

**WILTSHIRE ARCHAEOLOGY FIELD GROUP**



**Hardings Farm & Pond Farm**

**Purton Stoke, Wiltshire**

**SU 08350 908100**

Geophysical Survey

October 2018 – January 2019

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## **Summary**

A geophysical survey on fields at Purton Stoke, Wiltshire has revealed a number of linear features, as well as areas of occupation and possible industrial activity. A number of the linear features align closely with the results from lidar imagery, and hollow ways crossing the fields are visible in the ground. Previously reported finds from the fields has indicated activity during both the Iron Age and Romano-British periods. A saline well, known to have been developed during the Victorian period and located to the south of the surveyed fields, may well have existed in earlier periods and be linked to the past activities in these fields.

## **Date of Investigations**

The geophysical survey was undertaken in two fields at Purton Stoke, Wiltshire over five days from the 22nd October 2018 to the 20th January 2019. The work was carried out by members of the Wiltshire Archaeological Field Group, a not-for-profit unit part of the Wiltshire Archaeological and Natural History Society (WANHS).

## **Site Owners**

The fields are owned by Tim Rawlings of Hardings Farm & William Ponting of Pond Farm, Bentham nr Purton Stoke who gave permission for the geophysical survey.

## **Authorship**

This report was written and compiled by John Samways and Mike McQueen.

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## **Disclaimer**

*This report has been compiled with all reasonable skill, care and attention to detail within the terms of the project design, and within the general operating procedures of the Wiltshire Archaeology Field Group and WANHS. No responsibility is accepted whatsoever to third parties to whom this report or any part thereof is made known. Any such party relies upon this report at their own risk.*

## **Acknowledgements**

The Wiltshire Archaeology Field Group would like to express our thanks, gratitude and appreciation to the land owners of Hardings Farm & Pond Farm for their permission and enthusiasm to carry out the geophysical survey. Thanks also to Mike McQueen, a member of the WAFG, for his time in carrying out the geophysical survey using his own geophysical equipment and interpreting the results. Additionally, thanks to Colin Stares, a local Purton Stoke resident, who volunteered to assist with the geophysical survey. We are also grateful for the advice and support of David Sabin, from Archaeological Surveys, particularly with the magnetic susceptibility survey, and for his professional advice regarding the interpreting of the results. Without their help the survey would not have been carried out.

### The Location of the Survey

The survey was carried out in fields belonging to Hardings Farm and Ponds Farm at the western edge of the village of Purton Stoke, North Wiltshire. Purton Stoke is located to the south west of Cricklade, and close to the north west outskirts of Swindon; Figure 1.

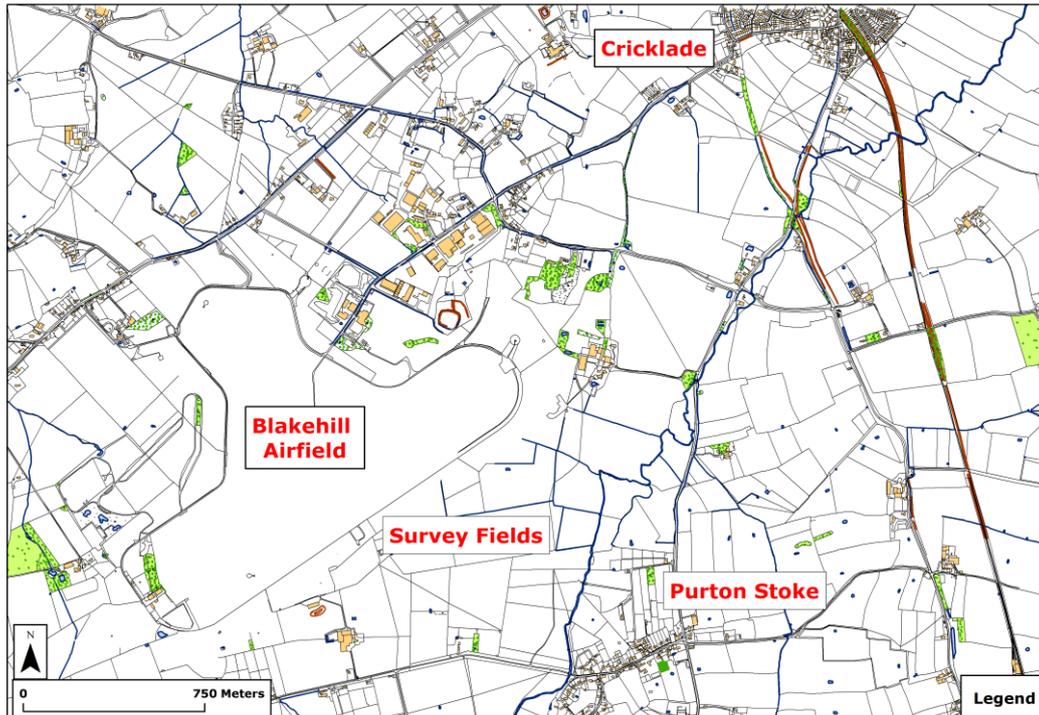


Figure 1: Location of Purton Stoke (Base Mapping: Ordnance Survey, Crown Copyright)

The underlying geology is Oxford Clay (British Geological Survey), Figure 2.



Figure 2: Underlying Geology (British Geological Survey, Crown Copyright)

The survey fields are used for pasture and have been ploughed in modern times, Figure 3.

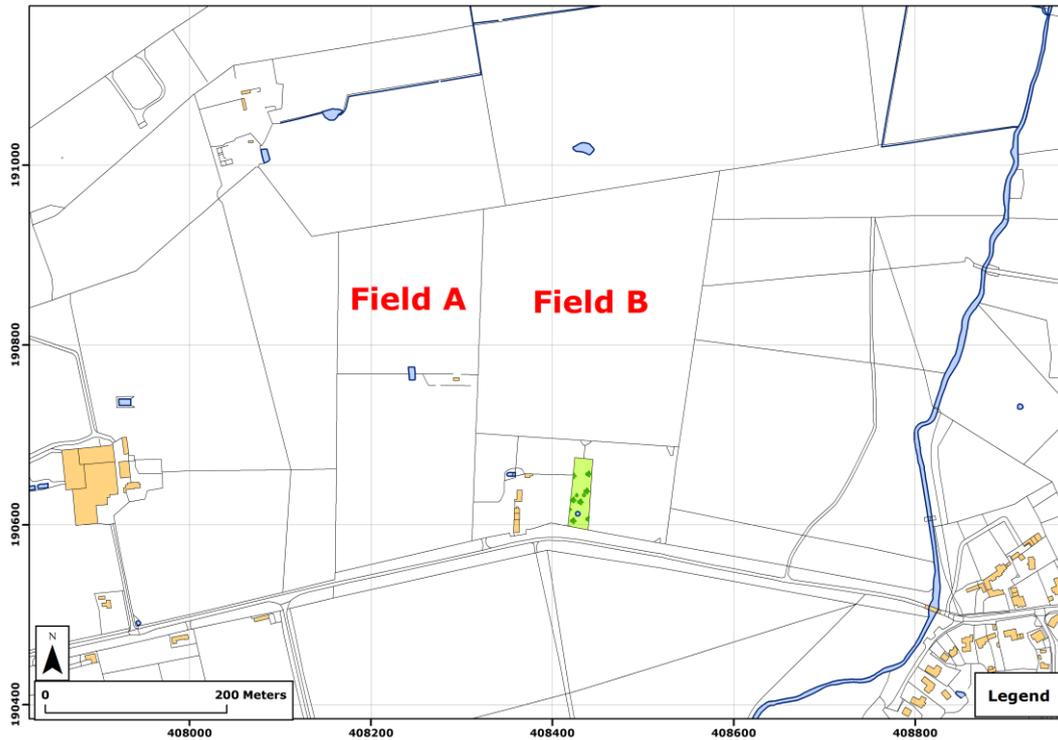


Figure 3: Location of Surveyed Fields (Base Mapping: Ordnance Survey, Crown Copyright)

### The Reason for the Survey

The survey was carried out at the request of a local resident, Colin Stares, to investigate an area from which a number of finds have been made by him over the years while field walking in Field A. A metal detectorist had also been active in Field B and the reported material finds are shown in Figure 4. The majority of the finds were dated to the Romano-British period and included coins, pottery, building materials and brooches.

