The Old Park, Dunham Massey, Trafford, Greater Manchester

Archaeological Investigation and Particpation Report

Oxford Archaeology North

February 2017

National Trust

Issue No: 2016-17/1783
OA North Job No: L10996
NGR: SJ 735 872

Document Title: **The Old Park, Dunham Massey, Trafford, Greater Manchester**

Document Type: **Archaeological Investigation and Participation Report**

Client Name: **National Trust**

Issue Number: **2016-17/1783**
OA Job Number: **L10976**
National Grid Reference: **SJ 735 872**

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SUMMARY

In 2015, the National Trust, who own and manage the estate at Dunham Massey, Trafford, Greater Manchester, commissioned a program of historic building survey to investigation and record the eighteenth century stables and carriage house (NGR SJ 734 873). The investigations involved survey and interpretation of the building fabric along with detailed documentary and archive research

These investigations acknowledged, but did not examine in detail, the earlier stable building depicted on two separate late seventeenth century 'birds eye views' of Dunham Massey by Kip and Knyff and Van Diest. A large stone building with a double pitched roof, which stands in contrast to the other timber framed buildings, was identified as being of significant interest.

In May 2016, Oxford Archaeology North (OA North) was invited by National Trust to deliver a programme of archaeological investigation and participation including topographic and geophysical surveys as well as an outline desk-based assessment and a programme of test pitting at the rededicated locations of the former buildings (NGR SJ 735 872). The test pitting element of the project was to have a strong emphasis on learning and participation, which entailed getting volunteers directly involved in undertaking the excavation as well as providing learning opportunities. The desk-based assessment and all the survey elements were to be carried out prior to the test pitting without volunteer involvement. The work commenced with the geophysical and topographic surveys in September 2016. The test pitting was carried out over one week in October 2016.

The programme of archaeological investigations at Dunham Massey revealed that the area at the northern end of Langham Grove has been subject to a certain amount of development. The test pitting exercise was able, within the constraints of the timescales allowed and the limited size of the pits, to help ground truth a sample of the geophysical responses and topographic survey features. The test pitting exercise however, allowed the volunteers to gain valuable experience in the techniques of archaeological excavations.

The investigations revealed that the buildings illustrated on Kip and Knyff and Van Diest are likely to be architecturally correct and a true representation of what may have once existed. However, although the geophysical survey has revealed several responses of potentially structural origin, one of which was found to be a brick kiln, there was no definitive evidence for the belowground remains of these buildings. This may be due to the limitations of the test pitting excavation or is the true nature of the area. Certainly, the area has seen significant modification both during and after the creation of the Old Park in the eighteenth century, possibly resulting in the removal of any trace of below ground remains.

The fact that the investigation was confined to the open area of Lanham Grove and that tree cover limited the scope of the geophysical and topographic surveys, may have negatively affected the outcomes. The buildings may be located within the trees and further investigation may help to clarify the exact location. However, the SSSI status of the Old Park limits the scope of any further investigation.

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ACKNOWLEDGEMENTS

Oxford Archaeology North (OA North) would like to thank Jamie Lund of National Trust for commissioning the project. Thanks are due to the National Trust staff and volunteers as well as those from the South Manchester Archaeology Research Team who participated in the excavations and exhibited great enthusiasm. Particular thanks are due to the staff of Dunham Massey Estate for their on-site assistance.

The desk-based assessment element of the project was undertaken and written by Helen Evans, the geophysical survey was undertaken and written by Mike Birtles, the topographic survey was undertaken by Mike Birtles and Jamie Quartermaine and written by Peter Schofield and the test pitting was undertaken by Mike Birtles and Jeremy Bradley and written by Jeremy Bradley. The drawings produced by Mark Tidmarsh. The project was managed by Karl Taylor who also edited the report.

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1. INTRODUCTION

1.1 CIRCUMSTANCES OF PROJECT

1.1.1 In 2015, the National Trust, who own and manage the estate at Dunham Massey, Trafford, Greater Manchester, commissioned a program of historic building survey to investigation and record the eighteenth century stables and carriage house (NGR SJ 734 873). The investigations involved survey and interpretation of the building fabric along with detailed documentary and archive research.

1.1.2 These investigations acknowledged, but did not examine in detail, the earlier stable building depicted on two separate late seventeenth century 'birds eye views' of Dunham Massey by Kip and Knyff and Van Diest. A large stone building with a double pitched roof, which stands in contrast to the other timber framed buildings, was identified as being of significant interest.

1.1.3 The large size and imposing architectural style of this building seemed excessive for a simple stable range, and raised the possibility that this was an indoor riding school. Riding houses were very popular amongst the aristocracy across Europe, particularly so in Spain and France. Architecturally speaking, riding houses were often designed to look like smaller versions of country houses. The example shown by Kip and Knyff shares the architectural style of the house, albeit on a far smaller scale.

1.1.4 Following on from this, in May 2016, Oxford Archaeology North (OA North) was invited by National Trust to deliver a programme of archaeological investigation and participation including topographic and geophysical surveys as well as an outline desk-based assessment and a programme of test pitting. The test pitting element of the project was to have a strong emphasis on learning and participation, which entailed getting volunteers directly involved in undertaking the excavation as well as providing learning opportunities. The desk-based assessment and all the survey elements were to be carried out prior to the test pitting without volunteer involvement.

1.1.5 A project design (*Appendix* 1) was submitted by OA North in response to an invitation to tender (ITT) document produced by National Trust. This was accepted by National Trust and the work commenced with the geophysical and topographic surveys in September 2016. The test pitting was carried out over one week in October 2016.

1.2 LOCATION, TOPOGRAPHY AND GEOLOGY

1.2.1 The Dunham Massey estate is situated on the southern border of Greater Manchester to the west of the town of Altrincham, at the eastern extent of the Mersey Basin (Fig 1). The National Trust owned estate is bounded to the south by the River Bollin, to the north-west by the Bridgewater Canal and to the north by Woodhouse Lane. To the west, Warburton township lies between Dunham and the River Mersey, the boundary between the townships being defined by a medieval ditch (Woodside 2000b). To the east, the estate is

bounded by the modern A56, the Roman road between the legionary fortress at Chester to the fort at Manchester (Margary 1973).

1.2.2 Drainage flows mostly east/west across the estate, creating a series of low sand and gravel ridges, the highest of which is formed by the northern bank of the River Bollin, where it forms the southern boundary of the estate. Dunham Hall, at 24m AOD, is situated on a localised high point above the river (Bayliss 2010).

1.2.3 The solid geology of Dunham is composed of red sandstones and marls formed when the area was a muddy coastal shore of a tropical sea (Bayliss 2010). The drift geology comprises a complex sequence of sands, gravels and patchy boulder clays, alluvial and fluvio-glacial gravels derived from post-glacial river flooding. These form narrow floodplains following the courses of the small tributary brooks and larger rivers (Nevell 1997).

1.2.4 The site of the building illustrated on the Kip and Knyff and Van Diest paintings and the area subject to investigation, lies approximately 150m to the south of Dunham Hall at the northern end of Langham Grove (NGR SJ 735 872). The area is wooded either side of Langham Grove driveway and the test-pit investigation was limited to the open area of the driveway beyond the tree canopy on to avoid damage to tree roots. The topographic and geophysical surveys were similarly limited, but survey was carried out below the canopy as appropriate. The area was generally flat and consisted of short grass.

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2. METHODOLOGY

2.1 INTRODUCTION

2.1.1 The work undertaken is outlined in detail in the project design (*Appendix 2*) and comprised a sequence of investigations commencing with an outline desk-based assessment followed by geophysical and topographic survey and, finally, by volunteer participation in the form of test pitting. The project design was adhered to in full, and the work was consistent with the relevant Chartered Institute for Archaeologists (CIfA) and Historic England guidelines (CIfA 2014a, 2014b, 2014c; Historic England 2015).

2.2 DESK-BASED ASSESSMENT

2.2.1 A desk-based assessment is usually undertaken as the first stage of a programme of archaeological recording, prior to further intrusive investigation in the form of trenching. It is not intended to reduce the requirement for evaluation, excavation or preservation of known or presumed archaeological deposits, but it will provide an appraisal of archaeological constraints and a guide to any requirement for further archaeological work.

2.2.2 The desk-based assessment element of this project was limited to a small number of sources, specifically, illustrations by Kip and Knyff and Van Diest, paintings by John Harris, the historic landscape survey carried out by Rob Woodside (2000a) and a historic building survey carried out by Matrix Archaeology (2015). It was stipulated that there was no requirement to consult additional sources.

2.3 GEOPHYSICAL SURVEY

2.3.1 ***Introduction:*** the two most commonly used techniques to undertake an effective geophysical survey in the location of archaeological remains are magnetometer and electrical resistance surveys. These allow below ground remains to be located in a non-intrusive manner, and are often applied to the same site as they produce complementary results.

2.3.2 Nevertheless, the results are very much dependent on the type of instrument that is used, and the method of data collection using the chosen instrument. These choices are based on the objectives of the survey, but there are external factors including the local geographical positioning of the site and topographic features, current and past land use, the solid and drift geology, and available resources such as time and budget. Due to the small area involved, both techniques were carried out on this site. As large an area as possible was surveyed in one day within the site constraints. Tree roots were a potential issue for the resistance survey and as much of the area was be surveyed as possible whilst remaining as far away from tree roots as possible.

2.3.3 ***Magnetometer Survey:*** the preferred geophysical technique in the detection of many archaeological remains is a magnetometer area survey, which is effective

in locating 'positively magnetic' material, such as iron-based (or 'ferrous') features and objects, or those subjected to firing, such as kilns, hearths, and even the buried remains of brick walls. This technique is also widely used to locate subtler magnetic features associated with settlement and funerary remains, such as boundary or enclosure ditches and pits or post-holes, which have been gradually infilled with more humic material. The breakdown of organic matter through micro-biotic activity leads to the humic material becoming rich in magnetic iron oxides when compared with the subsoil, allowing the features to be identified by the technique.

2.3.4 In addition, variations in magnetic susceptibility between the topsoil, subsoil and bedrock have a localised effect on the Earth's magnetic field. This enables the detection of features, such as silted-up or backfilled pits, due to the fact that the topsoil has more magnetic properties than the subsoil or bedrock, resulting in a positive magnetic anomaly. Conversely, earthwork or embankment remains can also be identified with magnetometry as a 'negative' feature due to the action in creating the earthwork of depositing the relatively low magnetic subsoil on top of the more magnetic topsoil. In this way, magnetometry is a very efficient technique and is recommended in the first instance by English Heritage (2008) for such investigations.

2.3.5 However, the main drawback to magnetic surveys is that non-thermoremnant features, such as stone building remains, or those features with magnetic susceptibility levels similar to those of the background (particularly in areas where the parent material of the topsoil has very low magnetic susceptibility levels) will fail to be seen in the magnetic survey results. Therefore, a complementary or more suitable technique, such as an earth resistance survey, was advised in addition, given the potential for buried stone foundations.

2.3.6 ***Magnetometry Equipment:*** the strength of the present geomagnetic field in Great Britain is approximately 50,000nT (nanoTesla). Most buried archaeological features usually result in very weak changes of less than 1nT to the magnetic field (Clark 1990, 65). The instrument used for this survey was a *Bartington* Grad 601-2 dual sensor fluxgate gradiometer, which has a sensitivity of 0.1nT when used in the 100nT range setting.

2.3.7 ***Electrical Resistance or Resistivity:*** the use of electrical resistance area survey is often seen as being complementary to magnetometry and is recommended by English Heritage where there is a strong presumption that buried structures or buildings are present that are not easily identifiable with magnetic methods. The technique requires injecting a small electric current into the ground via steel probes, and measuring the response with an earth resistance meter. The technique relies on the variable ability of the soil to resist an applied electrical current by the resistance meter from a pair of mobile probes to a corresponding pair of remote, static probes. The resulting resistance measurements (in ohms) can be used identify to buried features, which often have either a higher or lower resistance to the current than the background soil. Cut features that have been subsequently infilled, tend to be less resistant to the current flow and appear as low-resistance anomalies, whereas solid features such as structural remains tend to more resistant to the current flow and appear as high-resistance anomalies. One of the main disadvantages of the technique, when compared

with magnetometry, is that data collection over the same size of area is a much slower process.

2.3.8 ***Resistivity Equipment:*** the instrument used for this survey was a Geoscan Research RM15-D resistance meter with PA20 frame system and MPX15 Multiplexer. The 0.5m twin mode allows two parallel survey traverses to be collected simultaneously, the twin arrays being separated by 1m.

