

# ROMAN·ROADS·RESEARCH ASSOCIATION

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## FLUXGATE GRADIOMETER SURVEY

### LOW LEARCHILD ROMAN FORT & THE JUNCTION OF RR88 & RR87

#### NORTHUMBERLAND

APRIL 2023

MIKE HAKEN & DAVE ARMSTRONG

RESEARCH REPORT NO. SMX006





# ROMAN ROADS RESEARCH ASSOCIATION

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## SITE & SURVEY DETAILS

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### Site Description:

Survey was conducted at two related sites in Northumberland. The primary site is a Roman fort, identified in 1945 from aerial photographs on a slightly elevated platform of level land east of the Coe Burn, some 8.5km west of Alnwick. The fort is about 700m east of the second site, identified by Henry MacLauchlan (1864) as the junction of two Roman roads; the Devil's Causeway (RR88) and a road from High Rochester (RR87) in the direction of Low Learchild.

**Parish:** Edlingam CP

**Dates of Fieldwork:** 17<sup>th</sup> - 19<sup>th</sup> August 2022

**County:** Northumberland

### Fieldwork Personnel:

**Approx. Central NGR:** NU 1007 1137

**Supervisor:** James Lyall

**HER:** Northumberland

**Volunteers from RRAA:** Dave Armstrong, Mike Haken, Steve Hedworth, Albert Hills, Des Kelly

**Landowners:** Mr. Jabin Cussins (Low Learchild site). Mr. Andrew Ellis (Junction site)

**Volunteers from the Holystone History & Archaeology Group and the local community:** J. Fraser, T. Henfrey, A. Hetherington, J. Pearson, D Robinson, W. Tommasson.

**Tenant:** Mr. Tony Drummond (Low Learchild site)

## REPORT DETAILS

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**Report compiled by:** Mike Haken. Section 2. by Dave Armstrong. Summary of finds from the site held at the Great North Museum by Dr. Reb Ellis-Haken (see Appendix 2)

**Date Issued:** 15<sup>th</sup> April 2023

**Figures by:** Mike Haken

### Date submitted to/by:

**OASIS:** 17<sup>th</sup> April 2023 by Mike Haken

**Background research:** Dave Armstrong

**Northumberland HER:** 17<sup>th</sup> April 2023

**Historic England:** 17<sup>th</sup> April 2023

**Report Authorised by:** James Lyall

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# 1. INTRODUCTION

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## 1.1 Summary

Gradiometer surveys were carried out at two sites from 17th to 19th August 2022 by volunteers from the RRRRA, the Holystone History and Archaeology Group, and others from the local community. The surveys were at the poorly understood Roman fort at Low Learchild (HER No. 4465, NU 1007 1137), a Scheduled Monument (list. no. 1006440; Section 42 licence obtained), and at the supposed junction of the Devil's Causeway with the Roman road from High Rochester some 700m to the west (NU 0936 1116). They were part of a major RRRRA project to examine the Devil's Causeway and the sites along it and confirmed the presence of two successive Roman forts, not quite as proposed by Richmond (JRS 1957, 206). The road junction survey found possible evidence of the Devil's Causeway, but no junction.

Since the material published to date on Learchild fort amounts to just a few paragraphs, the opportunity has been taken to expand the report to include the surviving scraps of unpublished material from previous work by Sir Walter Aitchison in 1945, and Sir Ian Richmond in 1956. This includes the brief contents of relevance from Sir Ian Richmond's archive, with kind permission of the Bodleian Libraries, Oxford, along with a plan of the site drawn by Richmond (Fig. 3 & Appendix 1). A summary of the few finds recovered by Aitchison and Richmond along with field finds by local residents, all held in the Great North Museum: Hancock in Newcastle upon Tyne, is also included.

