

A Gradiometer Survey of Larkrise Primary School and St Gregory the Great School playing fields, Cowley St John, Oxford

For The East Oxford Archaeology and History Project

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1. **Summary Of Results.**

The East Oxford Archaeology and History Project conducted 1.4 hectares of gradiometer survey on the playing fields of Larkrise Primary School and St Gregory the Great School in June 2012. High levels of magnetic 'background noise' caused by both surface and subsurface highly magnetic items made the identification of genuinely archaeological magnetic anomalies very difficult. The only possible archaeological features identified in the survey data are a series of linear trends within the highly magnetic material thought to reflect cinder path ways separating 20th century allotment plots. A single slight curvilinear anomaly in the south west area of the survey is suggested as being possibly archaeological in origin.

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.

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 immediately to the north of the present day course of the Boundary Brook. It is bounded to the west by housing fronting on to Iffley Road, to the north by the Boundary Brook Estate and Larkrise School, and to the east by a foot path separating the playing fields from St Gregory's School. At this point along its course the Boundary Brook forms a shallow east to west valley approximately 700m from its confluence with the River Thames (see figure 1)

2.4 Description of the survey area

The survey covers an area of approximately 1.4 hectares of level grassed playing field split approximately in half by a recently planted hedge. The western half of the site is owned by St Gregory the Great School and the eastern half by Larkrise Primary School. Solid geology is Jurassic in date and consists of the Weymouth member of the Upper Oxford Clays. This is overlain by sands and gravels of the Northmore member (the first terrace of the river Thames) across the majority of the site. On the southernmost edge of the site terrace deposits are overlain by alluvium associated with the Boundary Brook (see figure 2).

2.5 Survey area history and archaeological potential

No previous archaeological investigation has been carried out within the footprint of the survey. Archaeological investigations on neighbouring sites conducted prior to proposed development have recorded no significant archaeological finds or features (NMR 2014). A small number of archaeological finds have been made within 500m of the site including:

- [The Bell Collection](#) of Mesolithic, Neolithic and Early Bronze Age stone tools discovered as surface scatters in the late 19th/early 20th century approximately 500m north west of the current site (Oxford City Council 2011a & b)
- A late Bronze Age urn discovered in the early 20th century close to Donnington Bridge Road to the west of the site (Oxford City Council 2011b, 19-20)
- Archeox test pit 22 in a back garden on Cricket Road approximately 500m to the east of the site produced several sherds of Roman pottery (Mellor 2014)

The survey area lies in the historic parish of Cowley, later the ecclesiastical and then civil parish of Cowley St John (Salmon 2010, 70-73). The general area survives as open fields until the construction of housing along Iffley Road to the west and the Florence Park estate to the south and south east in the 1930s. Ordnance Survey mapping from 1900 shows the establishment of allotments on the northern edge, and to the north and north east, of the survey area (see figure 8). A vertical aerial photograph from 1945 shows allotments covering the entire survey area. It is likely that these allotments survived until the construction of Larkrise School and its playing fields in the early 1970s.

3. **Methodology**

3.1 Date of fieldwork

Fieldwork was carried out in on 22/06/2012.

3.2 Grid Location

The location of the survey is shown in figure 3. 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 coordinates for the survey grid pegs are given in appendix 1.

3.3 Survey Configuration

| | |
|----------------------------------|---|
| Date of survey | 22 nd June 2012 |
| Grid size | 30x30m |
| Area of survey | 1.42 ha |
| Traverse direction | North/south |
| Traverse separation | 1m |
| Reading interval | 0.25m |
| Instrument type | Fluxgate gradiometer |
| Instrument model | Bartington Instruments Grad 601 (2) |
| Sensor element separation | 1m |
| Number of sensors | 2 |
| Sensor separation | 1m |
| Sample range | 1nT |
| Processing software | Terrasurveyor version 3.0.23.0 |
| Processes | <ol style="list-style-type: none"> 1. De Stagger: Grids: All Mode: Both By: -2 intervals 2. Despik Threshold: 1 Window size: 3x3 3. Clip from -20.00 to 15.00 nT |

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 previous 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 Terrasurveyor version 3.0.23.0. Full processing of the data was undertaken on completion of the survey using the clip, desprike and destagger processes in Terrasurveyor. Once processed data was exported to ArcGIS 10.2 as a georeferenced ASCII file and combined with other datasets for presentation

Interpretation

Unprocessed data is shown in figure 4 (greyscale image) and in figure 5 (stacked trace plot). Processed data is shown in figure 6. Interpretive plots of the survey data are shown in figures 7 and 8. Due to the very high levels of magnetic 'background noise' caused by surface (ferrous perimeter fencing) and unidentified subsurface structures and features it has been very hard to identify genuinely archaeological magnetic anomalies within the survey area. As a result only two interpretive classes have been used.

