polygon poorly drawn, bad weather
so5907/01	6	Not archaeological		Not archaeological	Probable	Natural feature	Probable	natural hillside, lots of mining activity on side of hill
so5907/05	1	Not visible on ground		Not visible	Probable	Unknown	Uncertain	not visible on ground, off track
so5907/05	2	Not archaeological		Not archaeological	Possible	Natural feature	Probable	natural terrace, irregular, shallow
so5907/05	3	Not archaeological		Not archaeological	Probable	Natural feature	Probable	natural break of slope

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so5911/02 (E)	1		Mound	Mound	Probable	Modern	Probable	mound made up of topsoil, subsoil and tree bases
so5911/02 (W)	1		Mound	Mound	Probable	Modern	Probable	loose dumped material on side of hill, mixture of topsoil, subsoil, sandstone and trees
so5911/11	1		Mound	Mound	Probable	Pre modern date uncertain	Probable	small oval mound, fairly solid, grass covered, black sand silt exposed by animals, in area of open grassland, although near houses so may be dump from their construction
so5911/11	2		Mound	Mound	Probable	Modern	Possible	mound of probable slag, as seen in mole hills, likely to be waste dump possibly from ditch next to this or possibly waste from closed colliery
so6007/01	1	Not visible on ground		Not visible	Probable	Natural feature	Probable	not visible, lidar anomaly caused by adjacent hollows and tracks
so6007/01	2	Not archaeological		Not archaeological	Probable	Natural feature	Probable	natural break in slope, no particular dimensions
so6007/01	3	Not archaeological		Not archaeological	Probable	Modern	Probable	area of young conifer, enclosed by barbed wire fence. no access possible
so6007/01	4	Terrace		Quarry	Possible	Pre modern date uncertain	Probable	steep terrace, top isn't level, appears to be cut into natural slope, might be associated with surrounding quarrying, two mature beech trees present on slope
so6007/01	5	Bank (earthwork)		Bank	Possible	Pre modern date uncertain	Probable	bank, possibly result of quarry spoil
so6007/02	1	Not visible on ground		Not visible		Natural feature		very slight break in slope, not archaeological, northern anomaly appears to be joining dots
so6007/02	2	Terrace		Not archaeological	Probable	Natural feature	Probable	terrace, probably natural,
so6007/02	3	Terrace		Unknown	Possible	Pre modern date uncertain	Possible	shallow terrace, mine shaft present on feature
so6012/03	1	Ditch		Drainage	Probable	Modern	Probable	small circular drainage channel, linking to channel coming from north which isn't clearly shown on lidar, cuts bank caused by footpath to east. similar to other drainage channels seen in general area, also links to 2nd drain by footpath
so6012/03	2	Ditch		Drainage	Probable	Modern	Probable	location of another drainage channel linking into c01, another channel joins at the northern end of c01, not drawn
so6012/03	3	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	bank running along side modern footpath, raised ground to west, likely to be old field boundary or just associated with footpath

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so6013/04	1	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	steep banked terrace, within feature the ground slopes very markedly from south to north, northern end forms end of hill sloping down to stream, less pronounced, eastern edge very pronounced
so6013/04	2	Other		Other	Probable	Natural feature	Uncertain	break of slope west to east, possibly feature, but may be natural, not clear.
so6013/04	3	Terrace		Unknown	Probable	Pre modern date uncertain	Probable	large terrace bank, fades away to north cannot distinguish from natural slope
so6013/04	4	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	large terrace bank, length as lidar, dimensions same as recorded on c03. appears to be same feature, but there is a break between them. becomes ephemeral to SW and ceases to exist
so6013/04	5	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	terrace bank, parallel with c04, not fully walked so drawn as viewed
so6013/04	6	Terrace		Terrace	Possible	Pre modern date uncertain	Uncertain	shallow vague and slightly irregular feature, unclear if archaeological or natural
so6013/04	7	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	terrace, runs parallel to c05
so6013/04	8	Not visible on ground	Not visible on ground	Not visible	Probable	Natural feature	Probable	nothing visible
so6013/04	9	Terrace		Terrace	Uncertain	Pre modern date uncertain	Uncertain	shallow vague and irregular feature may be natural, lidar also including unassociated charcoal platforms as part of feature
so6013/04	25	Other	Mound	Mound	Probable	Modern	Probable	series of 5 irregular mounds, visible on lidar, upcast from track construction
so6013/07	1	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	terrace, large on east side but less substantial on west, ?truncated to north by track, slight cycle track damage to west
so6013/07	2	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	similar terrace-like construction to c01 but unclear relationship
so6013/07	3	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	very similar terrace to c02, becomes much smaller to west
so6013/07	4	Terrace		Terrace	Possible	Natural feature	Possible	small slightly irregular terrace in base of small valley
so6013/07	5	Bank (earthwork)		Bank	Possible	Pre modern date uncertain	Probable	small bank, picked up on lidar, but not identified, appears to run from one end of valley to other.
so6013/07	6		Mound	Mound	Probable	Pre modern date uncertain	Probable	small earth mound, no associated features, prominent location on hilltop, good size for a barrow
so6013/07	7	Terrace		Terrace	Uncertain	Natural feature	Possible	irregular stretch of terrace, along east edge of slight hill, not continuous along length or consistent in form, probable charcoal pits present
so6013/26	1	Not archaeological	Not archaeological	Not archaeological	Probable	Natural feature	Probable	natural gentle slope

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so6013/26	2	Other		Hollow way	Probable	Pre modern date uncertain	Probable	hollow way does not continue NE and to SW is blocked by charcoal platform
so6013/26	3	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	shallow terrace, has been partly cut by path leading up to charcoal platform
so6013/26	4	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	shallow terrace, slightly irregular, does not continue to west
so6013/26	5	Ditch		Drainage	Possible	Unknown	Probable	shallow ditch not on same orientation and does not have a similar profile as other features in area
so6013/26	6	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	terrace bank, sloping north to south
so6013/26	7	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	north to south sloping terrace bank, similar to c06
so6013/26	8	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	medium terrace, extends west to the edge of hill, but does not appear to carry on up the hill. slightly irregular. slopes north to south
so6013/26	9	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	slight terrace bank on natural slope
so6013/26	10	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	medium terrace, clearly visible, extends west only as far as shown on lidar, west end is at start of steep hill slope
so6013/26	11	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	right angle terrace, with steep banks, with at least one charcoal platform on the top of s bank, enhancing the size. becomes shallower to north, then cannot be distinguished from natural ground slope,
so6013/26	12	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	roughly north-south terrace bank, to east it becomes impossible to distinguish from natural slope, reflects lidar extent.
so6013/26	13	Not visible on ground		Not visible	Probable	Natural feature	Possible	slight change in slope
so6014/13	1	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	terrace appears to turn south west and merge into natural steeper hill side c02, eastern end fizzles out
so6014/13	2	Not archaeological		Not archaeological	Probable	Natural feature	Probable	natural steep hillside dropping away to NW, along the top crossed by modern footpath, c01 merges in from a NE direction, might be using edge a natural field boundary?
so6014/13	3	Not visible on ground		Not visible	Probable	Natural feature	Probable	not visible
so6014/13	4		Mound	Mound	Probable	Pre modern date uncertain	Uncertain	irregular mound, predates plantation
so6014/13	5		Mound	Mound	Probable	Pre modern date uncertain	Uncertain	same as c04
so6014/13	6	Not archaeological		Not archaeological	Probable	Unknown	Probable	irregular mounds/dumps to SW

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so6014/13	7	Terrace		Terrace	Probable	Pre modern date uncertain	Possible	section of shallow terracing, not visible to NE, to SW runs into c06
so6014/13	8	Terrace		Terrace	Probable	Pre modern date uncertain	Possible	shallow terrace, might be natural but more likely arch. exists as drawn but might have linked c07 originally?
so6014/13	9	Terrace		Terrace	Probable	Unknown	Probable	large slope, dropping 3m plus from SW to NE, appears to be natural, there may have been use of flatter area SW of slope break for field? 2nd look - this feature appears more convincing as an archaeological feature
so6014/13	10	Not visible on ground		Not visible	Probable	Natural feature	Probable	no linear feature present here, only natural drop in slope SW to NE
so6014/13	11	Terrace		Terrace	Uncertain	Natural feature	Probable	large slope breaking NW to se, slope up to 10m wide appears to be natural slope, although this may have been utilised as a boundary
so6014/13	12	Terrace		Terrace	Uncertain	Natural feature	Probable	terrace ending in bank dropping from SW to NE, appears to be natural, fairly irregular, does not extend to se as interpreted from lidar, some irregular mounds are present but not linear earthwork
so6014/13	13	Other		Other	Probable	Pre modern date uncertain	Probable	series of irregular mounds, may be relatively modern, but pre-date plantation, had been interpreted as linear earthwork from lidar
so6015/05	1	Not archaeological		Not archaeological	Probable	Natural feature	Probable	natural slope, there appears to be very shallow hollows/channels running NW/se across the slope with an unclear origin
so6015/05	2	Hollow		Hollow way	Probable	Pre modern date uncertain	Probable	hollow way possibly leading up to workings towards the north, other shorter tracks also visible in vicinity
so6015/05	3	Not visible on ground	Not visible on ground	Not archaeological	Probable	Natural feature	Probable	not earthwork, parts are natural hillside while other parts are not visible, se corner was more terrace like so might be reuse of natural hillside but unlikely
so6015/05	4	Not archaeological	Not archaeological	Not archaeological	Probable	Natural feature	Probable	natural hillside-very large natural terrace?
so6015/05	5	Terrace		Terrace	Possible	Pre modern date uncertain	Possible	uncertain terrace, slightly irregular and sloping behind so might be natural
so6015/05	6	Terrace		Terrace	Possible	Pre modern date uncertain	Possible	possible terrace forming a field to north but shallow and slightly irregular
so6015/05	7	Hollow		Hollow way	Probable	Pre modern date uncertain	Probable	large hollow way cut through c08
so6015/05	8	Not archaeological		Not archaeological	Probable	Natural feature	Probable	natural hillside, later industrial workings may have enhanced the lidar response
so6109/05	1		Mound	Mound	Probable	Modern	Possible	steep sided, flat topped mound. solid earth? top appears to be yellow clay, could be spoil from forestry drainage works?

