A Gradiometer Survey of land to the north of ‘The Oval’, Rose Hill, Oxford

For The East Oxford Archaeology and History Project

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heritage lottery fund
UNIVERSITY OF OXFORD
DEPARTMENT FOR Continuing Education

1. Summary Of Results.

The East Oxford Archaeology and History Project conducted 3.4 hectares of gradiometer survey on land to the north and east 'The Oval' in summer 2012. The survey produced evidence of a post-medieval track way and boundary, as well as hints of medieval or post-medieval ridge and furrow cultivation. High levels of magnetic 'background noise' caused by both surface and subsurface ferrous items made the isolation of genuinely archaeological magnetic anomalies very difficult. Despite the site being within an area of known prehistoric, Roman-British and Saxon activity, no features of this date were identified in the survey data.

2. Introduction.

2.1 Background.

The survey was carried out as one of a number of geophysical surveys undertaken by the East Oxford Archaeology and History Project or ARCHEOX. ARCHEOX is a community archaeology project hosted by Oxford University's Department for Continuing Education, and funded by the Heritage Lottery Fund and Oxford University's John Fell Fund. The site was chosen as a survey location as it is one of the largest open spaces in the project's study area, it also lies within an area with known, Neolithic, Iron Age, Romano-British and Saxon activity.

2.2 Survey Aims

The survey was carried out with 2 principle aims:

- To locate and map archaeological subsurface archaeological features in one of the largest green spaces in East Oxford
- To train project volunteers in gradiometer survey techniques

2.3 Survey Location

The site is located on Rose Hill on the western edge of East Oxford. Rose Hill is a raised hilltop on the western end of a ridge of high ground projecting south-west from Shotover Hill (see figure 1). Ground drops away on three sides of the site; west towards the Thames flood plain, north towards the Boundary Brook/Cowley Marsh and south towards the Northfield/Littlemore Brook (see figures 1 and 2).

2.4 Description of the survey area

The survey covers an area of approximately 3.4 hectares spanning three fields designated areas A, B and C (see figure 4):

- Area A Rose Hill Primary School playing field (Oxfordshire County Council)
- Area B Rose Hill playing field (Oxford City Council)
- Area C Rose Hill recreation ground (Oxford City Council)

The majority of the survey area comprises relatively level mown grass and is thought to reflect substantially unmodified natural topography at between 84 and 88m OD. The southern half of area B has been substantially modified by the construction a levelled football pitch. The whole site is underlain by solid geology of the Ampthill Clay Formation of Jurassic date (see figure 3).

2.5 Survey area history and archaeological potential

No previous archaeological investigation has been carried out within the footprint of survey. The survey area lies in the historic parish of Iffley, between the historic settlements of Iffley (500m to the west), Church Cowley (1km to the north-east) and Littlemore (1km to the south-east). The Rose Hill estate was constructed on a

greenfield site in the mid-1930s and the survey area appears to have survived in a relatively unmodified state until the construction of Rose Hill Primary School and its playing fields in the 1950s/60s. This resulted in the removal of the north/south track way (area A) and southwest/northeast running field boundary (areas A and B).

There are no recorded archaeological finds from the within the footprint of the survey area, however a number of archaeological finds are known from within a 500m radius of the site including:

- A small quantity of worked flints of probable Neolithic or Early Bronze Age date is known from the area (Oxford City Council 2011a, figure 3)
- A focus of Iron Age activity in the Ellesmere Road/Rose Hill Road area approximately 200-300m west of the survey area (Oxford City Council 2011b). This includes an early to mid-Iron Age enclosed settlement at the King of Prussia/Cooperative supermarket site on Rose Hill Road (Gilbert 2008).
- The survey area is within a wider area of Romano-British ceramic industry in East Oxford. Kiln sites, burials and settlement activity have been recorded in the same Ellesmere Road/Rose Hill Road area outlined above (Oxford City Council 2011c). Roman ceramics have also been recovered from ARCHEOX test pits on the northern slopes of Rose Hill (Lee 2012)
- An Anglo-Saxon Brooch was discovered in the Abberbury Road area approximately 200m north-west of the survey area (Lee 2012).

A combination of its proximity to these finds and its hilltop location suggested that the survey area had good potential for locating archaeological features.

3. Methodology

3.1 Date of fieldwork

Fieldwork was carried out in summer 2012. Area A was surveyed on the weekend of 5/6th May 2012. Areas B and C were surveyed during the week of 18/24th June 2012.

3.2 Grid Location

The location of the survey is shown in figure 4. The survey was based on a series of 30x30m grids. Survey grids were established in the field using a Leica Smart Rover RTK GPS to within +/- 0.01m of the Ordnance Survey National Grid. The co-ordinates for the survey grid pegs are given in appendix 1.

3.3 Survey Configuration

Date of survey	May – June 2012
Grid size	30x30m
Area of survey	3.4ha
Traverse direction	North/south
Traverse separation	1m
Reading interval	0.25m
Instrument type	Fluxgate gradiometer
Instrument model	Bartington Instruments Area A Grad 601 (1), Area B Grad 601 (2)
Sensor element separation	1m
Number of sensors	Area A x1, Areas B and C x2

Sensor separation	Area A n/a, Areas B and C 1m
Sample range	1nT
Processing software	Geoplot version 2.5.16
Processes	clip (1 SD), despike, destagger (-2 intervals), destripe (median), interpolate (x), interpolate (y), clip (2 SD), compress (log scale)

3.4 Data collection and volunteers

One of the main reasons for undertaking the survey was to train a group of volunteers in gradiometer survey. As a result survey data was collected by a number of individuals, both project staff and volunteers, with a wide range of experience in gradiometer survey. To ensure high standards of data collection the collection speed of the gradiometer was varied to suit the pace of each individual, and data was collected along beaded traverse lines. The instrument was re-zeroed between users, and all data was collected under the close supervision of project staff. Each new operator was scanned prior to using the gradiometer to maintain a consistently high level of magnetic hygiene. The location, traverse configuration and name of operator were recorded in the field for each grid surveyed. When necessary grids affected by poor data collection or poor magnetic hygiene were recollected.

3.5 Processing and presentation of results.

Survey data was downloaded to a laptop computer, roughly processed and checked for operator error on site. Data was then backed up to a networked desktop computer at the end of each day. Data was downloaded, assembled and processed using Archeosurveyor version 2.5.16.0. Full processing of the data was undertaken on completion of the survey using the clip, despike, destagger, interpolate and compress processes in Archeosurveyor. Once processed data was exported to ArcGIS 10.0 as a georeferenced ASCII file and combined with other datasets for presentation

3.6 Interpretation

Unprocessed data is shown in figure 5 (greyscale image) and in figure 6 (stacked trace). Once processed magnetic anomalies were digitised and assigned to one of the following five interpretative categories (see figures 8 to 10).

- Archaeology: Magnetic anomalies considered to be definitely archaeological in origin on either morphological grounds or correlation with features shown on historic mapping. Shown in dark blue in figures 8-10.

- Possible archaeology: Magnetic anomalies considered on morphological grounds to be possibly archaeological in origin (less certain than ‘archaeology’). Shown in light blue in figures 8-10.

- Ferrous material: extremely strong magnetic anomalies, either discrete (caused by a single ferrous item) or linear (caused by ferrous services e.g. pipes/cables). Shown in yellow in figures 8-10.

- Made ground: the foot print of a football pitch in the southern half of area B built up approximately 0.5m above undisturbed ground level. Shown in light green in figures 8-10)

- Trend: weak linear trends in the survey results

Anomalies of particular interest have been assigned identifying numbers and are discussed at greater length in section 4 below and are illustrated on figure 9.