- Trend: Linear trend amongst strongly magnetic anomalies
- Possible archaeology: Curvilinear trends in strongly magnetic anomalies considered on morphological grounds and orientation to be possibly archaeological in origin. Shown in yellow in figures 7 and 8.

4. Results

4.1 Trends

3 parallel linear trends in highly magnetic anomalies are apparent running roughly north-east/south-west across the survey area and approximately 40m apart. The orientation and spacing of these trends corresponds closely those of pathways or tracks separating allotment plots shown on historical mapping (see figure 8). It is suggested that the linear trends in the survey data may be produced by highly magnetically enhanced cinder track ways from 20th century allotments.

4.2 Possible archaeological features

A single approximately 30m long curvilinear anomaly in the south-west area of the survey is suggested as a possible archaeological feature. This feature is different in character and orientation to the linear trends outlined above. Its highly magnetic

character suggests that it may be comparatively recent in date. The fact that its orientation diverges from both that of the allotment paths and the wider enclosure field system suggests that it is either pre 19th century or late 20th century in origin. It is worth noting that in other surveys undertaken as part of the ARCHEOX project modern ferrous material has differentially picked out older archaeological features which survived as earthworks into the 20th century landscape.

5. **Discussion.**

Of all of the gradiometer surveys undertaken as part of the ARCHEOX project the Larkrise/St Gregory's survey has been most compromised by 'back ground noise' caused by modern highly magnetic items. It is considered likely this highly magnetic material represents a combination of material introduced to the area during its life as allotments between c.1900 and 1970 and material introduced to level and firm up wet areas during the construction of Larkrise playing fields. This introduced material has made it almost impossible to detect the more subtle magnetic signatures of archaeological features within the survey area. The only features identified by the survey with any degree of certainty are trends within this 'magnetic noise' thought to relate to the area's use as allotments. A single slight curvilinear anomaly in the south west area of the survey is suggested as being possibly pre 19th century in origin. 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 earth resistance survey may have better potential to detect archaeological features than gradiometer survey alone.

References

Mellor, G. 2013. *EOXP Test Pit 22*. Available online at <https://www.archeox.net/sites/www.archeox.net/files/reports/EOXP%20TP22%20Report.pdf> (downloaded 14/04/2014)

NMR excavation index accessed through <http://www.heritagegateway.org.uk> (14/04/2014)

Oxford City Council. 2011a. 'Oxford Archaeological Resource Assessment: The Palaeolithic and Mesolithic'. Available online at <http://consultation.oxford.gov.uk/consult.ti/OARAAC/> (downloaded 13/08/2013).

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

Salmon, G.L. 2010. *Beyond Magdalen Bridge: the growth of East Oxford*. East Oxford Archaeology and History Project: Oxford.

8. **Acknowledgements**

The survey was supervised by Olaf Bayer, data was collected by project director David Griffiths and project volunteers Steve Nicholson and Phil Price. Particular thanks are due to Ed Finch (Larkrise School) and Rodger Caseby (St Gregory the Great School) for arranging access to the survey area.

Appendix 1. Survey grid peg coordinates

| | | |
|------|--------|--------|
| LG1 | 453100 | 204460 |
| LG2 | 453100 | 204490 |
| LG3 | 453100 | 204520 |
| LG4 | 453100 | 204550 |
| LG5 | 453130 | 204550 |
| LG6 | 453130 | 204520 |
| LG7 | 453130 | 204490 |
| LG8 | 453130 | 204460 |
| LG9 | 453130 | 204430 |
| LG10 | 453160 | 204430 |
| LG11 | 453160 | 204460 |
| LG12 | 453160 | 204490 |
| LG13 | 453160 | 204520 |
| LG14 | 453160 | 204550 |
| LG15 | 453190 | 204550 |
| LG16 | 453190 | 204520 |
| LG17 | 453190 | 204490 |
| LG18 | 453190 | 204460 |
| LG19 | 453220 | 204490 |
| LG20 | 453220 | 204520 |
| LG21 | 453220 | 204550 |
| LG22 | 453220 | 204580 |
| LG23 | 453250 | 204580 |
| LG24 | 453250 | 204550 |
| LG25 | 453250 | 204520 |
| LG26 | 453250 | 204490 |
| LG27 | 453280 | 204490 |
| LG28 | 453280 | 204520 |
| LG29 | 453280 | 204550 |