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so6115/03	1	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	irregular terrace bank, appears to continue to north of track, damaged by track, plus charcoal platform
so6115/03	2	Not visible on ground		Not visible	Probable	Natural feature	Uncertain	no linear feature identified, ground is irregular and disturbed by charcoal production, slope from NE to SW on this line
so6115/03	3	Terrace		Terrace	Probable	Unknown	Probable	medium size terrace slope, running NW-se, irregular, more disturbance towards west end, where it is also cut by trackway, may be levelled material from trackway
so6115/03	4	Terrace		Terrace	Possible	Unknown	Possible	north-south bank/slope, area to the north is relatively flat/level, slope is not large, irregular and not certain as an archaeological feature
so6115/03	5	Other		Other platform	Probable	Pre modern date uncertain	Probable	shallow hollow way/pathway, can't see a relationship with c04, viewed as drawn, but appears to continue to bottom of hill, some evidence of mining to the eastern side
so6115/03	6	Other		Terrace	Uncertain	Natural feature	Possible	irregular raised area/terrace, with unclear edges, appears to be natural edge of slope, but may represent eroded terrace, significant hollow way/track between this and c04 at break between gentle slope
so6115/04	1	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	terrace bank, quite shallow angle appears to exist as represented by lidar, irregular and less clear in places, undergrowth quite thick, not helping
so6115/04	2	Not visible on ground		Not visible	Probable	Natural feature	Probable	no clear linear features present, slight slope dropping from east to west.
so6115/04	3	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	medium-large terrace bank, cannot be seen continuing beyond that drawn, was not identified from lidar to investigate
so6115/04	4	Bank (earthwork)		Bank	Probable	Unknown	Probable	slight bank, at base of natural slope, uncertain relationship with c03, possible old hedge line?, irregular, lidar response may be exaggerated by some cut branches of trees
so6115/04	5	Not archaeological		Not archaeological	Probable	Modern	Probable	vehicle tracks on this alignment, FC, 10-30 years, no other linears visible
so6115/04	6	Not visible on ground		Not visible	Probable			not present as a linear, some forestry tracks and mining activity may have given some responses, which could have indicated a feature
so6115/04	7	Terrace		Terrace	Possible	Pre modern date uncertain	Probable	terrace bank forming right angle, NW-se part is more bank-like with a distinct drop in ground level to NE, and could be considered as a separate component, the southern end forms more of a terrace
so6116/01	1		Mound	Mound	Probable	Modern	Probable	large but irregular mound, in woodland but no trees growing on it, evidence of slag and coal below surface suggests modern origin

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so6205/06	1	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	shallow broad bank 0.40m high on inside of enclosure, 0.6m high on exterior
so6205/06	2	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	terrace not visible to SW
so6205/06	3	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	shallow bank clearly visible. possibly hollow/ditch on outside of bank but not clear through brambles
so6205/06	4	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	shallow vague bank becomes more ephemeral to NW
so6205/06	5	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	linear bank, appears to be continuation of enclosure
so6305/06	1	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	one of two parallel curving banks, unclear function, not visible to south due to very dense brambles
so6305/06	2	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	small bank, runs parallel to c01, not visible to south due to dense brambles
so6305/06	3		Mound	Mound	Probable	Pre modern date uncertain	Probable	mound, unclear function and relationship with c01+02
so6305/06	4		Not archaeological	Vegetation	Probable	Natural feature	Probable	area of very dense brambles
so6305/06	10	Not archaeological		Not archaeological	Probable	Modern	Probable	ruts caused by FC vehicles
so6315/01	1	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	large steep terrace v similar to c02, NE end in pine becomes v ephemeral and slightly irregular barely visible in field, ploughed out?
so6315/01	2	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	large fairly steep terrace, western end appears in good condition, eastern end and part in pine wood heavily truncated, hedge and modern fence may reuse terrace in field to east but unclear
so6315/01	3	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	medium sized terrace, smaller than c01 & c02, appears to fizzle out at either end although eastern end is also truncated by footpath/track
so6316/07	1	Not archaeological		Fence	Probable	Still in use	Probable	modern fence, boundary between dense conifer plantation to south and open woodland to north, earthwork visible beyond fence in south eastern corner, but mostly can't be accessed due to the young v dense plantation
so6316/07	2	Bank (earthwork)		Enclosure	Probable	Pre modern date uncertain	Probable	earthwork bank, forming sub rectangular enclosure. some loose sandstone fragments on top, appears to be mainly soil/earth construction. on west side becomes more truncated from the NW corner to SW corner
so6316/07	3	Ditch		Other	Probable	Pre modern date uncertain	Probable	shallow ditch part of enclosure boundary, cut by track to north, obscured by fence line to south
so6316/07	4	Not archaeological		Not archaeological	Possible	Modern	Possible	bank appears to have been cut by possible vehicle activity, apparent rutting, the bank here is significantly smaller

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so6316/07	5	Ditch		Component of enclosure	Probable	Pre modern date uncertain	Probable	wide ditch surrounding enclosure, cut at NE end by path/trackway
so6316/07	6	Ditch		Component of enclosure	Possible	Pre modern date uncertain	Probable	shallow part of ditch, becomes more ephemeral to the south, to the point where it is hard to identify
so6407/01	1	Bank (earthwork)		Enclosure	Probable	Pre modern date uncertain	Probable	sub rectangular earthwork enclosure, unclear relationship with mining activity. possible ditch to se. where cut by paths and track almost totally truncated. other erosion from walkers/bikes
so6407/01	2		Other	Other	Probable	Pre modern date uncertain	Possible	pit head
so6407/01	3		Pit without spoil	Surface mining pit	Uncertain	Unknown	Probable	small pit and mound, unclear relationship with enclosure
so6407/01	4		Other	Other	Probable	Pre modern date uncertain	Possible	small pond
so6410/09	1		Mound	Mound	Probable	Pre modern date uncertain	Probable	small earthen mound, grass and bracken topped, on the edge of an area of oak trees, 20-40 yrs old, also near junction of forestry tracks associated with FC work
so6413/09	1	Ditch	Not archaeological	Not archaeological	Probable	Modern	Probable	levelled area, approx 15m by 10m, appears that the old embankment has been pushed through to the east to create wagon turning/parking area
so6508/01	1	Not archaeological		Not archaeological	Probable	Natural feature	Probable	natural break in slope, charcoal platform evident
so6508/01	2	Not visible on ground		Not archaeological	Probable	Natural feature	Probable	possible tracks and charcoal platforms but no evidence of linear feature
so6508/01	3	Not visible on ground		Not visible	Probable	Natural feature	Probable	not visible
so6508/01	4	Other		Trackway	Probable	Modern	Probable	modern track but not recently used, wheel ruts visible
so6508/01	5	Bank (earthwork)		Bank	Uncertain	Pre modern date uncertain	Possible	shallow vague ephemeral bank or possible terrace
so6508/01	6	Other		Trackway	Probable	Pre modern date uncertain	Possible	holloway, possible earlier than example to south due to size although some evidence of modern use
so6508/01	7	Bank (earthwork)		Quarry	Possible	Pre modern date uncertain	Probable	bank, appears to be terraced bank, but may be alteration of significant natural slope of hill, evidence of at least one charcoal platform at top of feature. cut by modern footpath
so6508/01	8	Terrace		Bank	Probable	Pre modern date uncertain	Probable	terrace bank, steep edge, does not appear to continue north of hollow/track way, or continue south of southern trackway, indicating a relationship
so6508/01	9	Not archaeological		Not archaeological	Probable	Natural feature	Probable	appears to represent natural edge of slope, clearly not a continuation of feature to south, reuse of natural slope possible

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so6508/01	10	Not visible on ground		Not visible	Probable	Natural feature	Probable	some ground undulation but no evidence of linear feature
so6508/01	11	Not visible on ground		Not visible	Probable	Natural feature	Probable	not visible
so6508/01	12	Not visible on ground		Not visible	Probable	Natural feature	Probable	not visible
so6508/01	13	Not archaeological		Not archaeological	Probable	Natural feature	Probable	change in slope, natural
so6509/05	1	Not archaeological		Not archaeological	Probable	Natural feature	Probable	break of slope north-south, appears to be natural
so6509/05	2	Not archaeological		Not archaeological	Probable	Natural feature	Probable	fairly steep break in slope, start of a significant drop in height to a dip to the west. appears natural
so6509/05	3	Not visible on ground		Not visible	Probable	Natural feature	Possible	no linear features visible in area, slight change in slope n-s, but not really significant
so6509/05	4	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	slight east-west orientated bank, on the edge of a natural large bowl shaped hollow, which may be producing a more significant lidar response
so6509/05	5	Not visible on ground		Not visible	Probable	Natural feature	Probable	no linear features present, slight natural change in slope
so6509/05	6	Not archaeological		Not archaeological	Probable	Modern	Probable	area of disturbance, crossing vehicle ruts, with slight hollow at western edge, deeper rutting at eastern edge.
so6509/05	7	Not visible on ground		Not visible	Probable	Natural feature	Probable	no linears present, slight raised change in slope, natural
so6509/05	8	Not visible on ground		Not visible	Probable	Natural feature	Probable	not visible
so6509/05	9	Not archaeological		Not archaeological	Probable	Natural feature	Probable	probable natural break of slope to valley base to west,
so6509/05	10	Not visible on ground		Not visible	Probable	Natural feature	Probable	not visible
so6509/05	11	Bank (earthwork)		Quarry	Probable	Pre modern date uncertain	Probable	broad bank, fizzles out towards eastern end, not clear past the track
so6509/05	12	Not archaeological		Not archaeological	Probable	Natural feature	Probable	western side of track is caused by break in slope, to east caused by depression and charcoal platforms This appears to continue west of track 0.2-3 high
so6509/05	13	Terrace		Terrace	Possible	Pre modern date uncertain	Possible	shallow terrace, could be natural, not certain, EDIT slight hint of continuation west of track, 0.3m high
so6509/05	14	Not archaeological		Other	Probable	Natural feature	Possible	side of small valley, unclear if this is the lidar feature, unclear property boundary

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so6509/05	15	Not archaeological		Not archaeological	Probable	Natural feature	Probable	mixture of natural slope and charcoal platforms
so6509/05	16	Other	Other	Other	Probable	Pre modern date uncertain	Probable	series of hollows and/or banks running n-s on top of hill with possible terrace to west, unclear form, seem to be multiple phases, series of holloways??
so6510/01	1	Terrace		Terrace	Uncertain	Pre modern date uncertain	Possible	shallow irregular terrace or break of slope, possibly natural
so6510/01	2	Bank (earthwork)		Bank	Possible	Pre modern date uncertain	Probable	medium sized bank or terrace, with steep side, seems to be cut into natural slope of land, some visible to north see photo 0112, to west not visible under deep brash
so6510/01	3	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	terrace or possible bank with quarry pit present making interpretation difficult, mapped feature = full extent
so6510/01	4	Bank (earthwork)		Bank	Possible	Pre modern date uncertain	Probable	ephemeral linear bank, irregular in form, appears to be cut by field boundary
so6510/01	5	Other		Other	Probable			FC boundary, fields to east with clear earthworks evident. scrub land to the west, possibly garden, heavily overgrown and covered in snow, large steep bank evident in middle
so6510/01	6	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	large, steep bank, which continues on lidar into non-FC land to the south, viewed as drawn, dense undergrowth to the north, so could not investigate further
so6510/01	7		Not archaeological	Quarry	Probable	Pre modern date uncertain	Probable	young thick birch trees over whole area. appears to be area of old quarrying, features identified on lidar do not appear to be archaeological
so6510/01	8	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	terrace/bank, similar in dimensions to the two either side, relatively flat area behind bank, may be related to apparent quarry activity, though this is speculative
so6510/01	9	Terrace		Terrace	Possible	Pre modern date uncertain	Probable	large bank and uneven but relatively flat area behind c.5m also behind is a SW-NE orientated path/hollow-way pre-mod. some squared stone blocks are visible near base. possibly quarrying activity
so6510/01	10	Not visible on ground		Not visible	Probable	Natural feature	Possible	west area of drawn area exists as slope north to south, not present as linear earthwork. lidar image may be result of uneven ground and areas being grouped together. not arch
so6510/01	11	Terrace		Other	Probable	Pre modern date uncertain	Probable	ground level slopes from north to south, irregular edge, cut by old field boundary. not an overly clear feature, east of road uneven ground. feature not a distinct earthwork, quarrying?
so6511/08	1	Bank (earthwork)		Other earthworks	Probable	Pre modern date uncertain	Probable	bank and ditch marked as field boundary on map but might be earlier? cut by ditch running n-s across site EDIT forest enclosure boundary, runs s, clearly visible on lidar