4. Results

4.1 Ferrous anomalies

The survey results are dominated by strongly magnetic anomalies caused by ferrous structures and materials. This includes features that are obvious on the surface (e.g. the metal fencing that surrounds and separates each of the survey areas, park furniture and floodlight pylons). It also includes identifiable sub-surface features such as goal post foundations and buried cables, as well as a range of amorphous unidentifiable spreads of highly magnetic material. Although the items/features that cause these anomalies are likely to be small in size, they create significant areas of magnetic interference which make it difficult to detect the more subtle magnetic signatures of buried archaeological features. This is an issue across most of the survey area and is particularly problematic in the western area of Area A, most of Area B and all but the core of Area C (see figures 8 and 9). It is thought likely that the majority of the strongly magnetic anomalies in the survey area are 20th/21st century in origin and relate to the construction and use of Rose Hill primary school and playing field (Area A), the use of areas B and C as sports fields/ recreation grounds, as well as a build-up of lost or discarded ferrous material in an area that has been proximal to suburban development since the 1930s.

4.2 Archaeological features

A small number of archaeological features of probable post-medieval date were identified within the survey area.

Removed field boundary (features A and B)

A removed field boundary shown on the Iffley enclosure map c. 1830, Ordnance Survey mapping until the 1930s and a 1945 vertical aerial photograph, can be seen as a linear anomaly (features 1, 2 and 3) running approximately west/east across survey areas A and B. The feature is partially picked out by a linear series of ferrous anomalies. It is thought likely that this ferrous material was pushed into a boundary ditch when the boundary was removed in the 1950s.

Track way (feature C)

The western side of a track way, shown on the Iffley enclosure map c. 1830, Ordnance Survey mapping until the 1930s and a 1945 vertical aerial photograph, can be seen as a linear anomaly (feature 4) to the south of, and perpendicular to, removed filed boundary (features 1-3) in the western part of Area A. Much of this feature is overlain by the western edge of an arc of magnetic anomalies relating to a former athletics track on the school playing fields. However, there are hints of a linear feature possibly making the eastern side of the track way running parallel with, and approximately 10m to the east of, feature 4

4.3 Possible archaeological features

A small number of less distinct ‘possible’ archaeological features were also identified. It is worth emphasising that due to the very ‘noisy’ background against which the survey data was collected, there is an inherent bias in the ‘possible

archaeology' class towards larger and linear anomalies, and away from smaller point focused anomalies. This class of features consists of several fragmentary linear features in Areas A, B and C, as well as two broader areas of disturbance in Areas A and B (features 5 and 6). Features 5 and 6 are characterised by fewer traces of ferrous material and deviate away from discernable trends amongst the broader distribution of ferrous material. No attempt has been made to assign a date to these features. However, should any invasive archaeological work be become necessary within the survey areas features 5 and 6 would be good candidates for further investigation.

4.4 Ridge and furrow

A number of faint linear trends are apparent in Areas A and B. All run approximately parallel with removed field boundary (1-3) and perpendicular to track way (4). These features are parallel with a series of very slight linear earthworks apparent in LiDAR data of the survey area (see figure 12). These features are considered likely to be much the much denuded remnants of a ridge and furrow cultivation system of Medieval or Post-Medieval date.

5. Discussion.

As with many of the other gradiometer surveys carried out as part of the ARCHEOX project the significant amount of 'back ground noise' caused by modern ferrous items has made it very difficult to detect more subtle archaeological features within the Rose Hill survey area. The only certain archaeological features identified by the survey relate to post-medieval features removed in the 1950s. Slight traces of ridge and furrow, of medieval or post-medieval date, are the oldest features to have been confidently identified through a combination of gradiometer survey and LiDAR data. Neolithic, Iron Age, Romano-British and Saxon activity has been identified close to the survey area, however, no traces of such activity have been identified in the current survey area. Whilst it is possible that some of the smaller unassigned anomalies may be early in date it has not been possible to distinguish between them and modern features with any degree of confidence. The proximity to the site of known Romano-British pottery industry is a case in point. It is not impossible that some of the highly magnetic anomalies recorded by the survey may be caused by kilns and spreads of highly fired material rather than modern ferrous material.

The results of this survey are far from conclusive. Should further archaeological investigation or other intrusive works be undertaken in the survey area it is recommended to reanalyse targeted areas of the current survey data for unidentified features. In a suburban area with such high levels of background magnetic noise it is suggested that that targeted earth resistance survey might be useful to further elucidate some of the anomalies recorded by the current survey.

References

Gilbert, D, 2008 An Archaeological Evaluation at the King of Prussia, Rose Hill, Oxford. John Moore Heritage Services. Unpublished report.

Lee, T. 2012. East Oxford Archaeology Project Test Pit 32, 24 Abberbury Road. Available online at https://www.archeox.net/sites/www.archeox.net/files/reports/EOXP%20TEST%20PIT%2032_Abberbury%20Road.pdf

Oxford City Council. 2011a. ‘Oxford Archaeological Resource Assessment: The Neolithic and Bronze Age’. Available online at http://consultation.oxford.gov.uk/consult.ti/OARAAC/ (downloaded 13/08/2013).

Oxford City Council. 2011b. ‘Oxford Archaeological Resource Assessment: The Iron Age’. Available online at http://consultation.oxford.gov.uk/consult.ti/OARAAC/ (downloaded 13/08/2013).

Oxford City Council. 2011c. ‘Oxford Archaeological Resource Assessment: Roman’. Available online at http://consultation.oxford.gov.uk/consult.ti/OARAAC/ (downloaded 13/08/2013).

Oxford City Council. 2011d. ‘Oxford Archaeological Resource Assessment: Anglo Saxon and Scandinavian’. Available online at http://consultation.oxford.gov.uk/consult.ti/OARAAC/(downloaded 13/08/2013).

8. Acknowledgements

The survey was supervised by Olaf Bayer, data was collected by project staff including David Griffiths, Jane Harrison and Joanne Robinson; and a number of volunteers including Leigh Mellor, Gill Mellor, Beth Tichborne, Steve Nicholson, Swii Yii Lim, Colin Forrestal, Roelie Reed, Jane Parkinson, Tim Lee and Phil Price. Particular thanks are due to Charmaine Swift (Rose Hill Primary School) and Chris Bell (Oxford City Council parks department) for facilitating access to the survey area.

Appendix 1. Survey grid peg coordinates

ID	Easting	Northing
RHA01	453055	203400
RHA02	453085	203400
RHA03	453115	203400
RHA04	453025	203430
RHA05	453055	203430
RHA06	453085	203430
RHA07	453115	203430
RHA08	453085	203460
RHA09	453115	203460
RHB01	453145	203400
RHB02	453145	203430
RHB03	453145	203460
RHB04	453145	203490
RHB05	453175	203490
RHB06	453175	203460
RHB07	453175	203430
RHB08	453175	203400
RHB09	453205	203400
RHB10	453205	203430
RHB11	453205	203460
RHB12	453205	203490
RHB13	453235	203490
RHB14	453235	203460
RHB15	453235	203430
RHC16	453265	203490
RHC17	453265	203520
RHC18	453265	203550
RHC19	453265	203580
RHC20	453325	203490
RHC21	453325	203520
RHC22	453325	203550
RHC23	453325	203580
RHC24	453295	203490
RHC25	453295	203520
RHC26	453295	203550
RHC27	453295	203580
RHC28	453355	203520
RHC29	453355	203550
RHC30	453355	203580

