Battlefield Investigation

Policy and Guidance

October 2022

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Foreword

The Battlefields Trust aims to preserve, research and present battlefields as educational and historical resources. To preserve and accurately interpret battlefields the Trust needs to know where they are located. Combining documentary research, landscape analysis, and archaeological investigation is the recognised way to identify battlefield locations. These are also key disciplines to help the Trust better understand and present to the public such sites of conflict as well as commenting authoritatively on planning applications associated with battlefields and their setting.

This document sets out what the Battlefields Trust regards as best practice policy and guidance for investigating battlefields. It establishes a framework for researching battlefields, describes the methodological approach the Trust uses and outlines some of the constraints likely to be experienced, particularly for battlefield surveys.

This document is intended for use by Battlefields Trust regions when undertaking battlefield investigations and by those planning landscape evaluations and battlefield surveys. The methodological principles established within this policy and guidance are also likely to be relevant for planning archaeologists and commercial archaeology companies involved in planning policy decisions.

I'd like to thank Glenn Foard, Bryn Gethin, Tracey Partida, and Sam Wilson for their help in compiling this policy and guidance.

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Battlefields Trust – Battlefield Investigation – Policy and Guidance

1. Introduction

1.1. This document sets out the best practice policy and guidance to be used by the Battlefields Trust when conducting battlefield investigations and surveys. It provides policy and guidance on how best to manage and conduct such investigations and the methodologies that should be adopted, including those to maximise safe recovery, analysis and preservation of battlefield finds. Policy throughout this document is identifiable by 'must' or 'will' statements. All other statements are guidance which should be followed unless there is a good reason not to.

2. Overview and context

2.1. Battlefield investigations can be used to locate historic battlefields and to examine sites that have already been identified through earlier archaeological work. In the latter case, the policy and guidance on battlefield surveys in this document will be most useful.

2.2. Locating historic battlefields involves four distinct phases. Firstly, identifying the general location of the battlefield. Secondly, the collection and analysis of the primary accounts about the battle to understand what took place and to identify landscape clues in the accounts which might help place the action. Thirdly, the reconstruction of the historical terrain of the battlefield at the time it was fought so the landscape clues in the primary accounts can be used to develop a hypothesis about where the action took place. This can be augmented using historically sensitive KOCOA (**k**ey terrain, **o**bservation and fields of fire, **c**over and concealment, **o**bstacles, **a**venues of approach and withdrawal) analysis. Finally, the hypothesis should be tested systematically by surveying the proposed area using metal detectors to uncover evidence of the battle. The outcome of this survey needs to be analysed against earlier work conducted and the outcome published. Finds from the survey should be preserved in line with the Battlefields Trust portable objects preservation policy.

Identifying battlefield sites

2.3. To identify the general location of the battlefield it is always best to start with secondary sources to understand the historiography of the battle and where various authors have placed it. This provides a baseline against which primary accounts can then be assessed. These can help test the validity of the secondary accounts and allow other theories to be developed. Generally, early modern battles are better recorded in primary sources than medieval ones and have more clues about where the battle was fought. Locating early modern battles is therefore usually easier than locating medieval battlefields. Tradition, place name, antiquarian finds and other more recent chance finds can, with care, then be used to complement this analysis. In exploiting primary sources, it is often helpful, where there are more than a handful of accounts, to develop a concordance of events during a battle. This creates a timeline of micro events that occur during the battle and gathers the sections from

the primary accounts which describe each of these micro events so that they can be compared and a synthesis developed of what happened during that part of the battle. Landscape clues may be found at any point within this concordance.[1]

2.4. If locating the general area of the battlefield remains problematic after such assessment, consideration should be given to the wider strategic and tactical landscape: what lines of communication (roads and rivers) would most likely have been used by the opposing armies to advance to the battlefield once the location of the armies in the days leading up to the battle has been determined? Where were the key river crossing points? Which towns were used as supply bases? What terrain features would opposing commanders have tried to make use of to increase their chances of victory?

2.5. The last point reflects an approach first adopted by the soldier and battlefield author A.H. Burne in the 1950s, which he described as inherent military probability. This approach is, however, problematic. Burne, writing in the 1950s, suggested inherent military probability should reflect what he, as a 20th century artillery officer, would do confronted with a given set of terrain and military force. This assumed that commanders from earlier centuries thought and acted in ways identical to modern military officers, which cannot be correct. Glenn Foard has attempted to address this by arguing for an inherent historical military probability approach, whereby those assessing the terrain make judgements based on what a contemporary battle commander, with his knowledge of military doctrine, training and practice, and experience of battle from that time, would have done. Nevertheless, subjectivity is inherent within both these approaches and some battlefield archaeologists have started to use KOCOA analysis as an alternative methodology. KOCOA is a tool developed by the US military to assess terrain. Whilst KOCOA inevitably also involves a degree of subjectivity and assumes historical military commanders looked at battlefield components in the same way as modern practitioners, its proponents argue that it provides a framework for assessing terrain in a repeatable way and removes some of the subjectivity. Arguably, a good practitioner of the inherent historical military probability approach would include KOCOA elements in a systematic way in their analysis and it is only by assessing terrain from this historical perspective that KOCOA is a useful historic battlefield analysis tool.

Recreating the historical landscape[2]

2.6. The key features sought when reconstructing the landscape of a battlefield are those that affect the logistics - the long distance movement of men and materials (the strategic landscape) - and the terrain that effects the more immediate tactics of warfare, and are principally: roads; rivers with the position and nature of crossing points, whether ford, bridge or embankment; marsh or boggy land; wood and woodland; the extent and nature of unenclosed land, whether arable open field or common pasture; enclosed land; and settlement whether nucleated or dispersed

[1] An example of a concordance can be found in Glenn Foard, *Battlefield Archaeology of the English Civil War*, (Oxford: Archaeopress, 2012), appendix 3.