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so6511/08	2	Not visible on ground	Not visible on ground	Not visible	Probable	Natural feature	Probable	natural very gentle slope
so6511/08	3	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	medium sized terrace with flat top, unclear relationship with track to west makes it hard to define overall shape, abuts terrace??
so6511/08	4	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	medium sized bank has been cut by mod field boundaries, unclear relationship with c03, might have been recut around drain in centre of site where it appears as a large more modern ?drainage ditch
so6511/08	5	Other		Other	Probable	Natural feature	Possible	wide slightly raised linear ridge, not clearly arch, may be natural, only visible as drawn, not seen to south
so6511/08	6	Not visible on ground		Not visible	Probable	Unknown	Probable	no linear features visible in area marked on lidar
so6511/08	7	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	feature only seen as drawn, hard to see if it continues to north due to undergrowth, but appears less distinct
so6511/08	8	Other		Other	Probable	Natural feature	Probable	raised outcrop of sandstone, with extensive evidence of quarrying, form is of a steep bank, dropping from se to NW, some exposed rock with evidence of stone block removal, loose large stones lying around
so6511/08	9	Other		Other	Probable			area of clear felling, replanted with young conifers. largely fenced off, inaccessible due to this
so6515/01	1	Not visible on ground		Not visible	Probable	Natural feature	Possible	slight break of slope evident on the ground in area indicated on lidar, no clear feature present, very dense bracken present may be masking feature.
so6515/01	2	Other		Trackway	Possible	Unknown	Probable	linear hollow track-way, only feature present in area, may be footpath, or trackway.
so6515/01	3	Bank (earthwork)		Terrace	Possible	Pre modern date uncertain	Probable	small terrace bank, orientated NW-se, may be feature identified on lidar, estimated drawing, unclear position, only present on NE side of path
so6515/01	4	Terrace		Terrace	Probable	Natural feature	Probable	landscaped stepped/terraced down slope of hill, 3 distinct steps, appears to be natural formation, although possibly subject to partial human activity given industry in area
so6515/01	5	Not visible on ground		Not visible	Probable	Natural feature	Probable	no linear features present in area viewed, slight change in natural slope, area viewed as drawn, charcoal platform at northern end adjacent to footpath
so6515/01	6	Not visible on ground		Not visible	Probable	Natural feature	Possible	feature not visible, lidar response may be caused by natural slope and frequent charcoal platforms, pre-mod coppice in area
so6515/01	7	Not archaeological		Not archaeological	Probable	Modern	Possible	possible extraction associated with construction of railway to west and/or mine to south, might also be natural terracing of hillside
so6515/01	8	Terrace		Terrace	Probable	Natural feature	Probable	probably natural terrace, southern extent not viewed due to dense woodland

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so6515/01	9	Terrace		Terrace	Probable	Natural feature	Probable	same as c08
so6515/01	10	Bank (earthwork)		Bank	Possible	Pre modern date uncertain	Possible	terrace-like bank, unclear function but more promising than other features ID so far, slightly unclear due to dense vegetation
so6515/01	11	Not archaeological	Not archaeological	Not archaeological	Probable	Natural feature	Possible	natural break of slope combined with one or possibly two charcoal platforms
so6515/01	12	Terrace		Terrace	Possible	Natural feature	Uncertain	possible terrace, unclear as to origin maybe arch or natural, either side of footpath are extremely dense conifers
so6515/01	13	Not visible on ground		Not visible	Probable	Natural feature	Probable	natural hillside, rough ground in very dense larch
so6515/01	14	Not visible on ground		Not visible	Probable	Unknown	Probable	no clear evidence of linear feature in very dense larch but ground is very uneven and may be masking features, charcoal platforms are present
so6515/01	15	Terrace		Terrace	Probable	Natural feature	Possible	possible natural terrace in area of very dense larch, very undulating ground and at least one charcoal platform present
so6519/18	1	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	bank, small but fairly regular, ditch c02 on outside, no real evidence of visible entrance, doesn't seem to exist on NW corner-destroyed by veteran tree c07?
so6519/18	2	Ditch		Other	Probable	Pre modern date uncertain	Probable	ditch, continuous as with bank c01 except on NW corner by veteran tree c07
so6519/18	3	Other	Other	Component of enclosure	Probable	Pre modern date uncertain	Probable	CORRUPTED - REWRITTEN S-bend in ditch and bank c01 and c02, no clear purpose, profile of c01 and c02 remains more or less the same as elsewhere
so6519/18	4	Hollow		Hollow way	Probable	Pre modern date uncertain	Probable	small shallow hollow way, possibly leading to scowles to east, unclear relationship to enclosure
so6519/18	5	Other	Other	Other	Probable	Unknown	Probable	CORRUPTED - REWRITTEN Irregular lumps and small mounds in ditch c02 and exterior of enclosure
so6519/18	6	Other	Other	Not archaeological	Probable	Modern	Probable	CORRUPTED - REWRITTEN modern vehicle tracks/ruts crossing c01 & c02
so6519/18	7	Other	Other	Veteran tree	Probable	Pre modern date uncertain	Probable	CORRUPTED - REWRITTEN beech, 300+ years est., circumference approx 5m, growing on top of bank c01, post dating enclosure?, this is the only vet tree identified in the area
so6519/18	8	Hollow		Hollow way	Probable	Pre modern date uncertain	Probable	small possible hollow way
so6615/02	1	Terrace		Terrace	Probable	Pre modern date uncertain	Possible	shallow terrace, might be natural, not flat behind becomes less clear towards east in thicker larch
so6615/02	2	Terrace		Terrace	Probable	Pre modern date uncertain	Possible	large terrace might be reuse of natural terrace as slope continues a long way to the east

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so6615/02	3	Terrace		Terrace	Probable	Pre modern date uncertain	Possible	small shallow terrace not visible to east and lidar anomaly may be caused by vehicle track in this location, may curve south but very unclear
so6615/02	4	Not visible on ground	Not visible on ground	Not visible	Probable	Natural feature	Probable	not visible
so6615/02	5	Bank (masonry)		Bank	Probable	Pre modern date uncertain	Probable	stone bank leading east from mapped enclosure (not visible within the enclosure) decreases in size as it heads east
so6615/02	6	Terrace		Terrace	Probable	Modern	Probable	terrace forming eastern boundary of mapped enclosure, irregular mounds to south probably mining, does not appear to continue south or east
so6615/02	7	Not visible on ground	Not visible on ground	Not visible	Probable	Unknown	Uncertain	not visible but area of very dense brambles may be masking any smaller features
so6615/02	8	Not visible on ground	Not visible on ground	Not visible	Probable	Natural feature	Probable	not visible, undergrowth less dense than c07 but still not visible, number of mining pits visible which may be causing lidar response
so6615/02	9	Wall/facing (masonry)		Wall	Probable	Modern	Probable	enclosure wall, mapped in 1925, possible 1.25m wide ditch on exterior, 95% of enclosure is covered by very dense brambles but no trees
so6615/03	1	Other		Quarry	Uncertain	Pre modern date uncertain	Probable	ridge/outcrop of large/medium sandstone boulders/blocks, edge of w to e slope, may be natural outcrop of stone or edge of quarrying activity, slope drops down an estimated 40m from this line to valley base
so6615/03	2	Not archaeological		Vegetation	Probable	Still in use	Probable	fenced young conifer plantation, approx 10 years old, impassably dense, and cannot be seen into.
so6615/03	3	Terrace		Terrace	Uncertain	Natural feature	Probable	area of slightly flatter terrace, edge is visible, which caused lidar response, irregular, and exaggerated by charcoal platform, likely to be natural, but may have been utilised as field boundary.
so6615/03	4	Hollow		Hollow way	Probable	Pre modern date uncertain	Probable	hollow way, may be associated with charcoal working
so6615/03	5	Other	Other	Other		Unknown		CORRUPTED - REWRITTEN area was not FC land and could only be viewed from across valley, no clear evidence of features from a distance but closer investigation may still yield result
so6615/03	6	Not visible on ground		Not visible	Probable	Natural feature	Probable	no archaeological features present, an apparent natural ridge runs on this line, very irregular, some evidence of surface mining north east of recorded line
so6615/03	7	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	area of relatively flat terrace, with an apparently clear bank, the eastern edge runs along the natural edge of slope, in places it is difficult to identify the terrace bank
so6615/03	8	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	slight bank, which appears as a terrace on far eastern end, may be old field boundary/hedge line

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so6615/03	9	Terrace		Terrace	Probable	Natural feature	Probable	area of relatively flat ground north of drawn line with large wide slope dropping west to east, probably natural fall in slope the top of which may have been utilised as a boundary
so6815/03	1	Not visible on ground	Not visible on ground	Not visible	Probable	Natural feature	Uncertain	not visible, area is covered with dense brambles, which are masking the ground, but there is no indication of a linear being present
so6815/03	2	Not archaeological		Not archaeological	Probable	Natural feature	Probable	appears to be natural hill side, no obvious man-made features, some variation in slope angle but nothing to suggest archaeology
so6815/03	3	Terrace		Terrace	Possible	Natural feature	Possible	narrow terrace along hillside, irregular, may be natural, break in slope leading to road quite steep (c.25 degrees), may have been utilised in past as natural boundary
so6815/03	4	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	slight bank/ridge, small depression running along NW side, could not access east end of feature, due to very dense young saplings. at bottom end, appeared more as a terrace
so6815/03	5	Terrace		Terrace	Possible	Pre modern date uncertain	Possible	irregular wide terrace bank, southern end, where profile is drawn, feature is more consistent and clear, becomes wider and more irregular after junction with c04
so6815/03	6	Terrace		Terrace	Possible	Natural feature	Possible	appears to be natural hill side on northern edge, but may have formed a boundary linking with c05
so6815/03	7	Terrace		Terrace	Possible	Unknown	Uncertain	break of slope running alongside hill side forming slight terrace, with ground sloping down from s-n behind it, and sloping steeply s-n on n side to valley below, unclear if it is natural or arch
so6817/01	1	Not visible on ground		Not visible	Probable	Natural feature	Probable	no archaeological features present, west side of road there is a break in slope s to n, which may have resulted in lidar response, drop c.5m plus, appears natural. on east of path area is dense brambles - not visible
so6817/01	2	Not visible on ground		Not visible	Probable	Natural feature	Probable	not visible, area is dense with dead wood and brambles, but looked along line and could not see any features, a slope from south to north exists, but this is present for at least 40m to south
so6817/01	3	Not archaeological		Not archaeological	Probable	Natural feature	Probable	small stream channel, probably natural, culverted under modern road.
so6817/01	4	Terrace		Terrace	Probable	Unknown	Possible	large, steep terrace, becomes much smaller at southern end, and cannot be distinguished from natural slope, origin unclear, well defined and clear feature, does not appear to continue south as lidar
so6817/01	5	Terrace		Terrace	Probable	Pre modern date uncertain	Possible	this is the continuation of c04 but at this location it becomes smaller and increasing vague before disappearing completely