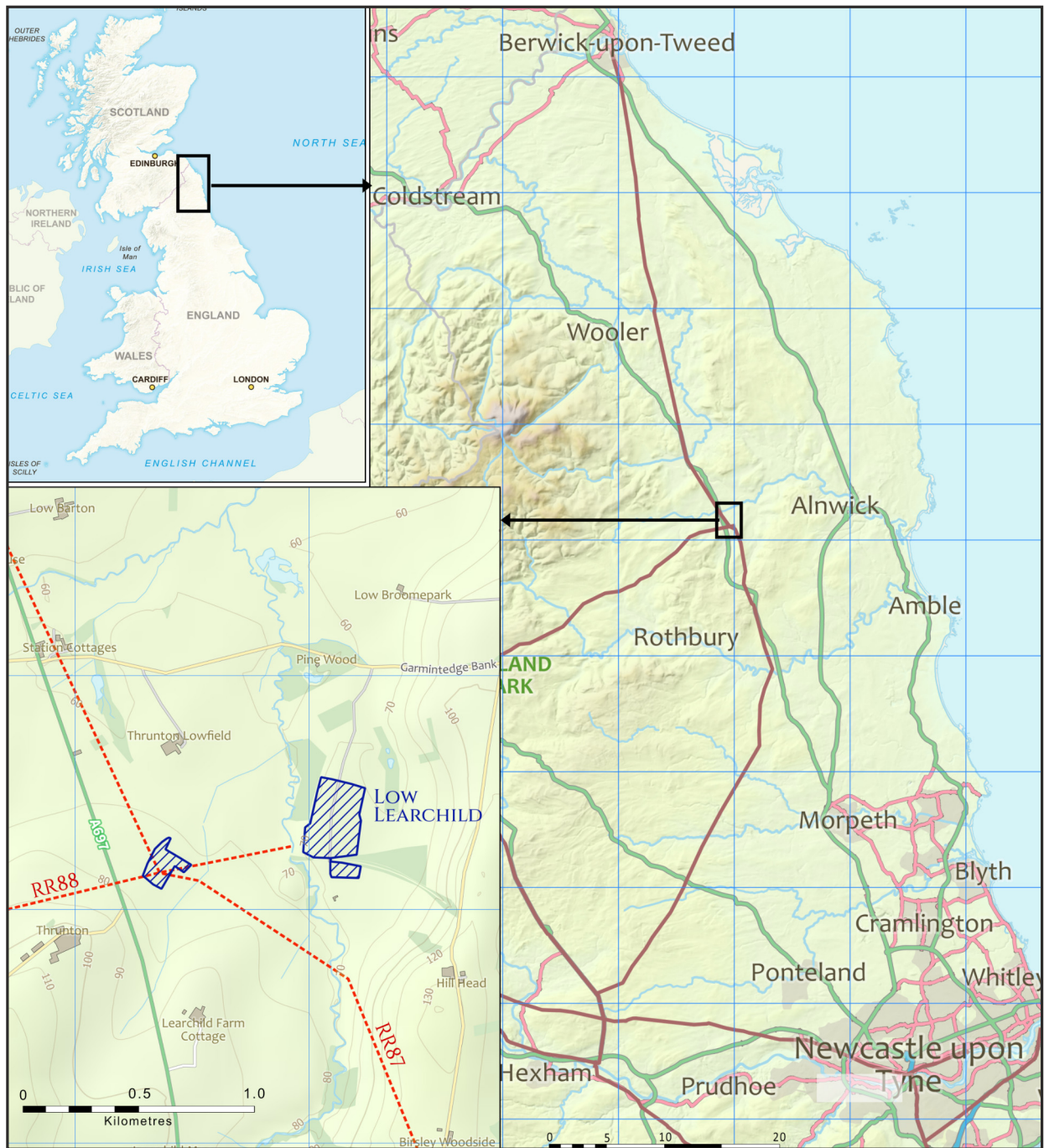
## 1.2 The Devil's Causeway Project

Numbered RR87 by Margary (1973, 478-480), the Roman road known as the Devil's Causeway is thought to branch from Dere Street (RR8) just north of Hadrian's Wall and travels in a generally NNE direction for 56 miles towards the mouth of the R. Tweed. Its course is known with reasonable confidence (apart from the extreme north and southwestern ends) thanks to a survey and subsequent map by MacLauchlan (1864). We would expect at least three forts along the road, plus fortlets and camps, yet Low Learchild is the only confirmed 'permanent' Roman military site along the road. As with other Roman roads in frontier territory the 'missing' installations are likely to be at river crossings, and the relative spacing, along with suspected temporary camp positions, could suggest locations at or near crossings of the R. Wansbeck, R. Font, Hart Burn, the R. Coquet, the R. Breamish, & the R. Till with the potential for a fort and crossing at the mouth of the R. Tweed.

In order to better understand the Devil's Causeway and its original function, the Roman Roads Research Association (RRRA) has initiated a project to survey and record the course of the road, and to utilise lidar and geophysics to investigate locations of potential military installations along its course. This will involve assessing not only those sites which have been previously suggested to be of Roman military origin, such as the possible temporary camps at West Marlish, Hartburn and Edlingham (Gates & Hewitt 2007), but also others which have only been recognised recently from lidar analysis (Bryn Gethin, pers. Comm.), alongside some with antiquarian claims for Roman origin.

## 1.3 Objectives of the Survey

- 1.3.1. To better understand the form and sequence of the Roman fortifications on the site.
- 1.3.2. To assess the possible presence of extra-mural settlement and roads/trackways, particular the oft mooted extension eastwards of RR88 from the east gate, if time permitted.
- 1.3.3. To encourage the involvement of local groups and the local community in both this survey and the wider Devil's Causeway Project
- 1.3.4. to survey the junction of RR87 & RR88, to confirm the location of the junction and ascertain whether any indications of structures or settlement at the junction may be present.



**Figure 1.** Location map showing survey sites (hatched in blue) near Low Learchild Roman fort, Northumberland. The brown lines on the main map are the known Roman roads, marked in red on the detailed map..

### 1.4 Site Location and Condition

The Low Learchild fort site sits on a low plateau falling away steeply to the Coe Burn on the west and south sides with a dry valley, that may have had a watercourse in Roman times, on the east side. The site is a Scheduled Monument. A kilometre to the north, the river Aln sits in a wide low valley. The plateau is relatively level and has excellent views to the north, west and south. The Devil’s Causeway can be seen from the site descending down a graded incline from the higher ground of Edlingham to the south and, after skirting the fort site to the west, the road continues northwards through the low valley of the Shawdon Burn linking to the Breamish valley. Another Roman road from High Rochester approaches the site from the west.