[2] With thanks to Tracey Partida for providing this section

(tactical terrain). All these features can assist or hinder in the movement of an army, the deployment of troops, and the engagement and action of the battle. But the landscape is not static and all these features have been altered, to a greater or lesser extent, over time. Roads might be realigned, upgraded to turnpikes and later major modern thoroughfares, or downgraded or even deserted entirely. Similarly, rivers can be straightened, scoured or diverted, but will also meander and create new channels by natural processes. Marshes can be drained, woods grubbed up and evidence of early agricultural practices, such as ridge and furrow, destroyed by modern agricultural practices or development. Landscape evolution can result in many early features being obscured or obliterated and the earlier the landscape that needs to be understood, the more complex and challenging is the task. The earlier character of the landscape and the chronology and mechanism of its change, as well as the nature of land tenure, the production of records of it, and survival of archives can all lead to very different potential for reconstructing terrain at the time of a battle.

2.7. The character of the landscape in the medieval period was governed by the natural environment and the agricultural regime, the latter in turn influenced by the administrative structure. Understanding the way in which the landscape was managed can assist in interpreting boundaries in the landscape. The basic units of administration were the parish, township and manor. Before the late nineteenth century parishes were solely ecclesiastical units that in many counties often contained multiple townships, but they did not control the agrarian system. However, it is vital to establish the exact boundaries of parishes as they may have some significance for the location of burials after battles. Battlefield chantry chapels can be particularly significant in this respect.

2.8. The manor was a feudal unit presided over by the lord of the manor, which governed through manorial courts controlling estate administration, including legal matters, and customary rights and duties. Such issues would be applicable to all members of the manor and some manors were vast, particularly in the north of the country, containing multiple townships. Manor courts often also governed agricultural practice, but on a more local basis as the unit for managing the agricultural landscape was the township.

2.9. A township was, in its simplest terms, a settlement with its agrarian system. It was, usually, a discrete expanse of land with defined boundaries, often using natural features such as rivers and watercourses. It is of particular importance to identify the earliest known township boundaries as they may have included a ring-fence[3] against a neighbouring territory, thus imposing a physical barrier in the landscape. A township might contain within its boundary nucleated and dispersed settlement, as well as communal open fields, woodland, meadows and pasture. Other shared resources outside of the townships territory, such as woodland and common

[3] Ring-fencing, as the name implies, involved putting a fence around a large parcel of land which could be a great field, or block of common pasture or meadow, but the land within the fence remained open. Ring-fencing a township against neighbouring lands was a method of controlling stock from entering or leaving.

pastures, might be vast areas enjoyed by members of a particular manor or township, or indeed multiple townships. Such shared resources did not form part of the township's territory until enclosure when allotments were made to each township in lieu of the common rights.

2.10. Reconstructing medieval landscapes is challenging often due to the paucity of sources, and to several centuries of landscape evolution that has masked or obliterated earlier features. For later periods, particularly the eighteenth and nineteenth centuries, the sources are usually far more prolific and detailed, thus allowing more comprehensive and accurate reconstruction.

2.11. In the medieval period agricultural priority was given to arable cultivation. Land suitable for the production of grain crops was used as such. The method of arable farming involved the creation of strips grouped together into furlongs, which were in turn organised with great open fields. Arable open fields may have been ring-fenced but would generally have had no hedges, walls or fences within them. Ploughing techniques of the period meant that over time the ridges were gradually increased in height, particularly on heavy soils to create ridge and furrow. These were periodically ploughed in the opposite direction to reduce the height. Evidence of open fields can be found on historic maps, sometimes as a clearly delineated extent or by name only. Evidence of both can be seen in a map of Kingsland in Herefordshire dated 1708. Archaeological evidence of open fields can still sometimes be found, although increasingly rarely, as seen at Edgehill in Warwickshire (Figure.1). Meadows formed an integral part of the open field system and were also unenclosed though they may have had internal divisions created by dykes. Meadows were by definition lands that were periodically water-logged and so not suitable for arable cultivation and as such were found alongside rivers and larger watercourses.

2.12. Common pastures were also unenclosed and could cover a significant area. Unlike the great open fields pastures were not ploughed but contained rough grazing, so likely to be less of an impediment to troop movements. However, open commons, and indeed woodland, were usually located on land with poorer soils often on the periphery of townships and on higher grounds.

Figure 1: Ridge and furrow at Edgehill. (© Glenn Foard)

2.13. Early enclosures were found around settlements, but they might also be found in consolidated demesne or in enclosures for pasture, particularly sheepwalks. The process of enclosure whereby lands farmed communally were divided up into parcels to be held in severalty by individual owners took several centuries to complete and varied in trajectory across the country. But it is important to note that while open land, of any type, could be divided and enclosed, the reverse rarely if ever happened, i.e. enclosed land was almost never thrown open and made commonable again. Thus, by identifying and mapping the remnants of all unenclosed land from what survives today and from historic map and other documentary sources it is possible to establish the very minimum of what would have been unenclosed land in the earlier centuries.

2.14. The location and extent of settlements is also important, whether nucleated, dispersed or single buildings. Large structures such as windmills and churches could provide markers in the landscape particularly for anyone unfamiliar with the area. Churches could be especially useful as they were generally orientated east-west thus providing useful information to scouts and commanders.

