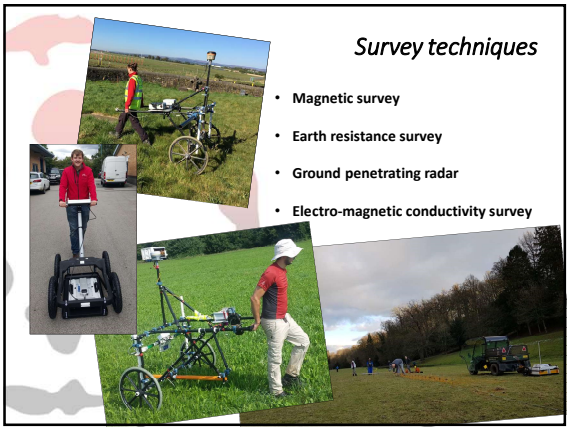
Looking beneath the ground:

geophysical survey results from Old Hall Farm, Thornton-le-Street

Thornton-le-Street History Group

Survey techniques



- Magnetic survey
- Earth resistance survey
- Ground penetrating radar
- Electro-magnetic conductivity survey

Magnetic Survey

Measurement of contrast between magnetic properties of archaeology and those of surrounding ground

Magnetic Enhancement

Measurement of contrast between magnetic properties of archaeology and those of surrounding ground

What causes magnetic enhancement?

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- Burning (individual features or clearance)

Magnetic Enhancement

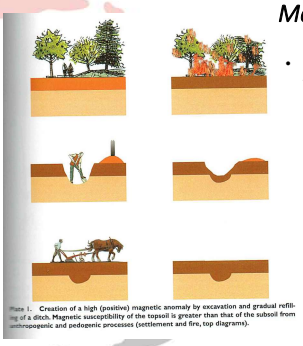
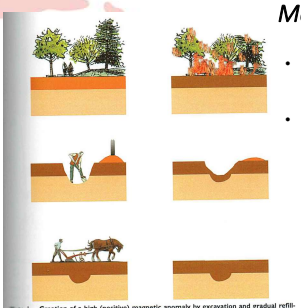


Plate 1. Creation of a high (positive) magnetic anomaly by excavation and gradual refilling of a ditch. Magnetic susceptibility of the topsoil is greater than that of the subsoil from anthropogenic and pedogenic processes (settlement and fire, top diagrams).

Aspinall A., Gaffney C. and Schmidt, A. 2008. Magnetometry for Archaeologists. AltaMira Press: Plymouth.

- Burning to clear land enhances topsoil

Magnetic Enhancement



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- Ditch dug around settlement (into less enhanced material)

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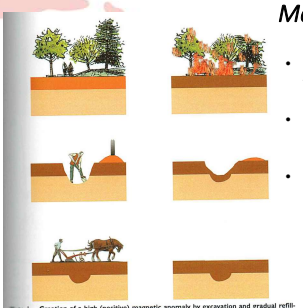
Magnetic Enhancement



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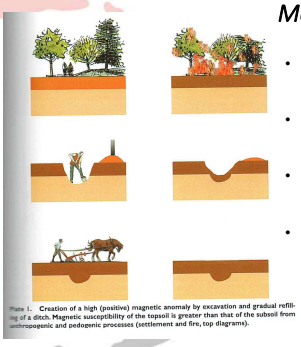

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- Ditch dug around settlement (into less enhanced material)
- Ditch gradually silts up with enhanced topsoil
- Left with magnetically enhanced feature compared with surroundings

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- Magnetotactic bacteria

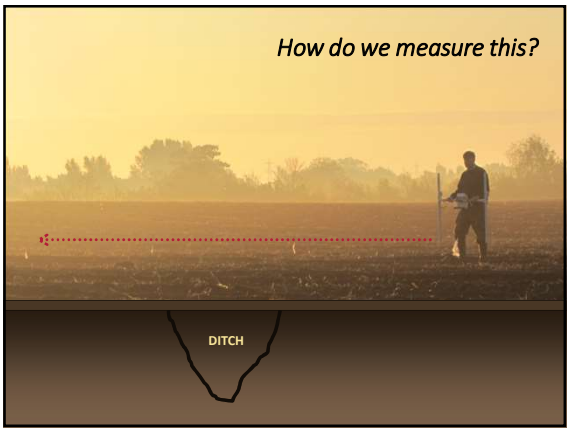
Magnetic Enhancement

Measurement of contrast between magnetic properties of archaeology and those of surrounding ground

What causes magnetic enhancement?