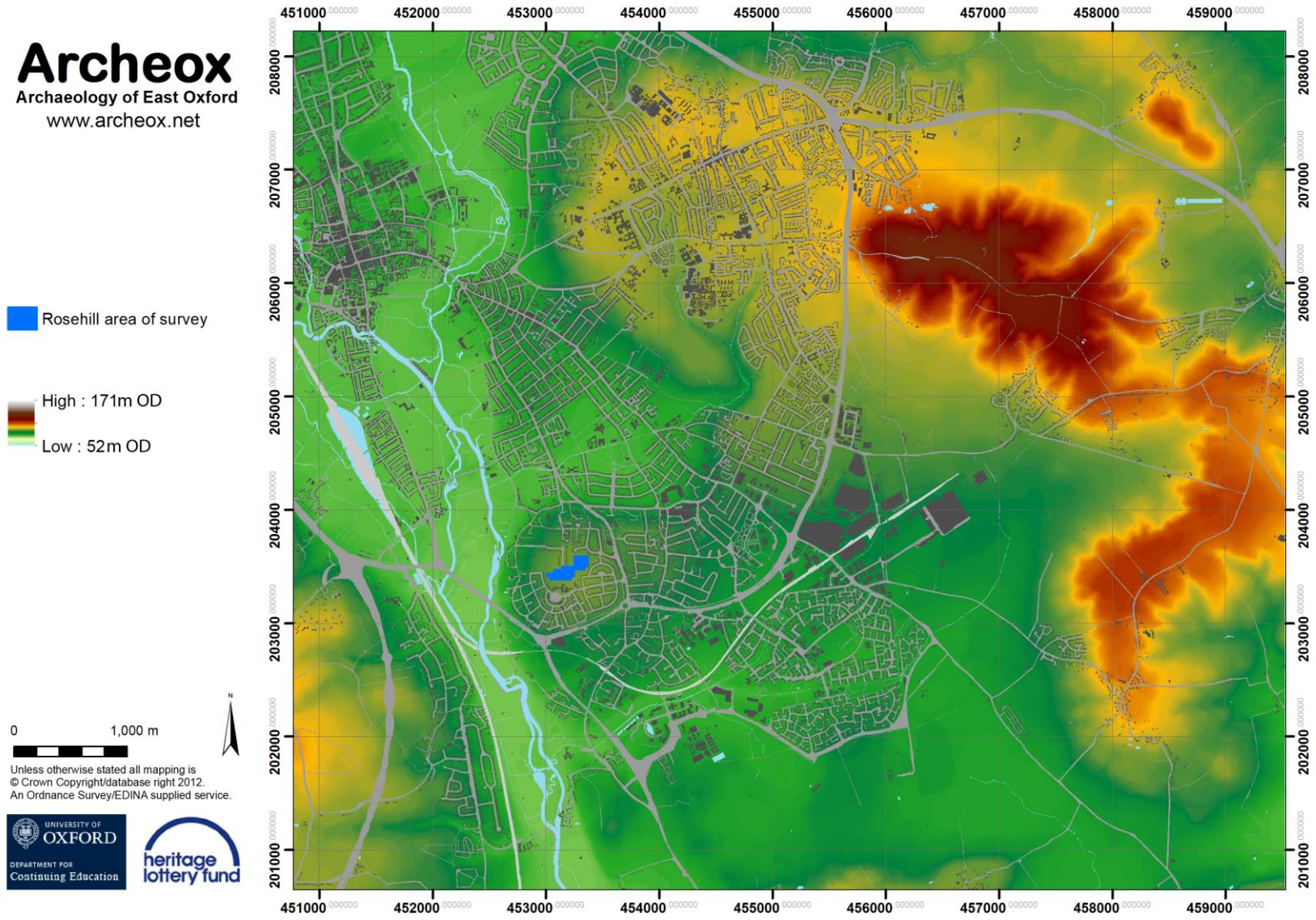

Figure 1. Survey location within East Oxford

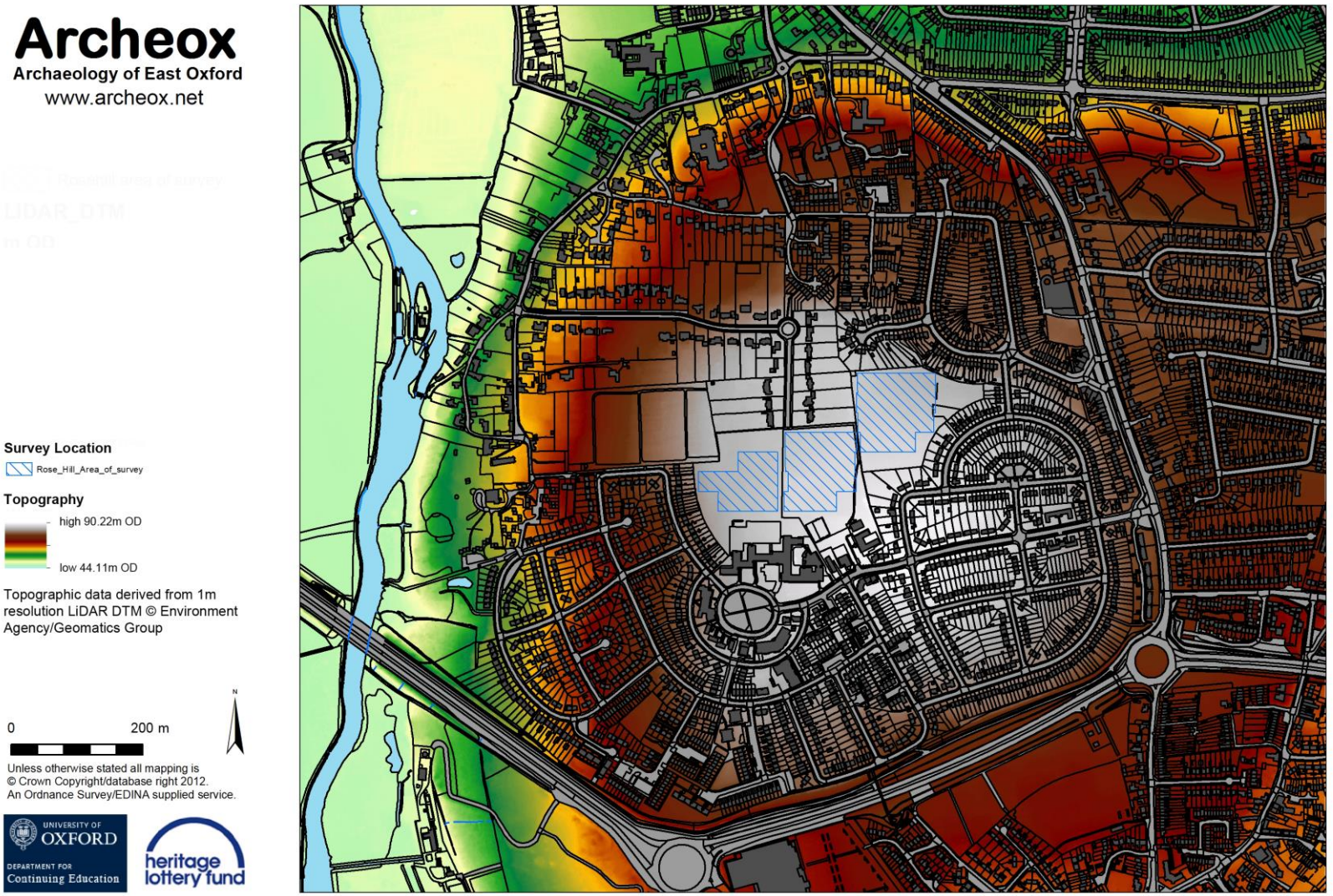

Figure 2. Survey location within Rose Hill