2.15. Roads were crucial to the movement of troops both over long distances to reach the battlefield and to manoeuvre around the local area. Commanders will normally have chosen the major routes when moving a large army, not least because their bridges will have been important to enable easy crossing of rivers by artillery and the wagons of the train. In addition to the major roads there would have been a network of smaller local roads serving the villages and farms. Reconstructing the full medieval road system for any landscape is a difficult challenge. Archaeological evidence for Roman roads can often be found but it is far from certain

that such roads were still in regular use in the medieval period. Ogilby's Itinerary, published in 1675, depicting post roads and recording side roads is arguably the most useful source for long distance routes, though earlier written itineraries can also provide the general direction of major roads between major settlements. Nevertheless, county and local maps provide more detailed and accurate plotting of routes.

Placing deployment and action within a reconstructed landscape

2.16. The recreation of the historical landscape of a battlefield makes it possible to attempt to place the action within that landscape using topographic clues found within the primary accounts of the battle. If the re-creation of terrain is only partial and/or the primary accounts provide few landscape clues, then uncertainty about the battle and battlefield is likely to remain.

2.17. The lack of landscape clues is a major inhibiter to placing battles within a given landscape. As Glenn Foard and Richard Morris have argued, this is starkly demonstrated by a comparison of the battles of Bosworth (1485) and Edgehill (1642), where the topographic references in all primary accounts number 13 for Bosworth and 143 for Edgehill.[4] But this remains a problem even for early modern battles. At Stow-on-the-Wold (1646), for example, within eleven primary accounts of the battle, there is arguably only a single landscape clue.

2.18. Nevertheless, inherent historical military probability that is based around the KOCOA framework can be used to begin to place the armies in the landscape, particularly where contemporary battlefield deployment practices and size of forces are understood, which is often the case for the early modern period. This is more difficult for medieval battles where approaches to army deployment are less well understood and the accounts of the size of armies involved in a battle are often exaggerated.

Surveying battlefields for archaeological evidence

2.19. Battles are ephemeral events. They take place over a relative short period of time, often only a few hours at most, and leave a limited archaeological signature, mainly consisting of objects dropped or fired during the engagement. Such objects are to be found unstratified in the top-soil rather than in a stratified context as is usual for other types of archaeological investigation. Grave pits, places where the dead from the battle were buried, are an exception to this. Bullet impact scars can sometimes also be found to show evidence of fighting, but these are generally associated with siege sites.

2.20. The spread of artefacts across the battlefield begins to define its extent and, when considered against the topographic reconstruction, some of which might remain visible in the landscape today, can begin to explain the use of ground by the

[4] Glenn Foard & Richard Morris, *The Archaeology of English Battlefields*, (York: CBA Research Report 168, 2021), p.21

opposing armies. Artefact distribution can also help identify which types of soldiers – infantry and cavalry, for example - operated in which part of the battlefield.

2.21. From the early modern period, the most ubiquitous types of battlefield finds are lead bullets fired from a range of infantry, cavalry and dragoon (mounted infantry) weapons. Iron and lead round shot, and lead case shot, all fired from artillery pieces, can also be located. Lead roundshot has also been found on later medieval battlefields, such as Bosworth (1485), St Albans II (1461), and Northampton (1460). It is possible lead roundshot was used on most, if not all, Wars of the Roses battlefields, though this has yet to be demonstrated archaeologically. Handguns were used in substantial numbers on just two Wars of the Roses battlefields– St Albans II and Barnet - and there only by continental mercenaries. While a handful of bullets from Bosworth might be from large bore handguns they could equally be from waggon mounted barrels. No evidence of significant use of handguns on other Wars of the Roses battlefields has yet come to light. Only Towton (1461) has produced ferrous arrowheads in any substantial numbers and the evidence from Wars of the Roses battlefields and Flodden (1513) suggests that other artefact scatters of items such as, horse pendants, strap ends, chapes, and weapon parts which can conceivably be linked to the battle are likely to be found only in very small numbers. No artefact scatters have been found on British battlefields before 1461, probably because most would have been made from iron and have simply not survived due to ground conditions. Against this background care needs to be taken in assuming that the lack of archaeological evidence means that a medieval battle or indeed battlefield actions in other periods which don't necessarily leave a signature – such as fighting between cavalry or where troops moved from deployment to initial engagement - did not take place in a particular location.[5]

3. Methodology

3.1 KOCOA analysis[6]

3.1. In conducting KOCOA analysis the starting point should be determining the tactical **objectives** of opposing commanders in fighting the battle. These should be found in or deduced from the primary sources. Once these end states have been identified an analysis should be undertaken of the **key terrain**, defined by the US military as 'any locality or area the seizure, retention, or control of which affords a marked advantage to either combatant'. Key terrain should be that which was vital for achieving a commander's military objectives in fighting a battle. Key terrain is not always high ground and the specific area of high ground may be important; for example, the 'military crest' which allows observation down to lower ground is likely to be more important than the 'topographic crest' if such observation is obscured from the latter. Potential key terrain can be assessed by considering its control by either force on the outcome of the battle. Control may result from seizing ground (ie capturing it) or securing it (ie dominating it from another position). Key terrain will also depend on whether a force is attacking or defending. Major obstacles are

[5] Foard and Morris, pp.22-23

[6] This section draws heavily on Craig Brown's 2021 PhD thesis – see further reading section

seldom key terrain, but ground which allows defenders to cover an obstacle with fire may be. Key terrain might also permit or deny movement.

3.2, Areas around key terrain, avenues of approach, and obstacles should be analysed to determine if they provide clear **observation and fields of fire** for opposing forces. This may differ in different periods, particularly given the obscuring effects of smoke from black powder weapons. Use of telescopes in later periods by senior officers and use of man-made structures, such as windmills or church towers may also be variables in understanding what can and cannot be seen. Areas of good observation and fields of fire create engagement zones which can support defensive operations. **Cover and concealment** is the opposite of observation and fields of fire and involves analysis to show areas where combatants are protected from direct or indirect fire (cover) or observation (concealment). Some obstacles and 'dead' ground – a dip in the landscape, for example - may provide this. The identification of cover and concealment can also help locate defensible terrain, possible approach routes, and areas where troops assemble. Observation, fields of fire, cover and concealment can all be analysed via digital elevation models in Geographic Information Systems (GIS) using line of sight analysis.