The entire survey site is currently pasture, grazed by both cattle and sheep at the time of survey. It is bisected by an access road running roughly north south, with significant rig and furrow surviving to the west of the road where the grazing is quite rough with large patches of reeds, especially in the south of the site. Just outside the limit of survey to the west is an area of woodland (see Fig. 1) which slopes quite steeply in places down to the Coe Burn. The ground here appears quite unstable, with considerable landslip and many tree throws which have potentially destroyed the north western edge of the fort site. To the east of the road the ground is more level with no trace of rig and furrow and the grass appears to be a relatively recent ley. The only clearly visible sign of the fort on the ground is a bump in the access road where it crosses the remains of the outer rampart.

A former railway line cuts across the site roughly east to west (now a track) along the southern edge of the fort, with a substantial embankment which carried it across the Coe Burn (Fig. 2). The impact of the construction of the railway on any archaeological remains is unknown.

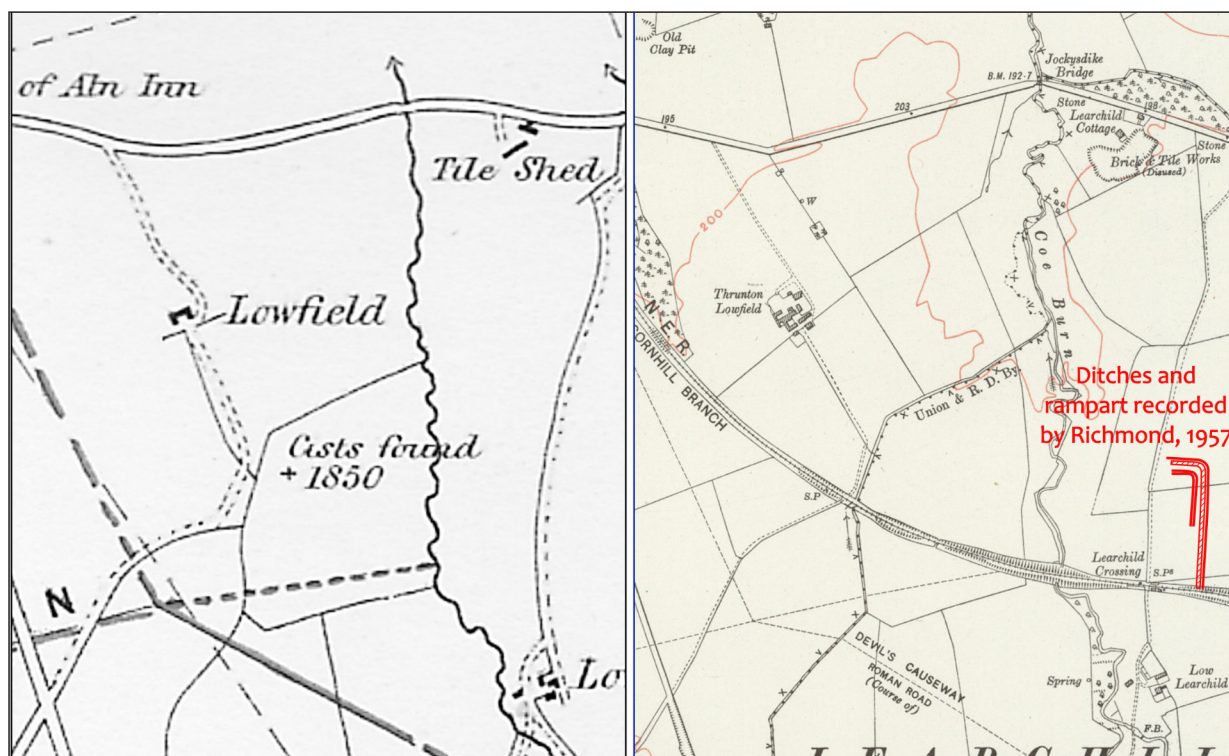
The smaller site to the west (centred roughly at NU 0936 1117), where the two Roman roads are marked as crossing by the Ordnance survey, slopes very gently down to the east. The field is improved grassland, recently re-sown. There are no surface features visible at the road junction.

## 2. BACKGROUND

### 2.1 Archaeological Background

#### 2.1.1. The Devil's Causeway

It has long been known to antiquarians that a Roman road known as the Devil's Causeway ran from north of Corbridge towards Berwick on Tweed, (Warburton 1716; Horsley 1732, 144 & map after p157), subsequently numbered RR87 by Margary (1973, 478-480). The first scientific step in recording the road was a full survey by Henry MacLauchlan during the 1850s at the request of the Duke of Northumberland, published as a plan accompanied by a commentary and additional notes



**Figure 2.** MacLauchlan's first accurate mapping (1864) of the Devil's Causeway close to Low Learchild, shown alongside the Ordnance Survey 6" to the mile map of 1926. The features recorded by Richmond are marked in red, showing the potential impact on the site by the former railway. OS map reproduced courtesy of NLS under CC-BY licence.

(MacLauchlan, 1864). This also covered a survey of RR88 from High Rochester to what we now know as the fort at Low Learchild (see Fig. 2), although MacLauchlan was unaware of the fort's presence.