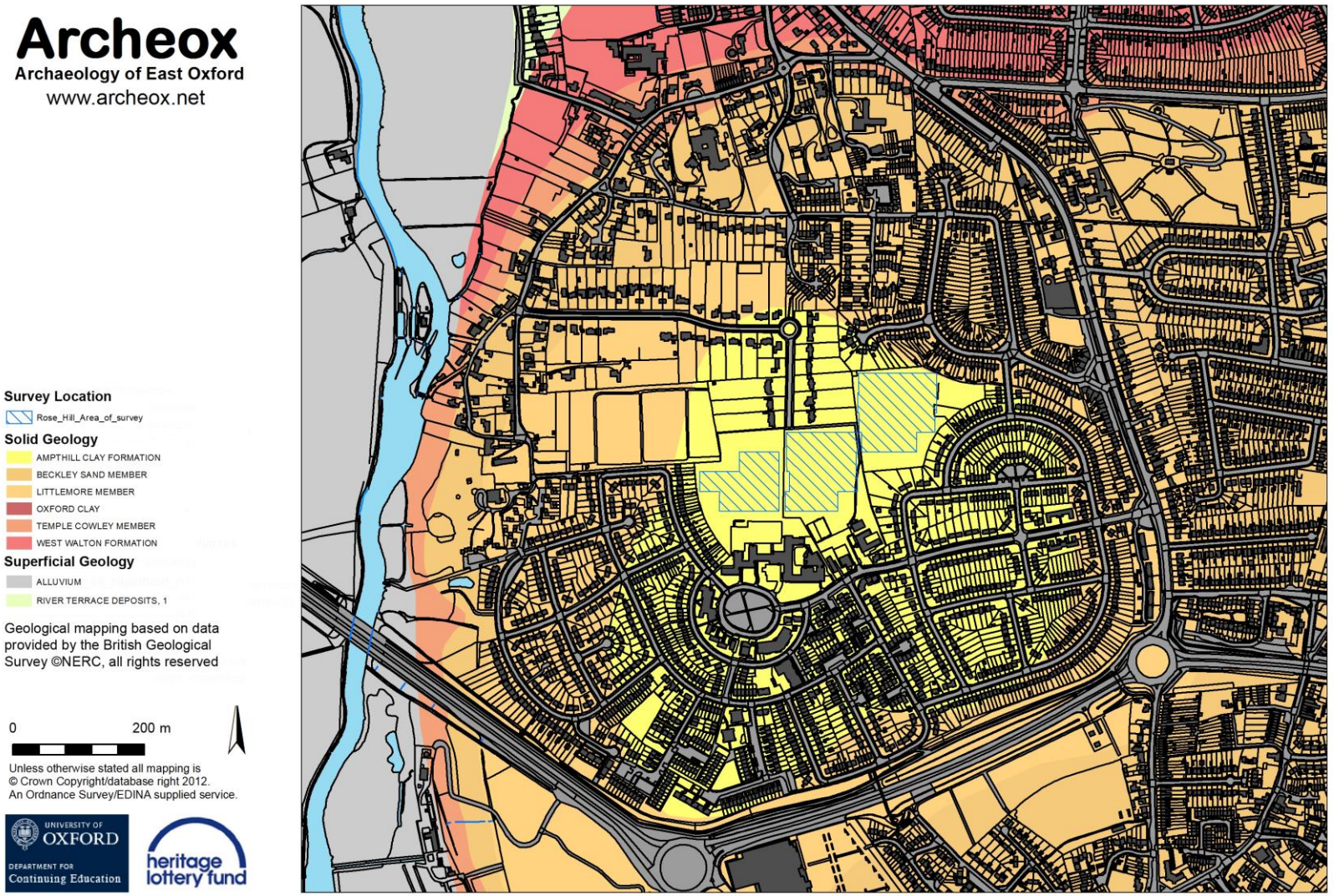

Figure 3. Survey location and geology

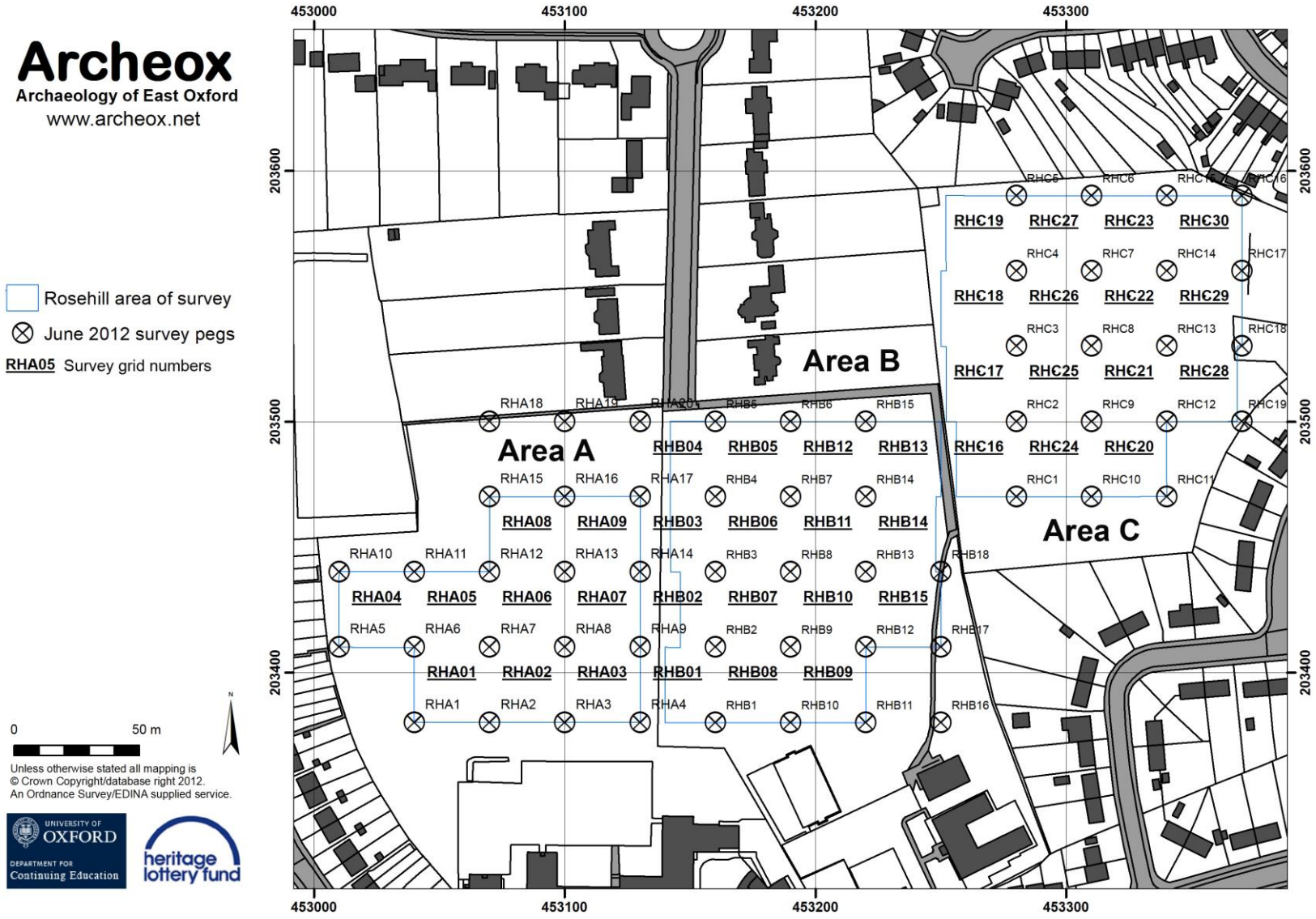

Figure 4. Survey grid locations (for grid peg coordinates see appendix 1)