3.3. **Obstacles** are natural or man-made features which prevent, impede or divert military movement. They can include buildings, hedgerows, walls, rivers, streams or gullies. Their importance depends on how they affect an attacking or defending force. Obstacles can 'disrupt' a force's movement and/or cohesion, 'turn' it away from a desired axis of advance, which may expose its flank to direct fire, 'fix' it so it cannot move for a period of time – a fordable river is one example, or 'block' it entirely from moving in a particular way. **Avenues of approach** support the movement of forces and are often vital in understanding how the opposing sides arrived on the battlefield and therefore their likely deployment orientation. For attacking forces avenues of approach are generally those that give the best cover and concealment from enemy fire and observation. Line of sight analysis and an assessment of obstacles should help determine the most likely approaches or axis of advance. Unit frontage is also a factor in determining likely approach avenues as generally, but not always, they will need to accommodate the size of force that is using them.

3.4. By considering all these factors through a historical doctrine, training, practice and experience lens, an assessment of the likely battlefield area can be made. But this is only possible if the historical landscape in which opposing commanders had to deploy their forces has been reconstructed.

3.2 Reconstructing Historical Landscapes[7]

3.2.1. The primary sources for landscape analysis are the various types of historic map: county, enclosure, tithe, and estate. All have particular advantages and limitations as all were made for a specific purpose.[8] County maps being of smaller

[7] With thanks to Tracey Partida for providing this section
[8] T Partida, 'Drawing the Lines: A GIS Study of Enclosure in Northamptonshire', PhD, Huddersfield (2014) pp.37-66

scale than the others omit much detail but are particularly useful for placing features in a wider landscape context and are especially useful for road networks.

3.2.2. Enclosure maps document the process of enclosure and, as they are legal documents, are highly accurate. They largely date from the eighteenth and nineteenth centuries, the parliamentary period of enclosure, and very few pre-eighteenth century enclosure maps have been found nationally. Their function was to plot the new allotment boundaries and roads. They often also map ancient enclosures, and pre-existing roads and buildings. But within the newly enclosed land former features are not shown so the landscape being replaced cannot be discovered from enclosure maps. Draft enclosure maps do plot both the existing and new landscape but these rarely survive.

3.2.3. Tithe maps, like enclosure maps, were legal documents and, in addition to being highly accurately plotted, also all record the same information, although not always presented in the same way.[9] The purpose of the tithe map and apportionment was to record the new tithe tax, or rent charge, payable on every titheable parcel of land in England and Wales. In many parts of the country they are extraordinarily detailed giving data field-by-field: name, description, state of cultivation (arable, pasture, meadow etc.), measurement (acres, roods, perches), rent charge, owner and occupier. Field names can be especially useful as they can describe soil conditions, identify lost features such as warrens and parks, and indicate former land use, e.g. stocking, dibbing and sart indicate former woodland.[10] Tithe maps are also particularly valuable for delineating township boundaries. However, their date range 1836-1850 means they post-date enclosure for most places and any features they show, including some township boundaries, may be enclosure or later impositions.

3.2.4. Estate maps can be the most useful as they are not confined to a particular process, function or period. Estate owners could be institutions: the Crown, colleges, charities, monasteries; aristocratic families; or owners of single farms. Estate maps could be made for any number of reasons: as working documents for management; as a means of calculation rents and dues, typically when the estate changed hands through inheritance or sale; when alterations were made, either large scale re-planning or minor modifications; to settle disputes; or as a display of wealth and status. It is this diversity of function that makes them the most useful group of maps to study, but with a significant caveat: they are limited to the land belonging to the estate, often wholly ignoring other property and as such should be treated with caution. But despite their fragmentary and subjective nature, estate maps can provide invaluable evidence of the condition of the landscape and, if there are a series of them, how it evolved.

[9] For a full discussion of the Tithe Commutation Act and tithe apportionments and maps see, Roger J. P. Kain & R.R. Oliver, The Tithe Maps of England and Wales: A Cartographic Analysis and County by County Catalogue, Cambridge, (1995)
[10] Partida, 2014. p.49

3.2.5. Other documentary sources such as county histories, estate and parish records, deeds and sale catalogues should also be consulted for evidence of landscape history and management. All of these can provide information about how agricultural systems were organised and managed and the types of crops being grown and stock being reared. Manor court rolls can provide the most useful non-map information as they record detail of the organisation and management of the landscape, including rights of way.[11] Archaeological features are also of great importance to understanding past landscapes, particularly so for those as early as the medieval. Aerial photography and lidar data should also be examined and as they can prove especially useful in identifying features such as ridge and furrow and former river channels and roads, and for generating contour data.

3.2.6. The use of a Geographic Information System (GIS) is fundamental to the reconstruction of historical landscapes. It allows the integration and systematic analysis of multiple data sets as well the ability to overlay multiple data sets to analyse the interaction between them. It also allows historical maps to be geo-rectified against a modern base-map, permitting an understanding of where those historical landscape features would have been located within today's terrain. Free GIS software is available from QGIS and the Battlefields Trust Research and Threats Coordinator can provide advice on using such software.

3.3 Battlefield Metal Detector Surveying[12]

3.3.1. Battlefields by nature cover large areas of land and their archaeology is, as described above, principally unstratified in nature. Most, but not all, battlefield artefacts are made from metal, so the most effective way of investigating them is through a metal detecting survey.