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so6817/01	6	Not visible on ground	Not visible on ground	Not visible	Probable	Natural feature	Probable	not visible as feature, forestry track is visible running on same alignment so lidar may have picked this up?
so6817/01	7	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	fairly shallow, medium sized terrace but fades out and does not appear to go anywhere at either end
so6817/01	8	Not visible on ground	Not visible on ground	Not visible	Probable	Natural feature	Probable	not visible
so6817/01	9	Terrace		Terrace	Possible	Unknown	Probable	very shallow but wide terrace, more of a change in the natural slope to west may be natural
so6817/01	10	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	terrace, large and steep on NW corner, becoming smaller before disappearing completely to s and e, charcoal platform visible on NW corner
so6817/01	11	Not visible on ground	Not visible on ground	Not visible	Probable	Natural feature	Probable	natural slope running down to NW,
so6817/01	12	Not archaeological		Not archaeological	Probable	Natural feature	Probable	natural break in slope in hillside, very big, area to east is fairly flat so might have been used as natural terrace
so6817/01	13	Terrace		Terrace	Probable	Natural feature	Possible	shallow but large terrace running for 30m+, probably but area to east is fairly flat so might be reused as boundary
so6817/01	14	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	terrace bank, clear feature, with mature conifers growing on top of it in places, changes as it turns, becomes wider, shallower and less convincing as an arch feature, a slope is still present but clear
so6817/01	15	Hollow		Hollow way	Probable	Pre modern date uncertain	Probable	deep, wide hollow way running up side of terrace, probably interpreted as part of c14, may be relatively modern
so6817/01	16	Other		Other	Probable	Pre modern date uncertain	Probable	level platform, probable industrial era rail/tram/track way
so6817/01	17	Not archaeological		Not archaeological	Probable	Natural feature	Probable	apparently natural ridge, sloping down from n to s, dropping 10-15m along length, outcrops of natural limestone visible in places, evidence of quarrying on eastern side, possibly extensive
so6817/01	18	Not archaeological		Not archaeological	Probable	Natural feature	Probable	very large, steep bank, irregular in line, appears to be natural, shape may be due to geology of sandstone and limestone
so6817/01	19	Not visible on ground		Not visible	Probable	Unknown	Uncertain	no features present in area, the area is quite a mess, debris after felling and ruts, but we made a thorough search, a forestry vehicle track/rutting exists close to line of feature
so6817/01	20	Other		Drainage	Probable	Pre modern date uncertain	Probable	man made or possibly natural channel leading from block of coppiced chestnut and hazel
so6817/01	21	Not visible on ground		Not visible	Probable	Natural feature	Probable	no linear features present, rounded hill slope runs south to north along line, also forestry vehicle track on roughly the right alignment may be giving lidar response

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
so6817/01	22	Terrace		Terrace	Probable	Unknown	Uncertain	medium-large terrace bank, viewed as drawn, continues to NW but vegetation becomes very dense, within area of coppiced hazel, some large stools, pre-modern, though still being coppiced
so6817/01	23	Terrace		Terrace	Probable	Pre modern date uncertain	Uncertain	small area of terrace bank, medium sized, appears to fade into natural slope at each end
so6818/08	1	Bank (earthwork)		Bank	Possible	Pre modern date uncertain	Probable	earth bank, not accessed as is private land, fenced off, this feature appears to be present as interpreted from lidar
so6818/08	2	Terrace		Terrace	Possible	Unknown	Uncertain	slight ridge/terrace, irregular, recorded from footpath as is on private land, not FC
so6818/08	3	Terrace		Terrace	Probable	Pre modern date uncertain	Probable	terrace bank, in open grassland, private ownership, dense bracken and grass, recorded from public footpath only.
so6818/08	4	Terrace		Terrace	Possible	Unknown	Possible	viewed from footpath, not accessed as is private land, appears to be terrace, but cannot be certain or tell if natural, likely to be old field boundary
so6818/08	5	Not archaeological		Not archaeological	Probable	Natural feature	Probable	slope of hill side, western side steep, gradual slope, east to west, northern side less steep, both appear to be natural formations
st5499/02	1	Bank (masonry)		Enclosure	Probable	Pre modern date uncertain	Probable	Rubble bank, appears to be consistently faced wall in places
st5499/02	2	Bank (masonry)		Other	Probable	Pre modern date uncertain	Probable	Shallow internal bank, dividing enclosure in half
st5499/02	3	Bank (earthwork)		Bank	Possible	Pre modern date uncertain	Probable	Very shallow, poorly defined bank, less stony than c02. Not strongly evident on lidar
st5499/02	4		Pit with spoil	Quarry	Probable	Pre modern date uncertain	Probable	Circular depression, with raised spoil heaped around edges forming a bank up to 0.5m high
st5499/02	5	Other		Bank	Possible	Pre modern date uncertain	Uncertain	Linear bank composed of larger rubble/boulders, unclear function, relationship with c01 unclear
st5499/02	6		Other	Other	Probable	Pre modern date uncertain	Possible	possible entrance in c01
st5499/03	1	Bank (masonry)		Other boundary	Probable	Pre modern date uncertain	Probable	linear rubble bank, coppicing present on both sides stool are c0.8m to c1.5m, wall continues beyond modern field boundary
st5499/03	2		Hollow	Quarry	Possible	Pre modern date uncertain	Probable	shallow hollow-looks to have a quarry face to north
st5499/03	3		Not archaeological	Vegetation	Probable	Natural feature	Probable	very large area of dense brambles
st5499/03	4	Wall/facing (masonry)		Wall	Probable	Pre modern date uncertain	Probable	dry stone wall, ruinous, located on OS map
st5499/03	5	Bank (masonry)		Bank	Probable	Pre modern date uncertain	Probable	shallow rubble bank very similar to c01 and probably part of same feature, some stones up to 1m. Does not appear to be same feature as recorded in earlier visit which is to the west of this feature

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
st5499/03	6		Not archaeological	Not archaeological	Probable	Natural feature	Probable	dense brambles
st5599/06	1	Terrace		Other	Possible	Pre modern date uncertain	Probable	length of terrace, as drawn with gap at northwest corner, unclear relationship with c02 and c04, probably continues south but access not possible due to dense undergrowth
st5599/06	2	Other		Unknown		Unknown		slope to north, might be natural, extremely dense brambles present, unclear relationship with c01 to west
st5599/06	4	Terrace		Other				extent as drawn, unclear relationship with c01, substantial feature
st5599/06	5	Not visible on ground						feature could not be identified at this location-undergrowth dense
st5599/06	6	Other	Not archaeological	Vegetation	Probable	Natural feature	Probable	Area of very dense brambles, currently impassable
st5599/06	7	Other						mound on lidar, not visible on ground due to dense brambles REVISTED AND ID ON SECOND ATTEMPT
st5599/06	7		Mound	Mound	Probable	Pre modern date uncertain	Probable	REVISTED shallow rounded mound, covered in dense brambles, not rubbly
st5599/10	1	Bank (earthwork)		Component of earthwork system	Uncertain	Pre modern date uncertain	Uncertain	very shallow bank more significant slope to the east. It is a larger feature to the north
st5599/10	2	Terrace			Probable	Pre modern date uncertain	Probable	bank, edge of terrace, joins onto NE orientated linear c03 to the north, does not extend any further west, park boundary more likely to be linear c04 to north
st5599/10	3	Terrace		Other earthworks	Uncertain	Pre modern date uncertain	Uncertain	shallow terrace-became very ephemeral to the north
st5599/10	4	Terrace		Unknown	Uncertain	Pre modern date uncertain	Probable	large terrace unclear relationship with track to west, did not see eastern end of feature, deer park boundary?
st5599/10	5	Not visible on ground		Other	Probable	Unknown		vague ephemeral bank, not representative of the lidar interpretation
st5599/10	6	Other		Unknown	Probable	Pre modern date uncertain	Probable	very shallow linear, only linear feature present in area, full extent drawn
st5599/10	7	Other	Stone	Unknown	Probable	Unknown	Uncertain	possible collapsed structure, not lidar feature, found while looking for other features
st5599/10	8	Bank (earthwork)		Other earthworks	Probable	Pre modern date uncertain	Possible	bank, medium size maybe entirely composed of stone rubble but hard to tell. Only viewed drawn area but appears to continue east
st5599/10	9	Other		Unknown	Probable	Pre modern date uncertain	Probable	vague feature possible terrace but does not reflect lidar, very vague and may not be a feature
st5599/10	10	Not visible on ground						no earthworks visible
st5599/10	11	Not visible on ground						not linear feature

Lidar No	Component	Linear type	Discrete type	Interpretation	Interpretation certainty	Date	Date certainty	Description
st5599/10	12	Not visible on ground						feature not visible, thick undergrowth, old forestry track present on similar alignment
st5698/22	1	Bank (earthwork)		Bank	Probable	Pre modern date uncertain	Probable	linear bank unclear relationship with gully to north
st5698/22	2	Bank (earthwork)		Unknown	Probable	Pre modern date uncertain	Probable	wide but shallow, increasingly ephemeral to west
st5698/22	3		Other	Surface mining pit	Uncertain	Pre modern date uncertain	Probable	Rocky outcrop, steep slope resulting in lidar response, maybe possible mining remains or natural topography

Appendix F Lidar features: Not archaeological or not visible on the ground in 2010