MacLauchlan's work formed the basis of subsequent mapping of the road by the Ordnance Survey (OS), who largely repeated his proposed course. The OS included the peculiar junction of RR88 and RR87 west of Low Learchild, but added a change of alignment of the Devil's Causeway at a modern drain, which seems highly improbable (Fig. 2).

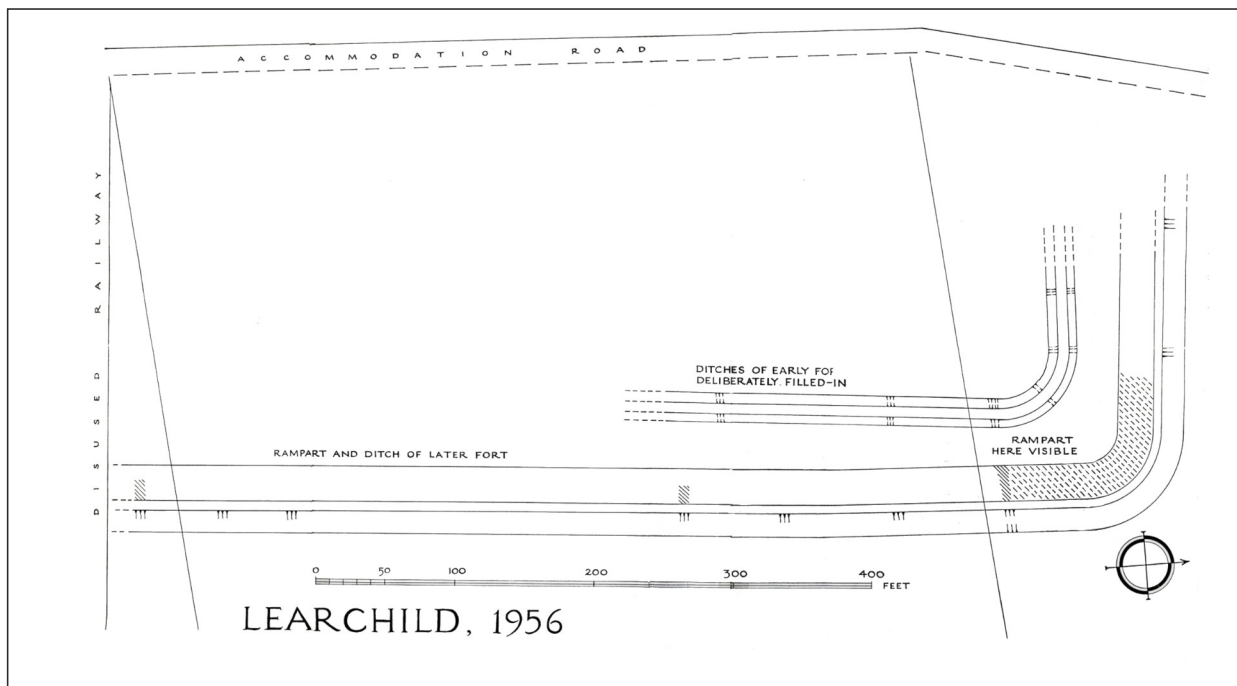
The most significant work on the Devil's Causeway was undertaken just prior to World War 2 by R. P. Wright (1938 & 1940), who investigated it at 48 places between Beukley and the R. Aln., including full sections across it at 20 of those sites. Wright typically found that it was about 24 ft. wide, with kerbs, solidly built with stone bottoming and a metalled surface. Wright could find little trace of the road close to Low Learchild, and the closest excavation he undertook was near the Bridge of Aln, some 1300m north of the Roman road junction. That excavation did establish that the road was in fact west of MacLauchlan's line and if projected would be 180ft (55m) west of the road junction recorded by MacLauchlan and the OS (1940, 74 & Fig. 2).

The very existence of the Devil's Causeway as a well surveyed and engineered road has always seemed a little odd, since it is not a major routeway into Scotland, and until recently Low Learchild was the only known Military site along it. Nick Hodgson has recently argued in support of Collingwood's proposition (Collingwood & Myres 1936, 127) that the Devil's Causeway formed part of a Trajanic Frontier, the road and forts along it like Low Learchild and the probable site at Wooperton (Ansell 2004) protecting the Northumberland Coastal Plain (Hodgson 2012, 213).

### 2.1.2. Low Learchild Roman fort

The existence of Low Learchild fort, unknown during Wright's work, was recognised in 1945 when crop marks of the east and north sides of two successive forts were photographed by Dr. St. Joseph (1951, 56). The fort may have been the *Alauna* listed in the Ravenna Cosmography (Rivet & Smith 1979, 245) taking its name from the river *Alauna* just to the north, now the R. Aln.