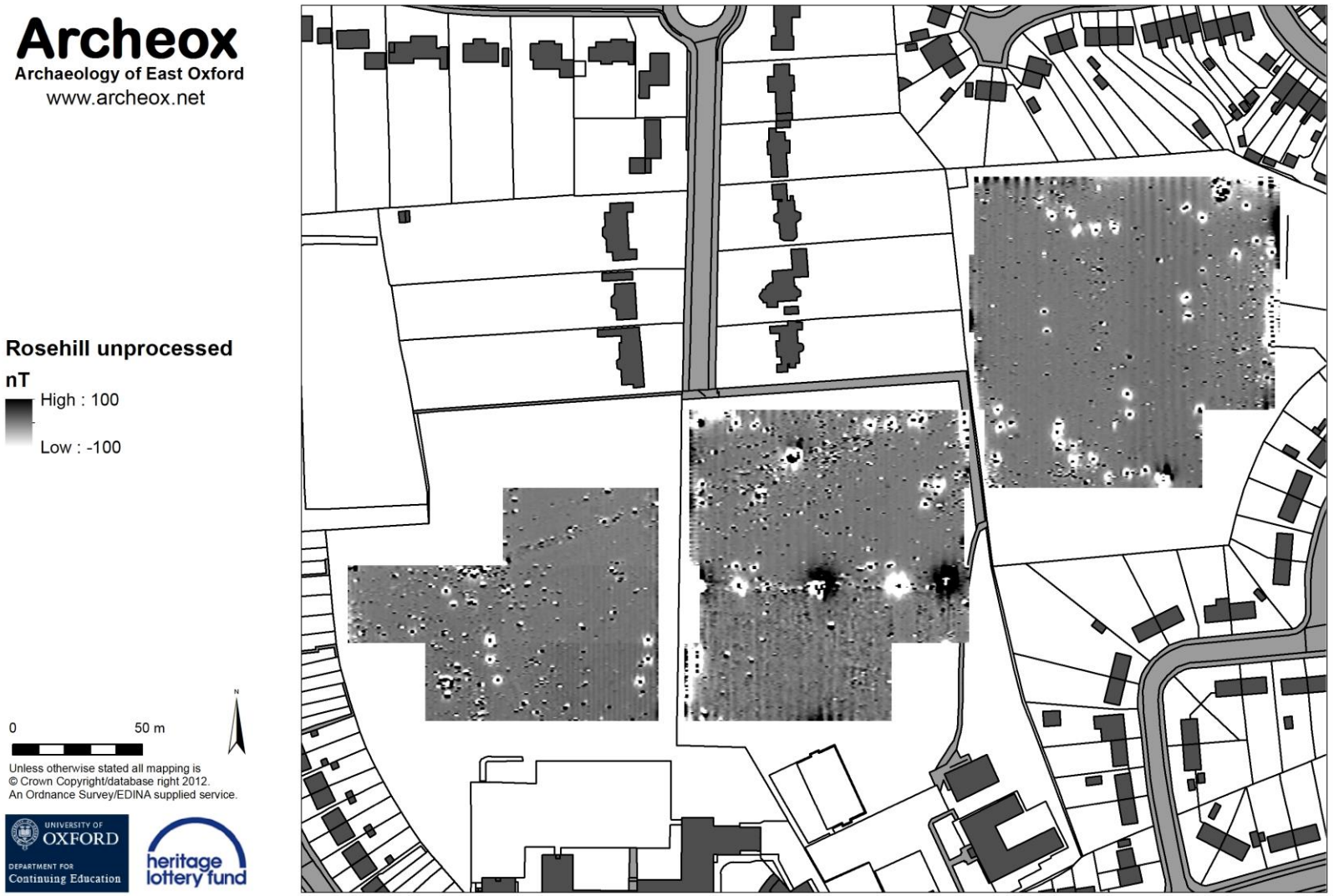

Figure 5. Unprocessed survey data (grey scale)

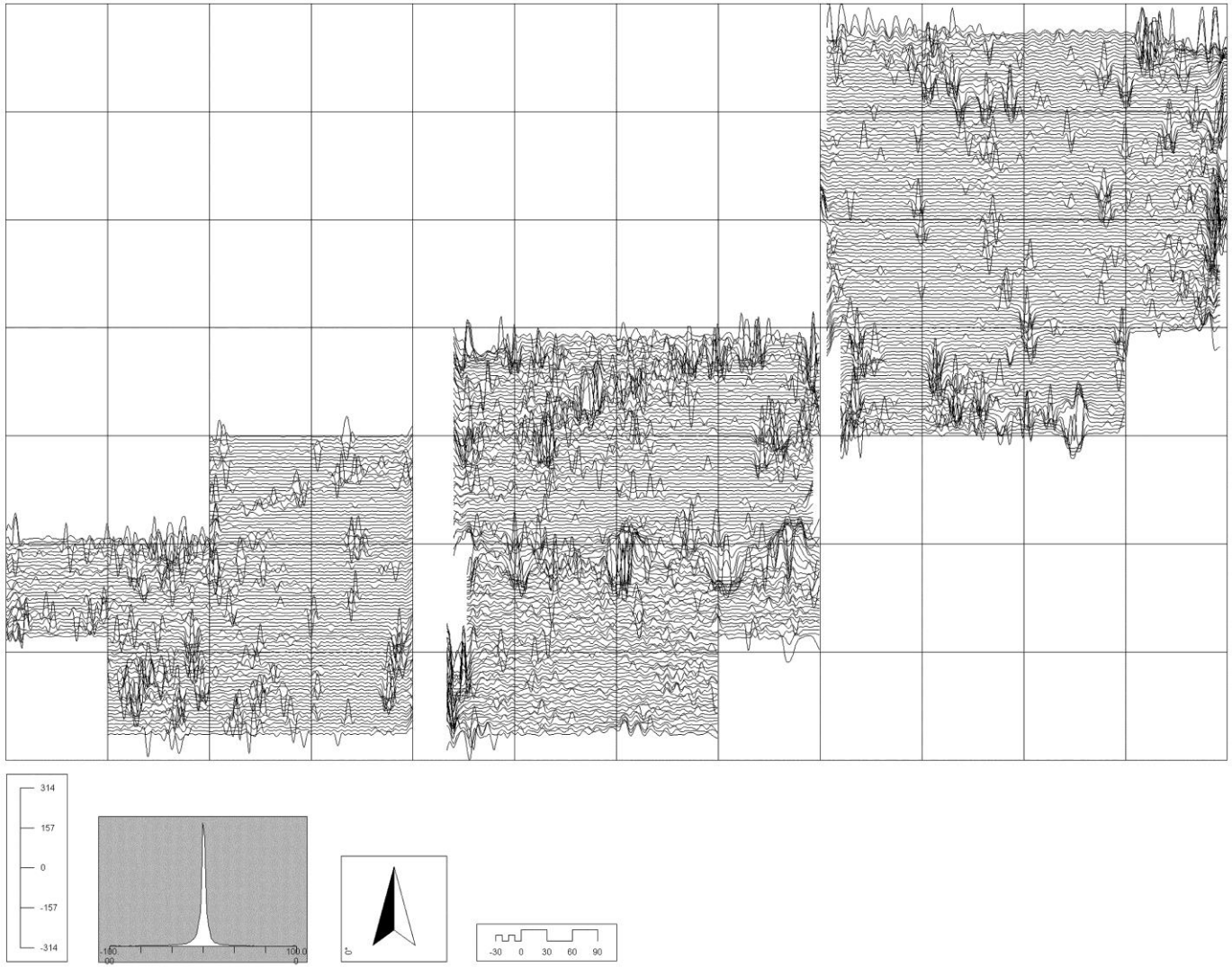

Figure 6. Unprocessed survey data (stacked trace)