F.i Lidar feature not visible on the ground

Lidar No	Component	Field record	Description	Possible cause	comments
so6015/05	3	Not visible on ground	not earthwork, parts are natural hillside while other parts are not visible, se corner was more terrace like so might be reuse of natural hillside but unlikely	Natural slope?	not clear if natural or archaeological
so6508/01	2	Not visible on ground	possible tracks and charcoal platforms but no evidence of linear feature	not visible	Field team looking in wrong place as anomaly not visible on NW illuminated projection used as the base
so5500/12	14	Not visible on ground	not visible	not visible	weak anomaly
so5907/05	1	Not visible on ground	not visible on ground, off track	not visible	weak anomaly
so6007/01	1	Not visible on ground	not visible, lidar anomaly caused by adjacent hollows and tracks	non-archaeological	
so6007/02	1	Not visible on ground	very slight break in slope, not archaeological, northern anomaly appears to be joining dots	Natural slope?	not clear if natural or archaeological
so6013/04	8	Not visible on ground	nothing visible	not visible	weak but appears to form part of system
so6013/26	13	Not visible on ground	slight change in slope	Natural slope?	not clear if natural or archaeological
so6014/13	3	Not visible on ground	not visible	not visible	Not really visible in lidar
so6014/13	10	Not visible on ground	no linear feature present here, only natural drop in slope SW to NE	Natural slope?	not clear if natural or archaeological
so6115/03	2	Not visible on ground	no linear feature identified, ground is irregular and disturbed by charcoal production, slope from NE to SW on this line	non-archaeological	weak anomaly
so6115/04	2	Not visible on ground	no clear linear features present, slight slope dropping from east to west.	Natural slope?	not clear if natural or archaeological
so6115/04	6	Not visible on ground	not present as a linear, some forestry tracks and mining activity may have given some responses, which could have indicated a feature	non-archaeological	weak anomaly possibly caused by vehicle tracks
so6508/01	3	Not visible on ground	not visible	not visible	weak anomaly
so6508/01	10	Not visible on ground	some ground undulation but no evidence of linear feature	not visible	weak anomaly
so6508/01	11	Not visible on ground	not visible	not visible	weak anomaly
so6508/01	12	Not visible on ground	not visible	not visible	weak anomaly
so6509/05	3	Not visible on ground	no linear features visible in area, slight change in slope n-s, but not really significant	Natural slope?	not clear if natural or archaeological
so6509/05	5	Not visible on ground	no linear features present, slight natural change in slope	Natural slope?	not clear if natural or archaeological

Lidar No	Component	Field record	Description	Possible cause	comments
so6509/05	7	Not visible on ground	no linears present, slight raised change in slope, natural	Natural slope?	not clear if natural or archaeological
so6509/05	8	Not visible on ground	not visible	not visible	weak anomaly
so6509/05	10	Not visible on ground	not visible	not visible	weak but appears to form part of system
so6510/01	10	Not visible on ground	west area of drawn area exists as slope north to south, not present as linear earthwork. lidar image may be result of uneven ground and areas being grouped together. not arch	non-archaeological	Fairly irregular anomaly, but possibly part of a system weak anomaly
so6511/08	2	Not visible on ground	natural very gentle slope	Natural slope?	not clear if natural or archaeological
so6511/08	6	Not visible on ground	no linear features visible in area marked on lidar	not visible	weak anomaly
so6515/01	1	Not visible on ground	slight break of slope evident on the ground in area indicated on lidar, no clear feature present, very dense bracken present may be masking feature.	Natural slope?	not clear if natural or archaeological
so6515/01	5	Not visible on ground	no linear features present in area viewed, slight change in natural slope, area viewed as drawn, charcoal platform at northern end adjacent to footpath	Natural slope?	not clear if natural or archaeological
so6515/01	6	Not visible on ground	feature not visible, lidar response may be caused by natural slope and frequent charcoal platforms, pre-mod coppice in area	Natural slope?	not clear if natural or archaeological
so6515/01	13	Not visible on ground	natural hillside, rough ground in very dense larch	Natural slope?	not clear if natural or archaeological
so6515/01	14	Not visible on ground	no clear evidence of linear feature in very dense larch but ground is very uneven and may be masking features, charcoal platforms are present	not visible	weak anomaly-possibly obscured by vegetation
so6615/02	4	Not visible on ground	not visible	not visible	Not really visible on lidar
so6615/02	7	Not visible on ground	not visible but area of very dense brambles may be masking any smaller features	not visible	weak anomaly-possibly obscured by vegetation
so6615/02	8	Not visible on ground	not visible, undergrowth less dense than c07 but still not visible, number of mining pits visible which may be causing lidar response	not visible	weak anomaly-possibly obscured by vegetation
so6615/03	6	Not visible on ground	no archaeological features present, an apparent natural ridge runs on this line, very irregular, some evidence of surface mining north east of recorded line	Natural slope?	not clear if natural or archaeological
so6815/03	1	Not visible on ground	not visible, area is covered with dense brambles, which are masking the ground, but there is no indication of a linear being present	Natural slope?	not clear if natural or archaeological
so6817/01	1	Not visible on ground	no archaeological features present, west side of road there is a break in slope s to n, which may have resulted in lidar response, drop c.5m plus, appears natural. on east of path area is dense brambles - not visible	Natural slope?	large terrace
so6817/01	2	Not visible on ground	not visible, area is dense with dead wood and brambles, but looked along line and could not see any features, a slope from south to north exists, but this is present for at least 40m to south	not visible	weak anomaly-possibly obscured by vegetation
so6817/01	6	Not visible on ground	not visible as feature, forestry track is visible running on same alignment so lidar may have picked this up?	non-archaeological	weak anomaly possibly caused by vehicle tracks
so6817/01	8	Not visible on ground	not visible	not visible	weak anomaly
so6817/01	11	Not visible on ground	natural slope running down to NW,	Natural slope?	not clear if natural or archaeological

Lidar No	Component	Field record	Description	Possible cause	comments
so6817/01	19	Not visible on ground	no features present in area, the area is quite a mess, debris after felling and ruts, but we made a thorough search, a forestry vehicle track/rutting exists close to line of feature	non-archaeological	weak anomaly possibly caused by vehicle tracks
so6817/01	21	Not visible on ground	no linear features present, rounded hill slope runs south to north along line, also forestry vehicle track on roughly the right alignment may be giving lidar response	non-archaeological	weak anomaly possibly caused by vehicle tracks
st5599/10	10	Not visible on ground	no earthworks visible	not visible	weak anomaly
st5599/10	11	Not visible on ground	not linear feature	not visible	weak anomaly
st5599/10	12	Not visible on ground	feature not visible, thick undergrowth, old forestry track present on similar alignment	not visible	weak anomaly-possibly obscured by vegetation

F.ii Lidar features recorded as not archaeological

Lidar No	Component	Field record	Description	Possible cause	comments
so5907/01	3	Not archaeological	lidar appears to represent deer fence and boundary between trees and new planting, dense brambles within fenced enclosure	Fence line	
so5907/01	5	Not archaeological	NMP data, appeared to be natural edge of slope, heading into valley, may be some activity from mining , trackway/holloway. polygon poorly drawn, bad weather	Natural slope?	not clear if natural or archaeological
so5907/01	6	Not archaeological	natural hillside, lots of mining activity on side of hill	Natural slope?	not clear if natural or archaeological
so5907/05	2	Not archaeological	natural terrace, irregular, shallow	Natural slope?	not clear if natural or archaeological
so5907/05	3	Not archaeological	natural break of slope	Natural slope?	not clear if natural or archaeological
so6007/01	2	Not archaeological	natural break in slope, no particular dimensions	Natural slope?	not clear if natural or archaeological
so6007/01	3	Not archaeological	area of young conifer, enclosed by barbed wire fence. no access possible	Other	
so6013/26	1	Not archaeological	natural gentle slope	Natural slope?	not clear if natural or archaeological
so6014/13	2	Not archaeological	natural steep hillside dropping away to NW, along the top crossed by modern footpath, c01 merges in from a NE direction, might be using edge a natural field boundary?	Natural slope?	not clear if natural or archaeological
so6014/13	6	Not archaeological	irregular mounds/dumps to SW	non-archaeological	Fairly irregular anomaly but may be a continuation of a recognised feature
so6015/05	1	Not archaeological	natural slope, there appears to be very shallow hollows/channels running NW/se across the slope with an unclear origin	Natural slope?	terrace height 5m
so6015/05	4	Not archaeological	natural hillside-very large natural terrace?	Natural slope?	large terrace
so6015/05	8	Not archaeological	natural hillside, later industrial workings may have enhanced the lidar response	Natural slope?	not clear if natural or archaeological
so6115/04	5	Not archaeological	vehicle tracks on this alignment, FC, 10-30 years, no other linears visible	non-archaeological	weak anomaly possibly caused by vehicle tracks
so6508/01	1	Not archaeological	natural break in slope, charcoal platform evident	Natural slope?	not clear if natural or archaeological
so6508/01	9	Not archaeological	appears to represent natural edge of slope, clearly not a continuation of feature to south, reuse of natural slope possible	Natural slope?	not clear if natural or archaeological
so6508/01	13	Not archaeological	change in slope, natural	Natural slope?	not clear if natural or archaeological
so6509/05	1	Not archaeological	break of slope north-south, appears to be natural	Natural slope?	terrace height 3-4m
so6509/05	2	Not archaeological	fairly steep break in slope, start of a significant drop in height to a dip to the west. appears natural	Natural slope?	terrace height 4m

Lidar No	Component	Field record	Description	Possible cause	comments
so6509/05	6	Not archaeological	area of disturbance, crossing vehicle ruts, with slight hollow at western edge, deeper rutting at eastern edge.	non-archaeological	weak anomaly possibly caused by vehicle tracks
so6509/05	9	Not archaeological	probable natural break of slope to valley base to west,	Natural slope?	not clear if natural or archaeological
so6509/05	12	Not archaeological	western side of track is caused by break in slope, to east caused by depression and charcoal platforms This appears to continue west of track 0.2-3 high	Natural slope?	not clear if natural or archaeological
so6509/05	15	Not archaeological	mixture of natural slope and charcoal platforms	Natural slope?	not clear if natural or archaeological
so6515/01	7	Not archaeological	possible extraction associated with construction of railway to west and/or mine to south, might also be natural terracing of hillside	Natural slope?	not clear if natural or archaeological
so6515/01	11	Not archaeological	natural break of slope combined with one or possibly two charcoal platforms	Natural slope?	not clear if natural or archaeological
so6815/03	2	Not archaeological	appears to be natural hill side, no obvious man-made features, some variation in slope angle but nothing to suggest archaeology	Natural slope?	terrace height 10-15m
so6817/01	3	Not archaeological	small stream channel, probably natural, culverted under modern road.	non-archaeological	
so6817/01	12	Not archaeological	natural break in slope in hillside, very big, area to east is fairly flat so might have been used as natural terrace	Natural slope?	large terrace
so6817/01	17	Not archaeological	apparently natural ridge, sloping down from n to s, dropping 10-15m along length, outcrops of natural limestone visible in places, evidence of quarrying on eastern side, possibly extensive	Natural slope?	large terrace
so6817/01	18	Not archaeological	very large, steep bank, irregular in line, appears to be natural, shape may be due to geology of sandstone and limestone	Natural slope?	large terrace
so6818/08	5	Not archaeological	slope of hill side, western side steep, gradual slope, east to west, northern side less steep, both appear to be natural formations	Natural slope?	Probably not natural slope

F.iii Lidar features whose status is not clear

Lidar No	Component	Field record	Description	Possible cause	comments
so6115/03	6	Other	irregular raised area/terrace, with unclear edges, appears to be natural edge of slope, but may represent eroded terrace, significant hollow way/track between this and c04 at break between gentle slope	Natural slope?	not clear if natural or archaeological
so6007/02	2	Terrace	terrace, probably natural,	Natural slope?	not clear if natural or archaeological
so5500/12	13	Terrace	top of natural hill side with a possible terrace behind, possibly caused by using top of natural hill as a boundary, ?modern field c.5m behind edge of terrace	Natural slope?	terrace height 30m+
so5500/12	17	Terrace	short length of terrace, may be natural as running diagonally across side of a steep hill	Natural slope?	not clear if natural or archaeological
so5500/12	18	Terrace	shallow terrace, may be natural hill side, may be related to c18 though it is unclear under all the brash	Natural slope?	not clear if natural or archaeological
so5500/12	19	Terrace	even less convincing terrace than c18 but may be part of one feature, unclear under the brash	Natural slope?	not clear if natural or archaeological
so6013/04	6	Terrace	shallow vague and slightly irregular feature, unclear if archaeological or natural	Natural slope?	not clear if natural or archaeological
so6013/04	9	Terrace	shallow vague and irregular feature may be natural, lidar also including unassociated charcoal platforms as part of feature	Natural slope?	not clear if natural or archaeological
so6014/13	8	Terrace	shallow terrace, might be natural but more likely arch. exists as drawn but might have linked c07 originally?	Natural slope?	not clear if natural or archaeological