## Magnetometry Survey at Purton Stoke, Wiltshire

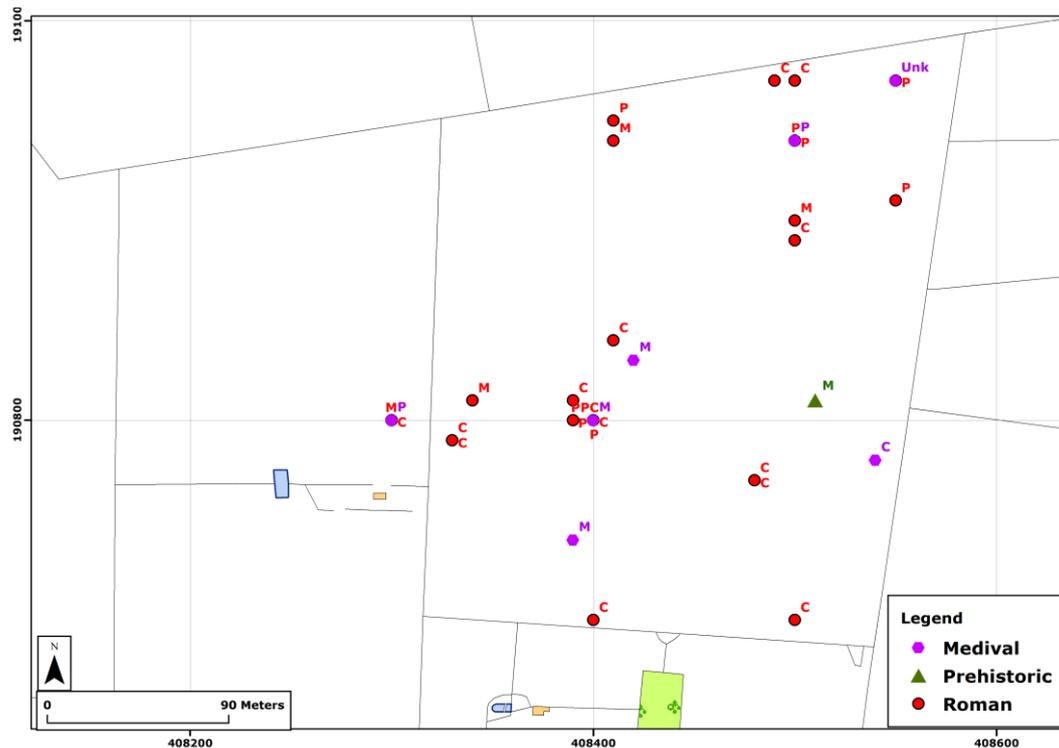


Figure 4: Wiltshire PAS database (Base Mapping: Ordnance Survey, Crown Copyright)

The Wiltshire HER shows no record of significant earthworks in the vicinity of the two fields except for an undated ditch in a field to the south of Field B, see Figure 5 below.

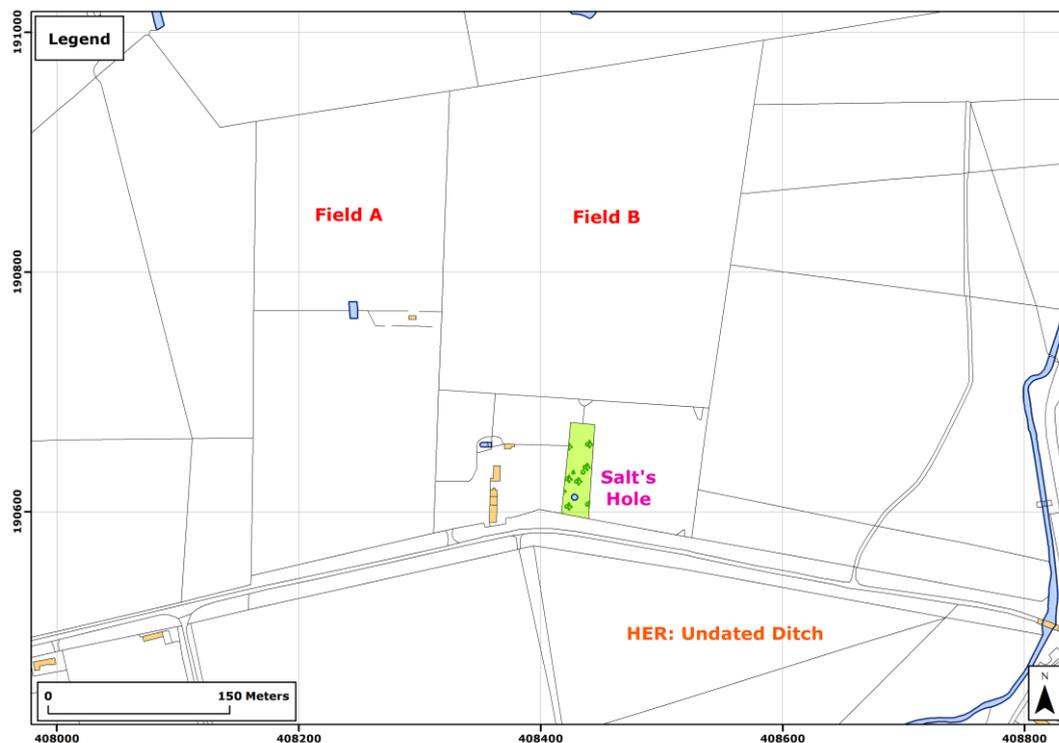


Figure 5: Wiltshire HER (Base Mapping: Ordnance Survey, Crown Copyright)

There is also a listed building to the south of Field B, known as Salt's House. According to Richardson (1919) this is a salt spring well house built in 1859. Adjoining the well a Spa was built in 1859 to offer this saline spring water rich in phosphate of lime. An analysis of the water by Dr Voelker (1860) showed

## Magnetometry Survey at Purton Stoke, Wiltshire

that the well produced Sulphated and Bromo-Iodated/Saline water. The water was regularly drunk by the locals for medicinal purposes and it was also bottled and sold widely. The Spa ceased operating in 1952.