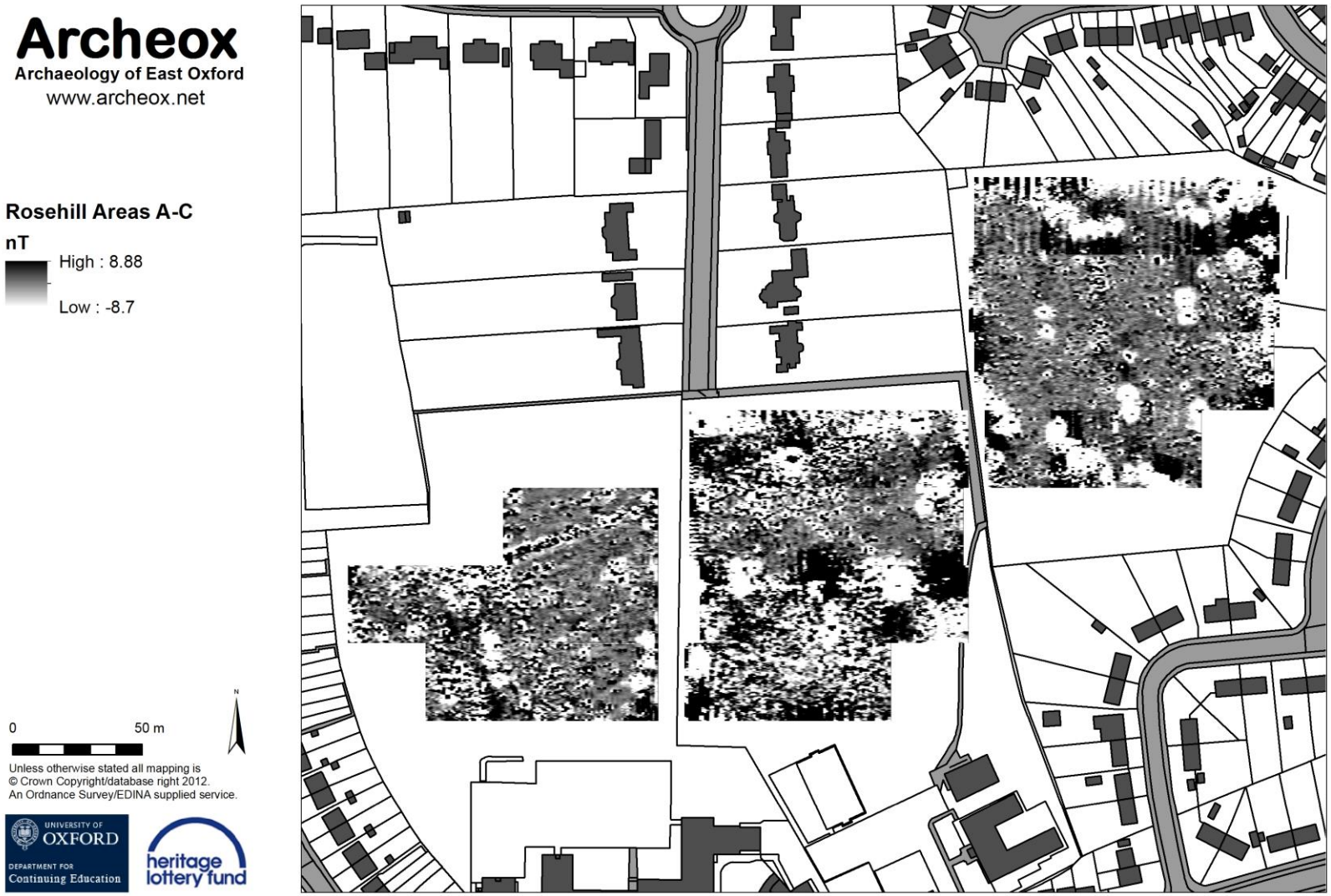

Figure 7. Processed survey data

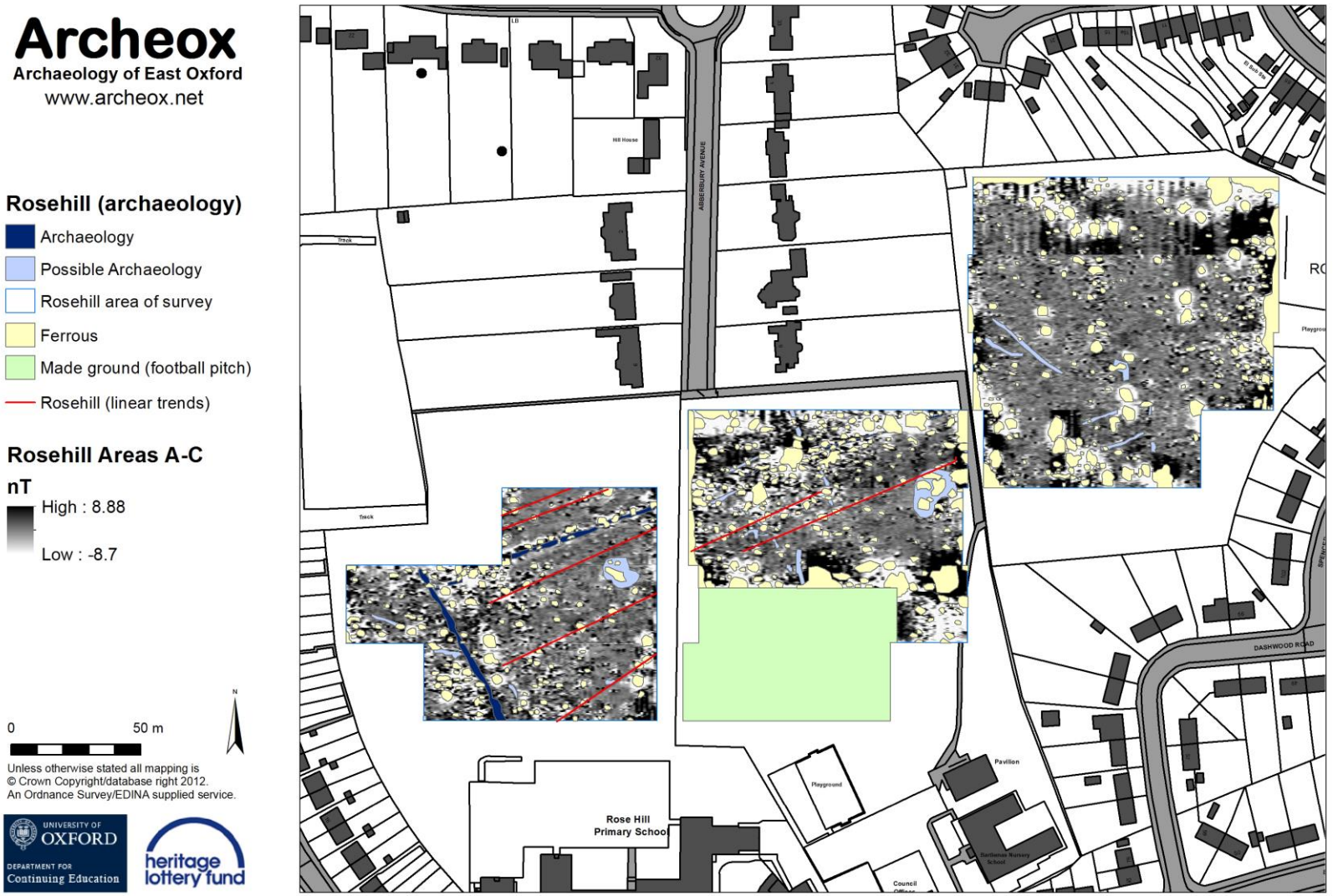

Figure 8. Processed survey data and interpretation

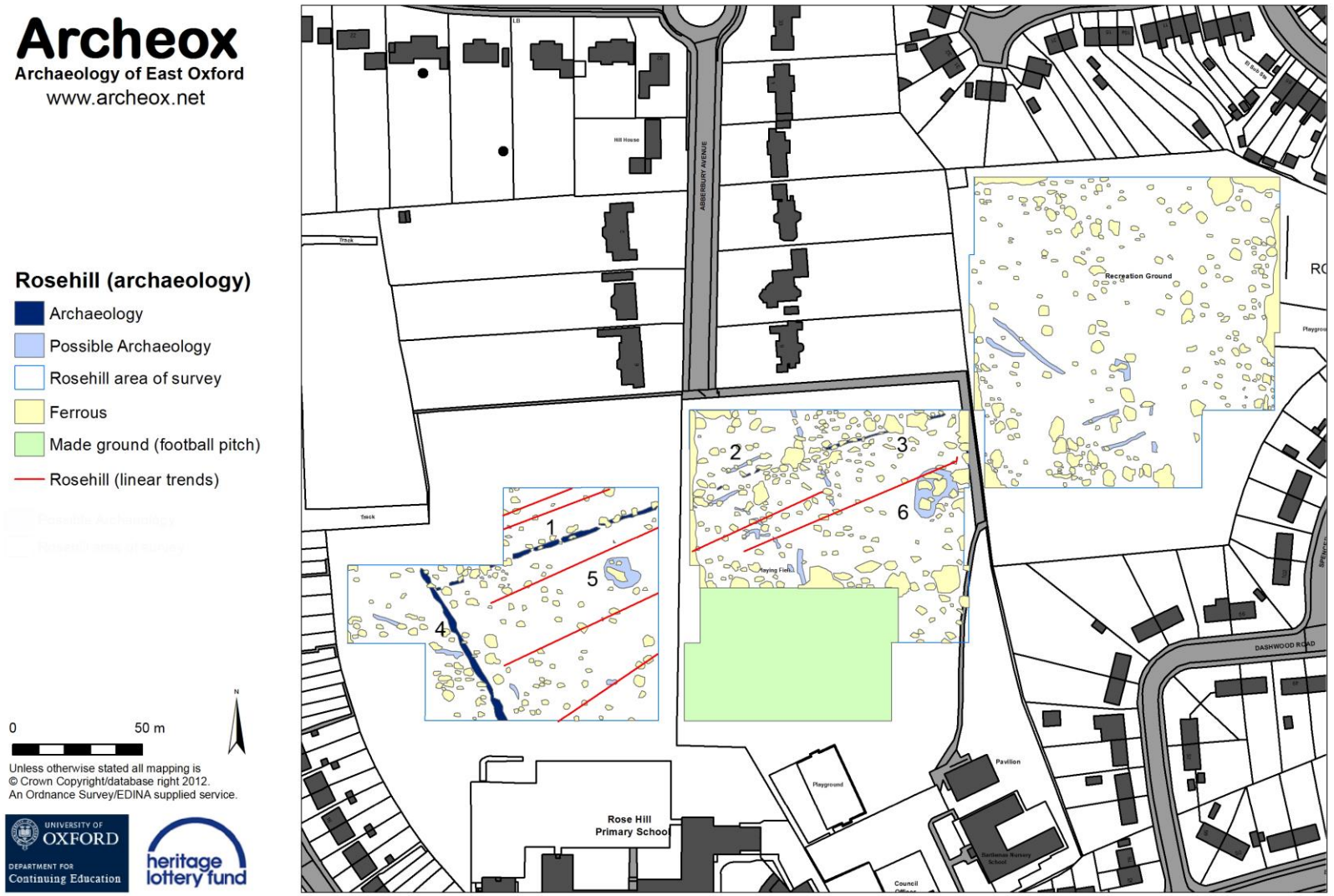