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-  Larkrise/St Gregs Location
-  High : 99m OD
-  Low : 58m OD

0 1 km

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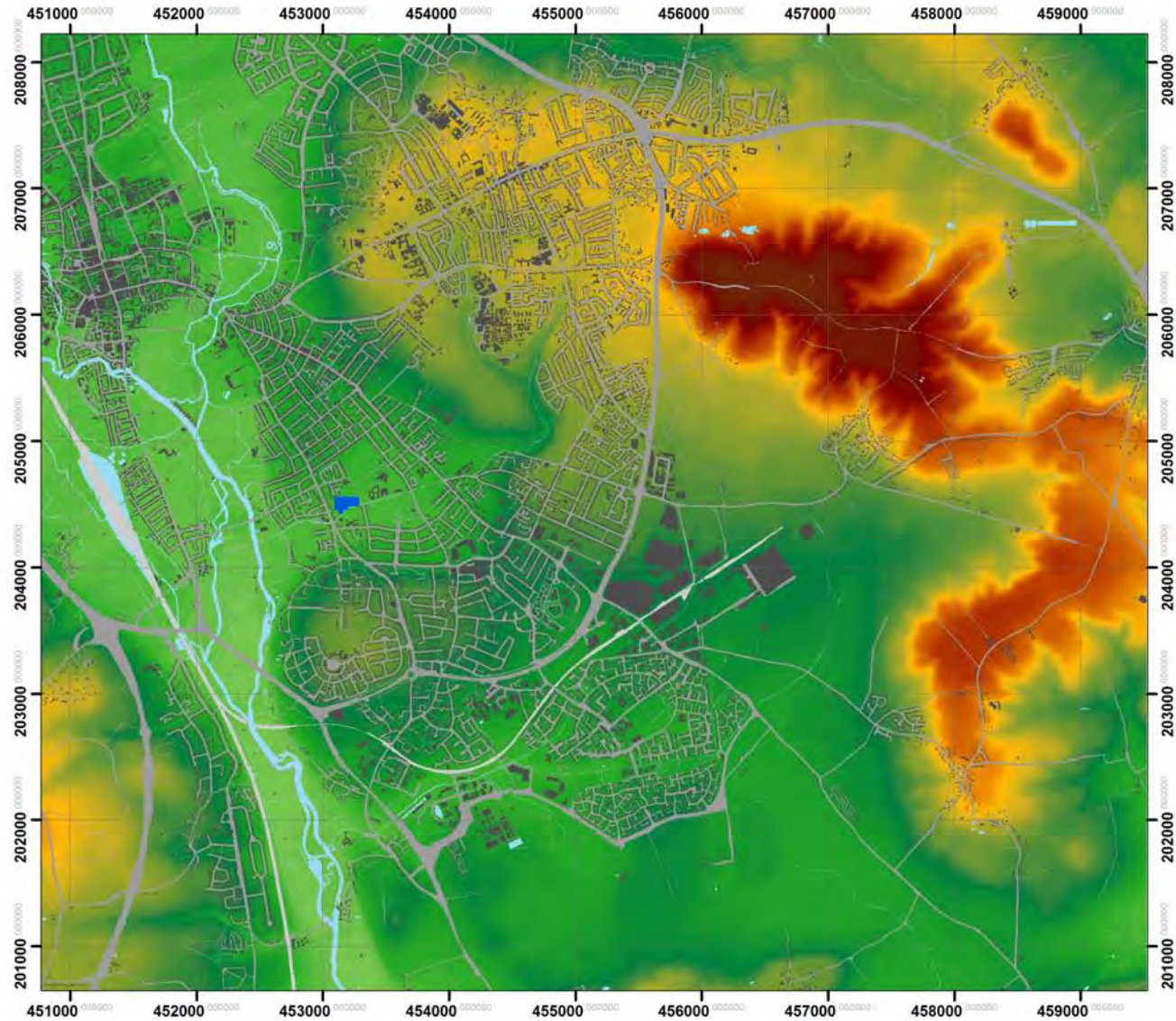