2.3.9 ***Sampling Interval***: the survey area was divided into 30m x 30m grids (Fig ??). Magnetometry sampling was at 0.25m intervals, with inter-transect distances of 1m, equating to 3600 sample readings per grid. The survey was carried out in 'zigzag' mode, with precautions to minimise any heading error during the magnetometry survey. In total, an area of approximately 0.51ha was surveyed with magnetometry (Fig 2). Resistivity was carried out on the same grid and sampling was at 1m intervals with inter-transect distances of 1m, equating to 900 sample readings per grid. In total, an area of 0.23ha was surveyed resistivity (Fig 2).

2.3.10 ***Survey Control:*** survey control was established in an open area by a high accuracy (+/- 0.02m), survey grade RTK GPS. The survey was accurately located onto the Ordnance Survey National Grid. Tree cover dictated that closed traverse with a total station was also used to establish control within the survey area. A site control network was established across the site as the basis for on-going site recording including the topographic survey and test pitting. All survey grid nodes were staked out with canes using a Leica 1200 series total station system. Survey guidelines and traverse canes were then staked out by tape.

2.3.11 ***Data Capture and Processing:*** magnetometry and resistance data were captured in the internal memories of the instruments and downloaded to a portable computer on-site and backed-up on to a USB drive. The individual grids were combined to produce an overall plan of the surveyed area, or 'composite'. The results were analysed and basic initial processing was carried out on-site using the software programme *'Terrasurveyor'*.

2.3.12 Final minimal processing of magnetometry raw data was undertaken off site in accordance with Historic England guidelines (English Heritage 2008) to remove any instrument error or survey effects to enhance subtler anomalies normally associated with archaeological features:

- Zero median traverse (ZMT) was applied to correct slight baseline shifts between adjacent survey lines;
- The data were selectively 'de-staggered' where necessary, to remove any displacement caused by surveying in zigzag mode. This is sometimes required when surveys are carried out on boggy, wet, overgrown or steeply-sloped areas;
- The data were de-spiked to remove random spikes. Random spikes are usually caused by erroneous small ferrous objects.

2.3.13 Final processing of the resistivity data was undertaken in accordance with Historic England guidelines (*ibid*).

- The data were de-spiked to remove high contact readings;
- A high pass filter was applied which removes variations in the background geological response
- The grids were periphery matched to correct for changes in the position of the remote probes

2.3.14 ***Presentation of the results and interpretation:*** the presentation of the data for the site involves a print-out of the processed data as a grey-scale plot for each of the surveys (Figs 3 and 4), together with interpretation plots (Figs 5 and 6).

2.4 TOPOGRAPHIC SURVEY

2.4.1 ***Photogrammetric Recording:*** the detailed topographic survey was entirely undertaken through aerial photography captured by small Unmanned Aerial Vehicle (UAV) with two OA North staff operators. The survey was carried out on 21st September 2016 and area was limited to the narrow roughly north-north-east/south-south-west corridor of Langham Grove running between the trees immediately south of Smithy Lane (Figs 7 and 8). The area was fragmented and limited by the extent of the surrounding tree canopy and in places it was only up to 75m wide. Around 520 images were captured during the survey.

2.4.2 ***Survey Control:*** survey control was established as described in *Section 2.3.10.* Tree cover dictated that a closed traverse with a total station was also used to establish control within the survey area.

2.4.3 ***Modelling:*** the photogrammetric processing was undertaken using Agisoft Professional software which provides detailed modelling using the overlap of a selection of photographs, and creates a very detailed Digital Terrain Model (DTM) across the site. The photographs were then digitally draped over the model to create an accurate three-dimensional model of the ground surface. The elevation scale was exaggerated to enhance subtle surface features. For this survey, 1cm contours and a hillshade view (x5 vertical height adjusted) (Figs 7 and 8) were created over an area measuring 155m by 100m.

2.5 TEST PIT EXCAVATION

2.5.1 ***Introduction:*** although the ultimate aim was to try to identify the riding school, a major emphasis for the excavation will be upon providing training, and providing a valuable experience for the participants, rather than undertaking extensive areas of excavations. While it was important that all areas opened are fully excavated, the extent of the Test Pits were clearly defined to ensure that the participants can comfortably complete these within the time allowed. Two professional archaeologists supervised the excavations, providing a ratio of five participants for every professional per day. Test Pits were sited on features highlighted by both the geophysical and topographic surveys. In total, 47 Test Pits measuring 0.5m by 0.5m and 5, measuring between 0.9m and 1m long by 0.5m wide, were excavated between 3rd and 7th October 2016 (Figs 9 – 16).

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2.5.2 ***Site Constraints:*** the area under investigation is part of the 79ha Dunham Park Site of Special Scientific Interest (SSSI) (Citation No. 1002940). This pasture-woodland and park-woodland has been managed since the medieval period and is one of the few remaining sites in England with a considerable number old trees and is regarded as being of national importance for its mature timber fauna. Due to this, English Nature stipulated that because of the potential for damage to tree roots, there should be no excavation below the canopy. Staff and volunteers were to proceed with caution during the excavations and there was to be no digging with tools such as mattocks. The Test Pits were to be excavated exclusively by trowel, however enough opportunities existed for excavation in the open areas of Langham Drive for this not to be an issue.

2.5.3 ***Turf Clearance and Excavation:*** turf was carefully removed from the excavation areas by manual techniques and stored separately from the spoil and adjacent to the excavation on geotextile. All excavation was carried out using exclusively manual techniques. Structural remains were cleaned to define their extent, nature, form and, where possible, date. It should be noted that no archaeological deposits were to be entirely removed from the site, and excavation of the pits, as anticipated, did not proceed below a depth of 1.2m. Each test pit was backfilled at the end of each day.

2.5.4 All information identified during the site works was recorded stratigraphically, using a system adapted from that used by the Centre for Archaeology Service of English Heritage. Results of the evaluation were recorded on *pro-forma* record sheets, and were accompanied by sufficient pictorial record (plans, sections and photography undertaken using D-SLR cameras) to identify and illustrate individual features. Primary records were available for inspection at all times.

2.5.5 ***Survey Control and Planning:*** survey control was established as described in *Section 2.3.10*. The precise location of all archaeological structures encountered was surveyed using a total station. All survey drawings were completed by manual draughting techniques on site. The drawings were generated at an accuracy appropriate for 1:10 scale. All information was tied in to Ordnance Datum.

2.5.6 ***Finds:*** finds recovery and sampling programmes were undertaken in accordance with best practice following current CIfA guidelines and subject to expert advice to minimise deterioration. OA in-house artefact and palaeoecology specialists, with considerable expertise in the investigation, excavation, and finds management of sites of all periods and types, were readily available for consultation.

2.5.7 Following the end of fieldwork, all finds were washed, assessed and handed to the National Trust Archaeologist.

2.5.8 ***Archive:*** a full professional archive has been compiled in accordance with current CI*f*A (2014c) and Historic England guidelines (2016). The paper and digital archive will be deposited with the National Trust on completion of the project.

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3 HISTORICAL BACKGROUND

3.1 INTRODUCTION

3.1.1 The following section presents a summary of the historical and archaeological background of the grounds of Dunham Hall. Given the nature of the project, this will concentrate on the history of the house and its immediate surroundings during the seventeenth and eighteenth centuries.

3.2 BACKGROUND

3.2.1 Relatively little is known about the sub-surface archaeology of the Dunham Massey estate prior to the eighteenth century; the historic environment as it stands is characterised largely by extant buildings and designed landscapes. Late seventeenth century paintings show the Jacobean house and its immediate environs, and a series form the mid-eighteenth show the house had been remodelled into a fashionable baroque style and the parkland woodland plantings established.

3.2.2 Archaeological work across the Dunham estate has been undertaken by local amateur groups, professionals and the National Trust (Woodside 2000a, 200b; Gregory and Miller 2013). It has included excavations, landscape and buildings surveys which have largely been focussed on the Old and New Parks. These investigations have primarily targeted sites and buildings depicted on the Van Diest, Kip and Knyff and Harris paintings (UMAU 2009; OA North 2010, 2014; Gregory and Miller 2013).

3.2.3 During the late 1990s, the National Trust undertook a programme of detailed research, culminating in the Dunham Massey Historic Landscape Survey; Volume 1, focussing on the polite landscape (Woodside 2000a) and Volume 2, the working landscape (Woodside 2000b). The results of documentary and archaeological research undertaken were subsequently incorporated into the National Trust NTSMR which has formed the baseline dataset for the following investigation.

3.2.4 ***The late medieval development of Dunham Hall:*** post-Conquest, Dunham became the seat of Hamo de Masci, after whom the estate is named. Historical records of 1173 and 1323 refer to a castle, although there is some argument regarding its location. One possible candidate is a large earthwork mound, close to the present hall, which was heavily landscaped in the seventeenth century for use as a prospect mount (Woodside 2000a). To the east of the Old Park, Watch Hill motte and bailey is a possible second candidate for de Masci's original castle, but is thought more likely to relate to a defended river crossing rather than a manorial seat (Nevell 1997).

3.2.5 In *c*1433, the Barony came into the hands of Sir Robert Booth (National Trust 2000). A description from *c*1410, suggests that the medieval hall, which replaced the Norman 'castle' at Dunham Massey originated as a moated site, a form typical of the region (Woodside 2000a). The Old Park was first recorded

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as a deer park in 1362 (*ibid*). At their height in the thirteenth and fourteenth centuries, many noblemen had deer parks, not only to enjoy the thrill of the chase and the high status of venison on the table, but also managed for their woodland resources (Rackham 1986).

3.2.6 ***Seventeenth and eighteenth century development of Dunham Hall:*** documentary and survey evidence suggests several phases of construction at Dunham Hall: by Sir George Booth *c*1616; by his grandson, the first Lord Delamere of Dunham Massey; in 1655 by the second Earl of Warrington, and in the mid-eighteenth century by the second Sir George Booth (Woodside 2000a).

3.2.7 Paintings and engravings by the Dutch painters Van Diest (1697), and Kip and Knyff (1697) show Dunham Hall and its surrounding parkland in the late seventeenth century following which, John Harris produced a series of paintings/engravings in *c*1751 illustrating the results of the second Sir George Booth's extensive building and landscaping works. These included the Old Park being planted with woodland forming a series of six radiating avenues visible in Harris' paintings (National Trust 2000). The seventeenth and eighteenth century paintings probably idealised and certainly romanticised representations of Dunham Hall. However, from a birds'-eye perspective (and possibly in the case of Harris relating to drawn plans), they clearly illustrate specific features relating to the house and its surrounding landscape.

3.3 THE SEVENTEENTH AND EIGHTEENTH CENTURY STABLES

3.3.1 In the foreground of Kip and Knyff (1697) (Plate 1), a series of three, large two-storey timber-framed buildings are depicted, arranged in a line backing onto the main formal driveway (South Avenue). The northernmost of these appears to be a barn with a large central waggon door. The central example has several smaller narrower doors which may be related to stabling. Detail on the southernmost of the timber framed buildings is not easy to discern but a loft window is visible in its gable end.

3.3.2 To the west of the timber framed buildings and at right angles to them, facing broadly south, is a large 5-bay double-pile building, seemingly built in rendered brick. Its ground floor has double-height windows and a large central waggon door. At its upper (loft height) levels, the building has five forward-facing gablets with simple balustrading between, and two high chimneys, in the Jacobean style. Adjacent to the western half of the building, west of the waggon door, another much lower ?5-bay timber framed building is shown orientated north-south. It is of a single story plus loft, has two projecting gabled wings to the rear, and has what appear to be external hog pens attached to its southern gable end. Behind the building a short distance to the west, is a pond, and an apparently damp, boggy area. The buildings, which surround a central yard with trackways leading from the drive, lie on an area of clearly defined higher ground.