Figure 9. Survey interpretation

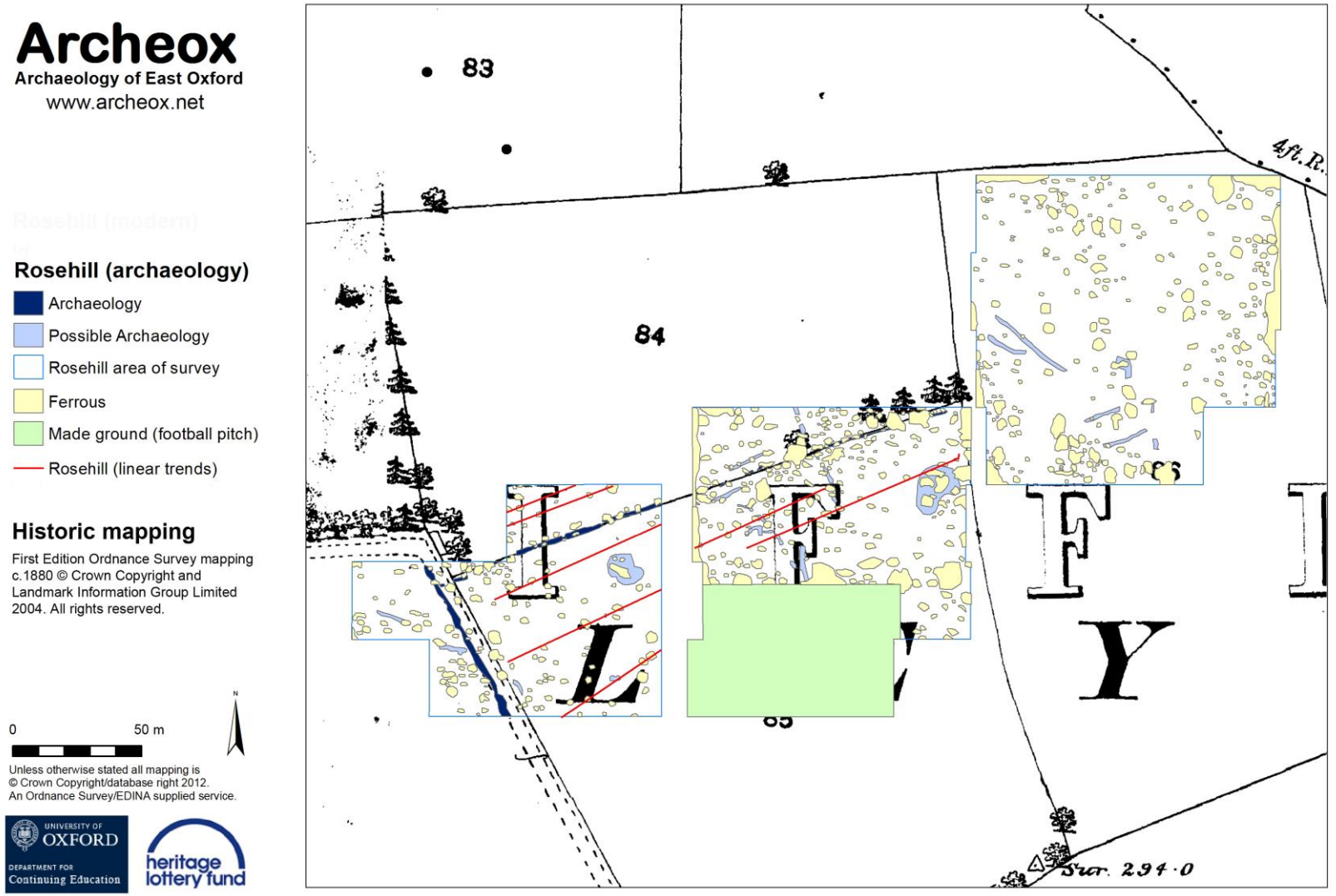

Figure 10. Survey interpretation and 1880s mapping

Figure 11. Slope model derived from 1m resolution LiDAR DTM

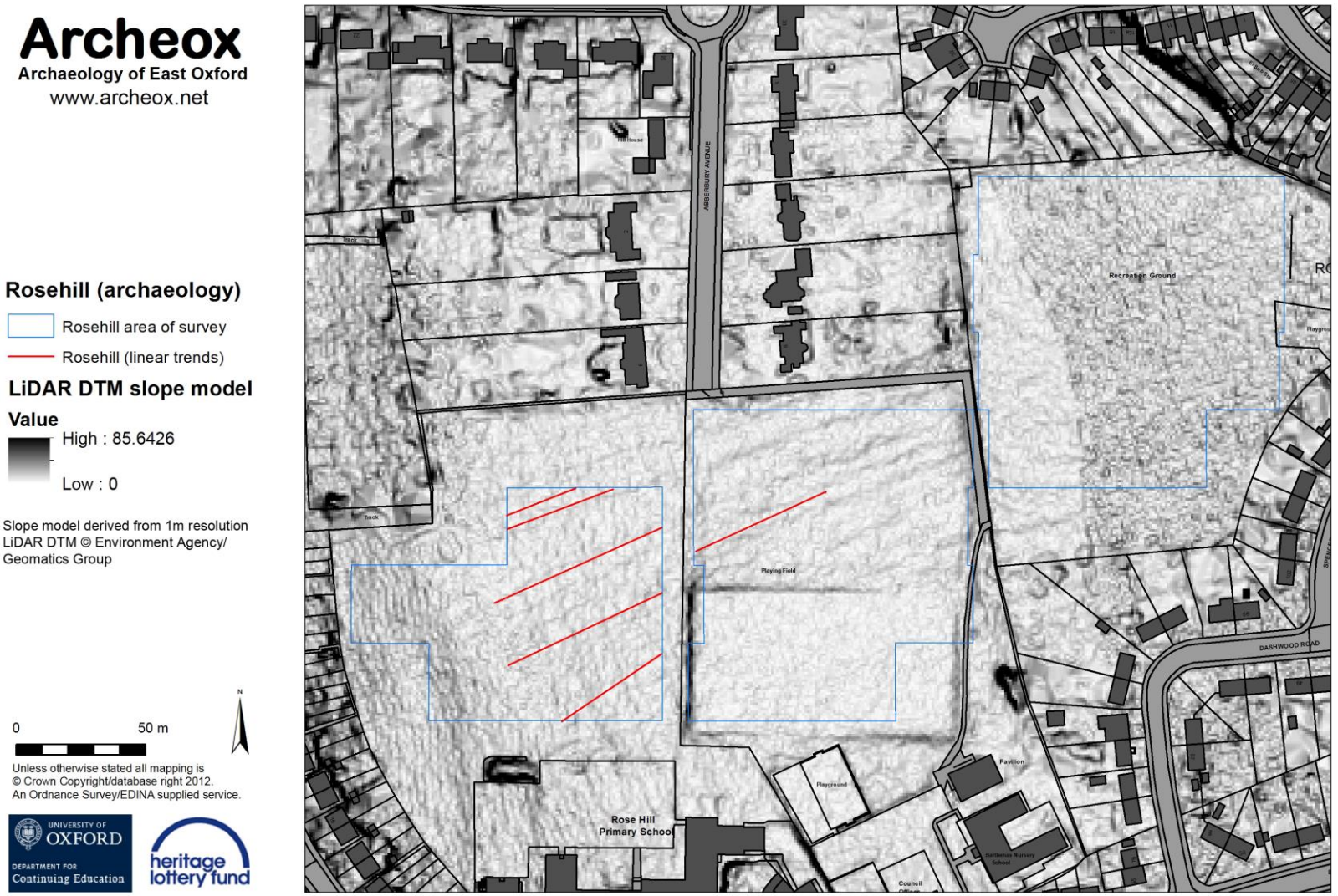