Figure 1. Location of the Larkrise/St Gregory's survey area within East Oxford

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-  Survey area
-  Alluvium
-  First terrace
-  West Walton Member
-  Weymouth Series

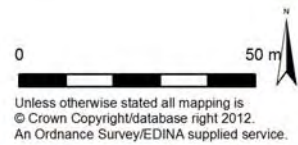


Figure 2. Survey area and underlying geology (data provided by British Geological Survey © NERC all rights reserved)

⊗ June 2012 survey pegs
▭ Larkrise/St Gregs Location



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Figure 3. Location of survey grid (see appendix 1 for grid peg coordinates)

Larkrise/St Gregory's

nT
High : 100
Low : -100



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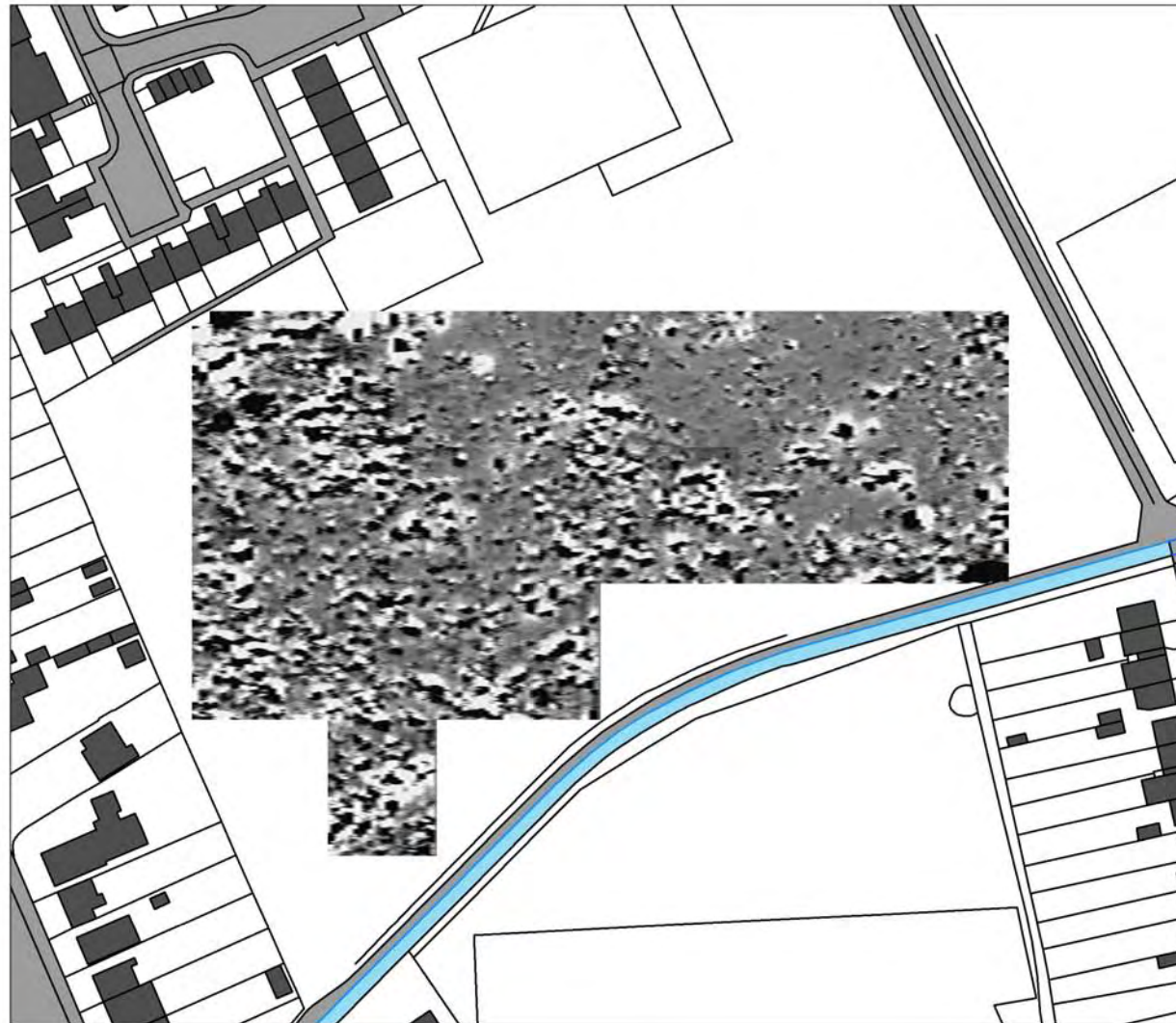