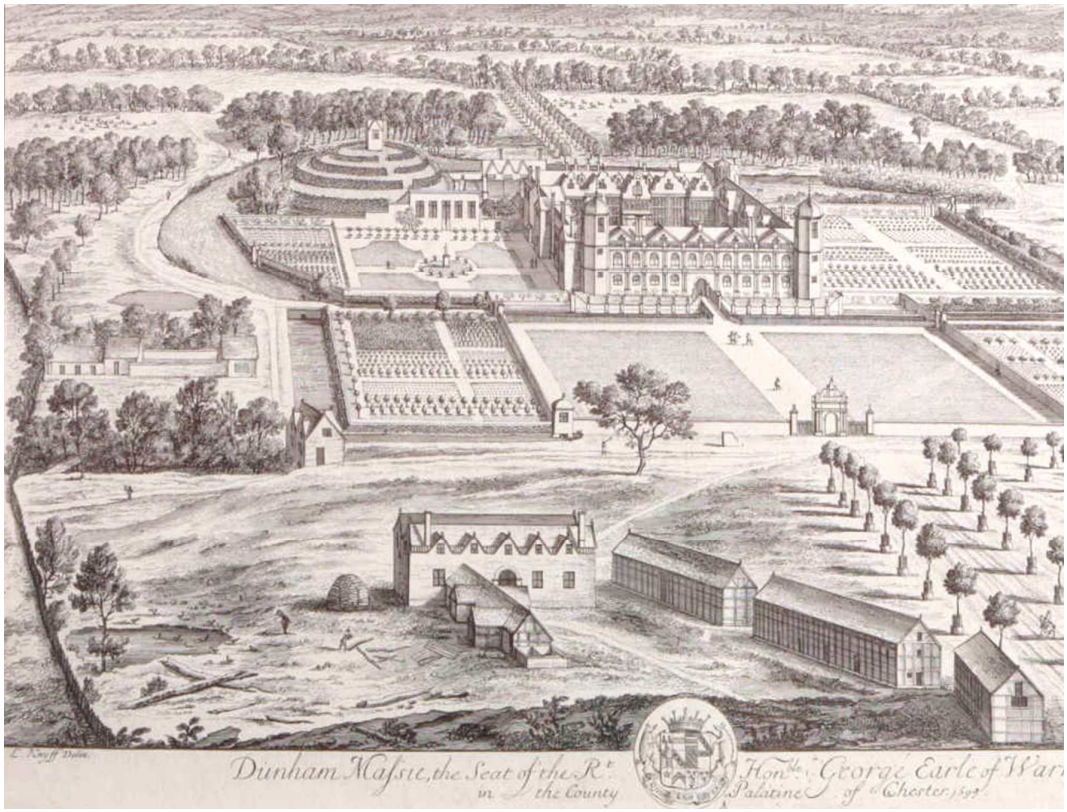

Plate 1: Kip and Knyff (1697), Showing the large buildings in the foreground, with the gabletted stable building in the centre.

Plate 2: Van Diest (1697) Birds' eye view of Dunham Massey with the supposed gabletted stable building just visible in the left foreground

3.3.3 Compared to north-east facing focus of Kip and Knyff (1697), Van Diest's (1697) painting (Plate 2) faces more to the north-west, meaning that the onlooker views the front rather than the rear of the large timber frame barn with the waggon door, aligned broadly parallel with South Avenue approaching the main entrance of Dunham Hall. The barn obscures the view of the large stone building, of which four gablets and the roof are visible behind. Whilst the perspective may be skewed in that the large stone building depicted by Kip and Knyff (1697) is now behind and therefore further away than the barn, it appears much smaller when compared with the barn.

3.3.4 John Harris produced a series of paintings/engravings in *c*1751, illustrating Dunham, following the second Sir George Booth's extensive remodelling. These portrayals, thought to have been derived from architects' plans, are from a wider perspective, and include the larger area taken in by the newly designed landscape. These show that the range of buildings depicted in 1697 have been superseded by tree-plantings and a new range of stable bocks and ancillary buildings have been constructed to the west, closer to yet presumably probably precluded from the main vistas from the hall.

3.4 DISCUSSION

3.4.1 Many examples of timber frame buildings of seventeenth century (and possibly earlier origin) have been identified across the estate (Woodside 2000b). Eighteenth and nineteenth century valuation books illustrate they were widespread; of the 230 dwellings (excluding farm buildings) surveyed at this time, 143 were originally timber framed, whilst only 87 were built of brick and had slate roofs (*ibid*). Most timber framed buildings on the estate were infilled with wattle and daub nogging, the majority later infilled with brick as this deteriorated (*ibid*). Many farm ranges likely to be contemporary have been identified on the estate through archival records; every farm had a shippon, a barn and a stable, as well as various stores and outbuildings; those at Yew Tree House Farm (SMR 51078-82) described in 1787 as consisting of: '*...a barn of three bays, brick walls, thatch roof, in repair. A stable of one bay, a hay barn and a shippon of two bays, walls timber and daub, in but middling repair, all covered with thatch'* (EGR 14/7/15).

3.4.2 Whilst the timber frame buildings depicted on the paintings seem much larger in scale that those described at Yew Tree House Farm, one appears to be a threshing or hay barn and one a shippon. These are associated with a typically agricultural scene including possible pig pens, a hay rick and a duck-pond.

3.4.3 Whilst it is not possible to discern the exact composition of the rust coloured infill between the timber frame barns shown on the paintings, is seems likely to relate to panels of wattle and daub. Most timber frame buildings stood on stone plinths and some examples have been identified on the estate, for example at Bollington Hall Farm (SMR 50964).

3.4.4 Paintings of the Dunham Hall itself shows it to be a substantial brick building and is thought to have been built by 'old' Sir George Booth (1566-1652), an assumption confirmed by a lengthy court leet dated June 1648, which records, "S*ir George Booth Builded three partes of Dunham House; all his Barnes, Mills, Gardens, Stables, and at every other Demesne house put some part*

thereof in reasonable repaire..." (EGR 3/3/3/2). These records suggest, therefore, that the 'old' Sir George Booth was responsible for the large probable stable block depicted on the late seventeenth century paintings.

3.4.5 The large 5-bay building depicted in the Kip and Knyff and Van Diest views is clearly of a higher status than the timber frame barns surrounding it. Its polite yet utilitarian architecture and the fact it is clearly part of a complex of farm buildings indicate that it is probably a stable-block. There is not sufficient evidence from the painting to corroborate suppositions that the building may have been a riding school. However, its ostentatious exterior does suggest commonalities with two surviving Elizabethan stable blocks, both located very close to Dunham Massey.

3.4.6 A contemporary example of a stable block at Peover Hall, Knutsford, dates to 1654, is of nine bays, contains 13 stalls and is built in red brick on a stone plinth, has stone dressings and a slated timber-framed roof. Internally, it contains Tuscan columns between the stalls, which are connected by an elaborate screen. There is also a heavily decorated panelled ceiling, cobbled and stone flag floors (Pevsner et al 2011). "*The form of the internal screen is similar in many of its details to the chapel screen at Cholmondeley Castle of 1655. The application of these details to a stable makes this one of the most lavish buildings of this date in Cheshire*" (Historic England 2016). Whitmore Hall, in Staffordshire was owned by the same family as Peover Hall and was completed in the late seventeenth century. One of its outstanding features is a late Elizabethan stable block; the ground floor is part cobbled and has nine oak-carved stalls, like that at Peover, divided by Tuscan pillars with ornamental arches above (Historic Houses 2016).

3.4.7 On the death of Henry Booth, the 1st Earl of Warrington, in 1694, a probate inventory was compiled which includes '*Furniture for the horses in the Stable'*, and lists the horse houses there; "*four brooding mares...three colts of two years...three colts of three years and five colts of four years past* (EGR 3/6/2/1/2). The list further includes six named race-horses, Domino, Have-it-all, Ogdon, Wilson, Grey Pad and Monmouth (Woodside 2000a).

3.4.8 There are many references to horse-racing in the seventeenth century and famous horse races recorded (including at Chester and Stamford), at which members of the local gentry met and competed their horses (Strutt 1838). Horse breeding was also the subject of much competition amongst the nobility, notably by Charles II following the Restoration (Whyte 1840). Burton, in the late seventeenth century, wrote that "Horse races are desports of great men, and good in themselves, though many gentlemen by such means gallop straight out of their fortunes" (Strutt 1838, 45).

3.4.9 When Sir George Booth, 2nd Earl of Warrington, inherited Dunham Massey in 1694, he found it *"...in such rotten condition and very barely furnished with worn out goods as had been far more prudent for me never to have come lived in it, than to attempt to keep it up"* (EGR 3/6/2/2/1). In a letter to his brother Henry Booth, dated 1722, he wrote *"Dunham was so decayed as forced me to rebuild it, for it could not have lasted safe another generation"* (EGR 3/6/2/2/2). In the first half of the eighteenth century, the second Sir George Booth remodelled Dunham Hall in the new fashionable Baroque style.

3.4.10 Prior to the eighteenth century, it was fashionable for large houses to be surrounded by relatively restricted formal gardens, often set out in geometric patterns. Following the English Civil Wars, however, Charles II brought back from his exile in France not only new ideas about horse breeding but also about Italianate architecture and landscapes. These were dominated by long-distance vistas, plantings and water features, as exemplified by great houses such as Chatsworth and Blenheim Palace (Platt 1994).

3.4.11 During the 1720s and 30s, the landscapes surrounding many country houses saw significant changes with large scale plantings of ornamental trees both in parkland and to compliment views of the landscape beyond (Barnett and Williamson 2005). Field boundaries, roads, orchards, farmyards and in some cases, whole villages were removed in order that parkland and vistas from the house did not include the practicalities of rural life (*ibid*).

3.4.12 With the help of his tenants, working off their manorial boons, the second Sir George planted the Old Park with woodland which included a series of formal avenues radiating from the hall (Woodside 2000a). It is within this context that it seems that the earlier range of stables and associated agricultural buildings were removed, and replaced with the present stable range which is situated close to the house; not only may they have been in poor condition, they would have restricted the vista from the Dunham Hall, towards the avenues illustrated on Harris' paintings of 1751.

4 GEOPHYSICAL SURVEY

4.1 GENERAL OBSERVATIONS (FIGS 3 AND 4)

4.4.1 Following scrutiny of the Kip and Knyff (Plate 1) and Van Diest (Plate 2) illustrations (see *Section* 3), and bearing in mind the restrictions on the size of the investigation area due to the woodland and the SSSI restrictions on test pit excavation, the geophysical survey area was located at the northern end of Langham Grove. This was deemed to be the most likely location of the riding school or stable block. The background magnetic survey exhibited strong responses on the west side of the survey area but in the main, the overall background response was of generally low magnitude with several obvious responses visible (Fig 3). The resistivity survey was similarly fairly even, the west side again exhibiting generally higher resistance, probably due to tree roots (Fig 4).

4.2 RESULTS (FIGS 5 AND 6)

4.2.2 ***Linear Features:*** a strong magnetic north/south linear response runs down the centre of the survey area ***M1***. This is partly visible on the ground as a raised linear earthwork (see also *Section 5.3.1*). The nature of the response suggests that the feature is probably some sort of bank containing material like gravel or clinker. At the northern end, the feature appears to turn to the east through 45 degrees, although a lower amplitude linear response carries on out of the survey area to the north and a lower amplitude response lies at 45 degrees to the east.

4.2.3 There are several other, short linear responses visible in the magnetic survey data, that mainly lie a north-east/south-west alignment. Most of these are of medium amplitude and may be associated with drainage features, although an archaeological origin is possible.

4.2.4 Linear responses are not as prevalent in the resistance data and none of the linear responses described above are immediately visible. However, the line of the response ***M1*** is possibly visible as a vaguely linear area of lower resistance in the centre of the survey area. There is also, a U-shaped medium-high resistance response ***R1*** on the eastern side of the survey area. This may be associated with tree roots.

4.2.5 ***Potential Building remains:*** there are several responses present in the magnetic data in particular, that may be indicative of buried structural remains. The most immediately obvious is a very strong rectangular response, around 17m long by 7m wide, situated in the centre of the survey area ***M3***. The response lies on a north-west/south-east alignment and corresponds to the general alignment of the timber frame buildings illustrated on Kip and Knyff (Plate 1). The amplitude of the response is indicative of a thermoremnant feature such as an area of intense burning. This may have several causes, including the burning down of structures for example. The response is not

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convincingly reflected in the resistance data, although this general area in the resistance data is quieter than the surrounding area.

4.2.6 Just to the north of ***M2***, a response ***M4*** of similar amplitude and on a similar alignment, is visible. The cause of this may be similar to ***M2***, or may simply be a spread of thermoremnant material. There are other discrete responses such as ***M5*** that may be associated with evidence of former structural features. Some of these, particularly on the west side, appear to coincide with high resistance responses ***R2*** although the high resistance responses are probably due to tree roots.

4.2.7 ***Other responses:*** there is an area of general magnetic enhancement in the south-west corner of the magnetic survey data ***M6*** that contains several discrete responses indicative of pits as well as magnetic spikes. This suggest that this area has been subject to disturbance in the past. It is possible that the discrete responses are due to the root balls of removed trees. There are also several discrete responses scattered around the south-east part of the survey area suggestive of small pits.

4.2.8 There are three areas of strong magnetic responses on the edges of the survey area that are of similar amplitude to response ***M1***. It is difficult to ascertain a cause for these but the one at the northern end is probably of modern origin as it lies close to the current Smithy Drive.