Lidar No	Component	Field record	Description	Possible cause	comments
so6014/13	9	Terrace	large slope, dropping 3m plus from SW to NE, appears to be natural, there may have been use of flatter area SW of slope break for field? 2nd look this appears more convincing as archaeological feature	Natural slope?	not clear if natural or archaeological
so6014/13	11	Terrace	large slope breaking NW to se, slope up to 10m wide appears to be natural slope, although this may have been utilised as a boundary	Natural slope?	not clear if natural or archaeological
so6014/13	12	Terrace	terrace ending in bank dropping from SW to NE, appears to be natural, fairly irregular, does not extend to se as interpreted from lidar, some irregular mounds are present but not linear earthwork	Natural slope?	not clear if natural or archaeological
so6015/05	5	Terrace	uncertain terrace, slightly irregular and sloping behind so might be natural	Natural slope?	not clear if natural or archaeological
so6115/03	4	Terrace	north-south bank/slope, area to the north is relatively flat/level, slope is not large, irregular and not certain as an archaeological feature	Natural slope?	not clear if natural or archaeological
so6509/05	13	Terrace	shallow terrace, could be natural, not certain, EDIT slight hint of continuation west of track, 0.3m high	Natural slope?	not clear if natural or archaeological
so6510/01	1	Terrace	shallow irregular terrace or break of slope, possibly natural	Natural slope?	not clear if natural or archaeological
so6515/01	4	Terrace	landscaped stepped/terraced down slope of hill, 3 distinct steps, appears to be natural formation, although possibly subject to partial human activity given industry in area	Natural slope?	terrace height 6m but over 3 steps - N/A
so6515/01	8	Terrace	probably natural terrace, southern extent not viewed due to dense woodland	Natural slope?	not clear if natural or archaeological
so6515/01	12	Terrace	possible terrace, unclear as to origin maybe arch or natural, either side of footpath are extremely dense conifers	Natural slope?	not clear if natural or archaeological
so6515/01	15	Terrace	possible natural terrace in area of very dense larch, very undulating ground and at least one charcoal platform present	Natural slope?	not clear if natural or archaeological
so6615/02	1	Terrace	shallow terrace, might be natural, not flat behind becomes less clear towards east in thicker larch	Natural slope?	not clear if natural or archaeological
so6615/02	2	Terrace	large terrace might be reuse of natural terrace as slope continues a long way to the east	Natural slope?	not clear if natural or archaeological
so6615/03	3	Terrace	area of slightly flatter terrace, edge is visible, which caused lidar response, irregular, and exaggerated by charcoal platform, likely to be natural, but may have been utilised as field boundary.	Natural slope?	terrace height 15-20m
so6615/03	7	Terrace	area of relatively flat terrace, with an apparently clear bank, the eastern edge runs along the natural edge of slope, in places it is difficult to identify the terrace bank	Natural slope?	not clear if natural or archaeological
so6615/03	9	Terrace	area of relatively flat ground north of drawn line with large wide slope dropping west to east, probably natural fall in slope the top of which may have been utilised as a boundary	Natural slope?	not clear if natural or archaeological
so6815/03	6	Terrace	appears to be natural hill side on northern edge, but may have formed a boundary linking with c05	Natural slope?	not clear if natural or archaeological
so6815/03	7	Terrace	break of slope running alongside hill side forming slight terrace, with ground sloping down from s-n behind it, and sloping steeply s-n on n side to valley below, unclear if it is natural or arch	Natural slope?	not clear if natural or archaeological
so6817/01	9	Terrace	very shallow but wide terrace, more of a change in the natural slope to west may be natural	Natural slope?	not clear if natural or archaeological
so6818/08	4	Terrace	viewed from footpath, not accessed as is private land, appears to be terrace, but cannot be certain or tell if natural, likely to be old field boundary	Natural slope?	not clear if natural or archaeological

Appendix G so5500/05; All standing stones

Photograph 1: so5500/05, component 05: Stone 05: scale at 50cm divisions.

Photograph 2: so5500/05, component 06: Stone 02: scale at 50cm divisions

Photograph 3: so5500/05, component 07: Stone 03, scale at 50cm divisions

Photograph 4: so5500/05, component 08: Stone 04, scale at 50cm divisions

Photograph 5: so5500/05, component 09: Stone 05, scale at 50cm divisions

Photograph 6: so5500/05, component 10: Stone 06, scale at 50cm divisions

Photograph 7: so5500/05, component 11: Stone 07, scale at 50cm divisions

Photograph 8: so5500/05, component 12: Stone 08, scale at 50cm divisions

Photograph 9: so5500/05, component 13: Stone 09, scale at 50cm divisions

Photograph 10: so5500/05, component 14: Stone 10, scale at 50cm divisions

Appendix H Woodland Historic Landscape characterisation:

H.i Methodology for Step 1: Dividing HER records into information for Heritage Character Components

Action 1: Extracting data from HER

Select polygon of area of woodland being characterised and create a shapefile

Compare with HER applying a buffer of 0.5km

Export data from the HER as an excel table

Action 2: Identifying required HER fields

Keep the following headings in the excel spreadsheet

- AREA NUMBER
- SITE NUMBER
- GENERAL TYPE
- SPECIFIC TYPE
- GENERAL PERIOD
- SPECIFIC PERIOD
- CONSTRUCTION DESCRIPTION
- GRID REFERENCE
- DESCRIPTION

Delete other fields
Apply the filter tool to the spreadsheet (Data tab → Filter button)

SAVE THIS EXCEL FILE – CALL IT *location tag/data exported from HER*

Action 3: Sorting by category

Create copy of /data exported from HER file – call it ***location tag/processed HER data.*** All future work should be in this file

Copy and paste the GENERAL TYPE column to create a new column called AMALGAMATED TYPE.

Retain the original GENERAL TYPE column, but divide/combine/edit the AMALGAMATED TYPE column in the following way

HER GENERAL TYPE	Action
AGRICULTURE AND SUBSISTENCE	Retain if clearly agricultural and rename as AGRICULTURAL – If these are associated with sites in other categories re-assign to those categories – e.g. industrial banks → INDUSTRY. Woodbanks/linear earthworks with no specific association should be reassigned as EARTHWORK. NB agricultural sites which are contiguous with contemporary settlement sites should be classed as SETTLEMENT
CIVIL	Combine with SETTLEMENT

HER GENERAL TYPE	Action
COMMEMORATIVE	Retain, but delete place names or small scale discrete features e.g. Named Trees. **NB** class any COMMEMORATIVE sites which are whether contiguous with or within contemporary settlement as SETTLMENT
COMMERCIAL	Combine with SETTLEMENT or INDUSTRIAL as appropriate
COMMUNICATIONS	Retain unless these are mineral tramways or railways - in which case combine with INDUSTRIAL. If they are associated with sites in other categories re-assign to those categories
DEFENCE	Retain but rename as MILITARY. Re-assign any sites (e.g. iron Age hillforts) where this designation is not appropriate
DOMESTIC	Rename as SETTLEMENT
EVENT	DELETE
EDUCATION	Combine with SETTLEMENT
GARDENS PARKS AND URBAN SPACES	Combine with SETTLEMENT
HEALTH AND WELFARE	Combine with SETTLEMENT
INDUSTRIAL	Separate charcoal platforms into new category: CHARCOAL PLATFORM
MARITIME	Retain
MONUMENT <BY FORM>	Combine with other types if appropriate. Search the SPECIFIC TYPE column and separate undated Earthworks into a new AMALGAMATED TYPE called EARTHWORK – if these are associated with sites in other categories (e.g. INDUSTRIAL sites) re-assign to that category Separate FINDSPOTs into new AMALGAMATED TYPE called FINDSPOT check the DESCRIPTION column to ascertain the date of the finds – where finds are within (and part of) in another category (e.g. prehistoric finds from a prehistoric site) delete them. Combine LiDAR sites with other categories if appropriate. Retain discrete features like STONES to see if they conform to Step 2 criteria for inclusion as Archaeological Zones.
RECREATIONAL	Retain unless either contiguous with or within contemporary settlement, in which case class as SETTLMENT?
RELIGIOUS RITUAL AND FUNERARY	Retain? But rename as RITUAL
TRANSPORT	Combine with COMMUNICATION unless these are mineral tramways or railways - in which case combine with INDUSTRIAL. If they are associated with site in other categories re-assign to those categories
UNASSIGNED	Combine with other categories as appropriate LiDAR Hollows →INDUSTRIAL Delete LiDAR Features. Delete Placenames
WATER SUPPLY AND DRAINAGE	Combine with other categories as appropriate e.g. Wells → SETTLEMENT, Ponds/Drainage → INDUSTRIAL unless clearly AGRICULTURAL.

NB check entries are correctly categorised and re-assign as appropriate

SAVE THE EXCEL FILE AT THIS POINT!

Action 4: Sorting by date

Copy and paste the GENERAL PERIOD column to create a new column called AMALGAMATED PERIOD.

Retain the original GENERAL PERIOD column, but divide/combine/edit the AMALGAMATED PERIOD column in the following way

HER GENERAL PERIOD	Action
PREHISTORIC (500,00BC – AD43)	Retain
ROMAN (AD43 – 410)	Combine ROMAN, EARLY MEDIEVAL AND MEDIEVAL into a new category called HISTORIC.
EARLY MEDIEVAL (410 – 1066)	
MEDIEVAL (1066 – 1540)	
POST MEDIEVAL (1540 – 1901)	Separate data by SPECIFIC PERIOD. Assign entries up to and including (COMPONENT 17) to HISTORIC. Combine entries which include COMPONENT 18 or later to LATE POST MEDIEVAL unless description clearly indicates they are HISTORIC. Where specific date is not recorded see UNKNOWN
MODERN (1901 – PRESENT)	Combine with LATE POST MEDIEVAL
UNKNOWN	Combine with other periods. As a rule of thumb: Bell Pits, Charcoal Platforms, LiDAR Hollows, Scowles, Wood Banks → HISTORIC. Clay Pits, Forestry Inclosures, Foundries, Mining, Quarries, Spoil Heaps, and Targets → LATE POST MEDIEVAL **NB** Retain undated earthworks the date of which cannot be inferred from the HER as UNKNOWN. Also

SAVE THE EXCEL FILE AT THIS POINT!