Figure 4. Unprocessed grey scale plot of gradiometer data

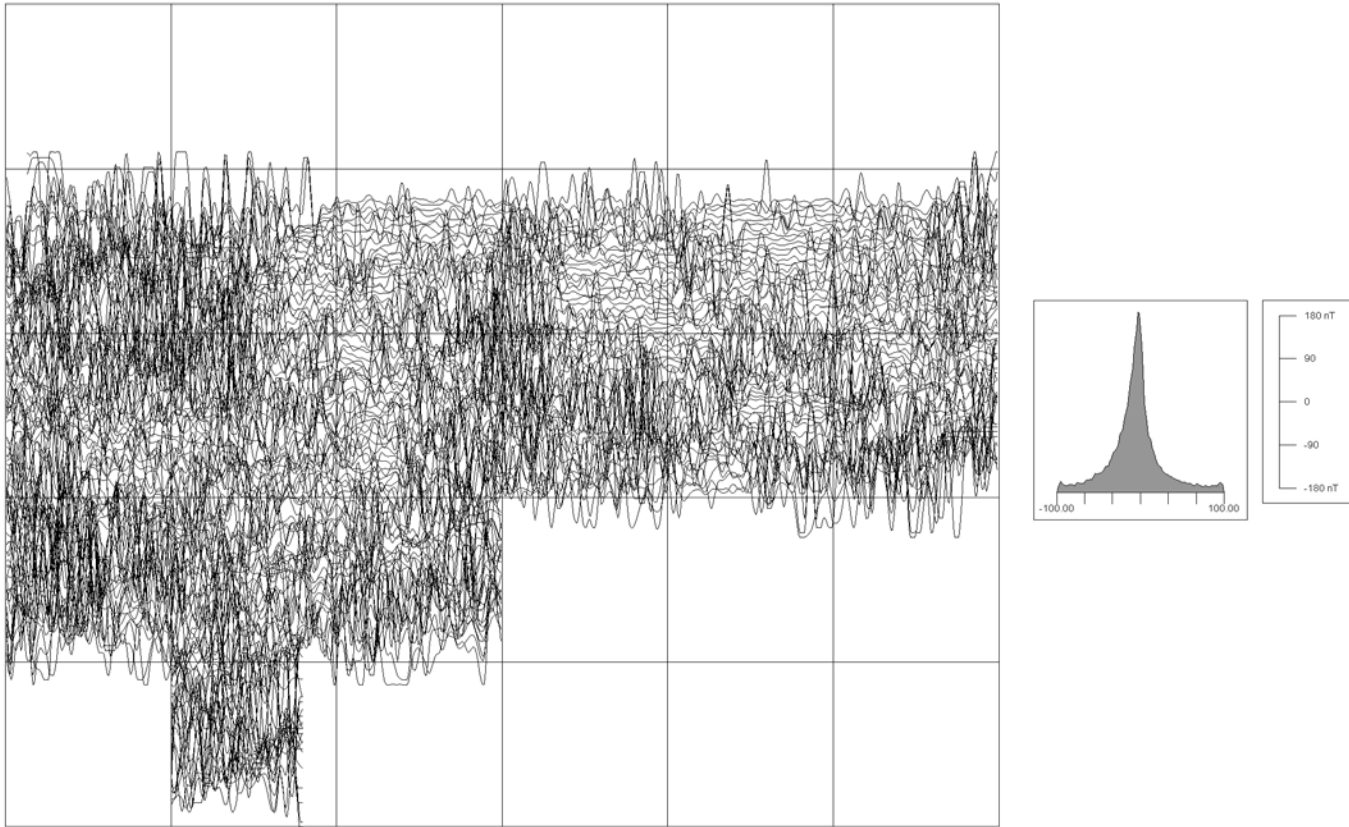


Figure 5. Unprocessed stacked trace plot of gradiometer data

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Larkrise/St Gregs Processed

Value
High : 53.39
Low : -68.39



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Figure 6. Processed grey scale plot of gradiometer data

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— Larkrise_trend
Possible archaeology
Larkrise/St Gregs Processed
nT
High : 53.39
Low : -68.39