- Burning (individual features or clearance)
- Decay of organic material (pits and middens)
- Magnetotactic bacteria
- Deposition of magnetic material (rubbish)


How do we measure this?
DITCH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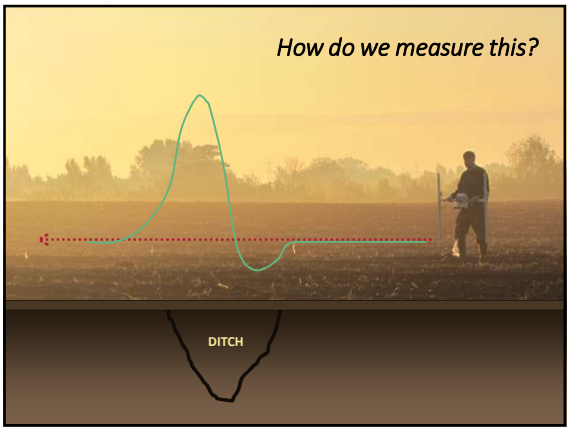
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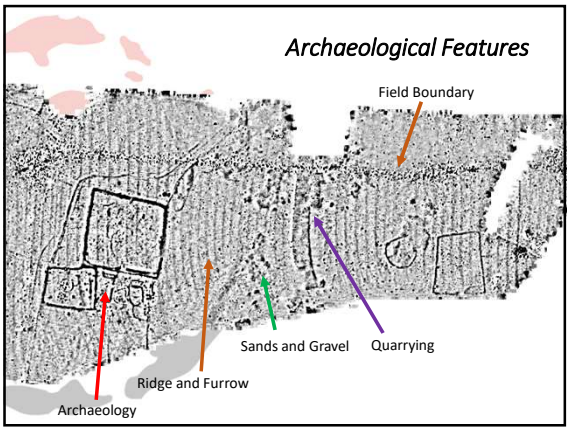
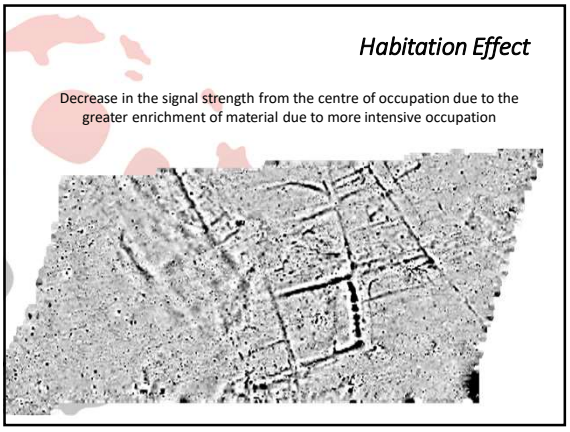
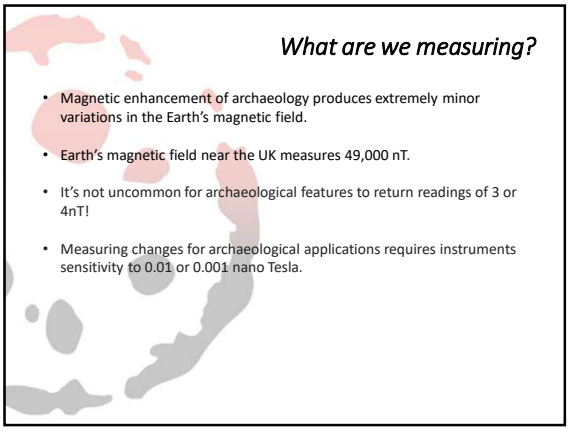
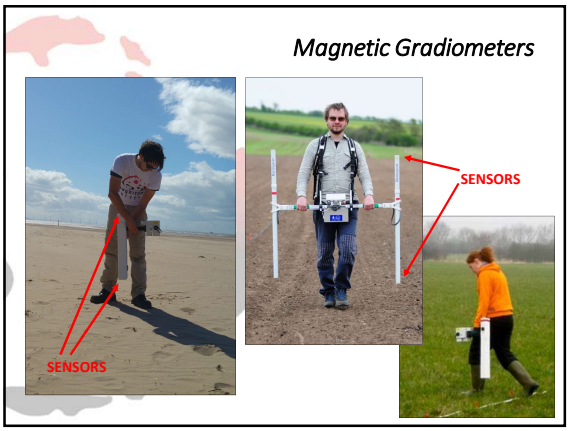
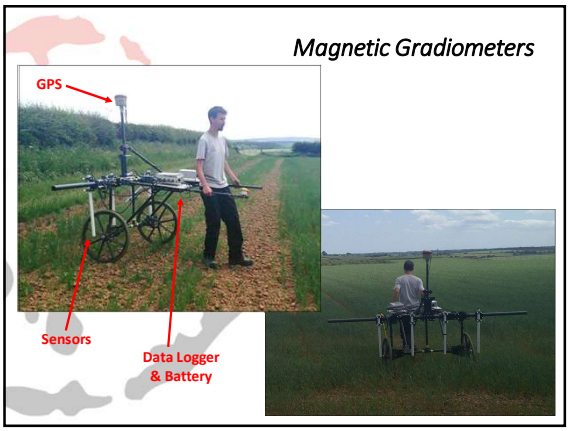