Lidar imagery of the fields appears to reveal a semi-circular enclosure in the north-east corner and north-west corner of the two fields. There is a second similar feature in the south-west corner of field A. A number hollow ways cross the area in a roughly east-west direction, although they appear to have been ploughed out in Field A: Figure 6.

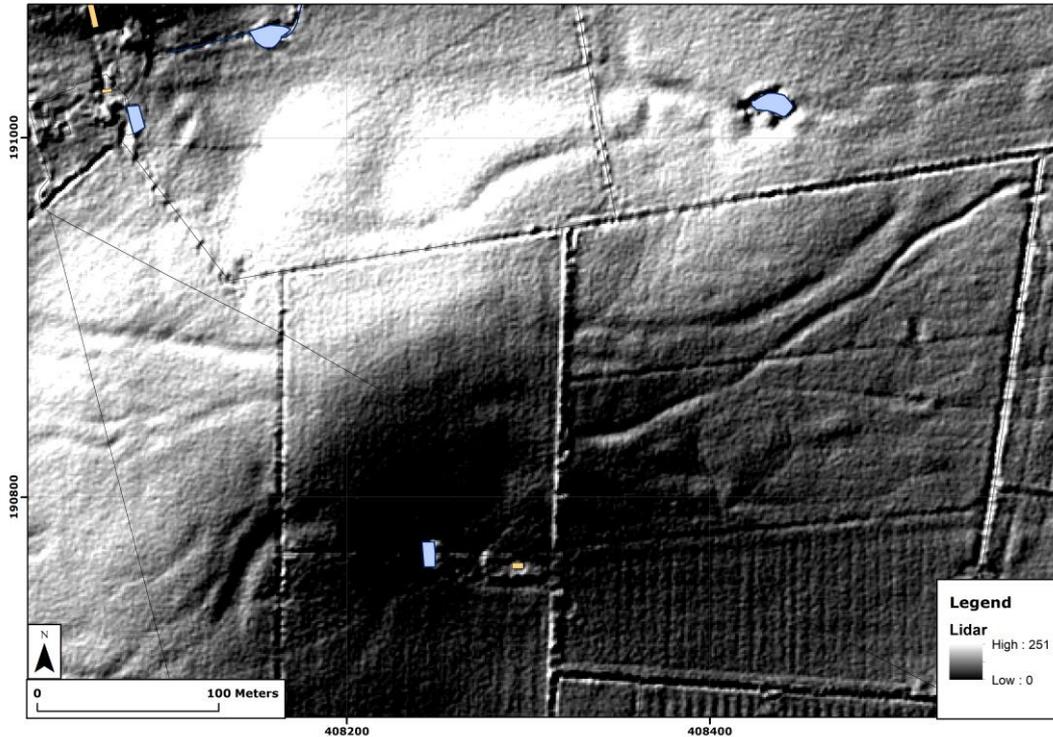


Figure 6: Lidar Image (Source: Data.Gov.UK Base Mapping: Ordnance Survey, Crown Copyright)

### The Aim of the Survey

The aim was to establish any evidence of past human activity in the fields using magnetometry.

Permission for the survey to be carried out was given by the land owners.

## Carrying out the Survey

The survey was carried out on five separate days between 22nd October 2018 and 20th January 2019 by Mike McQueen, supported by John Samways and Colin Stares.

Field A was under grass, but it is regularly ploughed and this appears to have flattened any earthworks that might have appeared in this field. Field B was also used for pasture but has not been ploughed very often. The grass was fairly short but there were some patches of upstanding dead weeds which appear to correspond with areas of disturbed ground identified by the geophysical survey.

The centre of Field A was the highest point of the survey and the land then gradually fell away in all directions. The highest point in Field B was on the western side and the field then gently sloped down to the east. There are upstanding earthworks visible in Field B, particularly where the hollow ways, shown on the Lidar in Figure 6, run across it.

The weather was generally dry and partly sunny on the survey days and the ground was fairly firm, except for the eastern side of Field B where there were wet areas associated with the location of former ponds.

## Survey Grids

Full and partial 20m x 20m survey grids were laid out as shown in the following map using a MobileMapper 300 and Pocket GIS Software. The MobileMapper 300 was fully RTK corrected to give an accuracy to 0.002m – 0.010m. The grids were assembled into blocks to reflect the layout of the field and are shown in Figure 7 below.

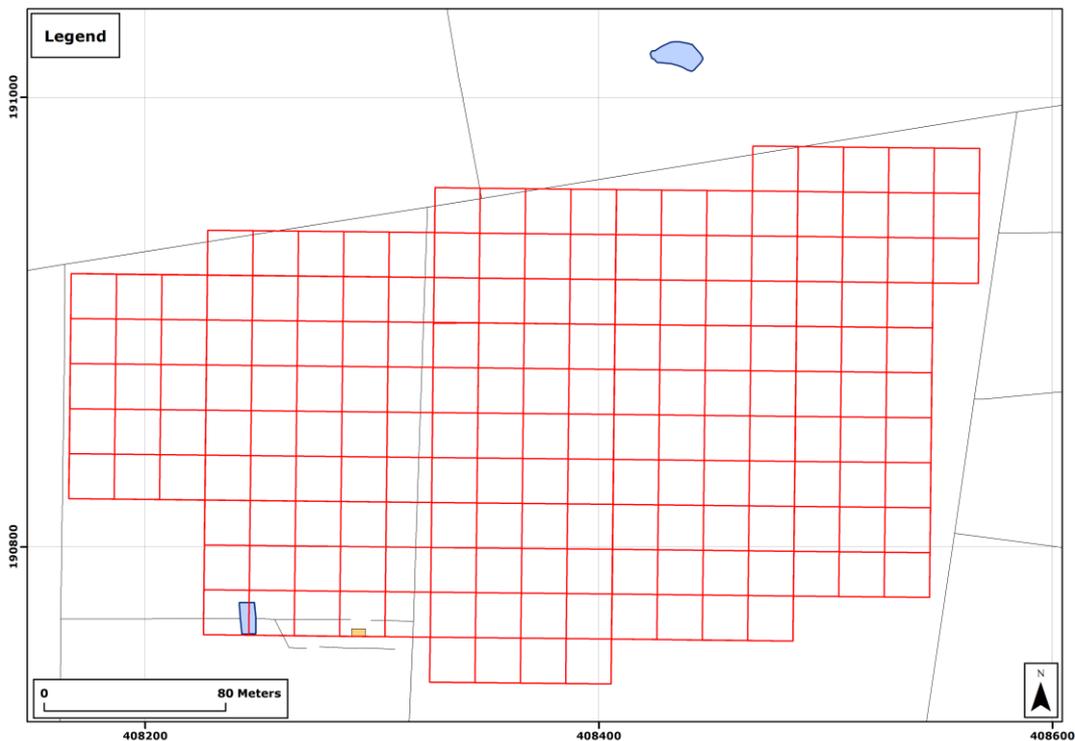


Figure 7: Survey Grids (Base Mapping: Ordnance Survey, Crown Copyright)

**Magnetometry Survey.**

The magnetometry survey was carried out using a Bartington Grad601-2 Dual Sensor Gradiometer set up as follows:

|                           |                     |
|---------------------------|---------------------|
| Units:                    | nT                  |
| Collection Method:        | Zigzag              |
| Sensors:                  | 2 @ 1.0m spacing.   |
| Readings / Sampling       | 1 per 1m / 4 per 1m |
| Dummy Value               | 32000               |
| Direction of 1st traverse | East                |
| Palette                   | Greyscale           |