0 50 m
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Figure 7. Processed grey scale plot of gradiometer data and interpretation

- Larkrise/St Gregs Location
- Larkrise_trend
- Possible archaeology

0 50 m

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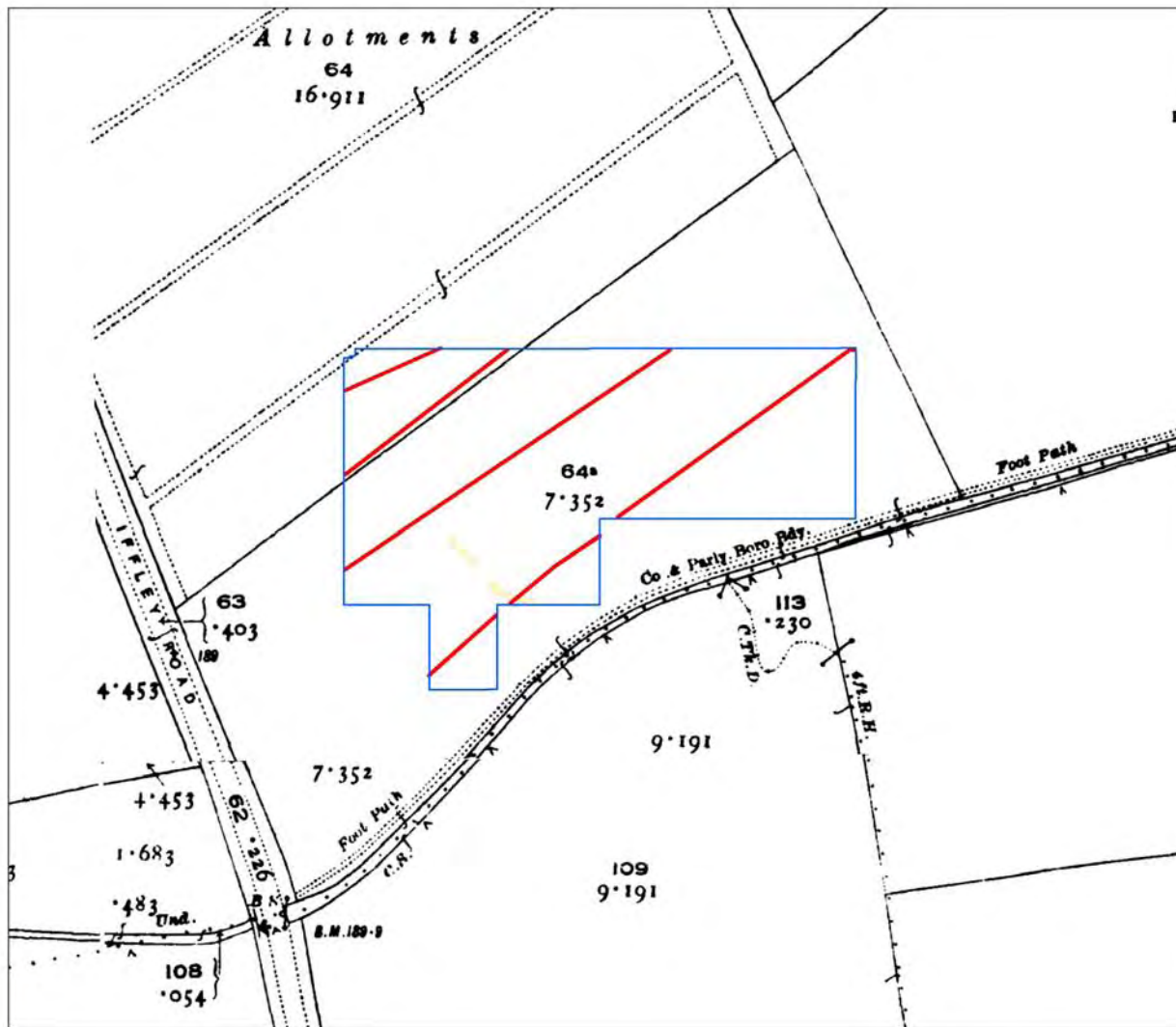





Figure 8. Survey interpretation and historic mapping (1921) © Crown Copyright and Landmark Information Group Limited 2014

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 Larkrise/St Gregs Location


0 50 m



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Figure 9. Survey area and 1945 aerial photograph –(source Google Earth)