Action 5: Removal of duplicate HER records

Remove any duplicates in each category

- Using the filter tool select the different categories e.g. Historic Agriculture
- Check Area Numbers column for duplicates and delete as appropriate

H.ii Methodology for Step 2: Creating Heritage Character Component maps

Action 6: Creation of maps from sorted HER data

Once sites have been separated out as above it will be necessary to produce maps showing the separate categories. This can be achieved using comma separated files can then be used in the HER to extract data. The data can then be displayed in ArcMap

IN EXCEL

- Using the filter tool select the different categories e.g. Historic Agriculture
- Copy the Area Numbers column
- Open a new blank spreadsheet
- Paste the Area Numbers onto this using the Paste Special tool with the Transpose box ticked (so the Area Numbers appear in a row rather than a column)
- Save as a CSV (comma delimited) file. Repeat for each category.
- Open CSV files in Notepad
- Copy the row of Area Numbers

IN SMR:

- Paste into HER Area Icon list box (minimise displayed records before doing this – button with hands)
- Select Display on Cogis button (open Woodland characterisation mxd to do this)

IN ARCMAP:

- Tick FEATURES SENT FROM SMR SEARCH.lyr
- Save as shape file (NB this has to be done for each HER layer but do not export ones which contain no data – check attribute table if unsure). Right click on each HER layer and select Data → Export Data. Save as appropriate.
- Add the new shape files for each category (e.g. Historic Agriculture) and group together. Save the group as a layer file e.g. Historic_agriculture.lyr

IN ARCCATALOG

- Save a new (polygon) shapefile with _area added to file name e.g. Historic_agriculture_area.shp

Action 7: Creation of mapped Heritage Characterisation Component maps

IN ARCMAP

- Use professional judgement to determine whether the shapefiles created during action 6 require further modification.
- If appropriate Use this shapefiles created as part of Action 6 to draw around points, lines and polygons of the layer file to create Heritage Character Component maps.
- Discrete points, lines or polygons within *c*. 500m of others and which share the same heritage characteristics can be amalgamated into a single polygon.
- Discrete point features or features less than 1ha in extent which are in excess of *c.* 500m from others which share the same heritage characteristics can be excluded from this process.

H.iii Heritage Character Component maps by period

H.iv Forestry Design Plan Area 23

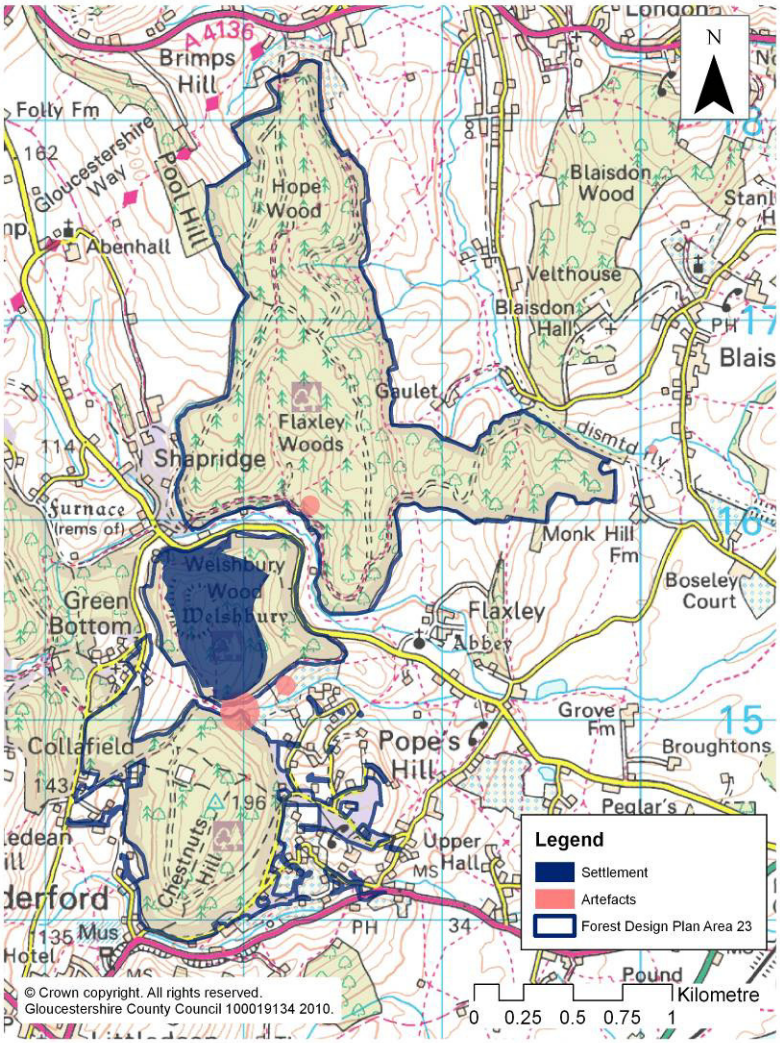

Figure 45: Forest Design Plan Area 23: Prehistoric Heritage Character Components

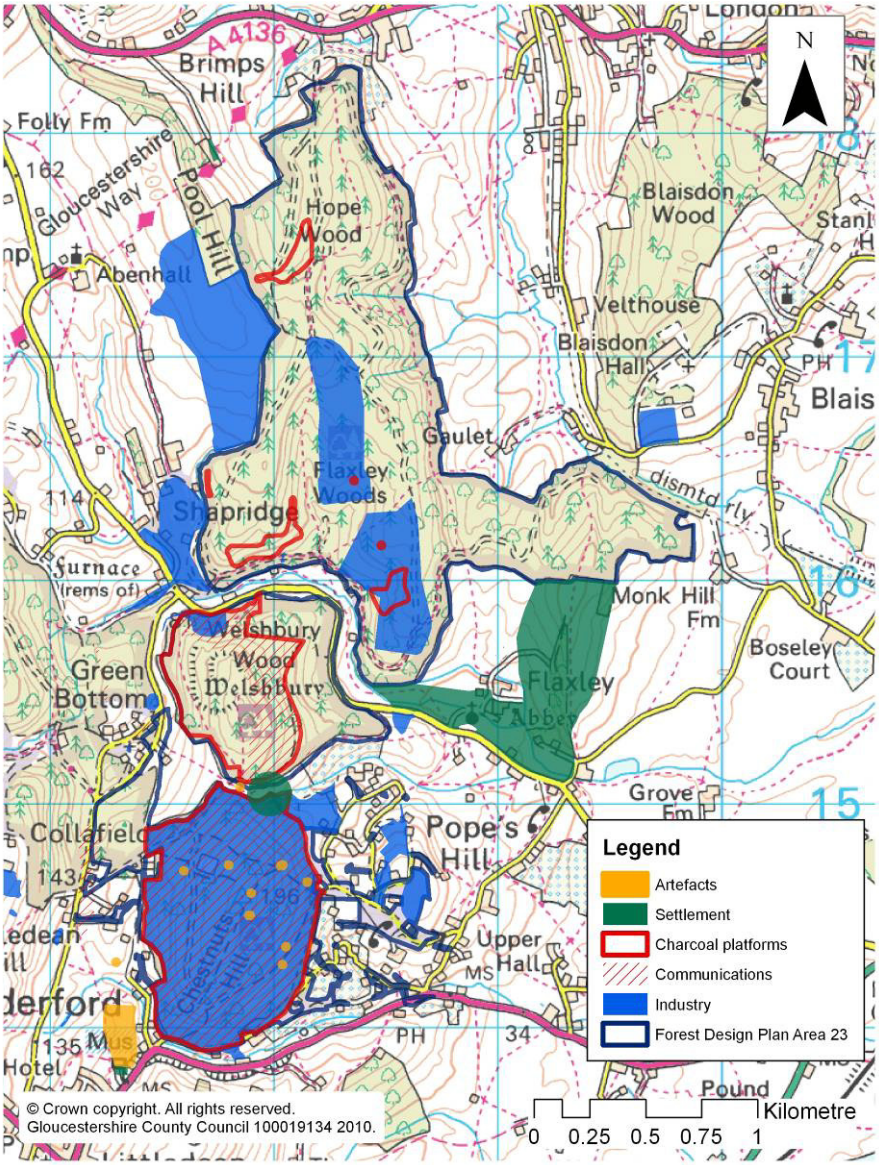

Figure 46: Forest Design Plan Area 23: Historic Heritage Character Components

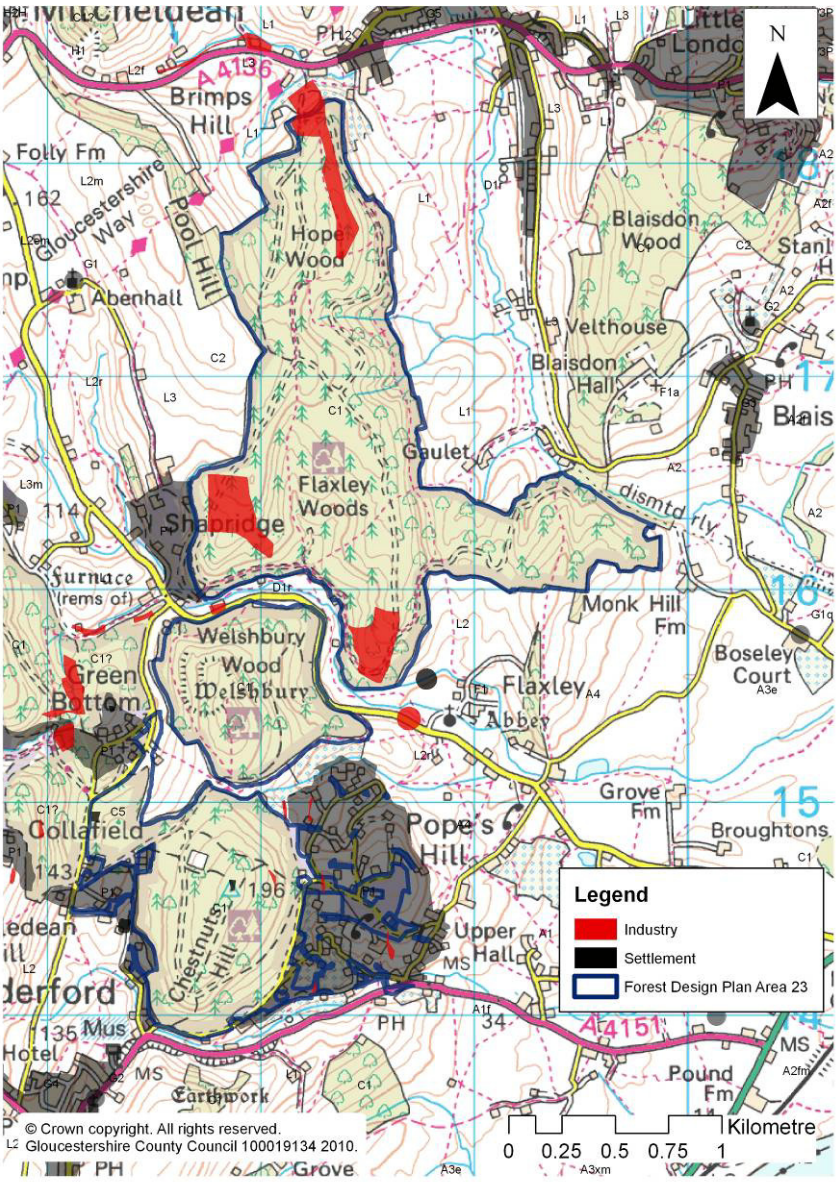

Figure 47: Forest Design Plan Area 23: Late post-medieval Heritage Character Components