The cropmarks suggested an earlier fort with a double ditch, located within a later and much larger



**Figure 3.** A 'cleaned up' version of Sir Ian Richmond's unpublished drawing (facing west) of his interpretation of Low Learchild based on his own limited excavations and those of Sir Walter Aitchison in 1946. A photo of the original is reproduced in Appendix 1

fort defended by a single large ditch. Trial trenching on the larger ditch was undertaken in late 1945 by Sir Walter Aitchison, with further work conducted in 1946. Unfortunately, Aitchison died before publishing and his notes are now lost. However, the draft of a brief letter and sketch sent to St. Joseph in 1945 does survive (Aitchison 1945), and describes an asymmetrical (sometimes termed *Punic*) ditch 26ft (7.9m) wide and 3ft 6 ins (1m) deep, with a 'sump' (ie so called 'ankle-breaker' or cleaning slot) at the bottom (see p.24). The ditch had been deliberately filled with no trace of silting, suggesting to Aitchison it was short lived. The letter also states that a stone road running westwards from the site was found by probing, which he believed to be MacLauchlan's extension. The intent to excavate it was stated, but there is no surviving record of that happening.

In 1956 Sir Ian Richmond carried out further excavation (which was supervised by Charles Daniels), that enabled him to estimate the minimum dimensions of the two forts (JRS 1957, 206). Curiously, he describes the larger outer ditch as just 15ft wide (as opposed to Aitchison's 26ft), the smaller ones for the earlier fort being 8ft (2.5m) wide with 8ft separation, and deliberately filled in. Richmond also died before publishing and sadly his archived papers in Oxford do not contain any further information, although Charles Daniels did manage to locate a copy of Richmond's site plan (Fig. 3) while discussing the site with Nick Hodgson over 20 years ago. The work by Aitchison & Richmond was briefly discussed and summarised by Eric Birley (1961, 244-5), who repeated Richmond's assertion that an earlier small fort was 'contained within the other', concluding that the fort was 'unlikely to have been continued in occupation after the establishment of the Hadrianic frontier-system'.

Richmond gave minimum dimensions of 250 x 750 ft (76 x 229m) for the outer fort, and 130 x 250 ft (39.6 x 76m) for the inner, smaller one, both orientated north/south. However, a resistivity survey, conducted in 1991 by an informal group of Newcastle University archaeology students on three small areas of the site (Anderson, Rushworth & Willis 1992, 34), suggested that the northern rampart of the larger, outer defences, was at least 170m long (ibid, 37). Sadly, only a single paragraph account of that work survives, with no images.

### 2.1.3. Brief Summary of Finds from Low Leachild

Pottery sherds apparently suggesting first and second century occupation (JRS 1947, 167) were found by Aitchison, although these, along with a small quantity of Roman finds recovered by Richmond, have long been assumed to be lost (e.g. Haycock 2021, 8). Fortunately, they have recently been located in the collections of the Society of Antiquaries of Newcastle Upon Tyne at the Great North Museum by Andrew Parkin, the museum's Keeper of Archaeology. He also located two small boxes of field finds made by local residents in 1980 and 2002. Finds from ditch fills made during Richmond's excavation do not appear to be part of the assemblage and notes and photographs from Aitchison's excavation referred to on the Accession card for Box 117 are also now absent. Also missing is a sherd of a decorated Samian bowl (Dragendorff 29), manufactured between AD40 and 85, listed in the accession record as being 'in the envelope', however the envelope was not present. Assuming the identification was correct (made by Charles Daniels in 1972), this missing sherd is consistent with a Flavian date for the earliest fort.

Apart from a few comments by Charles Daniels on the Accession Cards created in 1972, the finds had not previously been analysed. A brief assessment was carried out by the RRRA's finds officer, Dr. Reb Ellis-Haken, a summary list being given in Appendix 2. None of the finds had been cleaned, and microscopic analysis of the pottery fabrics could not be made, although that would probably have made little difference to the information the assemblage can provide given its small size (just 29 sherds of pottery) and the lack of any contextual information.

The accession card for material from Aitchison's excavation (Box 117) also mentions three sherds of a 'post-Hadrianic' Samian bowl, which were present, and appear to be part of a Curle 15 Shallow Bowl (AD 70-140) which had clearly been burnt after being broken. Six other coarseware sherds in poor condition are of an oxidised sandwich, with an orange outer and grey core, with two rims. These are not inconsistent with a 1st or 2nd century date. Finds from the ditch fills includes evidence for Roman structures in the form of sherds of CBM, along with one large piece of *tegula* which had been burnt. A



**Figure 4.** The supposed cheek piece from Low Leachild, more probably part of a statue.

piece of glass, also from the ditch fills, is best described as a blob comprising a white layer sandwiched between two cobalt blue layers and is possibly suggestive of bead or bangle manufacture on site. Other indications of industrial activity from the ditch fills come from six sherds of what appear to be kiln lining, all burnt, previously identified as coarseware pottery.

The surface finds include two undatable sherds of Samian ware, both burnt but they are sadly undatable. There are also four sherds of greyware, three highly fired. Whilst two could be from Holme on Spalding Moor, we cannot rule out the possibility that the other sherds are from a currently unknown Northumberland production site, as has been suggested for greyware from some sites along the Wall. The other surface finds of pottery include a rim of possible Ebor Ware, a few other sherds of pink/orange fabric and a burnt sherd of possible Cranbeck reduced ware.

A roughly circular lead token or gaming piece is amongst the surface finds, as is a jet disc of similar size, presumed to also be a gaming piece or token. Both are probably Roman, although similar lead tokens of medieval date are known.