The surveys were processed in the following way:

- De-strip: Median Traverse All Grids
- Clip: 1.0 Standard Deviations
- De-Stager: 50cm All Grids
- Clip: 3.0 Standard Deviations

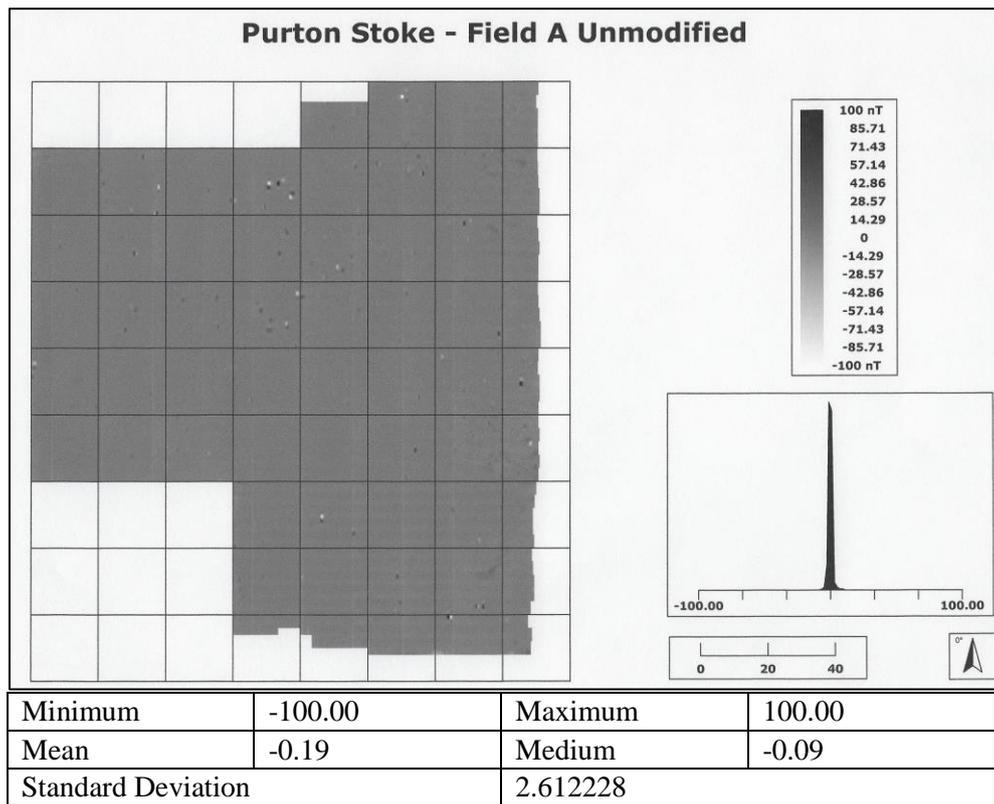


Figure 8: Field A Unmodified Magnetometer Survey

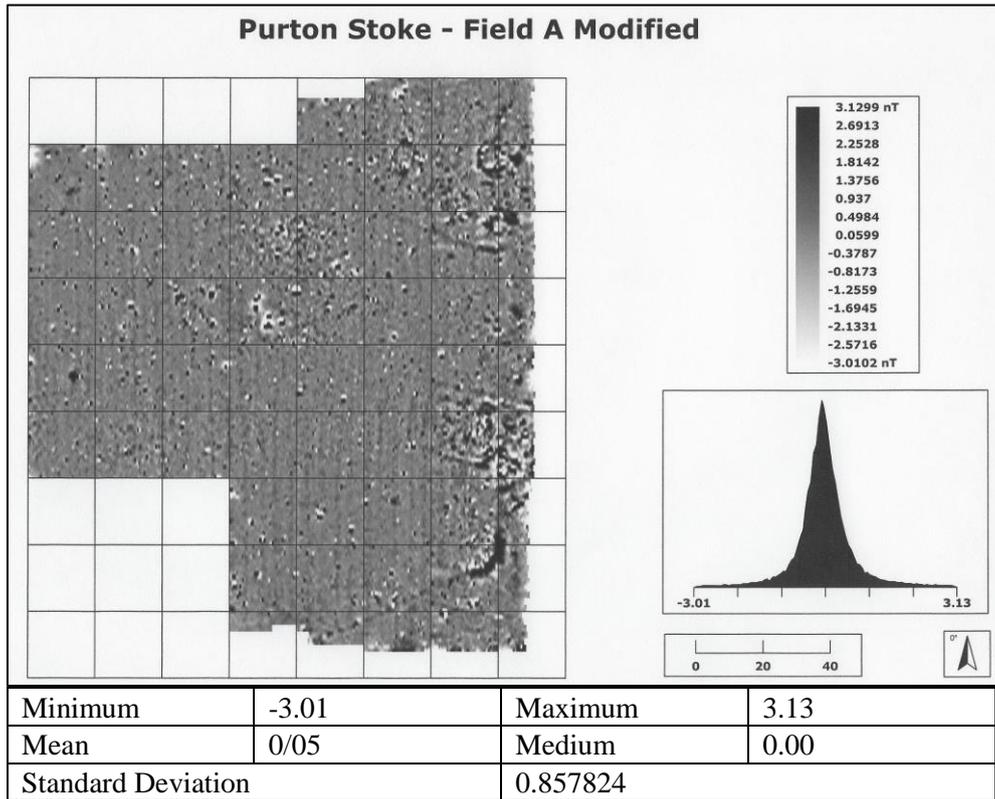


Figure 9: Field A Modified Magnetometer Survey

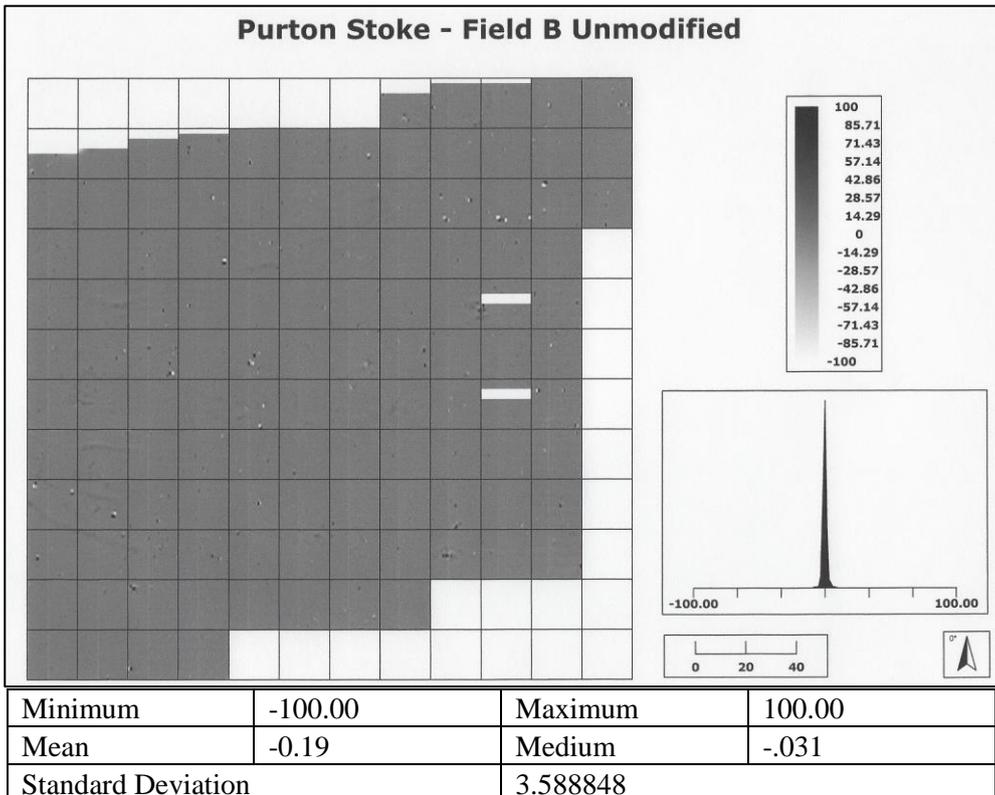
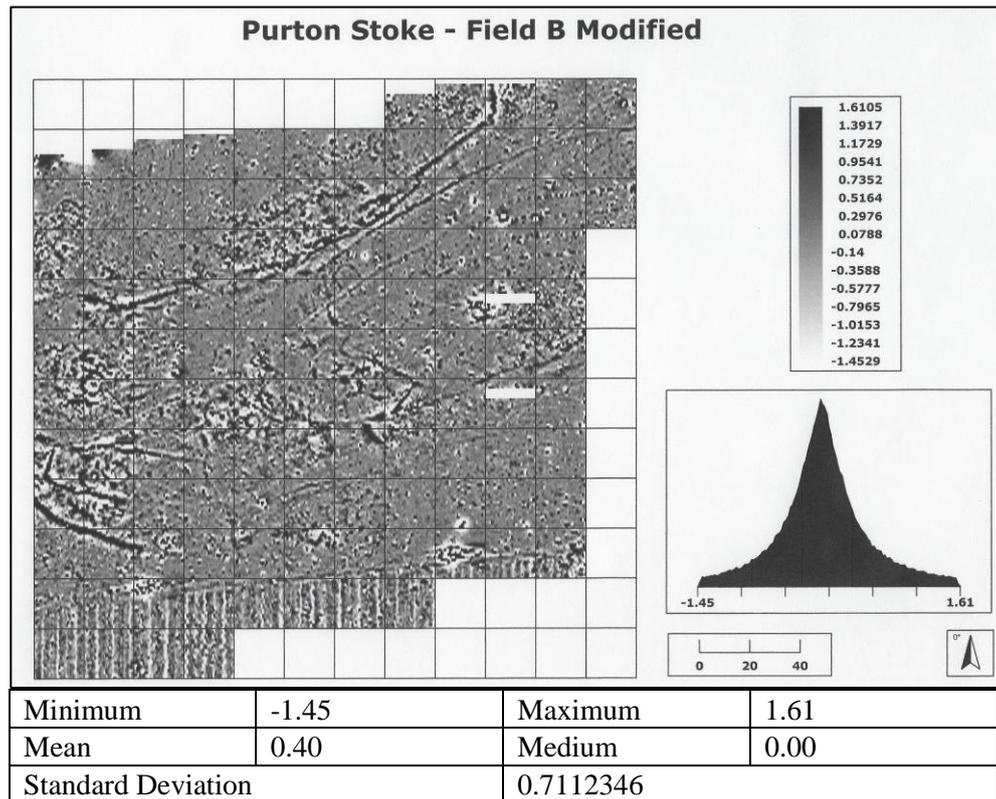


Figure 10: Field B Unmodified Magnetometer Survey



*Figure 11: Field B Modified Magnetometer Survey*

### **Magnetic Susceptibility measurement**

Soil samples were taken from four locations as shown below in Figure 12.

Three of the samples were taken from areas of high activity on the magnetometer survey and the fourth was taken from an area of little activity.