H.v Forest Design Plan Area 40

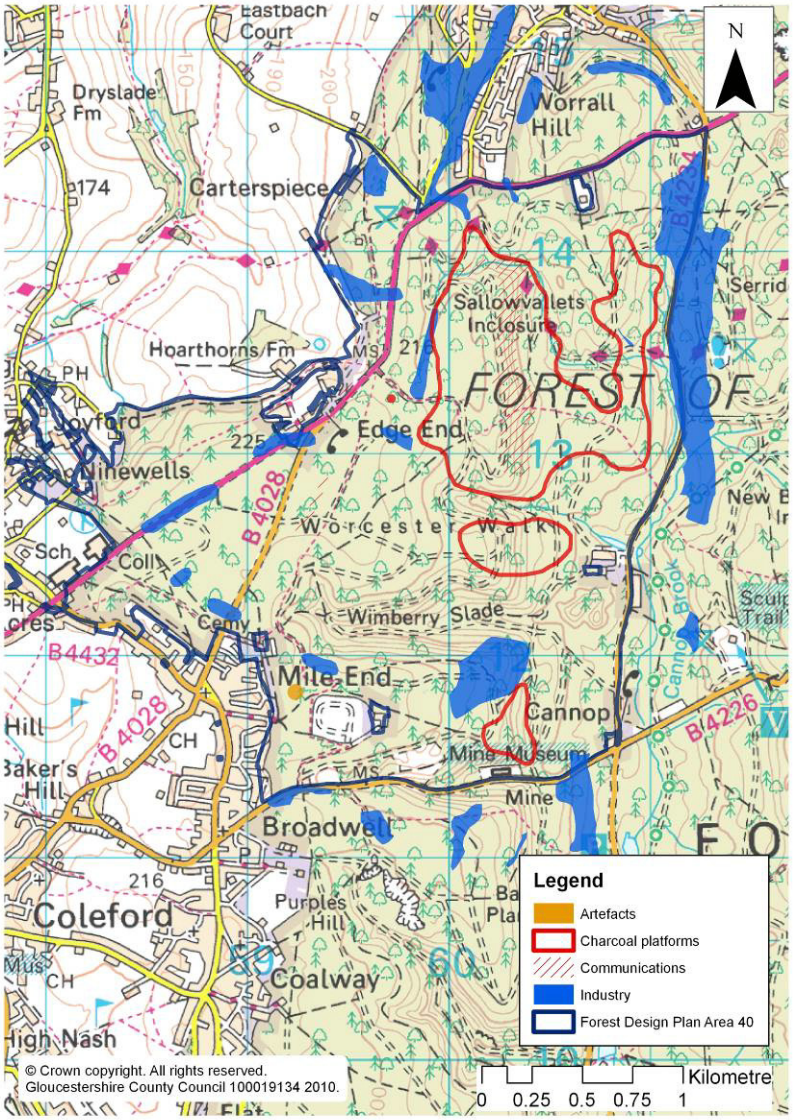

Figure 48: Forest Design Plan Area 40: Historic Heritage Character Components

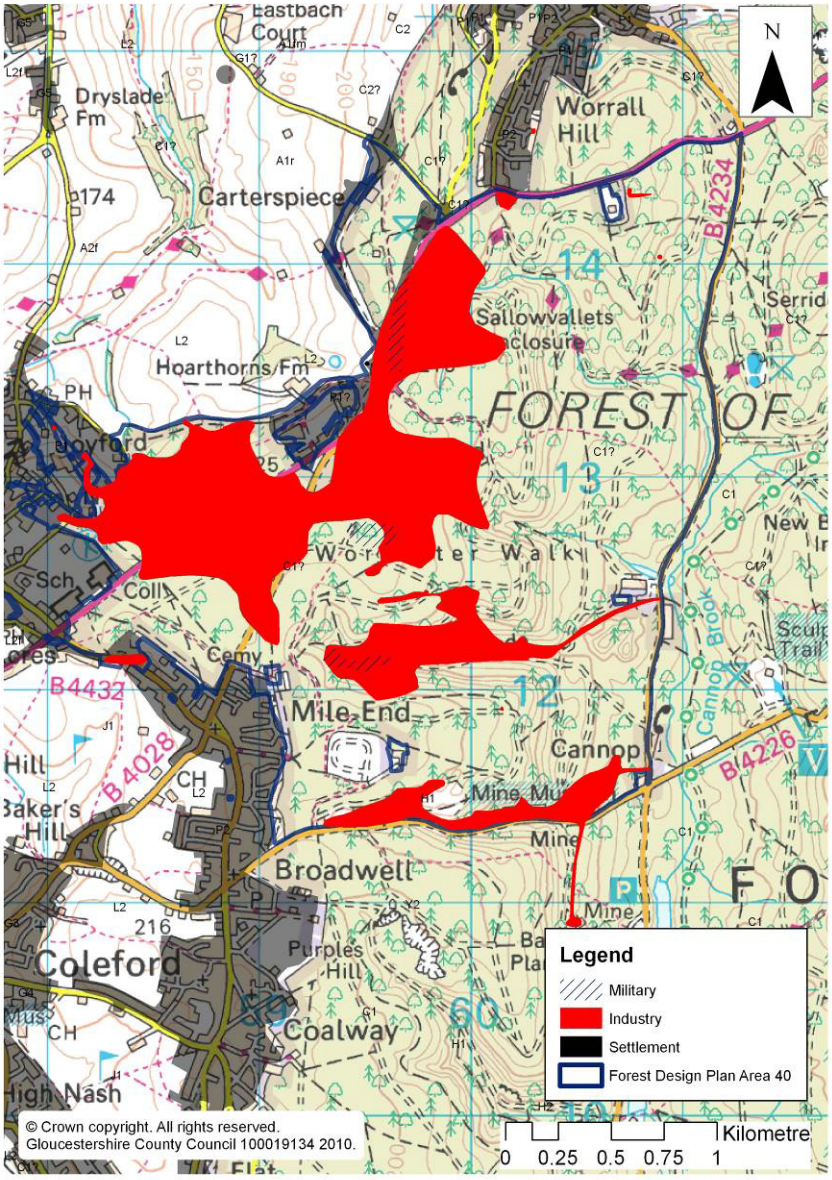

Figure 49: Forest Design Plan Area 40: Late post-medieval Heritage Character Components

H.vi Revised methodology for future characterisation

Step 1

Action 1 – 3

These actions should remain the same as in the scoping analysis

Action 4

Action 4 should be undertaken in the following way:

Copy and paste the GENERAL PERIOD column to create a new column called AMALGAMATED PERIOD. For multi-period sites a separate AMALGAMATED PERIOD column should be used for each general period represented.

Retain the original GENERAL PERIOD column, but divide/combine/edit the AMALGAMATED PERIOD column in the following way

HER GENERAL PERIOD	Action
PREHISTORIC (500,00BC – AD43)	Retain
ROMAN (AD43 – 410)	Retain but rename ROMANO-BRITISH
EARLY MEDIEVAL (410 – 1066)	Retain
MEDIEVAL (1066 – 1540	Retain
POST MEDIEVAL (1540 – 1901)	Separate data by SPECIFIC PERIOD. Assign entries up to and including (COMPONENT 17) to EARLY POST MEDIEVAL. Combine entries which include COMPONENT 18 or later to LATE POST MEDIEVAL unless description clearly indicates they are EARLY POST MEDIEVAL. Where specific date is not recorded see UNKNOWN
MODERN (1901 – PRESENT)	Combine with LATE POST MEDIEVAL
UNKNOWN	Retain but rename PRE-MODERN DATE UNCERTAIN unless description indicates period e.g. Forestry Enclosures, clearly post 18th century industrial sites such as Foundries, deep mining sites or associated spoil heaps, Targets, Shooting ranges → LATE POST MEDIEVAL

SAVE THE EXCEL FILE AT THIS POINT!

Step 2

This should remain the same as with the scoping analysis with the exception of Action 7 which should be undertaken in the following way

Action 7: Creation of mapped Heritage Characterisation Component maps

IN ARCMAP

- Use professional judgement to determine whether the shapefiles created during action 6 require further modification.
- If appropriate Use this shapefiles created as part of Action 6 to draw around points, lines and polygons of the layer file to create Heritage Character Component maps.
- Discrete points, lines or polygons within *c*. 500m of others and which share the same heritage characteristics can be amalgamated into a single polygon.
- Discrete point features or features less than 1ha in extent which are in excess of *c.* 500m from others which share the same heritage characteristics should not be excluded from this process at this stage, although professional judgement should be applied to determine whether they contribute in any meaningful way to the Heritage Character Area maps compiled during Step 3 of the process.

Appendix I Earthwork systems in Forestry Commission land by type

I.i Systems surveyed in 2010

- Type 1: Earthwork systems which predominantly consist of a coherent arrangement of interrelated boundaries.
  - Type 1a: Earthwork systems which predominantly form a rectilinear boundary system
    - So6013/04 and so6013/07
    - So6815/03
  - Type 1b: Earthwork systems which predominantly define parallel linear enclosures
    - so6509/05 and so6013/26
    - so6315/01
    - so6115/04
    - so6615/02
- Type 2: Earthwork systems which contain elements of a coherent arrangement of interrelated boundaries.
  - Type 2a: Earthwork systems which contain elements of a rectilinear boundary system
    - st5599/10
    - st5698/22
    - so6511/08
    - so6014/13
    - so6115/03
    - so6615/03
    - so6818/08
  - Type 2b: Earthwork systems which may contain elements of linear boundaries
    - so6007/02
    - so6508/01
- Type 3: Earthwork systems which predominantly consist of boundaries conforming to no discernable patterns and may represent several phases of boundary systems
  - so5500/12
  - so6817/01
  - so6510/01
- Type 4: Earthwork systems which were interpreted as predominantly either not the result of archaeologically significant features, or variations in natural topography.
  - so5907/01
  - so5907/05
  - so6007/01
  - so6515/01
  - so6015/05

I.ii Systems surveyed prior to 2010-07-19

- Welshbury Wood
  - so6715/12
- Chestnuts Wood
  - so6714/13.
- Flaxley Wood
  - so6816/02
  - so6816/03.

I.iii Systems never surveyed

- so5411/04
- so5411/06
- so5413/02
- so5413/03
- so5511/01
- so5511/02
- so5512/06

- so5513/02
- so5600/10
- so5612/02
- so5700/08
- so5703/04
- so5715/05
- so5911/10
- so6011/09
- so6105/01
- so6107/03
- so6205/07
- so6208/05
- so6215/04
- so6304/01
- so6508/03
- so6608/03
- so6608/04
- so6609/03
- so6615/02
- so6616/14
- so6709/02
- so6715/02
- so6715/03
- so6716/05