4.3 DISCUSSION

4.3.1 The geophysical survey has highlighted a high number of features, many of which, particularly those within the resistance survey data, are of natural origin and are due to the presence of tree roots.

4.3.2 There are however, some responses that may be evidence of former structural remains, mainly present in the central and northern part of the survey area. In particular, magnetic response ***M2*** warrants further investigation in the form of test pitting. Also of interest is response ***M1*** and some of the shorter linear responses. These are also visible on the topographic hill shade plot and are worthy of further investigation during the test pitting phase of the project.

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5 TOPOGRAPHIC SURVEY

5.2 INTRODUCTION

5.2.1 The logic for locating the geophysical survey area (*Section 4.4.1*) was applied to the location of the topographic survey area. The survey area was expanded to take in as much of the area at the northern end of Langham Grove as possible (Figs 7 and 8) across an area measuring 155m by 100m. The area was limited to a narrow roughly north-north-east/south-south-west corridor running between the avenue of trees located in Langham Grove and immediately south of Smithy Lane. The area was fragmented and limited by the extent of the surrounding tree canopy and in places it was only up to 75m wide.

5.3 RESULTS (FIGS 7 AND 8)

5.3.1 ***Linear Features:*** the most obvious visible feature is a linear section of flat-topped embanked earthwork ***T1*** orientated north-north-east/south south-west and extending from the junction of Smithy Drive and South Avenue down the centre of Langham Grove. This feature was present in both the hillshade and contour plots and coincided with linear response ***M1*** visible in the magnetic survey data (*Section 4.2.2,* Figs 3 and 6). The surveyed section of the earthwork measures at least 104.5m long by over 10.4m wide and is up to a maximum of 0.3m high. The northern end, consisting of a further section measuring 22m long, is visible as a slight linear mark on the north side of Farm Walk. The feature runs southwards through Langham Grove extending down to the west of Old Man Pool. The southern end of the feature disappears slightly where the ground drops away to the south but apparently continues to the edge of the deer park and outside of the present survey area.

5.3.2 There is slight evidence for linear ridge and furrow cultivation ***T2*** located at the northern end of the survey area. This is orientated roughly east-north-east/west-south-west and extends over an area of 63m by 21m. The ridges are roughly 3.8m apart and are located immediately adjacent to the south side of Smithy Drive, and are apparently cut by Farm Walk. The northern end of the linear earthwork feature ***T1*** runs into this area but is still evident where it has presumably been over-ploughed. The identification of the limits of visible ridge and furrow cultivation is constrained by the narrow nature of the survey area between the tree canopy. The alignment of the northern end of magnetic response ***M1*** where it turns through 45 degrees to the east (*Section 4.2.2*), coincides with a possible linear feature in the topographic survey. The amplitude of the magnetic response suggests, as outlined in *Section 4.2.2,* that this feature is not due to ridge and furrow cultivation.

5.3.3 It is possible that there is a further small section of potential cultivation on the same alignment ***T3*** located approximately 2/3rds of the way down to the south end of the linear feature. The short linear responses visible in the magnetic survey data ***M2*** may be associated with these features, although they are strong responses indicating perhaps different origin. It appears that the cultivation is possibly cut by the linear feature ***T1***. To the east of these, feature

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T4 is a roughly rectangular area measuring 17.8m by 12.2m visible. It is possible that this reflects a small platform crossed by the ***T1*** and coincides with a strong magnetic response ***M5***, visible in the magnetic survey data (*Section4.2.6*) and interpreted as potential structural remains.

5.4 DISCUSSION

5.4.1 The remnants of the linear feature ***T1*** possibly relate to a carriage drive/ride running through the west side of the parkland south of Dunham Hall, as depicted on the some of the early county mapping, possibly as early as Bryant's and Swire & Hutchings and definitely by the time of the One Inch Ordnance Survey mapping, where it skirts the western edge of Old Man Pool. It is possible that this route relates to one of the trackways depicted running towards/through the area of the original stable and barns depicted on Kip and Knyff and Van Diest (Plates 1 and 2). The geophysical response ***M1*** lies on the same alignment but is not as wide.

5.4.2 The topographic survey does not reveal any significant evidence for the position of the buildings illustrated by Kip and Knyff and Van Diest, although topographic feature ***T4*** together with magnetic response ***M5***, may be evidence of features associated with structural remains.

5.4.3 It is possible that the features on the northern edge of the parkland at Langham Grove ***T2***, are evidence of straight-sided, presumably post-medieval ridge and furrow cultivation. Other areas within the Dunham Deer Park contain evidence for ridge and furrow cultivation on roughly the same alignment, in particular, to the east of Island Pool.

6 TEST PIT EXCAVATION

6.2 INTRODUCTION

6.2.1 Following the results of the geophysical and topographic surveys, several responses and features were identified and test pit locations were identified, based mainly upon the interpretation of the magnetic survey (Fig 9). In line with the site constraints (*Section 2.5.1*), these were confined to the areas beyond the tree canopy. In total, 52 Test Pits were excavated with the intention being to enable them to be excavated and completed by volunteers over the course of five working days. In practice, and given the nature of the results of the surveys, the excavation of the Test Pits entailed a flexible approach, whereby small pits were opened initially and were either subsequently expanded or opened with slightly larger dimensions.

6.2.2 The excavated dimensions of each test pit were intended to be 0.5m by 0.5m, the exceptions being **TP25**, **37**, **38**, **43** and **44**, which were between 0.9m and 1m long by 0.5m wide (Fig 9). Geophysical response ***M3*** revealed through gradiometer survey was targeted by Test Pits **1-9**, **35 - 6**, and **46 - 52**, whilst the north/south aligned linear earthwork (***M1*** and ***T1***) detected by the magnetic and topographical surveys was sampled by Test Pits **17-21** in the south and **22**, **27 - 32** and **42** in the north. Test Pits **10 - 16** were placed to sample feature ***M5*** and ***T3***. Test Pits **33 - 34** and **22 - 26** examined the area to east of the north end of ***M1***, whilst Test Pits **29**, **37 - 39**, **41**, **43** and **44** investigated archaeological remains revealed in the northern area of the site.

6.2.3 Topsoil formed the upper stratigraphic component in all cases (denoted by a context number ending in ***01***). Generally, this was variations of sandy-silt usually dark grey-brown. Occasionally, it was very dark grey, almost black depending on the surrounding ground conditions, especially Test Pits **12** and **7**. Some Test Pits (for instance **1**, **2**, **11**, **12**, **23**, **26**, **40** and **52**), did not reveal any archaeologically significant deposits other than topsoil, subsoil (usually greyish–brown/brownish-grey silty-sand) and natural sands or in a few cases clay (Test Pits **17**, **18**, **20**, **30**, **33** and **34**).

6.2.4 Based on the artefacts recovered during the excavation, activity on the site spans a period from the mid to late seventeenth century to the first part of the nineteenth century. However, there is little in the way to indicate which parts of the site constituted the earliest activity, partly due to the limitations of the test pit methodology and the lack significant cross-stratigraphic relationships. Generally, the test pits suggested discrete areas of activity that were difficult to interpret. A single feature, the long linear (***M1*** and ***T1***) identified via all techniques employed, was the one unifying factor, as it cut across most other activity, and a cinder surface associated with it was stratigraphically the latest deposit.

6.3 RESULTS

6.3.1 Test Pits **17 – 21** (Fig 10) revealed two shallow north/south aligned gullies ***2006*** and ***2104***, cut into the underlying natural sands ***2105*** or subsoil deposit ***2003***. That they were cut into different deposits, makes it difficult ascertain whether they were the same feature, despite their proximity and shared alignments. A cinder surface ***1802***, ***1902***, ***2002*** and ***2101*** was revealed within the north/south orientated linear earthwork, explaining the strong geophysical response ***M1*** (Plate 3). Finds comprised burnt bone, melted glass/slag from the cinder layer ***1902***, and window glass from the topsoil ***1801***.

Plate 3: Test Pit **19**, viewed toward the north, showing cinder surface (***1902***) lying below topsoil (***1901***; 0.5m scale)

6.3.2 Test Pits **11 – 16** (Fig 11) had been placed in order to examine possible rectilinear feature identified by both the geophysical and topographic surveys (***M5*** and ***T4***). Cut features were identified within Test Pits **13**, **15** and **16**, which appeared to be fairly narrow gullies ***1306***, ***1503***, ***1603*** and ***1605***, again it was not clear what these features represented (Plate: 4). It is entirely possible that they represented structural elements such as beam slots, but the evidence is lacking. Six pottery sherds, all from a cream ware hollowware vessel were recovered from the top soil in Test Pit **15**.

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Plate 4: Test Pit **13**, viewed toward the north-west, showing cut feature ***1306*** (0.5m scale)

Plate 5: Test Pit **47** during excavation, viewed toward the south-west, showing CBM layer ***4705*** scattered with possible stone roof tile fragments (0.5m scale)

6.3.3 The large north-west/south-east orientated rectangular geophysical response ***M3*** situated mid-way along the area under investigation, was examined by Test Pits **1 – 9, 35-36** and **45 – 52** (Fig 12). Ceramic Building Material (CBM) bearing layers, in variable amounts, suggested that this feature was a clamp kiln for bricks which would explain the very strong magnetic response. Clinker layers ***504*** and ***605*** were observed above the natural substrate, both sealed by subsoil deposits ***503*** and ***604***, possibly the residue of the fuel for the kiln. At the south-east end in Test Pit **35**, layers containing CBM appeared, which was seen to overly subsoil deposits, whilst beyond Test Pits **4 – 6**, in Test Pits **7 – 9**, the CBM layers could be seen laying directly above the natural substrate. CBM bearing deposit ***402*** was of note as it appeared to preserve the carbonised impression of a timber, perhaps part of the fuel load. The clinker layers sealed by subsoil, with CBM bearing layers above, might suggest that the kiln was fired at least twice. A single incomplete brick, a possible waster, was retained from CBM bearing layer ***703***.

Plate 6: Cobbled surface ***5003***; Test Pit **50**, viewed toward the north-west (scale 0.4m)

6.3.4 Test Pits **45 - 48** (Fig 13) recovered more evidence of the clinker layers ***4504***, ***4505***, ***4607***, ***4608***, ***4705*** (Plate 5) and ***4804***, with the much the same sequence represented; clinker layers overlain by subsoil sealed by CBM layers extending north-west as far as Test Pit **50**. Test Pit **46** contained two cut features ***4605*** and ***4610***, which were seemingly later than the kiln.

6.3.5 The course of ***M1*** and ***T1*** was, again apparent, as a clinker surface in Test Pits **35 – 36** (Fig 13) and **45 – 47** (Fig 12), although this was obscured in the geophysics by the strong response ***M3***. A cobbled surface (Plate 6), possibly aligned north/south, was in Test Pits **50** and **51** (Fig 13), which appeared to post-date the kiln. Other than topsoil finds, no dating evidence was recovered

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from the kiln or other features within the transects. A possible brick waster was recovered from CBM bearing layer ***703***, which was not closely datable.

6.3.6 Test Pits **27 -34**, **42** (Fig 14), **22-26**, **37**, **41** (Fig 15) and **38 – 40**, **43** and **44** (Fig 16). were placed to further examine the end of ***M1*** where it changes direction as well as potential topographic features ***T2***.

6.3.7 Test Pits: **27-34** and **42** revealed little other than a north-west/south-east aligned ditch ***2906***, and two CBM bearing layers ***3003*** and ***3202***. Redeposited clay layer ***3303*** produced a fragment of mid-seventeenth to mid-eighteenth century tobacco pipe bowl, whilst a near complete tobacco pipe bowl (mid to late seventeenth century) was recovered from the topsoil in Test Pit **32**. Other finds comprised white salt glazed stoneware, colourless window glass and green vessel glass, dating from the early eighteenth century onwards.

Plate 7: Possible internal surface Test Pit **37**; ***3703***. North at top of image (0.5m scale)

6.3.8 The north-west/south-east arm of ***M1*** identified during the geophysical survey was investigated by Test Pits **22-26**, and **37** and **41**. A cut feature ***2505***, was noted over the approximate position of this arm of the response. Two distinct fills ***2502*** and ***2504*** both contained brick fragments. TPs ***37*** and ***41*** excavated in response to the feature identified within Test Pit **25**. Both Test Pits contained distinct silty-clay CBM bearing layers/surfaces ***3703*** and ***4102*** which would have been within side any putative building foot print. Layer/surface ***4102*** produced a sherd of brown stoneware with freckled glaze, with a date range of the late seventeenth to late eighteenth century. Eighteenth century Dark glazed earthenware and a possible fragment of kiln fabric was recovered from the layer above (***4102***).