3.3.2. The approach to a battlefield survey will be dictated by the research questions it is attempting to answer. Is it trying to locate the battlefield, determine its extent, or discover more about part of a battlefield that has already been located through earlier survey work? The research question must be determined before any consideration is made about how the survey is to be undertaken. This must be discussed with both the Trust's Research Coordinator and Archaeological Advisor.

3.3.3. Before commencing a survey, a Project Coordinator must be appointed who has experience of undertaking battlefield surveys and an archaeological advisor appointed to support the project. The archaeological advisor does not need to be the project coordinator, but where this is possible it is the recommended approach. All those involved with the project must, before detecting commences, sign the finds waiver form (Appendix 1) in which they relinquish any claims to artefacts they find. Before work commences, the project must also establish how all finds will be

[11] They are in fact court 'orders' but are called 'rolls' as they were originally recorded on a roll of parchment. Many are also found in book form or on separate leaves. They also record such items as admittances to, and deaths within the manor, and fines for transgressions of local ordinances.
[12] This section draws heavily on the work of Foard and Morris (2012) (see further reading)

identified and analysed and agree a suitable place of final deposit in line with the Battlefields Trust policy on portable battlefield artefacts.

3.3.4. The Project Coordinator will be responsible for maintaining a register of nominated detector users involved in the survey; arrange site access; ensure best practice in survey and recording methodology is applied throughout the survey; seek to ensure appropriate arrangements are made for essential conservation of and deposition of finds in a museum archive; brief the nominated detector users and ensure that they adhere to the principles set out in the written agreement. All volunteer detectorists must be covered by the Trust's public liability insurance.

3.3.5. The Project Coordinator must liaise with the appropriate Local Archaeological Officer and the Finds Liaison Officer regarding all relevant aspects of the survey. Where the survey is on a Registered Battlefield the Project Coordinator must advise Historic England's regional team and battlefield lead. The Trust's Research and Threats Coordinator can advise on this. No survey work should be undertaken without permission of the landowner who should also be kept abreast of intended survey times and locations to ensure there is no undue impact on their agricultural regime. Maintaining a good working relationship with landowner(s) is essential for any current or future work on a particular site.

3.3.6. Nominated metal detector users on battlefield surveys must agree to abide by the Policies, Guidelines and Agreements of The Battlefields Trust and to follow the specific survey and recording methods defined for the survey.

3.3.7. All those working on a battlefield survey always have a responsibility to look after their own welfare and those with whom they work. An outline Risk Assessment for battlefield survey, prepared by the Trust, is at Appendix 2 in this document and should be read by all those taking part in a battlefield survey. Any site-specific additions concerning health and safety should be made to this outline risk assessment before it is shared with those participating in the survey.

3.3.8. Nominated detector users will be covered by The Battlefields Trust public liability insurance while undertaking survey work.

3.3.9. Access times shall be agreed between the Project Coordinator and the Nominated detector users.

3.3.10. No detecting should take place except under supervision of the Project Coordinator or a representative of the Battlefields Trust specified by them.

Setting up the survey

3.3.11. The purpose of surveying a battlefield is to produce a representative sample of battlefield related finds rather than to recover all the surviving artefacts. A range of factors can distort sampling, including concentrating detector surveying in particular areas of the battlefield above others, the experience of the detectorist, the sophistication of the metal detector used, and ground conditions.

3.3.12. To ensure representative sampling is achieved by a metal detector survey, two different approaches are possible. One is using a survey grid (eg. 20m x 20m) with detectorists detecting in each grid square in a single orientation to give full surface coverage. Finds are bagged and pin flagged for later recording via GPS. If required, the area can be redetected at 90 degrees to the original survey orientation. This approach is slow, takes a lot of time to cover large areas and there is often no information as to how complete the coverage was or how much time was spent in each square. If a grid is already set up on part of a site, for example where geophysical survey or fieldwalking is also taking place then it may be appropriate to use this approach with care.

3.3.13. The alternative approach is for detectorists to detect along a transect laid out across the ground. The transect width can be varied to create different levels of sampling. The sweep of a detector is around 2m so across a 10m transect this would produce a sample of about 15-20% of the surface area. Conversely a 5m transect would give 30-40% coverage. Detecting at less than 2.5m begins to risk the transects overlapping. This makes comparison with wider spaced transect results on the same or other battlefields - a vital component of the methodology - less straightforward. Transects should be laid out along two baselines created using cross-sight ranging poles. Once the ranging poles are aligned transect widths are established between the ranging poles using a tape measure or a pre-measured rope with transect widths marked on it. Coloured flags are used to mark each transect at the desired interval in an alternating pattern (the Battlefields Trust uses red-yellow-red-yellow-green to avoid confusion between transects) which is then repeated. The transects can then be extended beyond the baselines to the field boundaries or over undulating terrain by aligning by sight new coloured flags of the same colour with the two that have already been positioned along the baselines to mark a single transect line (see Figure 2). The flags can be made using short lengths of bamboo cane and waterproof ripstop fabric cut to size and stuck onto the canes using gaffer tape. A typical transect layout is shown schematically in Figure 2 below. An example of a baseline with transect flags is shown in Figure 3. Should the equipment be available, transects of the desired spacing can also be pre-created in GIS and the data then transferred onto a sub-metre accuracy GPS and subsequently staked out on the ground using the internal GPS ‘stake out’ function.

3.3.14. Once the transects are laid out, each detectorist moves along a transect from flag to flag whilst detecting. Unless specifically trying to locate iron objects, detectors should use a setting which seeks to discriminate out iron. If iron objects are being sought, the setting should be ‘all metal’. Advice on sensitivity settings should be taken from experienced detectorists on the survey. Generally, where such advice is not forthcoming, average setting levels of sensitivity should be used initially and then modified up or down depending on the results; too many ephemeral signals may indicate the sensitivity should be reduced, whilst few signals may suggest it needs to be increased (or the ground has no finds).