The soil samples were passed to David Sabin, Archaeological Surveys, to measure their mass specific magnetic susceptibility for low ( $X_{lf}$ ) and high ( $X_{hf}$ ) frequencies using a Bartington MS2 with MS2B sensor. Three sub samples were measured and mean values calculated. The frequency dependence ( $X_{fd}$ ) was calculated for each sub sample as a percentage also.

Sample 1:  $X_{lf} = 18.4 \cdot 10^{-8} \text{m}^3 \text{kg}^{-1}$   $X_{hf} = 17.79 \cdot 10^{-8} \text{m}^3 \text{kg}^{-1}$   $X_{fd} = 3.35\%$

Sample 2:  $X_{lf} = 12.94 \cdot 10^{-8} \text{m}^3 \text{kg}^{-1}$   $X_{hf} = 12.5 \cdot 10^{-8} \text{m}^3 \text{kg}^{-1}$   $X_{fd} = 3.54\%$

Sample 3:  $X_{lf} = 25.74 \cdot 10^{-8} \text{m}^3 \text{kg}^{-1}$   $X_{hf} = 24.67 \cdot 10^{-8} \text{m}^3 \text{kg}^{-1}$   $X_{fd} = 4.16\%$

Control sample:  $X_{lf} = 9.11 \cdot 10^{-8} \text{m}^3 \text{kg}^{-1}$   $X_{hf} = 8.9 \cdot 10^{-8} \text{m}^3 \text{kg}^{-1}$   $X_{fd} = 2.34\%$

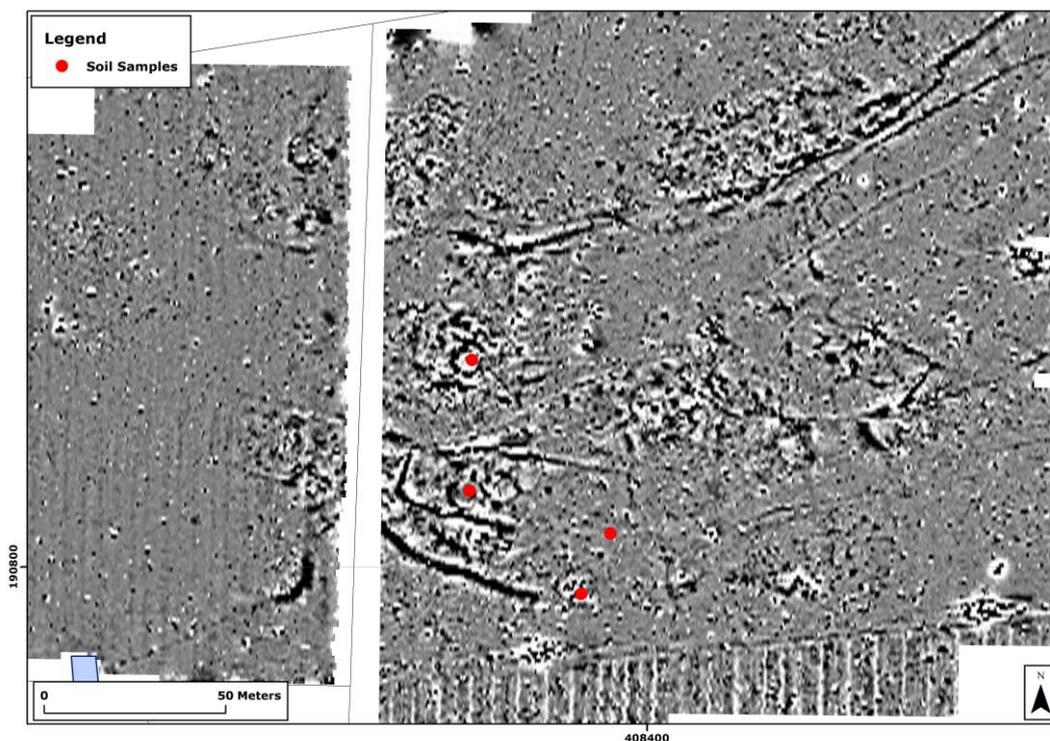


Figure 12: Soil Sample locations (Mapping: Ordnance Survey, Crown Copyright)