6.3.9 Test Pits **38 – 40**, **43** and **44** were placed over the other arm of the feature and a near vertical sided cut ***3904*** filled with clay ***3903*** in the vicinity of the north-

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west/south-east arm was revealed, whilst Test Pit **44** contained a clay layer ***4403***, potentially deliberately deposited. Test Pit **38** revealed a CBM bearing layer ***3803***, as did Test Pit **45** ***4503***. In the former case, deposit ***3803***, which contained fragments of handmade bricks possibly indicative of a foundation, lay above natural, whereas in the latter, ***4503*** lay above a heat affected layer ***4504***. Eighteenth century Dark glazed earthenware was recovered from Test Pits **38**, **40** and **44**.

6.3.10 The cinder/clinker surface associated with ***M1*** was identified at its northern end in Test Pits **22**, **40**, **43** and **50** (Fig 15).

6.4 DISCUSSION

6.4.1 The excavation of the Test Pits in Langham Grove has demonstrated the presence of below-ground remains in, or close to, the vicinity of the buildings illustrated by Kip and Knyff and Van Diest. Evidence for the below ground remains of certain features highlighted during both the topographic and geophysical surveys was confirmed, notably the north/south aligned linear earthwork ***M1*** and ***T1***. This was revealed to contain a clinker layer, consistent with the nature of the response. Geophysical response ***M3*** identified as possible structural remains was revealed to be a probable brick kiln. This explanation is entirely consistent with the nature of the response.

6.4.2 Linear feature ***M1*** and ***T1*** was identified from the clinker layer that appeared to cap the feature, rather than producing below ground remains that convincingly demonstrated evidence of an earthwork. That the clinker/cinder surface could be traced through successive test pits, suggest that this was deliberately laid down. The bricks located at the northern end of ***M1*** may suggest the presence of robbed out building activity.

6.4.3 Features ***M5*** and ***T4***, were less successfully identified, although it is fair to say that the presence of cut features (of uncertain use) lend some credence to the structural activity of the corresponding date and location.

6.4.4 The brick kiln ***M3*** appeared to be stratigraphically earlier than ***M1*** and ***T1***, the clinker/cinder surface being seen to overlie CBM bearing layers that characterised ***M3***. It was the combination of these CBM bearing layers, as well as areas of heat affected sand and layers of clinker and cinder that demarcated the kiln. That there were occasions when subsoil deposits were seen to overlay some of the CBM and were heat affected, which in turn had been overlain by further CBM bearing layers, suggest that there might have been more than one firing of the kiln. Unfortunately, very little of the CBM recovered from the area of the kiln was diagnostic, and therefore it was not possible to obtain any complete brick dimensions. Had this been possible, it may have dated the firing of the kiln to a phase of building at Dunham Massey by a comparison of the brick sizes.

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6 FINDS

6.1 INTRODUCTION

6.1.1 Some 50 artefacts were recovered during the excavation weighing 3344g. Over half of these, (32 in total) were recovered from topsoil deposits with the remainder being derived from stratified contexts. Appendix 2 lists the finds by category, with the largest being pottery, followed by vessel glass.

6.2 CERAMICS

6.2.1 ***Pottery***: some 17 fragments of pottery, generally small un-abraded, were recovered. The small size, however, does suggest that the material had been reworked. Other than two sherds of transfer printed willow pattern (Top soil, Test Pits **7** and **18**), the remainder of the pottery was eighteenth century in date, represented by White salt-glazed stoneware, Tin glazed earthenware, Dark glazed earthenware, Cream and Pearl ware. A single sherd of Brown freckled glazed stoneware, was perhaps German in origin, but equally likely to English, of late seventeenth to late eighteenth century date.

6.1.2 ***Tobacco pipe***: of the five fragments found during the excavation, that from topsoil deposit in Test Pit **32**, was particularly interesting. This was bowl likely to date to the second half of the seventeenth century (Davey 1985).

6.3 GLASS

6.3.1 ***Window glass:*** three of the six sherds were green mid-pane fragments, with absence of elongated bubbles suggesting that they were not forest glass (C Howard-Davis, pers comm). The colourless examples are likely to be eighteenth century and later. The window glass was derived from the either topsoil or subsoil deposits (Test Pits: **10**, **18**, **29** and **39**).

6.3.2 ***Vessel glass:*** eleven fragments of green vessel glass were recovered. These were both too small, and non-diagnostic to closely date. Other than ascribing a broad mid-seventeenth century or later date, little more can be said (C Howard-Davis, pers comm).

6.3.3 ***Other finds:*** the remaining finds were not closely datable, and comprised Brick fragments, stone roof tile, burnt bone and iron objects. The bricks that were retained during the excavation (see *Appendix 2*), displayed one or more diagnostic elements, but not enough to estimate the original dimensions. That from Layer ***703*** in Test Pit **7** may have been a possible waster with one face distorted. The fragment from cinder layer ***4102*** in Test Pit **41**, may have been a fragment of kiln fabric, as it exhibited a rod impression.

6.3.4 Three fragments of stone roof tile were recovered from Test Pits **19** and **40** are of little interpretive value, as was a nail from Test Pit **42**. A heavily corroded possible knife blade was recovered from the same test pit. However, without

further investigation in the form of an X-ray, this interpretation is at best tentative. The burnt bone from Test Pit **20** was likely accidental, as it was derived from clinker layer ***2002***.

6.4 DISCUSSION

6.4.1 The finds from the test pit excavation provide little in the way of interpretative evidence for the site. The small size of the fragments of ceramic and glass suggest that the area has been subject to successive landscaping. The finds only provide a broad a date range from the mid to late seventeenth century until latter part of the eighteenth century for the activity located in the area of the test pits, and contribute little to understanding of the site.

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7 DISCUSSION

7.1 INTRODUCTION

7.1.1 The programme of archaeological investigations at Dunham Massey have revealed that the area at the northern end of Langham Grove has been subject to a certain amount of development. The test pitting exercise has been able, within the constraints of the timescales allowed and the limited size of the pits, to help ground truth a sample of the geophysical responses and topographic survey features. The test pitting exercise has however, allowed the volunteers to gain valuable experience in the techniques of archaeological excavations. From this point of view the project has been a success.

7.2 THE RIDING SCHOOL OR STABLE BLOCK

7.2.1 The desk-based assessment revealed that a number of farm ranges were once present at several locations across the estate at Dunham Massey containing structures including timber frame buildings of similar dates and probable appearance to those illustrated by Kip and Knyff and Van Diest. If timber frame buildings existed here, it is not unreasonable to assume that the timber frame buildings shown at the northern end of Langham Grove are accurate representations of such structures, although apparently larger in scale.

7.2.2 The nature of the external appearance and the size of the gabled building leads to the assumption, especially when compared to other examples at nearby halls, that this building was almost certainly a stable block rather than a riding school. Brick structures have been identified within the estate, many of which, including Dunham Hall itself, were described as being built by 'old' Sir George Booth. It is probable that the gabled stable block, if it existed, was also built by him. It is probable that this building was of rendered brick with stone quoins, window and door surrounds.

7.2.3 Brick making on an estate such as Dunham Massey would have been undertaken within the estate itself and the results of the geophysical survey, corroborated by several test pits have revealed the presence of a probable rectangular brick kiln ***M1*** with evidence for several firings, in the centre of the survey area. Unfortunately, no whole bricks survived and although many of the finds recovered from the test pits date to the seventeenth century, there was no clear evidence to suggest that kiln was of this date. It is of course, entirely possible that a kiln was established close to the site of the stable block, further investigation may help to establish the date of the kiln.

7.2.4 The other significant feature identified by the geophysical and topographic survey that were targeted with test pits, was a rectilinear response to the south of ***M1***. This feature ***M5***, ***T4*** was revealed to contain several cut features that may represent beam slots. The nature of the response and the excavated test pits point to a possible structural origin, but there is no definitive proof of this.

7.2.5 The linear feature ***M1***, ***T1*** running down the centre of Langham Grove, revealed by the geophysical and topographic surveys was found to contain a clinker layer along its length deliberately laid down and of later date than the kiln. This feature respects the current alignment of Langham Grove and may have been some sort of path or drive probably laid down during remodelling of the area in the eighteenth century during planting of the Old Park by the second Sir George in the eighteenth century as illustrated by Harris in 1751.

7.2.6 A number brick fragments found just above the natural level at the northern end of ***M1***, may suggest the presence of robbed out building activity, however, this is conjectural given the size of the test pit.

7.3 CONCLUSION

7.3.1 The investigations have revealed that the buildings illustrated on Kip and Knyff and Van Diest are likely to be true representations of such structures, if they existed. However, although the geophysical survey has revealed several responses of potentially structural origin, one of which was found to be a brick kiln, there is no definitive evidence for the belowground remains of these buildings. This may be due to the limitations of the test pitting excavation or is the true nature of the area. Certainly, the area has seen significant modification both during and after the creation of the Old Park in the eighteenth century, possibly resulting in the removal of any trace of below ground remains.

7.3.2 The fact that the investigation was confined to the open area of Lanham Grove and that tree cover limited the scope of the geophysical and topographic surveys, may have negatively affected the outcomes. The buildings may be located within the trees and further investigation may help to clarify the exact location. However, the SSSI status of the Old Park limits the scope of any further investigation.

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3 ILLUSTRATIONS

3.4 FIGURES

3.5 PLATES

Plate 5: Test Pit **47** during excavation, viewed toward the south-west, showing CBM layer ***4705*** scattered with possible stone roof tile fragments (0.5m scale)

Plate 6: Cobbled surface ***5003***; Test Pit **50**, viewed toward the north-west (scale 0.4m)

Plate 7: Possible internal surface Test Pit **37** ***3703***. North at top of image (0.5m scale)

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APPENDIX 1: PROJECT DESIGN

1 INTRODUCTION TO THE PROJECT

1.1 Oxford Archaeology North (OA North) has been invited by National Trust to deliver a programme of archaeological investigation and participation at Dunham Massey, a remodelled Elizabethan House and estate near Altrincham. The project is financed by National Trust and OA North have been requested to carry out topographic and geophysical survey as well as an outline desk-based assessment and a programme of test pitting, which will be carried out by volunteers with professional archaeological supervision.

1.2 The Dunham Massey estate is owned and managed by National Trust who, in 2015 commissioned a programme of historic building survey to investigate and record eighteenth century stables and carriage house. The investigations acknowledged an earlier stable building depicted as being located to the south of the main hall on two separate late-seventeenth century views of Dunham Massey by Kip and Knyff and Van Diest. It is possible that, given the size of the buildings illustrated, it was an indoor riding school, which were popular at the time. However, there is no mention of a riding school at Dunham Massey, neither are there any records its existence.

1.3 The test pitting element of the project has a strong emphasis on learning and participation. This will entail getting volunteers directly involved in undertaking the excavation as well as providing learning opportunities. OA North is able to provide this due to our extensive experience in outreach activities across the region. The desk-based assessment and all the survey elements will be carried out prior to the test pitting without volunteer involvement.

2 OXFORD ARCHAEOLOGY NORTH

2.1 Outreach, training, and community archaeology: as an educational charity, outreach and community involvement is a core value of the organisation. Thus, an integral part of most research projects is familiarity with, and experience of, working with local community groups, children and volunteers. OA North has been providing archaeological services within the NorthWest since 1979, and throughout this time has been closely involved with amateur groups on many projects throughout the region. This has included professional support and also the provision of expertise, training and resources for archaeological excavation, recording, survey and documentary studies. Consequently, OA North has amassed a very considerable body of experience in working, training and co-ordinating such activities, with both children and adults. Some examples of community-based projects undertaken by the company, or with which OA North is currently involved, are provided below, although the list is by no means exhaustive.

• Windermere Reflections Surveys: OA North provided the supervision of the fulling mills, iron working, woodland and mineral community surveys of the Windermere Reflections project. These entailed detailed surveys and entailed the development of plane table and theodolite survey techniques using a disto mounted on the respective telescopes. The technique proved very successful and allowed the volunteers to undertake the recording using basic and affordable survey techniques. In addition, the landscapes were photogrammetrically recorded using photographs taken from a small helicopter. OA North then undertook a detailed programme of survey training for lead mining, iron mining and slate quarrying sites in Langdale and Grasmere using broadly similar techniques, except that the considerable complexity of the Banks slate quarry meant that it was necessary to record the complex by photogrammetry, and then the volunteers were involved in drawing up the sites from the photogrammetry plots.