Archaeological Features
Field Boundary
Sands and Gravel
Quarrying
Ridge and Furrow
Archaeology

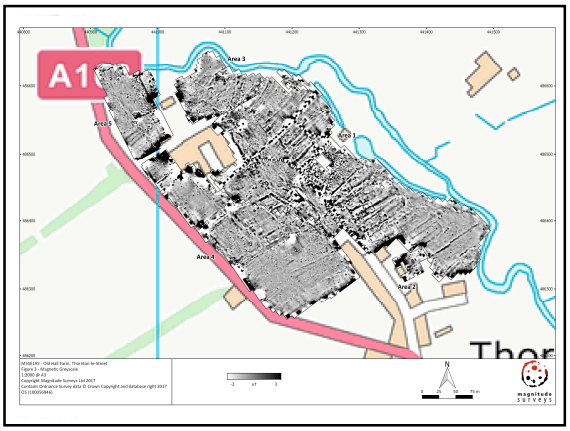

Habitation Effect
Decrease in the signal strength from the centre of occupation due to the greater enrichment of material due to more intensive occupation


What are we measuring?
Magnetic enhancement of archaeology produces extremely minor variations in the Earth's magnetic field.
Earth's magnetic field near the UK measures 49,000 nT.
It's not uncommon for archaeological features to return readings of 3 or 4nT!
Measuring changes for archaeological applications requires instruments sensitivity to 0.01 or 0.001 nano Tesla.


Magnetic Gradiometers
SENSORS
SENSORS


Magnetic Gradiometers
GPS
Sensors
Data Logger
& Battery


Survey Areas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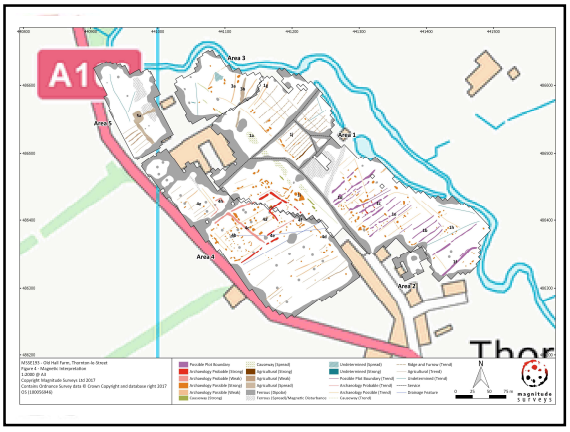
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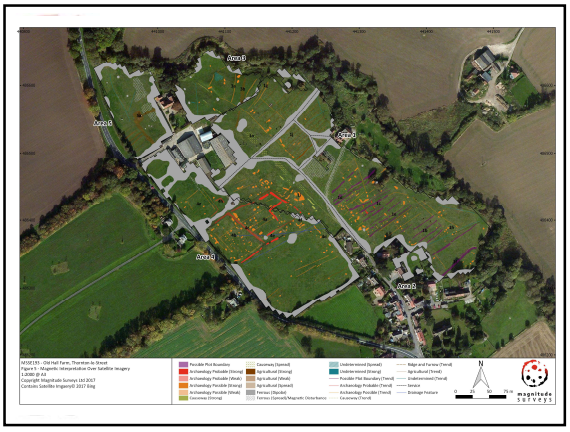
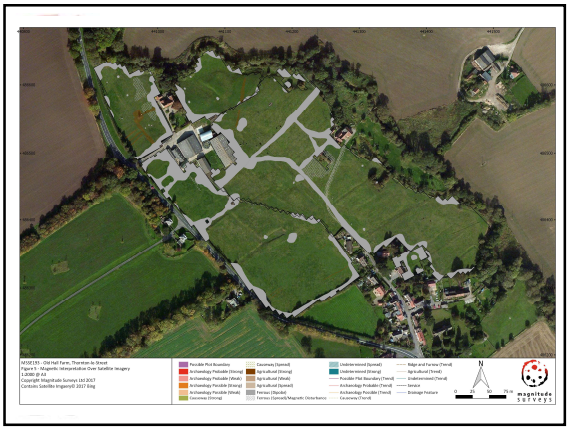
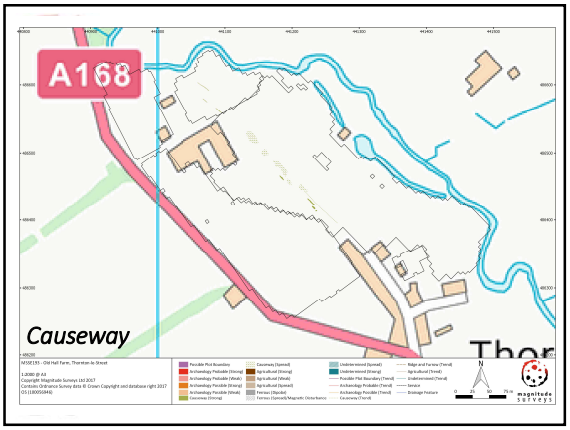
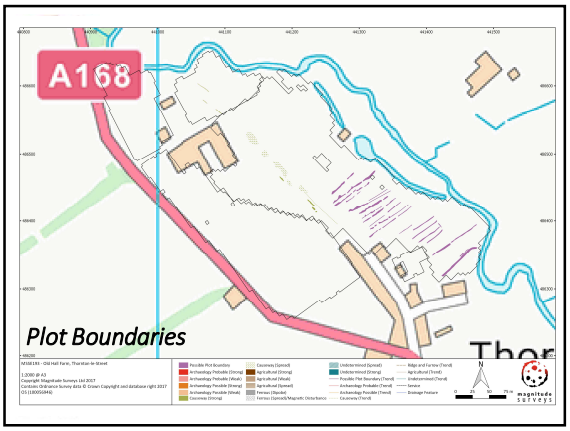
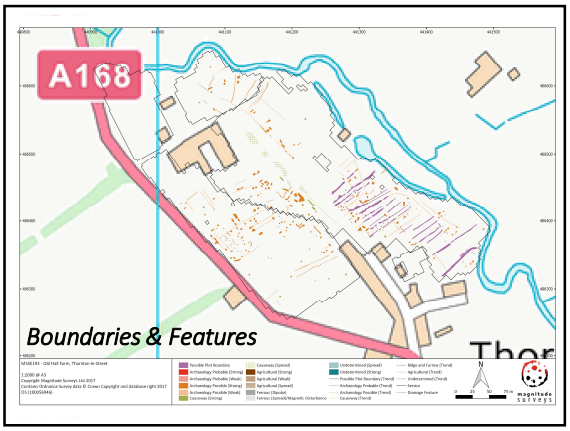