The results demonstrate higher levels of magnetic susceptibility for samples 1 – 3 when compared to the control sample, as one would expect. The control sample is probably slightly higher than expected for this type of clay soil possibly due to agricultural activity but perhaps also a low level signature from past human activity or agricultural soil improvement.

Samples 1 and 2 demonstrate low levels of enhancement with moderate levels for sample 3. The enhancement is probably not indicative of industrial activity and is consistent with burning associated with habitation.

Samples 1 – 3 demonstrate higher levels of frequency dependence compared to the control sample which is typical for soils altered by habitation. The highest level of frequency dependence (sample 3) correlates with the highest levels of magnetic susceptibility indicating an increase in the level of extremely fine superparamagnetic particles probably relating to burning.

To summarise, the values of magnetic susceptibility would be entirely consistent with settlement activity and are unlikely to support any interpretation of industrial activity at this stage. However, be aware of the very small number of samples taken and how these may only be indicative of activity within a few metres.

Looking at the magnetometry values, there were no anomalies that were significantly enhanced enough to represent intact kilns. It is possible that agricultural erosion and spreading of such features could also account for this. The variable positive and negative responses in the magnetometry data could indicate quite shallow structural remains with small areas of stone or clay intermingled with magnetically enhanced soil.

## Results and Interpretation

The Lidar image in Figure 6 shows some potential features, which are highlighted in Figure 13 below.

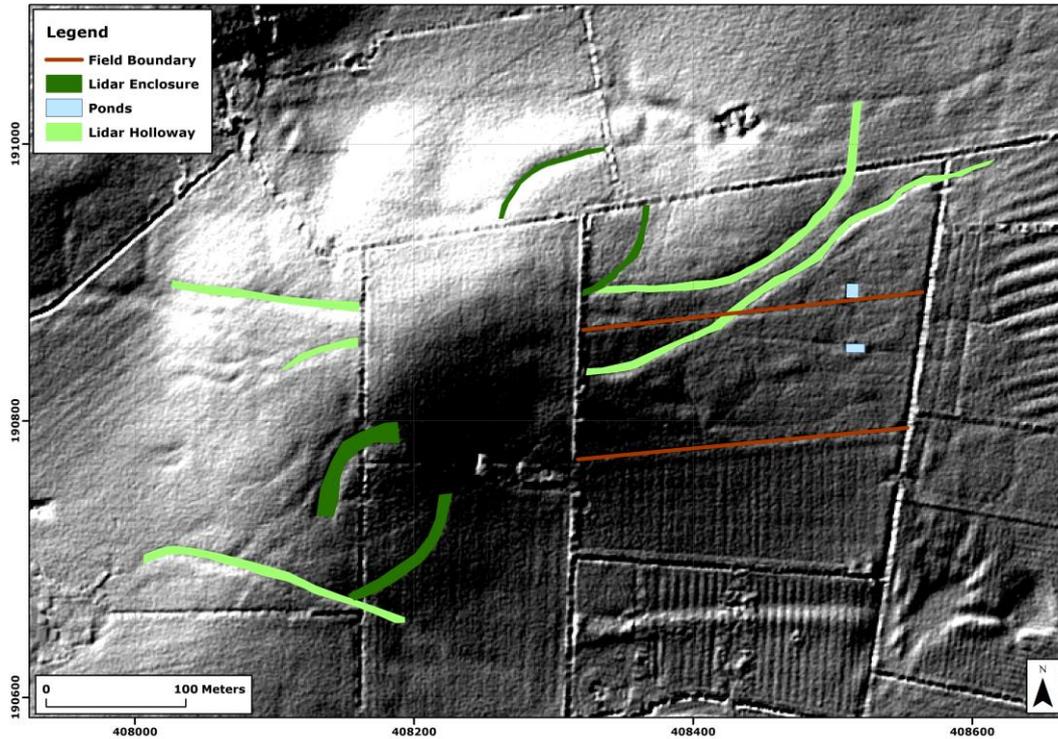


Figure 13: Annotated Lidar Image (Source: Data.Gov.UK Base Mapping: Ordnance Survey, Crown Copyright)

The combined geophysical survey results for Fields A & B are shown in Figure 14.

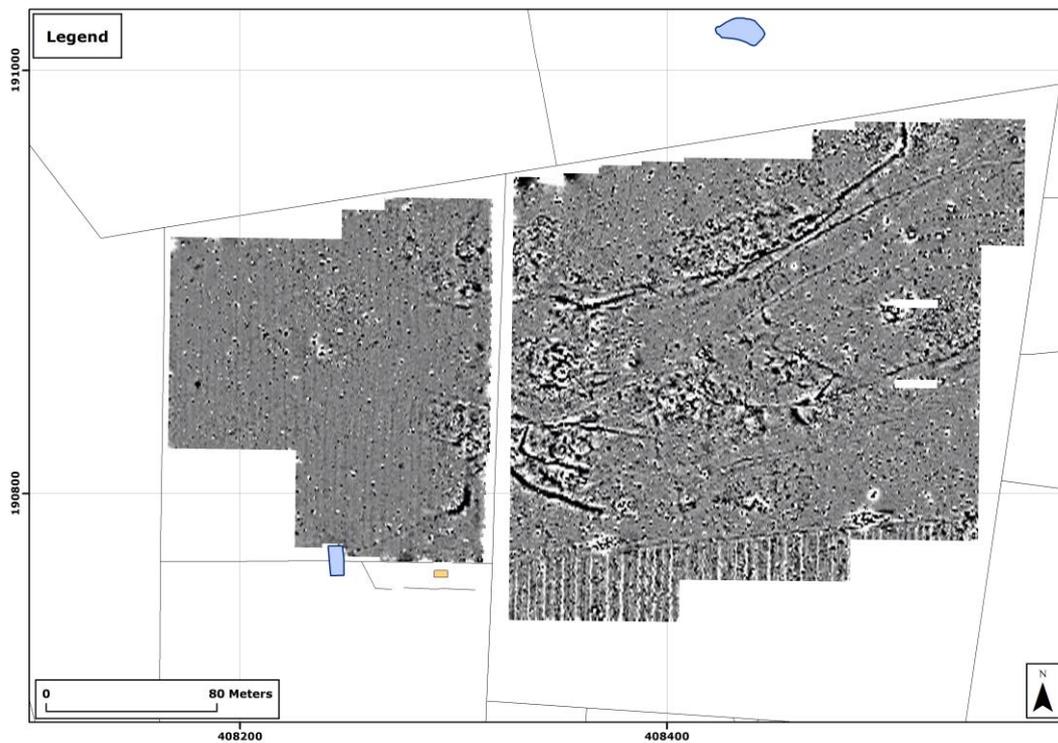


Figure 14: Magnetometer results (Base Mapping: Ordnance Survey, Crown Copyright)

# Magnetometry Survey at Purton Stoke, Wiltshire

These results have been interpreted as possible archaeological features as indicated in Figures 15 and 16 below.