• Holwick: OA North was involved in a long term community survey of Holwick village and the valley landscape in the North Pennines on behalf of the AONB and also Natural England. In particular, this entailed the detailed recording of a number of longhouse settlements. The survey work entailed a broad range of survey techniques from specially flown oblique aerial photography, LiDAR, documentary studies, identification surveys, detailed surveys using a theodolite and Disto. The latter technique was designed to allow cheap, but efficient, survey techniques that would be within the pocket of amateur groups.

• Sizergh Castle: in 2013 OA North undertook a very high profile community excavation and survey project of Sizergh Park, which is owned and managed by the National Trust. The project entailed an intensive programme of excavation of a burnt mound, a boundary ditch, but also topographic surveys, geophysical surveys and a building survey of a large barn. It entailed the production of banners, and a number of presentation events. The project was open to the general public and entailed stands to present the results to the general public and to engage younger visitors. The programme involved school visits and school children were involved in the excavation programme. The project entailed the dissemination of the results through detailed reports and booklets.

• Duddon Valley: OA North undertook archaeological supervision of the excavation of ring cairns at Seathwaite Tarn on behalf of the Duddon Valley Local History Group, and contributed to the publication on the results of the programme.

• Muncaster Fell Archaeological Survey: OA North provided supervision for a programme of archaeological survey of long houses on Muncaster Fell. The programme entailed an identification survey of the wider area, a detailed topographic survey of the longhouses and a kerbed cairn and also a geophysical survey of the area around the ring cairn.

• Birley Fields: in 2012, OA North, in partnership with the Manchester Metropolitan University and many local residents, undertook a community archaeology project at Birley Fields, Hulme, to excavate and record a lost nineteenth-century streetscape. Over 180 local residents participated in the excavations, including many young people and those from ethnic minorities. OA North organised site visits for school parties and community groups, which resulted in visits by an additional 400 local people to the site over a three-week period.

• Greenside Lime Kiln, Kendal: in 2010, the successful excavation and restoration of Greenside Lime Kiln combined the leading expertise of OA North with resources from the local community, including members of local Young Archaeology Clubs, school children aged 8-15 years and local masons and artists. The result of this project raised awareness of the presence of this Scheduled Monument and united a community in an appreciation of their heritage.

3 WORK TO BE UNDERTAKEN

3.1 The description of work to be undertaken is defined in the invitation to tender document and are as follows:

• Desk-based assessment: to acquire and scrutinise the Kip and Knyff and Van Diest illustrations, as well as paintings by John Harris in order to locate the buildings. To consult the historic landscape survey carried out by Rob Woodside in 2000 and become familiar with the conclusions of the historic building survey carried out by Matrix Archaeology in 2015

• Topographic Survey: following the identification of the likely location of the buildings, a topographic survey will be carried out in order to produce a contour map of the area most likely to contained the buildings

• Geophysical Survey: a geophysical survey will also be conducted following identification of the area most likely to have contained the buildings

• Test Pitting: following all of the above, a programme of targeted test pitting will be carried out on likely targets identified by the desk-based assessment and surveys.

4 PREPARATION

4.1 From the very beginning there will be a process of liaison between OA North, and National Trust and the South Trafford Archaeology Research Team. This will entail formulating methods of recruitment and selection of volunteers as well as defining the extent and scope of the test pitting. A full and detailed specification will be produced by OA North to carry out the test pitting once the results of the desk-based assessment and surveys are known.

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5 PROJECT SIGNAGE

5.1 It may be desirable to produce one interpretation banner at the beginning of the project. This would be printed onto a very durable PVC banner fabric, which can be suspended from its corners by eyelets or mounted onto a solid wooden base, and would be A0 sized. It would have limited amounts of text and a small number of large photographs, and would be similar to those used at Sizergh Castle and would be intended to steer people into the area of the excavation.

5.2 Banners of this form were used at the recent Sizergh Dig in the Park programme and have been found to resist weathering for at least six months.

6 VOLUNTEERS AND GROUPS

6.1 In tandem with National Trust and the South Trafford Archaeology Research Team, OA North will devise the strategy for volunteer and group participation within the test pitting element of the project. It is proposed that the desk-based assessment and surveys be carried out prior to any volunteer participation. Given the relatively small scale of the works to be carried out and the budgetary constraints, it is suggested that the numbers of volunteers present at any one time, be kept fairly small (around 10). In order to maximise the scope of the volunteer and group participation and in order to try to involve as many people as possible, limiting the participation time to around one day per volunteer may be appropriate.

7 PROJECT INTRODUCTION

7.1 One of the first stages of the project should be a presentation that will be undertaken on site and would be intended to introduce volunteers to excavation techniques. This will include an introduction to the theory and practices of archaeological excavation, palaeoenvironmental analysis, finds processing, and survey techniques. The aim would be to introduce the participants to the proposed programme.

8 DESK-BASED ASSESSMENT

8.1 Introduction: a desk-based assessment is usually undertaken as the first stage of a programme of archaeological recording, prior to further intrusive investigation in the form of trenching. It is not intended to reduce the requirement for evaluation, excavation or preservation of known or presumed archaeological deposits, but it will provide an appraisal of archaeological constraints and a guide to any requirement for further archaeological work.

8.2 The desk-based assessment element of this project will however, be limited to a small number of sources, specifically, illustrations by Kip and Knyff and Van Diest, paintings by John Harris, the historic landscape survey carried out by Rob Woodside and a historic building survey carried out by Matrix Archaeology. There is no requirement to consult any other sources.

8.3 Following consultation of the sources an interim statement will be produced outlining the nature of the results and suggestions for the placement of test pits.

9 TOPOGRAPHIC SURVEY

9.1 Photogrammetric Recording: it is proposed to record the immediate environs of the area identified as having the highest potential for the riding school by means of high altitude photography, which, using specialist photogrammetric software, can be used to create accurate three dimensional models of the site and topographic surfaces. There are two methods available, the first is to use a UAV, which is a small multi-engine model helicopter and provides photography from any altitude up to approximately 200m height. The alternative is to use mast with a camera mounted on top. The advantage of the mast is that the photography can be undertaken below tree cover, which is a potential issue on this site. In practice it is proposed to use both techniques and cover as much of the area as possible. However, survey will probably be limited to the most open areas. Survey control is introduced to the photographs by the

placement of survey control targets across the site which are located by means of survey grade GPS or total station.

9.2 The photogrammetric processing is undertaken using Agisoft software which provides detailed modelling using the overlap of up to 120 photographs, and creates a very detailed DTM (Digital Terrain Model) across the site. The photographs are then digitally draped over the model to create an accurate three dimensional model of the ground surface. The elevation scale can be exaggerated in order to enhance subtle surface features.

9.3 Survey Control: it is proposed that survey control be introduced to the sites by means of a high accuracy survey grade RTK GPS where possible. This can achieve accuracies of +- 20mm, and will ensure that the survey is accurately located onto the Ordnance Survey National Grid. If there is tree cover in the environs of the site then, the GPS will be used to get control near to the sites and control will be taken to the site by closed traverse using a total station. If at any of the sites there is no mobile reception (necessary to provide corrections for the GPS) then the control will be established by means of a total station. A site control network will be established across the site as the basis for on-going site recording.

10 GEOPHYSICAL SURVEY

10.1 Introduction: the two most commonly used techniques to undertake an effective geophysical survey in the location of archaeological remains are magnetometer and electrical resistance surveys. These allow below ground remains to be located in a non-intrusive manner, and are often applied to the same site as they produce complementary results.

10.2 Nevertheless, the results are very much dependent on the type of instrument that is used, and the method of data collection using the chosen instrument. These choices are based on the objectives of the survey, but there are external factors including the local geographical positioning of the site and topographic features, current and past land use, the solid and drift geology, and available resources such as time and budget. It is proposed that due to the small areas involved, both techniques will be carried out. As large an area as possible will be surveyed in one day given the nature of the site constraints. Tree roots are potential issue for the resistance survey and as much of the area will be surveyed as possible.

10.3 The techniques are defined below and will be carried out according to English Heritage Guidelines (2008).

10.4 Magnetometry: a magnetic, or magnetometer, survey is usually the first choice for a geophysical survey owing to its ability to be carried out relatively quickly (due to recent improvements in commercially available instruments), and is therefore more cost effective. Consequently, magnetometry is a very efficient technique and is recommended in the first instance by the English Heritage Guidelines (2008) for such investigations.

10.5 Magnetometry will easily locate ‘positively magnetic’ material such as iron-based features and objects, or those subjected to firing such as kilns, hearths, and even the buried remains of brick walls. Therefore, this technique is suitable in the detection of features associated with industrial activity. This technique can also be widely used to locate the more subtle magnetic features associated with settlement and funerary remains, such as boundary or enclosure ditches and pits or postholes, which have been gradually infilled with more humic material. The breakdown of organic matter through microbiotic activity leads to the humic material becoming rich in magnetic iron oxides when compared with the subsoil, allowing the features to be identified. Conversely, earthwork or embankment remains can also be identified with magnetometry as a ‘negative’ feature due to the action in creating the earthwork of upturning the relatively low magnetic subsoil on to the more magnetic topsoil. This technique is classed as a passive technique as it relies on measuring the physical attributes, or the magnetic field, of features that exist in the absence of a measuring device, such as a kiln or ferrous object.

10.6 However, the main drawback to magnetic surveys is that non-thermoremnant features, such as stone building remains, or those features with magnetic susceptibility levels similar to those of the background (particularly in areas where the parent material of the topsoil has very low

magnetic susceptibility levels) will fail to be seen in the magnetic survey results. Therefore, a complementary or more suitable technique, such as an earth resistance survey, is advised in addition, given the potential for buried stone foundations at the priory site.

10.7 Methodology: a vertical gradiometer will be employed, the Bartington Grad601-2, with a sensor separation of 1.0m. The instrument is held above ground from which data are captured in the internal memory, and then downloaded to a portable computer for processing. The survey area will be divided into a 30m grid system dependant on the suitability of the site conditions. Within this grid system, sampling will be at a minimum of 0.25m intervals on a 1.0m traverse separation.

10.8 Electrical Resistance Survey: non-magnetic stone structures or megaliths cannot be easily identified with magnetometry. Therefore, stone building remains may be difficult to identify or interpret without the use of electrical resistivity.

10.9 This technique is classed as an active technique as it requires physically injecting a current into the ground and measuring the response. An earth resistance meter relies on the properties of the moisture retained within the soil to pass an electrical current through the ground from a pair of mobile probes, mounted on a frame, to a pair of remote probes. The resistance is measured between the probes and can identify buried remains when compared to the background resistance. Cut features that have been subsequently infilled tend to be more moisture retentive and thereby less resistant to the current. These features manifest as low resistance anomalies. Structural remains or buried megaliths are more resistant to the current flow and are seen as high resistance features.

10.10 Methodology: a Geoscan Research RM15 resistivity meter will be employed. The standard methodology for an electrical resistance survey is to have four mobile probes mounted horizontally on a frame at a distance of 0.5m apart. These probes literally make contact with the ground and will produce a depth of penetration of approximately 0.5m-1.0m. The data are captured in the internal memory of the RM15 and then downloaded to a portable computer. The survey area will be divided into the same 30m grid system also used for the magnetic survey, and whichever size is deemed more suitable to the site conditions. Within this grid system, sampling will be at 1.0m intervals on a 1.0m traverse separation.

11 TEST PIT EXCAVATION

11.1 OA North will supervise the excavation of the test pits which will entail test pits of nominal size (depending upon the nature of the results of the surveys and desk-based assessment but probably no bigger than 2m by 2m) to be able to be excavated and completed over the course of five working days. The final layout and number of the test pits will be finalised after the results of the surveys have been analysed. In practice, the number of test pits will be dependent upon the numbers of participants, and it is anticipated that this will entail a flexible approach, whereby small pits will be opened initially and can then be expanded or additional areas opened as the work progresses.

11.2 The following section outlines a methodology for the undertaking of the excavations. Although the ultimate aim is to try to identify the riding school, a major emphasis for the excavation will be upon providing training, and providing a valuable experience for the participants, rather than undertaking extensive areas of excavations to tight timetables. While it is important that all areas opened are fully excavated, the extent of the excavation areas will be defined so as to ensure that the participants can comfortably complete these areas within the time allowed. At the end of the excavation backfilling will be the responsibility of National Trust.

11.3 It is anticipated that there will be two professional archaeologists supervising the excavations, and that there will be a ratio of four or five participants for every professional per day.