The most remarkable and best known find from the site, (possibly from Richmond's work), is a copper alloy object usually described as being from a cavalry parade helmet, on permanent display in the museum. Given its form as a representation of a human ear with a central hole, it is understandable why that interpretation may have been made, however on closer inspection the object is clearly cast and quite thick. A helmet manufactured this way would have been too heavy for practical use, indeed Mike Bishop has confirmed that to the best of his knowledge, all other known examples of helmets were made from hammered and chased sheet (M.C. Bishop, pers. comm. email 22 March 2023). It is suggested, therefore, that it is much more likely that the piece is part of a life-size statue or bust, a very unusual find from a fort.

## 2.2 Geological Background

Geologically the site has a bed rock of the Ballagan Formation - sandstone, siltstone and dolomitic limestone. This sedimentary bedrock was formed between 358.9 and 344.5 million years ago during the Carboniferous period. Overlying that the till is Diamicton, a terrigenous deposit laid down between 116 and 11.8 thousand years ago in the Devensian stage of the Quaternary period (British Geological Survey 2022). Diamicton is unsorted to poorly sorted and contains particles ranging in size from clay to boulders, suspended in an unconsolidated matrix of mud or sand.

## 3. METHODOLOGY

The surveys were conducted using a Sensys Magneto MXPDA 5 fluxgate gradiometer 5-probe array. The cart is equipped with a Trimble R8s GNSS GPS system, operated in a base and rover configuration. This machine is capable of high resolution data collection, and takes readings every 10cm along the traverse axis and every 50cm along the grid axis (thus achieving 18000 readings per 30m square). The machine collects data within a 0.2 nT (nanoTesla) sensitivity range. Because the cart uses a real time kinematic GPS to position itself, each data point of the survey has an in-built sub 2cm accuracy.

Sighting poles were used as temporary markers at the end of each traverse to guide the operator and

ensure full and efficient coverage with the cart.

The data from the Sensys MXPDA are downloaded into Sensys DLMGPS 4.01-12 software, then exported in an Ascii format, which for each data point includes the xcoord, ycoord (in UTM format), the data value (in nT) the filename (line) from which the data came from, and the probe number. The AGT (Archaeological Geophysics Toolbox) plugin is used to import the data into QGIS, (as part of our policy to utilise open source and freely available software wherever possible), which creates a shapefile with the data imported from the Ascii file, adding line numbers and a new value (val-process). AGT calculates val-process depending on whether a mean or a trend calculation is selected when data is imported. 9 out of every 10 points are discarded at this stage to keep the data manageable, giving us 10cm spacing between the remaining points.

After this, either a cubic spline approximation or a B-spline approximation are used, from the processing toolbox in QGIS. This creates a raster image from the points, maintaining the full range of the data. Finally, the raster data (Tiff format) are visualised in QGIS and tweaked to assess which cut-off points (in nT) gave the clearest results, in this case +/- 3 nT for the image in Figure 4. Due to the difficulty in clearly identifying anomalies due to the low readings, six separate images were prepared, three isolating a narrow range of positive responses, and three negative. These were then used to create the results shown as weak, medium and strong responses in Figure 5.

All mapping in this report was produced in QGIS using Ordnance Survey OpenData products (mainly Zoomstack & Terrain 50) along with lidar data from the Environment Agency, all released under Open Government Licence 3.0. The report was produced in Affinity Publisher, with figures prepared in Affinity Designer and image manipulation where necessary carried out in Affinity Photo. All maps have north pointing vertically to the top of the page, unless stated otherwise.

Project management, survey, data processing, report production and archiving were conducted and prepared to standards exceeding the current best practice guidelines (CifA, 2014; David et al., 2008, Schmidt & Ernenwein, 2013; Schmidt et al., 2015).