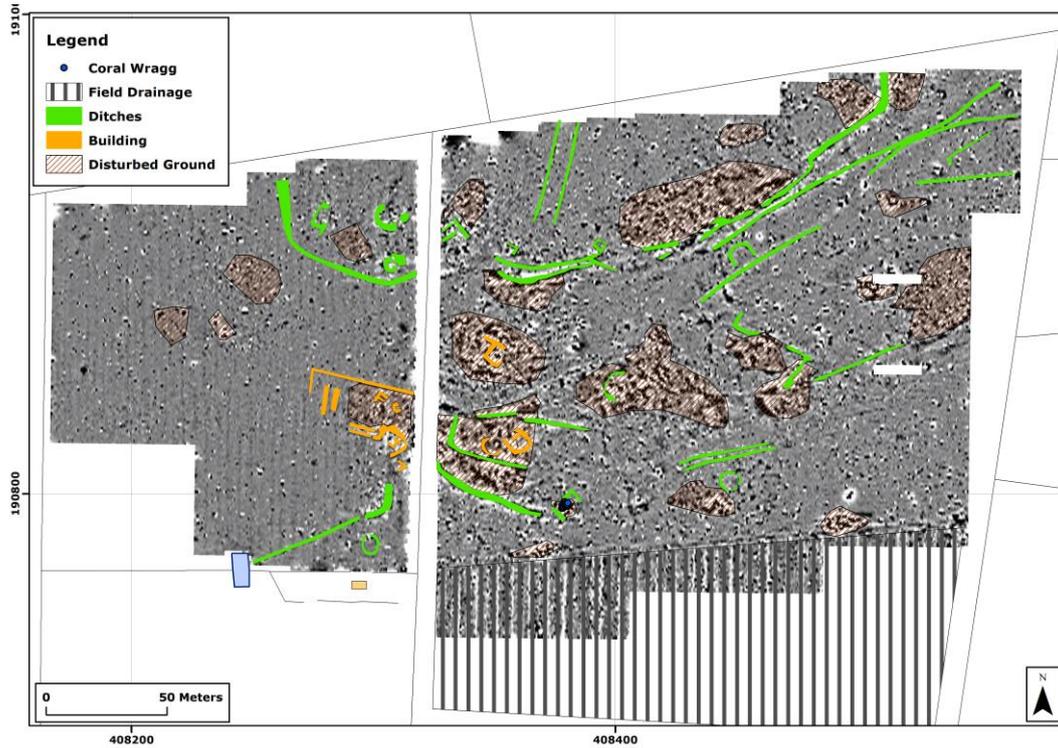


Figure 15: Magnetometer Results Interpretation (Base Mapping: Ordnance Survey, Crown Copyright)

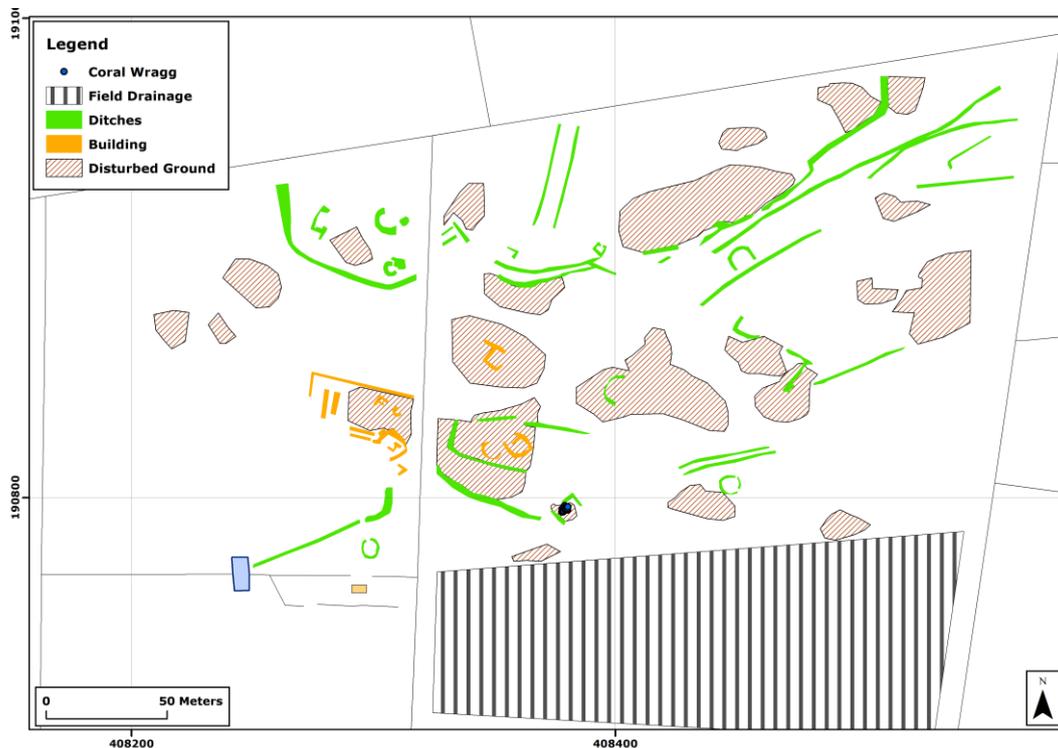


Figure 16: Interpretation (Base Mapping: Ordnance Survey, Crown Copyright)

The geophysical results can be overlaid onto the features identified from the Lidar mapping as shown in Figure 17.