11.4 Site Preparation and Preliminary Survey: prior to the commencement of any work, a risk assessment will be compiled by the OA North Project Director. The initial element of the fieldwork will comprise the establishment of survey control using survey grade GPS and/ or

total station. Gazebos/ tents may be erected on site to provide cover immediate to the site. The on site welfare facilities will be used throughout the project.

11.5 Survey Control: survey control will be established during the topographic survey phase (Section 3.6.3).

11.6 Turf Clearance and Excavation: at the outset and if necessary, the turf will be carefully removed from the excavation areas by manual techniques and will be stored separately from the spoil and adjacent to the excavation on tarpaulins/ terram. Areas of understory may need to be cleared prior to commencement.

11.7 All excavation will be carried out using exclusively manual techniques. Spoil from the excavation will be stored at a location adjacent to each site. Structural remains will be cleaned to define their extent, nature, form and, where possible, date. It should be noted that no archaeological deposits will be entirely removed from the site. It is not anticipated that excavation in any of the pits will proceed below a depth of 1.2m, although should this be considered necessary, then the pits will be widened sufficiently to allow the sides to be stepped in or battered back to a safe angle of repose.

11.8 All information identified in the course of the site works will be recorded stratigraphically, using a system adapted from that used by the Centre for Archaeology Service of English Heritage. Results of the evaluation will be recorded on pro-forma context sheets, and will be accompanied with sufficient pictorial record (plans, sections and both black and white and colour photographs) to identify and illustrate individual features. Primary records will be available for inspection at all times.

11.9 A full and detailed photographic record of individual contexts will be maintained and similarly general views from standard view points of the overall site at all stages of the evaluation will be generated. Photography will be undertaken using D-SLR cameras and will be undertaken throughout the course of the fieldwork. Photographs records will be maintained on special photographic pro-forma sheets.

11.10 Planning: the precise location of all archaeological structures encountered will be surveyed by a combination of manual techniques using a planning frame or using a total station. All survey drawings will be completed by manual draughting techniques on site. This process will ultimately generate scaled plans within an AutoCAD system, which will then be refined by manual draughting by local community volunteers. The drawings will be generated at an accuracy appropriate for 1:20 scale, but can be output at any scale required. Sections will be manually drafted as appropriate at a scale of 1:10. All information will be tied in to Ordnance Datum. On completion of the excavations aerial photographs will be taken of each pit using a photographic mast and/ or UAV if tree cover allows.

11.11 Backfilling: the excavation areas will be backfilled by the National Trust.

11.12 Finds policy: finds recovery and sampling programmes will be in accordance with best practice (following current Chartered Institute of Field Archaeologists (CIfA) guidelines) and subject to expert advice in order to minimise deterioration. OA has close contact with Ancient Monuments Laboratory staff at the University of Durham and, in addition, employs in-house artefact and palaeoecology specialists, with considerable expertise in the investigation, excavation, and finds management of sites of all periods and types, who are readily available for consultation.

11.13 Finds storage during fieldwork and any site archive preparation will follow professional guidelines (UKIC). Emergency access to conservation facilities is maintained by OA North with the Department of Archaeology, the University of Durham. Samples will also be collected for technological, pedological and chronological analysis as appropriate.

11.14 Human remains are not expected to be present, but if they are found they will, if possible, be left in situ covered and protected. If removal is necessary, then the relevant Home Office permission will be sought, and the removal of such remains will be carried out with due care and sensitivity as required by the Burials Act 1857.

11.15 Any gold and silver artefacts recovered during the course of the excavation will be removed to a safe place and reported to the local Coroner according to the procedures relating to the Treasure Act, 1996.

12 POST-EXCAVATION WORK

12.1 An archive for the project will be prepared during and immediately following the fieldwork programme for and a summary forwarded to the HER. The results of the excavation will form the basis of a full archive to professional standards, in accordance with current Historic England guidelines. The project archive represents the collation and indexing of all the data and material gathered during the course of the project. The deposition of a properly quantified, ordered, and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the CIfA.

12.2 An interim report will be compiled at the end of the excavation. It will present, summarise, and interpret the results of the programme. It will include an index of archaeological features identified in the course of the project, with an assessment of the site's development. It will incorporate appropriate illustrations, including copies of the site plans and section drawings all reduced to an appropriate scale.

12.3 Initial finds processing will, as far as possible, be carried out on site by volunteers. This may involve the initial processing and cataloguing of finds, cross-checking site records, preparing phase plans, and checking all drawings. Participants will be encouraged to contribute any fresh research information, which may be incorporated into the final report.

13 REPORT PRODUCTION

13.1 Final Report: an interim statement outlining the results of the desk-based assessment, topographic and geophysical surveys will be produced upon completion of this work. The final report will present, summarise, and interpret the results of the programme detailed above, and will include the following.:

- a front cover to include the NGR and the client
- the dates on which the fieldwork was undertaken
- acknowledgements and the names of all contributors to the project including all the volunteers
- a description of the project and methodology
- a summary of the historical background
- results of the topographic and geophysical surveys
- results of the excavation work
- specialist reports on the assessment of the samples and artefactual assessment if necessary
- assessment of the significance of the historic environment remains
- a complete bibliography of sources from which data has been derived
- a copy of this project design, and indications of any agreed departure from that design
- a list of the archive contents

13.2 The report will incorporate appropriate illustrations as defined in the invitation to tender document, including copies of the site plans, and detailed survey plans, all reduced to an appropriate scale. The site mapping will be based upon the CAD base. The report will be

accompanied by photographs and historic illustrations illustrating the principal elements of the landscape.

13.3 Final Report: the final report will incorporate all the results of the work including the watching brief. It will be in a similar format to the interim report.

13.5 Editing and submission: the report will be subject to the OA North's stringent editing procedure; then a draft will be submitted to the client for consultation. A summary of the work will be provided for OASIS.

14 OTHER MATTERS

14.1.1 Access and Welfare: access for the site will be negotiated with National Trust. Access to the sites for excavation will allow for the use of a vehicle to gain access. Welfare facilities will be provided for the staff and volunteers by National Trust.

14.1.2 Health and Safety: full regard will be given to all constraints during the work, as well as to all Health and Safety considerations. The OA North Health and Safety Statement conforms to all the provisions of the SCAUM (Standing Conference of Unit Managers) Health and Safety manual. Risk assessments are undertaken as a matter of course for all projects, and will anticipate the potential hazards arising from the project. A detailed and specific risk assessment will be undertaken in conjunction with the client prior to commencement.

14.1.3 Insurance: insurance in respect of claims for personal injury to or the death of any members of the public in the course of the project will be covered by OA North, who has insurance cover which complies with the employers' liability (Compulsory Insurance) Act 1969 and any statutory orders made there under. For all other claims to cover the liability of OA North in respect of personal injury or damage to property by negligence of OA North. The insurance cover is as follows:

- £10 million public liability
- £10 million employer's liability
- £5 million professional indemnity

15 OA NORTH PROJECT TEAM

15.1 Project Management: the project will be under the project management of Karl Taylor, BSc (Hons) ACIfA (OA North Project Manager) to whom all correspondence should be addressed. Karl is a very experienced buildings archaeologist, who has undertaken or managed literally hundreds of surveys throughout Northern England, and has considerable experience of working on similar projects to that proposed. He is a member of the Institute for Historic Building Conservation (IHBC) and the Society of Architectural Historians of Great Britain (SAHGB). He has managed many very diverse projects most of which are predominantly building survey orientated. Karl is also a very experienced geophysical surveyor and will direct the geophysical survey. Karl has worked for several high profile geophysical survey contractors including Stratascan and Phase Site investigations.

15.2 Desk-Based Assessment: the desk-based assessment will be directed by Andy Phelps BA (Hons) MA, who is very experienced buildings archaeologist. He has a great deal of experience in the survey, recording and interpretation of historic buildings, having undertaken a diverse range of projects. These include nineteenth century farm complexes, textile mills, glass houses, eleventh century churches, lighthouses, bridges, lock keepers cottages, and bothies and hospitals to name but a few. Recent highlights include the completion of surveys upon a mid eighteenth century canal workshop in Glasgow, believed to be the earliest canal related structure in Scotland, and a nineteenth century steamer terminal at Ardrishaig in western Scotland, which demonstrated the early use of concrete in the area. Most recently he has completed work upon an important example of a nineteenth century pavilion style hospital and written up the survey of a unique

late eighteenth century viewing station in the Lake District. He has also undertaken statements of significance on buildings ranging from the Bishops Palace in Norwich to urban Methodist chapels, to an early seventeenth century manor house near Burnley.

15.3 Excavation Director: the excavations will be directed by Jeremy Bradley BA Hons (OA North Project Officer) who has a wide range of archaeological experience, gained over the last 20 years, on both rural and urban sites, and on evaluations and open-area excavation, including large infra-structure projects such as the Wasdale (2012) pipeline. Other projects Jeremy has directed include three campaigns of field work at Furness Abbey Presbytery between 2009-11 and other medieval sites such as Clitheroe Castle sites and Penrith New Squares. Jeremy's chosen area specialism is the medieval period, particularly the study of medieval pottery in the North West. Work on medieval pottery has included a significant assemblage from a pottery production site at Samlesbury, Lancashire and urban assemblages from Carlisle, both of which have been published. Jeremy worked as a Project Officer for Humber Field Archaeology between 1999-2005, which involved supervising all levels of archaeological excavation, post-excavation analysis on sites in Hull, east Yorkshire and North Lincolnshire.

15.4 UAV Survey: this will be carried out by Jamie Quatermaine and Pete Schofield. Jamie is a very experienced landscape surveyor, who has undertaken or managed literally hundreds of surveys throughout Northern England since 1984, and has considerable experience of working on similar projects to that proposed. He has managed a major recording programme of Lyme Park, Cheshire, and very detailed surveys of the South West Fells including areas such as Barnscar and Burnmoor. He has also undertaken surveys of Lowther Park, Cumbria, Rufford Park, Lancashire and has also managed the recording programme of Lathom Hall and Park, Lancashire and the survey of the Forest of Bowland for United Utilities. He has been a project manager since 1995 and has managed over 250 very diverse projects since then, which are predominantly survey orientated, but of all periods from the Palaeolithic to the twentieth century.

15.5 Jamie is a qualified land surveyor (Topographic Sciences Diploma Glasgow University) and has an exhaustive knowledge and understanding of surveying techniques. He regularly runs training courses in survey techniques and has the expertise to devise a variety of low tech survey techniques for training volunteers.

15.6 Pete works full time on landscape surveys across the north-west. He has undertaken surveys at Hardknott Forest, Cumbria, Hartley Fold Estate, Cumbria, Ennerdale Valley, West Cumbria, a major programme of landscape survey across nine upland areas in North Wales, Little Asby Common for the Friends of the Lake District, and the Holwick and Force Garth surveys, Teesdale. With the exception of Jamie Quartermaine, he is our most experienced landscape archaeologist.

15.7 Geophysical Survey: the geophysical survey will be directed by Karl Taylor and carried out in the field by Mike Birtles BSc (Hons), MSc. Mike is an experienced surveyor and carries out all of OA North's in-house surveys. Mike has carried out surveys on diverse sites from Ambleside Roman Fort to sites in the Ribble Valley under the auspices of the University of Central Lancs.