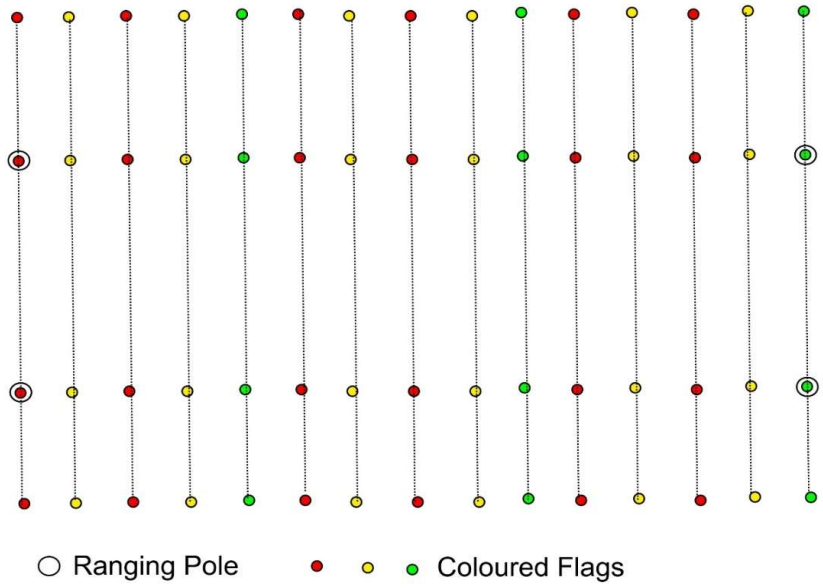

Figure 2: Layout of transects showing ranging poles and coloured flags

Figure 3: 5m transects baseline laid out at Stow (1646) battlefield

3.3.15. The spacing of transects should be determined by the research objectives of the project. If a large area needs to be covered then a reconnaissance survey with 10m transects may be used. This should, at least for the early modern period, be sufficient to identify areas where some battle activity took place and help to target future re-survey work using 5m or 2.5m transects. Until the completion of the

Battlefields Trust Mortimer's Cross survey in 2022, the search for medieval battlefields was judged to be best undertaken using 2.5m transects as this increased the chances of locating relevant finds because experience at Bosworth suggested that, for such early battlefields, these were very limited. However, the Mortimer's Cross survey[13] demonstrated that surveying at 2.5m transects was still no guarantee of success and that, if large areas of ground need to be reconnoitred, an initial 10m transect approach might still be best, particularly if time and resources are limited. This though requires more research.

3.3.16. Whilst metal objects make up the most common material culture on battlefields, some non-metallic items might also be located. Gun flints (See. Figure 4) may be identified by detectorists as they scan the surface, particularly in ploughed soil, or as they dig and these should be treated as finds of significance.

3.3.17. It is highly unlikely that human remains will be discovered as part of a metal detecting survey, but if they are, work in that area of the survey must cease, the police be informed, and advice sought from the Trust's Research Coordinator and Archaeological Advisor.

Figure 4: Probable gunflint recovered from the battlefield on Stow on the Wold (1646)

Recovery, analysis and storage of finds

3.3.18. Recovery of finds should be undertaken by individual detectorists. Smaller bags in which to place individual finds of significance must be carried by the detectorists. Once a find worth recording is made it must be placed in the smaller find bag and the date and initials of the detectorist written on the bag using an indelible marker pen before being pin-flagged to where the find was made for

[13] See Mortimer's Cross Survey Report 2022 (The Investigation of Mortimers Cross Battlefield (battlefieldstrust.com)), p.91 for this discussion.

subsequent GPS recording. Even ‘irrelevant’ finds of significance must be recorded in this way (eg. a Roman coin found on a Civil War battlefield) as they still represent important information for the wider archaeological record.

3.3.19. Detectorists must also carry a large finds bag for ‘junk ’on each field on each detecting day which they record the date they are detecting and their initials using an indelible marker pen. The ‘junk ’bag must be reviewed by the Project Coordinator at the end of the day to ensure no important finds have been misidentified as ‘junk’ and to allow them at least to be recorded to the relevant field. On most sites, collecting the junk by ‘survey day’ or ‘area’ will be sufficient but in cases where there is a severe level of contamination from modern rubbish (eg. fields where ‘green waste’ has been spread), collecting junk on a transect-by-transect basis may be necessary in order to better gauge the level of impact across an area and thus how this may affect the recovery of genuine archaeological objects.

3.3.20. In addition to recording the location of individual finds of note, GPS must be used to record the area of survey by taking a location reading at least at each corner of the transect area and preferably at the end of each transect. Ideally sub-metre accuracy GPS should be used for all location, including finds, recording, but where this is not available, navigation accuracy GPS must be used. If sub-metre accuracy GPS is available, the end points of each transect should be recorded to enable their position to be recreated in GIS. Finds and survey area data must be plotted to GIS as part of any project (see para 3.2.6 for details of freely available GIS software).

3.3.21. Finds of significance must be cleaned carefully and then measured. Standard archaeological methodology regarding the cleaning of metal finds should be adhered to, although lead shot should be gently cleaned using warm water. This enables the subtle firing evidence on the surface of the bullet to be observed and prevents the disturbance of lead dust from dry brushing – a consideration when processing a large assemblage of bullets. Lead (and iron) shot must be weighed using micro scales and, where the bullet is not deformed, the diameter of the shot measured using sub-millimetre electronic callipers to help determine the type of weapon used to fire the shot. Bullet analysis should also be undertaken to determine whether and how the shot was fired, bearing in mind that a bullet having no markings does not necessarily mean that is has not been fired. Measurement and analysis must be recorded, preferably on a spreadsheet, and photographs of the finds of note taken using a vertical camera stand and with a millimetre scale to show the dimensions of the object. Analysis of battle related finds, including specialist advice, can be organised by the Battlefields Trust Research Coordinator. Analysis of non-battle related finds usually involves purchasing specialist input or an agreement for support from the relevant Portable Antiquities Scheme Finds Liaison Officer.