Magnetometry Survey at Purton Stoke, Wiltshire

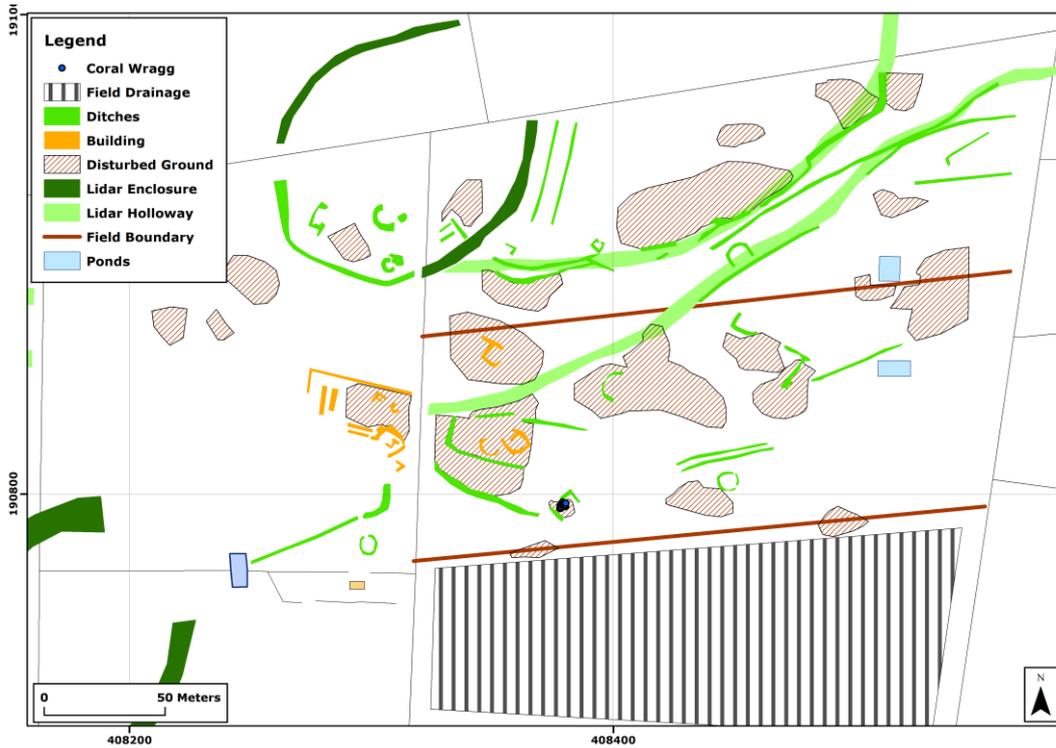


Figure 17: Lidar and Magnetometer Interpretation (Base Mapping: Ordnance Survey, Crown Copyright)

The geophysical survey results also show a strong correlation with the finds made in the two fields as shown in Figure 18 below.

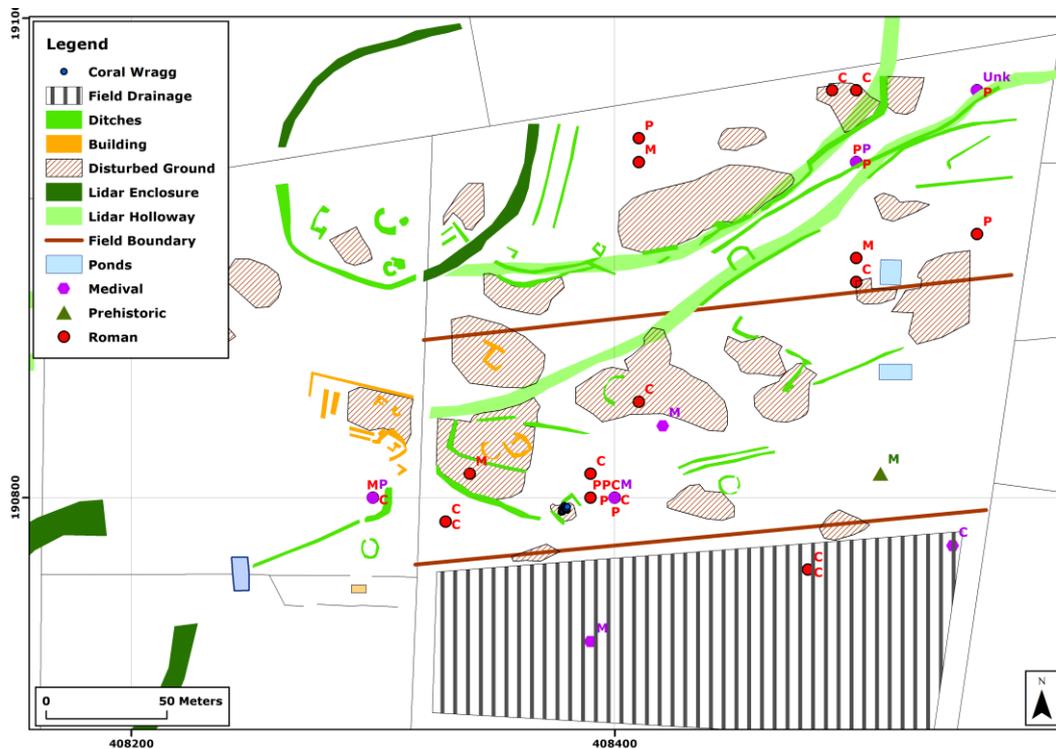


Figure 18: Survey Results and Finds (Base Mapping: Ordnance Survey, Crown Copyright)

The semi-circular enclosure overlapping the top corners of the fields has the appearance of being Prehistoric in date. The south west section in Field A contains possible round houses and pits and there are also areas of disturbed ground in the south east section in Field B.

## Magnetometry Survey at Purton Stoke, Wiltshire

Based on their morphology and the finds that have been made the remaining features appear to be part of Romano-British settlement. This settlement is laid out along side some substantial hollow ways which can still be seen as earthworks in Field B. These hollow ways suggest that there was a great deal of movement to and from the site. Parts of the hollow ways appear to have been flanked by ditches.

There is no evidence of paddocks or field systems associated with this settlement which would be expected if it was a farming settlement.

The main feature in the settlement runs from Field A into Field B and appears to contain the foundation of small structures surrounded on three sides by substantial ditches. The ground is very disturbed but the magnetic susceptibility analysis of soil samples indicates that this was not caused by pottery kilns or metal working.

The other features in Field B are less clear cut. There is a small area where small chunks of coral wrag limestone are poking through the grass. This could indicate the site of another structure. Mainly the remaining features are either small ditches in no obvious form and areas of disturbed ground.

The close location to a source of mineral and salt water suggests the possibility of salt production. The water could have been heated in pans to extract the salt which would have been a valuable resource in this part of the country where salt wells are not common. Alternatively there may have been a well on the sloping ground which could have ritual significance, particularly if the water was thought to have medicinal benefits at that time.

More recent activity in Field B includes a field drainage system along the southern end, two ponds and two old field boundaries running east-west across it.

### **Conclusions**

The geophysical survey has produced some results which suggest possible Prehistoric and Romano-British occupation and activity in the two fields. There are not a large number of sites of this nature known in this part of Wiltshire. The exact nature of this occupation / activity is not clear cut. To help try and establish what this might have been will only be possible by excavating some of the features identified by the geophysical survey. If the activity did in some way relate to the exploitation of the local availability of mineral and salt water, this would make the site fairly unique in the County.

### **Next Steps**

Preliminary discussions have been held with the County Archaeologist, Melanie Pomeroy-Kellinger, and she has confirmed that there would be some value in undertaking excavations to try and establish what activities were underway in the fields and to obtain firm dating evidence. It is therefore proposed that the land owners will be approached to see if they will give permission for excavations to take place. If they agree it is proposed that these will be carried out in two stages:

1. Firstly, a test excavation by the authors of this report of a single trench across the ditch and a possible structure inside the main feature in Field B to try and obtain dating evidence and a clearer understanding of what the features may be.
2. Secondly, and subject to the results of the first test excavation, a more extensive excavation by the Wiltshire Archaeological Field Group involving a number of larger trenches to investigate more of key features.

## **Bibliography**

Volker, Dr. 1860., in *Taking the Waters at Purton Spa*, Cricklade Historical Society Bulletin, Vol III, No. 1. 1990, pp1-5.

Richardson, M S. 1919, *The Story of Purton*

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Lidar            Survey Open Data provided by the Environment Agency; 1m DTM source data downloaded from <http://www.geostore.com/environment-agency/survey.html#/survey?grid=SU09>.