APPENDIX 2: FINDS CATALOGUE

Test pit	Context	Material	Quant	Identification	Description	Wt (g)
20	***2002***	bone	1	burnt bone	burnt/calcined bone fragment	1
7	***703***	cbm	1	brick	Incomplete brick, possible waster. Corner of brick present with one face distorted (61mm thick). Sanded base	981
10	***1002***	cbm	1	brick	Half brick sandy fabric. Grass impressions. 64mm thick, 115mm wide	1302
41	***4102***	cbm	1	kiln fabric/brick	Possible kiln fabric with rod impression, grass impressions, and flat surface	243
8	***801***	ceramic	1	flatware	Pearlware fragment, c 1780-1830	6
18	***1801***	ceramic	1	flatware	Refined white earthenware, Willow pattern transfer, c 1820+	9
18	***1801***	ceramic	1	tobacco pipe	Tobacco pipe stem. Not closely datable	2
33	***3003***	ceramic	1	tobacco pipe	Tobacco pipe bowl fragment (thin walled c 3mm), milling visible. Mid-seventeenth to mid eighteenth century	1
32	***3201***	ceramic	1	tobacco pipe	Tobacco pipe stem. Not closely datable	2
32	***3201***	ceramic	1	tobacco pipe	Tobacco pipe bowl, partial milling around stem, casting seam visible, heal missing. Mid- to late-seventeenth century	6
42	***4201***	ceramic	1	tobacco pipe	Tobacco pipe stem. Not closely datable	3
7	***701***	ceramic	1	vessel	Refined white earthen ware Willow pattern fragment. 1820+	1
15	***1501***	ceramic	6	vessel	Cream ware vessel (rilled). Hollow ware, c 1760-1820	36
29	***2902***	ceramic	1	vessel	White salt glazed stoneware, small jar rim and shoulder, c 1720-1760	6
38	***3803***	ceramic	1	vessel	Dark glazed earthenware body sherd, glossy glaze. Eighteenth century	6
40	***4003***	ceramic	2	vessel	Dark glazed earthenware body sherd, glossy glaze. Eighteenth century	18
41	***4102***	ceramic	1	vessel	Dark glazed earthenware body sherd, glossy glaze. Eighteenth century	9
41	***4103***	ceramic	1	vessel	Brown stoneware freckled glaze, German or English. Late seventeenth to late eighteenth century	6
42	***4201***	ceramic	1	vessel	Tin glazed earthen ware	1

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					(small fragment, < 20mm). Circa 1710-1780	
44	***4403***	ceramic	1	vessel	Dark glazed earthenware body sherd, glossy glaze. Mid- to late-eighteenth century	4
19	***1902***	glass	1	industrial residue	Green glass slag/melted glass	2
7	***701***	glass	2	vessel	Green vessel glass (1.5mm thickness) contains impurities	4
8	***801***	glass	2	vessel	Green vessel glass, impurities present, with rough, pitted exterior	13
10	***1001***	glass	6	vessel	Fragments of green vessel glass (bubbles vissible)	10
31	***3102***	glass	1	vessel	Green vessel glass, contains impurities	3
10	***1001***	glass	1	window	Green glass, c 1.5mm thickness	1
18	***1801***	glass	1	Window	Colourless window glass, no imprities, c 1mm thick. Eighteenth century +	1
29	***2902***	glass	1	window	Colourless window glass, 1.5mm thickness. Eighteenth century +	1
39	***3901***	glass	3	Window	Green window glass, c 1mm thickness	2
42	***4201***	iron	1	knife	Possible knife blade. Abundant corrosion deposits	67
42	***4201***	iron	2	Nail	Complete square sectioned nail (broken)	17
19	***1903***	stone	2	roof tile	Roof tile fragments. Micaceous sandstone. 8mm thick	147
40	***4000***	stone	1	Roof tile	Roof tile fragment. Micaceous sandstone. 15mm thick, 177mm by 102mm	433

APPENDIX 3 CONTEXT INDEX

Test pit	**Context number**	**Context type**	**Interpretation**
1	***101***	Deposit	Topsoil
1	***102***	Deposit	Subsoil
1	***103***	Deposit	Natural
2	***201***	Deposit	Topsoil
2	***202***	Deposit	Subsoil
2	***203***	Deposit	Natural sand
3	***301***	Deposit	Topsoil
3	***302***	Deposit	CBM/silt layer
3	***303***	Deposit	Subsoil
3	***304***	Deposit	Natural sand
4	***401***	Deposit	Topsoil
4	***402***	Deposit	Sand layer with square charcoal rich lens
4	***403***	Deposit	Subsoil
4	***405***	Deposit	Natural sand
5	***501***	Deposit	Topsoil
5	***502***	Deposit	Sand layer
5	***503***	Deposit	Subsoil
5	***504***	Deposit	Heat affected sand
5	***505***	Deposit	Natural sand
6	***601***	Deposit	Topsoil
6	***602***	Deposit	Clinker layer
6	***603***	Deposit	CBM layer
6	***604***	Deposit	Sand layer
6	***605***	Deposit	Heat affected sand
6	***606***	Deposit	Natural sand
7	***701***	Deposit	Topsoil

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7	***702***	Deposit	Clinker layer
7	***703***	Deposit	Sand and CBM layer
7	***704***	Cut	Cut connected with clamp kiln
7	***705***	Deposit	Sand layer containing CBM and charcoal
7	***706***	Deposit	Natural sand
8	***801***	Deposit	Topsoil
8	***802***	Deposit	CBM Layer
8	***803***	Deposit	CBM Layer
8	***804***	Deposit	CBM Layer
9	***901***	Deposit	Topsoil
9	***902***	Deposit	Subsoil
9	***903***	Deposit	Natural sand
10	***1001***	Deposit	Topsoil
10	***1002***	Deposit	Subsoil
10	***1003***	Deposit	Subsoil
10	***1004***	Cut	Possible pit
10	***1005***	Deposit	Natural sand
11	***1101***	Deposit	Topsoil
11	***1102***	Deposit	Subsoil
12	***1201***	Deposit	Topsoil
12	***1202***	Deposit	Subsoil
13	***1301***	Deposit	Topsoil
13	***1302***	Deposit	CBM Layer
13	***1303***	Deposit	Subsoil
13	***1304***	Deposit	Fill of ***306*** (CBM fragments)
13	***1305***	Deposit	Subsoil
13	***1306***	Deposit	Cut feature (use not determined)
14	***1401***	Deposit	Topsoil

14	***1402***	Deposit	Subsoil
14	***1403***	Deposit	Natural sand
15	***1501***	Deposit	Topsoil
15	***1502***	Deposit	Fill of ***1503***
15	***1503***	Cut	Cut (use not determined)
15	***1504***	Deposit	Natural sand
16	***1601***	Deposit	Topsoil
16	***1602***	Deposit	Fill of ***1603***
16	***1603***	Cut	Cut (use not determined)
16	***1604***	Deposit	Layer
16	***1605***	Cut	Cut (use not determined)
16	***1606***	Deposit	Fill of ***1605***
17	***1701***	Deposit	Topsoil
17	***1702***	Deposit	Subsoil
17	***1703***	Deposit	Subsoil
17	***1704***	Deposit	Clay
18	***1801***	Deposit	Topsoil
18	***1802***	Deposit	Clinker layer
18	***1803***	Deposit	Subsoil
18	***1804***	Deposit	Sand and clay layer
18	***1805***	Deposit	Layer containing clinker
19	***1901***	Deposit	Topsoil
19	***1902***	Deposit	Clinker layer
19	***1903***	Deposit	CBM layer
19	***1904***	Deposit	Natural sand
20	***2001***	Deposit	Topsoil
20	***2002***	Deposit	Clinker layer
20	***2003***	Deposit	Subsoil

20	***2004***	Deposit	Fill of ***2004***
20	***2005***	Deposit	Clay natural
20	***2006***	Cut	Cut (use not determined)
21	***2101***	Deposit	Topsoil
21	***2102***	Deposit	Clinker layer
21	***2103***	Deposit	Fill of ***2104***
21	***2104***	Cut	Cut (use not determined)
21	***2105***	Deposit	Natural sand
22	***2201***	Deposit	Topsoil
22	***2202***	Deposit	Clinker layer
22	***2203***	Deposit	Subsoil
22	***2204***	Deposit	Natural sand
23	***2301***	Deposit	Topsoil
23	***2302***	Deposit	Subsoil
23	***2303***	Deposit	Natural sand
24	***2401***	Deposit	Topsoil
24	***2402***	Deposit	Subsoil
24	***2403***	Deposit	Subsoil
24	***2404***	Deposit	Natural sand
25	***2501***	Deposit	Topsoil
25	***2502***	Deposit	Upper fill of ***2505***
25	***2503***	Deposit	Subsoil
25	***2504***	Deposit	Lower fill of ***2505***
25	***2505***	Cut	Cut. Possible robbed out foundation
25	***2506***	Deposit	Natural sand
26	***2601***	Deposit	Topsoil
26	***2602***	Deposit	Subsoil
26	***2603***	Deposit	Natural sand

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27	***2701***	Deposit	Topsoil
27	***2702***	Deposit	Subsoil
27	***2703***	Deposit	Natural sand
28	***2801***	Deposit	Topsoil
28	***2802***	Deposit	Subsoil
28	***2803***	Deposit	Natural sand
29	***2901***	Deposit	Topsoil
29	***2902***	Deposit	Subsoil
29	***2903***	Deposit	Clay layer
29	***2904***	Deposit	Fill of ***2906***
29	***2905***	Deposit	Brick fragments
29	***2906***	Cut	Cut (use not determined)
30	***3001***	Topsoil	Topsoil
30	***3002***	Deposit	Clinker layer
30	***3003***	Deposit	Subsoil
30	***3004***	Deposit	Clay layer
30	***3005***	Deposit	Natural sand
31	***3101***	Deposit	Topsoil
31	***3102***	Deposit	Subsoil
31	***3103***	Deposit	Natural sand
32	***3201***	Deposit	Topsoil
32	***3202***	Deposit	Subsoil (contains CBM and charcoal)
32	***3203***	Deposit	Subsoil
32	***3204***	Deposit	Natural sand
33	***3301***	Deposit	Topsoil
33	***3302***	Deposit	Subsoil
33	***3303***	Deposit	Clay layer
33	***3304***	Deposit	Natural sand and clay

34	***3402***	Deposit	Topsoil
34	***3403***	Deposit	Subsoil
34	***3404***	Deposit	Clay layer
35	***3501***	Deposit	Topsoil
35	***3502***	Deposit	Clinker layer
35	***3503***	Deposit	CBM layer
35	***3504***	Deposit	CBM layer
35	***3505***	Deposit	Natural sand
36	***3601***	Deposit	Topsoil
36	***3602***	Deposit	Clinker layer
36	***3603***	Deposit	Subsoil
36	***3604***	Deposit	Natural sand
37	***3701***	Deposit	Topsoil
37	***3702***	Deposit	Subsoil
37	***3703***	Deposit	CBM layer
37	***3704***	Deposit	Natural sand
38	***3801***	Deposit	Topsoil
38	***3802***	Deposit	Subsoil
38	***3803***	Deposit	CBM layer
38	***3804***	Deposit	Natural sand
39	***3901***	Deposit	Topsoil
39	***3902***	Deposit	Subsoil
39	***3903***	Deposit	Fill of ***3904***
39	***3904***	Cut	Cut (use not determined)
39	***3905***	Deposit	Natural sand
40	***4001***	Deposit	Topsoil
40	***4002***	Deposit	Clinker layer
40	***4003***	Deposit	Subsoil

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40	***4004***	Deposit	Natural sand
41	***4101***	Deposit	Topsoil
41	***4102***	Deposit	Subsoil congaing frequent pebbles and charcoal
41	***4103***	Deposit	Subsoil
41	***4104***	Deposit	Subsoil
41	***4105***	Deposit	Natural sand
42	***4201***	Deposit	Topsoil
42	***4202***	Deposit	Subsoil
42	***4203***	Deposit	Natural sand
43	***4301***	Deposit	Topsoil
43	***4302***	Deposit	Clinker and CBM layer
43	***4303***	Deposit	Relict topsoil
43	***4304***	Deposit	Sand and clay layer
44	***4401***	Deposit	Topsoil
44	***4402***	Deposit	Subsoil
44	***4403***	Deposit	Clay layer
44	***4404***	Deposit	Sand and clay layer
45	***4501***	Deposit	Topsoil
45	***4502***	Deposit	Clinker layer
45	***4503***	Deposit	Subsoil
45	***4504***	Deposit	Heat affected sand
45	***4505***	Deposit	Natural sand
46	***4601***	Deposit	Topsoil
46	***4602***	Deposit	Clinker layer
46	***4603***	Deposit	Fill of ***4610***
46	***4604***	Deposit	Sand layer
46	***4605***	Deposit	Sand layer
46	***4606***	Deposit	Sand layer

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46	***4607***	Deposit	Heat affected sand
46	***4608***	Deposit	Natural sand
46	***4609***	Deposit	Fill of ***4611***
46	***4610***	Cut	Cut (use not determined)
46	***4611***	Cut	Cut (use not determined)
47	***4701***	Deposit	Topsoil
47	***4702***	Deposit	Clinker layer
47	***4703***	Deposit	CBM layer
47	***4704***	Deposit	Sand layer
47	***4705***	Deposit	Sand layer
47	***4706***	Deposit	Natural sand
48	***4801***	Deposit	Topsoil
48	***4802***	Deposit	CBM layer
48	***4803***	Deposit	Sand layer
48	***4804***	Deposit	Natural sand
49	***4901***	Deposit	Topsoil
49	***4902***	Deposit	Subsoil
49	***4903***	Deposit	Natural sand
50	***5001***	Deposit	Topsoil
50	***5002***	Deposit	Subsoil
50	***5003***	Deposit	Surface
50	***5004***	Deposit	Bedding layer for Surface ***5003***
50	***5005***	Deposit	CBM layer
51	***5101***	Deposit	Topsoil
51	***5102***	Deposit	Subsoil
51	***5103***	Deposit	Surface

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