Figure 12. Slope model derived from 1m resolution LiDAR DTM, overlain with gradiometer survey linear trends

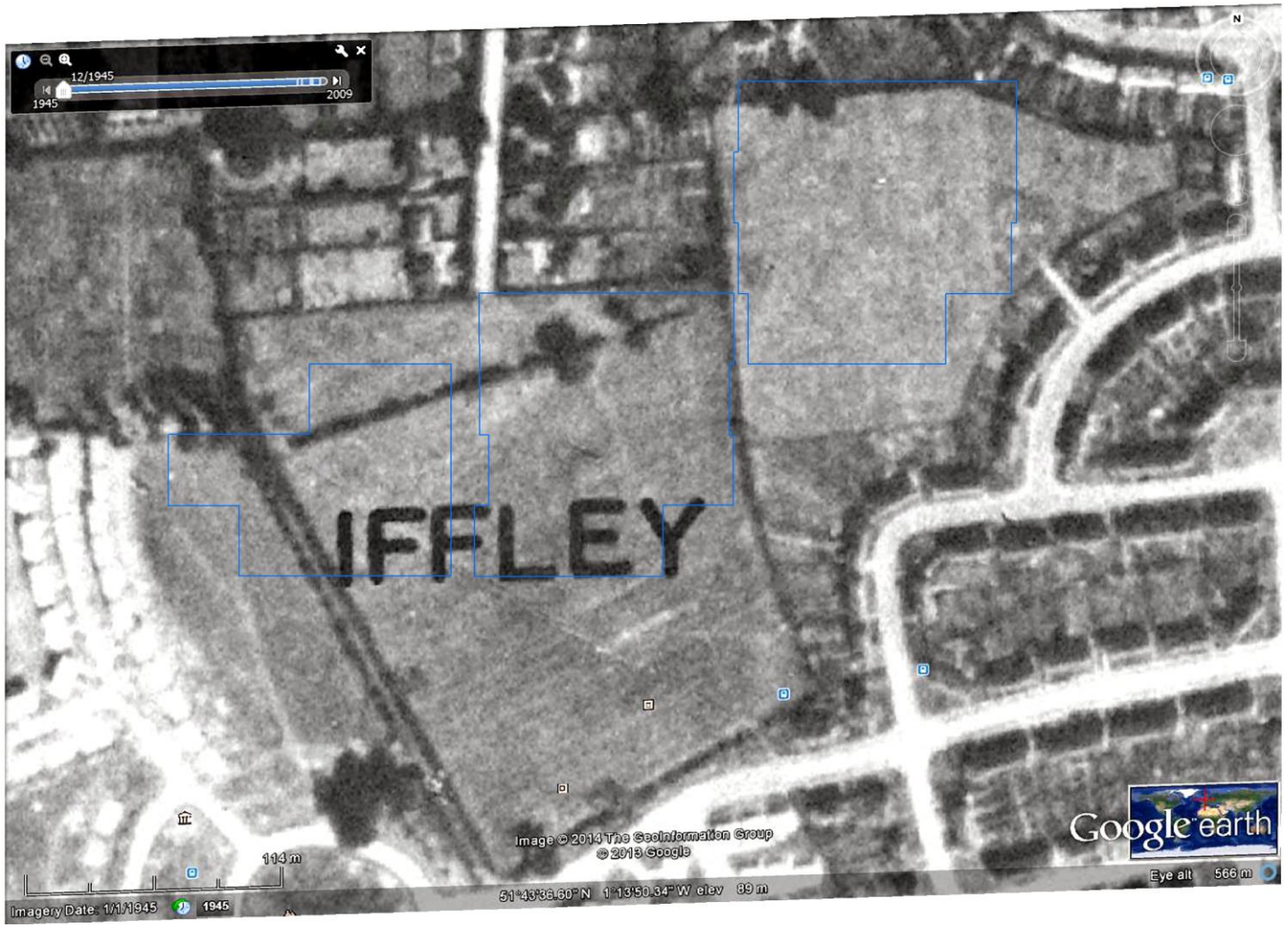

Figure 13. Extract of 1945 aerial photograph from Google Earth, overlain with survey area