A168
Causeway


A168
Plot Boundaries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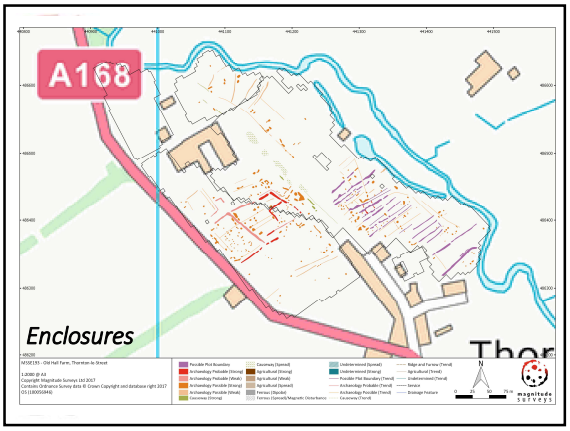
Boundaries & Features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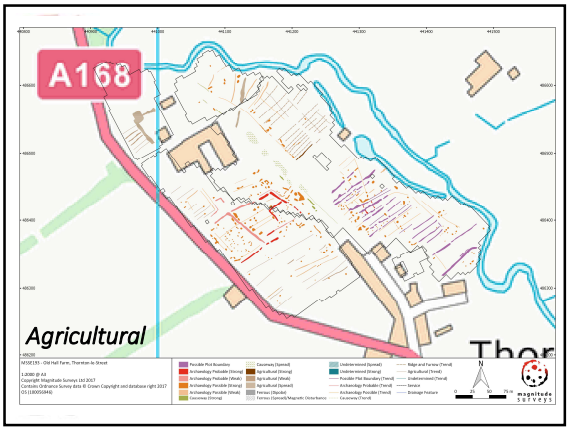
Enclosures


A168
Agricultural

Our interpretation

- NO DATING EVIDENCE
  - Contemporary? Multiphase? Zonation?
- Dominant NE-SW alignment: causeway and water
- 'Causeway' is central to the layout
- How has plough damage and ferrous disturbance affected the interpretation?
- Implies complex history of the site
- Provides complementary data adding detail to the picture of a 'classic' shrunken village

Your interpretation

How does this tie into the bigger picture?

Your interpretation

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Any questions?

Thanks for having us!