## 4. THE GRADIOMETER SURVEYS

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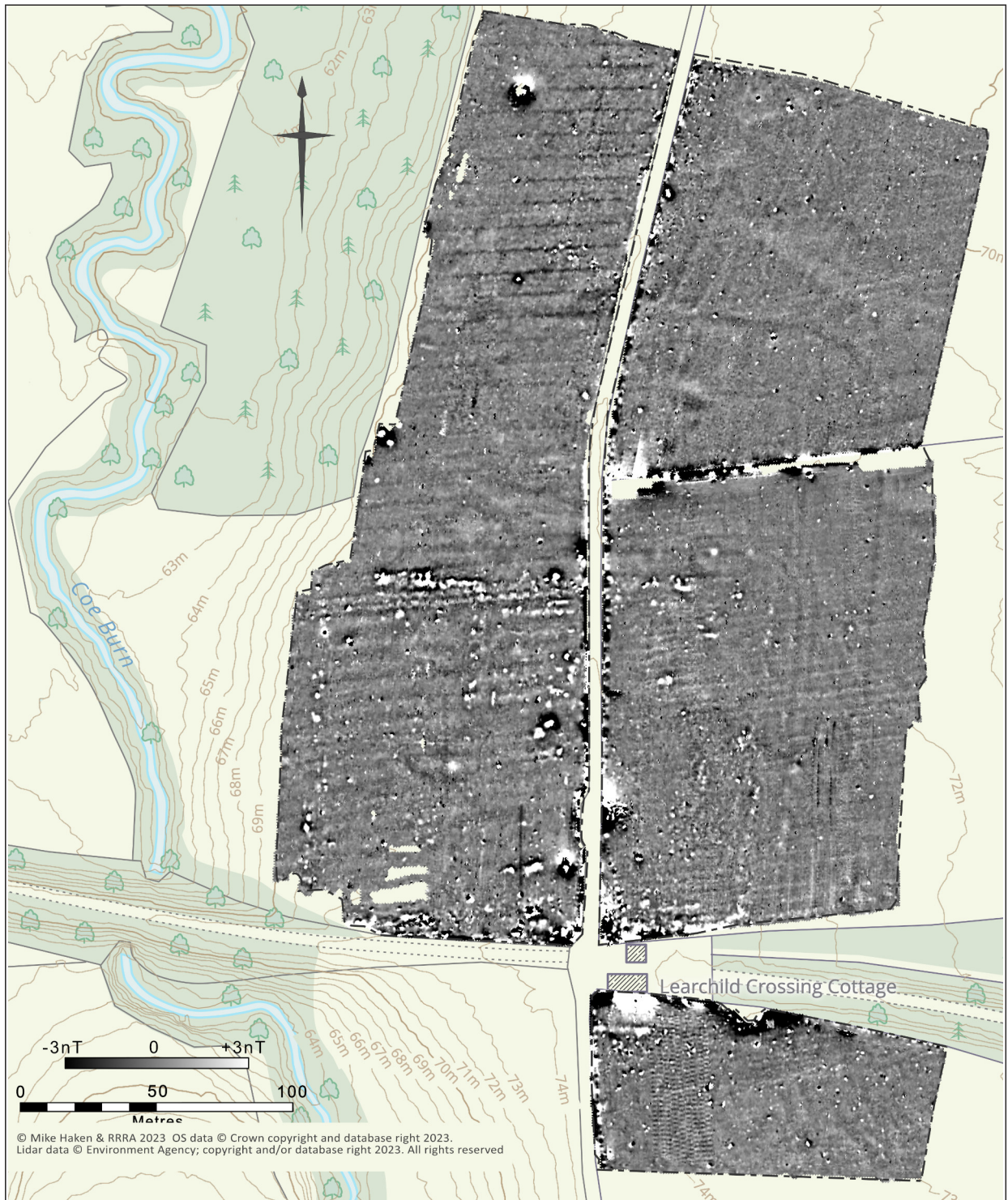
On Day 1, the area east of the access road and north of the former railway was surveyed, covering an area of 3.46 Ha, quite an achievement for inexperienced volunteers. The area west of the road was surveyed on Day 2, where rig and furrow slowed the work slightly. In the south west corner of the site large areas of rushes made pushing the cart difficult and extremely hard work, and in extreme cases impossible, hence the five large gaps in the survey in this area. It had been hoped to survey westwards almost to the Coe Burn, however work was abandoned at the 70m contour on health and safety grounds since the volunteers were becoming exhausted. Given the circumstances, it is a tribute to the determination of those involved that 2.95 Ha were covered. On day 3, about 0.75 Ha were surveyed to the south of the former railway and east of the access road, before moving to the second site where MacLauchlan and the Ordnance survey both mark the junction of the two Roman roads, RR88 and RR87. Just over 1.9Ha were surveyed at the second site, making a total of 9.05 Ha for the three days.

### 4.1 Gradiometer survey of the Roman fort

#### 4.1.1. Presentation and Visualisation

The results of the gradiometer survey at Low Learchild are shown in Figure 5. Whilst geophysical surveys are often presented with positive readings as dark, it is RRA policy to present results the other way round. The human eye is much better at distinguishing differences between light tones than it is between dark tones; since gradiometry is best at showing positive features (e.g. most ditches), these are shown as lighter tones.

In general, the magnetic responses from archaeological features were unusually weak. For this reason,



**Figure 5.** Results of the gradiometer survey conducted by volunteers under the supervision of James Lyall, at Low Learchild

whilst we usually clip results at  $\pm 7$ nT, in this case they were clipped at  $\pm 3$ nT, that is to say any readings beyond that range will appear as black or white on the image. Even then, features were not easy to distinguish.

An interpretative plan has been prepared, shown in Figure 6, which separates anomalies likely to be the result of agricultural and modern activity, specifically rig & furrow, field boundaries, wire fencing and pipelines from other anomalies resulting from archaeological features. The diagram also shows large dipolar anomalies, which show as black and white blobs on the greyscale image, which are likely to be caused by large pieces of buried metal, and sometimes areas of intense heating, such as kilns or