3.3.22. All finds should be stored in 13 litre polypropylene airtight boxes (Stewart boxes, product ID: 1781008), separate boxes for: coins, copper alloy, ferrous, lead, lead bullets. Finds bags are stored standing upright in Find Number order within the appropriate box. To facilitate this the boxes are divided into compartments using

4mm thick corrugated plastic, with a second level of finds in a subdivided tray stapled together from corrugated plastic. To maintain low humidity each box to contain sealed silica gel bags. As a general rule of thumb 85g of silica gel is required for each half cubic meter of volume. Sealed bags of silica gel can be obtained from Kite Packaging and GeeJay Chemicals. Inside to the front of each box a humidity Indicator strip faces outward to enable regular (at least weekly) monitoring of humidity levels. Humidity strip indicator cards can be obtained from Amazon.co.uk.

Publication

3.3.23. Results of surveys, and the data sets once complete, must be recorded in report form and data and report(s) archived with the Archaeology Data Service and the report(s) on the Battlefields Trust own website.

3.4. **Ground conditions**

Object survivability

3.4.1. The nature of the ground can have an impact on the survivability of objects and how easy it is to recover them through a metal detecting survey.

3.4.2. Susceptibility of metal to corrosion can be categorised into three groups. Corrosion resistant metals such as gold and silver (or where gold and silver plating has protected the metal lying beneath); metals, such as copper and lead, which corrode quickly initially and then build-up a protective layer; and, finally, metals, most notably iron, which do not form a protective layer and therefore corrode rapidly. Smaller and more complex shaped objects in the latter category will decay more quickly than larger objects, therefore, an iron arrowhead may not survive at all whilst iron round shot may be preserved to some extent.

3.4.3. Land use affects the survivability of objects. If the land has been used for arable farming, the ploughing may have damaged objects in the soil and increased aeration, both of which increase rates of decay. In contrast, pasture fields may see better preservation as objects may have passed down to the bottom of the soil column due to worm action to where the soil is less aeriated. Where pasture has been converted to arable, it is possible that such arable stratification has been undisturbed, particularly if deep ploughing has not been used. Secondary stratification may also occur in limited areas, including within remnant furrows of former ridge and furrow. This process can also occur through colluviation at the base of a hill slope and alluviation on flood plains.

3.4.4. Soil drainage also has an impact on survivability of objects, as well drained soils tend to be better aeriated. Finally soil chemistry will separately have an impact on survivability. Broadly speaking acidic (low pH) soils aid corrosion whilst alkaline (high pH) soils generally support more stable conditions, though not always for lead, which is important given the prevalence of lead shot on UK battlefields.

Impact on detecting

3.4.5. Land use can also impact on rates of metal detector recovery. Generally speaking, and assuming soil chemistry conditions are consistent, fewer finds are likely to be made on long term/permanent pasture than on arable land or pasture land which has been cultivated in recent decades. In part, this is due to objects having passed down toward the bottom of the soil column due to worm action, making detection more difficult. In extreme cases this can place objects out of the range of modern metal detectors.

3.4.6. Deep ploughing of pasture or on land where there is a possibility that secondary stratification has occurred, can bring objects closer to the surface and therefore locatable with a metal detector. The arrow heads found at Towton (1461) may have been located due to this process. This can, however, have a negative impact on the archaeology as deep ploughing can damage the objects and lifting them from a stratified and more corrosion stable position in the ground can increase rates of decay.

Figure 5: Waterloo Uncovered stripping back the top soil at Hougoumont. The majority of flags mark musket balls (photo © Sam Wilson)

3.4.7. In a planning archaeology context it may be possible to require the ground surface to be stripped back in 15cm spits with the spoil and the new surface level detected, allowing a secondary check on the surface layer removed and deeper penetration of the remaining ground. This approach was used by Waterloo Uncovered (see Figure 5) to increase the recovery of lead shot around the farm of Hougoumont. Here surface detecting (on long-standing pasture) recovered very few finds but the removal of just a few centimetres of turf and topsoil revealed a huge scatter of battlefield debris. It was also used at Worcester (1651) during archaeological investigations for the dualling of the southern relief road as the 17th

century layer was found to be around 58cm below the surface due to alluviation from the rivers Teme and Severn.[14]

3.4.8. Project Coordinators working on Battlefields Trust surveys should bear in mind when designing surveys and interpreting results that some finds might not be retrievable due to alluviation, colluviation, and deep soil columns on long-standing-pasture. Surveys on alluvial land should be avoided unless there is an opportunity to strip back soil layers or better understand the nature of below-ground deposits through geo-archaeological augering prior to metal detector survey.

3.4.9. Project Coordinators also need to be aware of the potential for contamination on battlefields. This occurs through the depositing of metal 'rubbish 'on battlefield land. This can be caused by holding festivals and other events (including historical re-enactment) on battlefields, as has occurred at Cropredy Bridge (1644), Tewksbury (1471), and Hastings (1066) where ring pulls, coins, and in the case of Hastings, discarded sparklers from Bonfire Night events, make metal detecting very difficult. 'Green 'waste disposal, which, in theory, involves spreading biodegradable waste over a land, but in practice often includes metal objects, as experienced at Barnet (1471), also prevents metal detecting taking place. Stripping back topsoil can help address this problem on long term pasture but not on recently cultivated fields. However, this is unlikely to be feasible unless the survey is as part of an archaeological condition attached to commercial development.

3.4.10. Long grass on a pasture field can also create poor detecting conditions and surveys should be conducted where possible in the late autumn to early spring timeframe when the grass is at its shortest or after it has been cut back or grazed low at other times of year.

[14] Richard Bradley (Wessex Archaeology), presentation on *Recent investigations at Worcester – sampling a seventeenth century battlefield in an alluvial environment*, 11th Fields of Conflict Conference, 7-8 May 2022

Further Reading

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Glenn Foard and Richard Morris (2012)*, The Archaeology of English Battlefields,* CBA Research Report 168, Oxford

Glenn Foard (2012), *Battlefield Archaeology of the English Civil War*, Archaeopress, Oxford

Glenn Foard and Anne Curry (2013), *Bosworth 1485 – A Battlefield Rediscovered*, Oxbow Books, Oxford

Glenn Foard, Sam Wilson and Tracey Partida (2020). *Barnet Battlefield Project 2015-2018*. University of Huddersfield (https://archaeologydataservice.ac.uk/library/browse/issue.xhtml?recordId=1184473&recordType=GreyLitSeries)

Glenn Foard and Tracey Partida (2022) *The 2018-2022 Investigation of the 1461 Battle of Mortimer's Cross*, Battlefields Trust (https://battlefieldstrust.com/media/820.pdf)

D.F Harding (2012), *Lead Shot of the English Civil War – A Radical Study*, Foresight Books, London

ROTC (Reserve Officer Training Corps – U.S. Army). (2002). Section 3: *Introduction to terrain analysis*, Washington, D.C 8420011_CH05_03_p244-265:8420011_CH05_03_p240-261-7 (citizenmilitem.com)

Appendix 1

Formal Agreement for Metal Detectorists

www.battlefieldstrust.com

FORMAL AGREEMENT FOR METAL DETECTORISTS WORKING ON BATTLEFIELD SURVEYS WITH THE BATTLEFIELDS TRUST

TO BE COMPLETED BEFORE STARTING WORK ON SITE

BATTLEFIELD NAME:

I agree, when working on the above survey, to abide by the principles and conditions set out in the Trust's **POLICY FOR METAL DETECTING ON BATTLEFIELD SITES**

I agree to waive all rights of ownership to all finds so that these may be incorporated into the site archive.

I also agree to abide by section 81 of the Treasure Act (1996) Code of Practice[1] and, as such, I hereby waive all rights to rewards for objects discovered that could otherwise be payable under the Treasure Act 1996.

I, (Name in block capitals)……

have read and understood the above agreement and will abide by its conditions.

Signed:
Detectorist:……..……Date: …../…../…..

Signed:
On behalf of The Battlefields Trust……..…….Date: …../…../…..

[1] Section 81 of the Treasure Act Code of practice:
"Rewards will not be payable when the find is made by an archaeologist or anyone engaged on an archaeological excavation. In cases of uncertainty archaeologists are recommended to require any individuals for whom they are responsible, or to whom they have given, or for whom they have sought, permission to search, to sign a statement waiving their right to a reward. If there is doubt as to whether the finder was an archaeologist (or a person engaged on an archaeological excavation or investigation), the Treasure Valuation Committee shall decide". Treasure Act 1996. Code of practice (Revised) (England and Wales, DCMS, London (2002).

Appendix 2

Battlefield Survey Outline Risk Assessment

BATTLEFIELD METAL DETECTING SURVEY RISK ASSESSMENT & MITIGATION GUIDANCE
The Battlefields Trust

A first aid kit will be carried at all times when a project team in the field and information provided as to the nearest A&E department.
A record of any accidents to volunteers or Battlefield Trust officers will be maintained.

- ***Slips & trips etc***

Important to take extra care near trenches and deep ditches, including those with water. Also likely to be exacerbated in icy conditions.
Care to be taken when climbing fences and gates.
Dangers of barbed wire also to be noted.

- ***Digging, pegging etc***

Danger of injury, particularly to feet, from digging and inserting grid markers.
Metal detectorists cannot not wear steel capped boots or similar protective footwear, so particular care must be taken.
Markers for transects to be suitably flagged for visibility
Digging tools to be suitable for the task and well maintained
Metal ranging poles not to be carried vertically within 6m of overhead cables.

- ***Manual handling***

Carrying of heavy or large amounts of survey equipment such as ranging poles, marker flags, detectors and digging tools.
Equipment to be spread between the survey team as far as practicable.

- ***Low temperatures***

Fieldworkers are likely to be in the field for up to 7 hours in very cold conditions in the winter. All should ensure they wear appropriate clothing and footwear.

- ***High temperatures***

Fieldworkers are likely to be in the field for up to 7 hours without cover in the summer. They must ensure to carry plenty of water and to wear suitable clothing, especially a hat to protect against sunstroke.

- ***sharp objects in the ground***

Glass attached to bottle tops and other such items.
Care to be taken in removing objects by hand.

- ***Road traffic***

Fieldwork will involve crossing of roads. Particular care is needed when walking along or crossing roads.
Parking of vehicles by fieldworkers to be in suitable locations where they do not cause a safety hazard.

- ***Stock***

Dangers of stock, such as bulls, to be assessed before entering any field. Also care taken to ensure gates are closed to avoid any incidents caused by stock escaping onto roads etc.

- ***Lone working***

Lone working will not normally be practiced. Metal detecting will normally be conducted with a team of two or more individuals.
Where lone working is unavoidable then a mobile phone will be carried at all times; also the person undertaking the work will report in to the Project Coordinator or other agreed responsible person as appropriate, when starting work and when completing work on each specific day.

- ***Weil's Disease***

Risk of contracting Weil's desease (Leptospirosis).
Avoid standing or running water where rats may be active. Wash hands before handling food or eating.