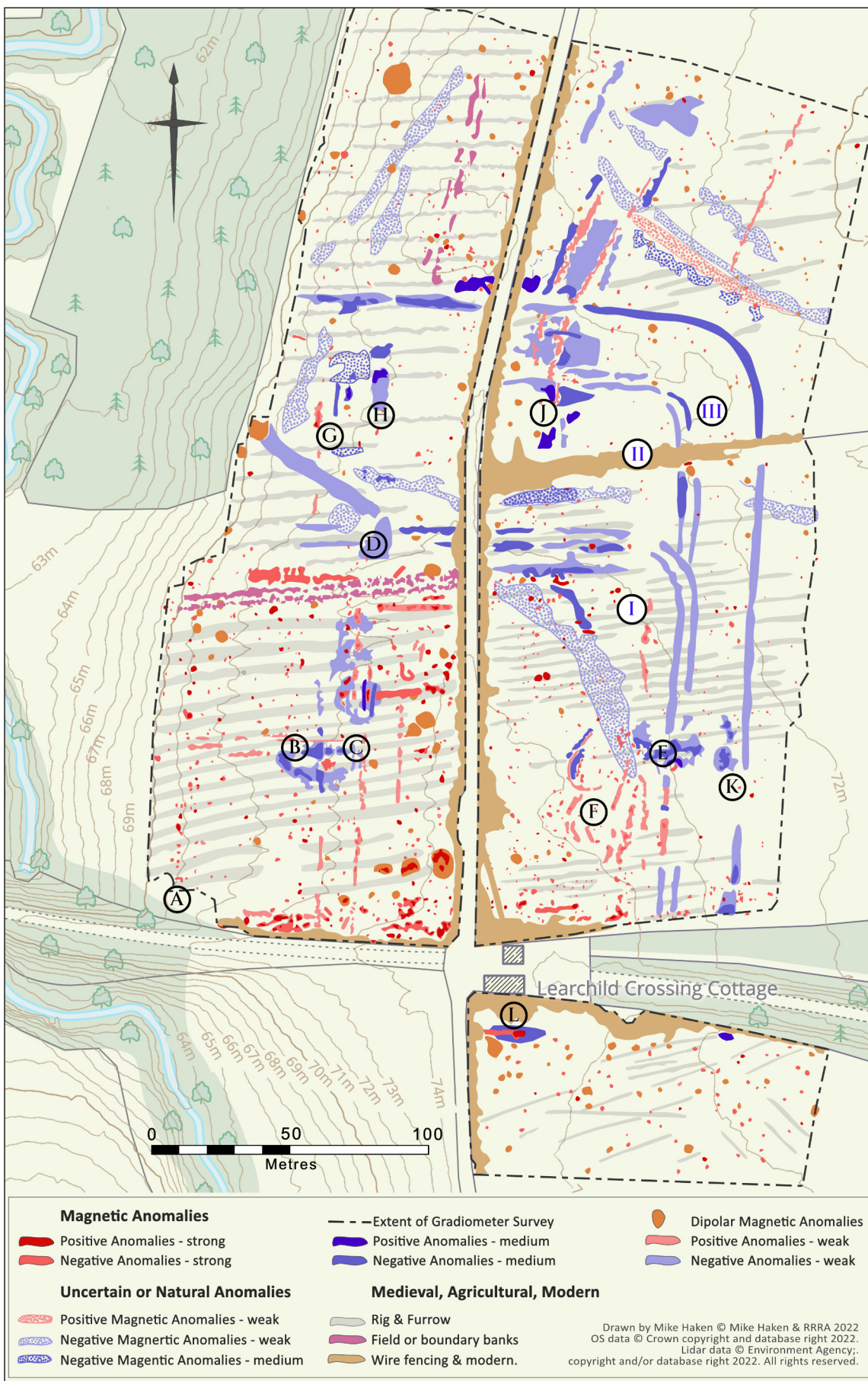


Figure 6. Interpretation of the results of the gradiometer survey at Low Learchild Roman fort.



ovens.

Normally, small discreet anomalies would not be recorded on the interpretative plan, however it was observed at an early stage that the majority of these were concentrated within an area defined to the north and east by a pair of ditches, potentially a fort. These anomalies were plotted on Figure 5 in the hope that their distribution across the site might provide further information regarding the possible layout and phasing.

#### 4.1.2. Anomalies Created by Agricultural Activity

The survey shows clear evidence of three distinct types of rig and furrow, all trending west to east, showing on the survey (Figs 5 & 6) as parallel bands of alternately negative and positive readings. The rig and furrow is still visible west of the access road and is very clear on lidar visualisations (Fig. 7), although the tops of the rigs are generally no more than 15cm higher than the furrow. In the south-west of the site, they are of the classic reverse 'S' form, characteristic of ploughing by teams of oxen. This rig and furrow is probably medieval, although the technique remained in use until oxen were generally replaced with horses. In Northumberland, the use of horses was already prevalent by the 18th century, with oxen making a brief reappearance in the late 18th and early 19th centuries as the price of horses rose sharply (Bailey & Culley 1797, 61). A low bank representing a former field boundary, shown on the 1864 OS map (Fig. 2), marks the current northern boundary of the reverse 'S' type ploughing, although lidar suggests that it originally extended further to the north. North of the bank the rigs become straight, characteristic of horse drawn ploughing, but still about 8m across, and continue to the limit of the survey. In this area a pair of discontinuous linear negative anomalies probably represent another former field boundary, although this is far from certain. North of the survey the rigs remain straight but are now half as wide, just 4m (see Figure 7); in Northumberland this is typical of land brought into cultivation in the late 18th century (ibid.). Similar narrow rig and furrow can be seen on Figure 4 to the east of the access road.

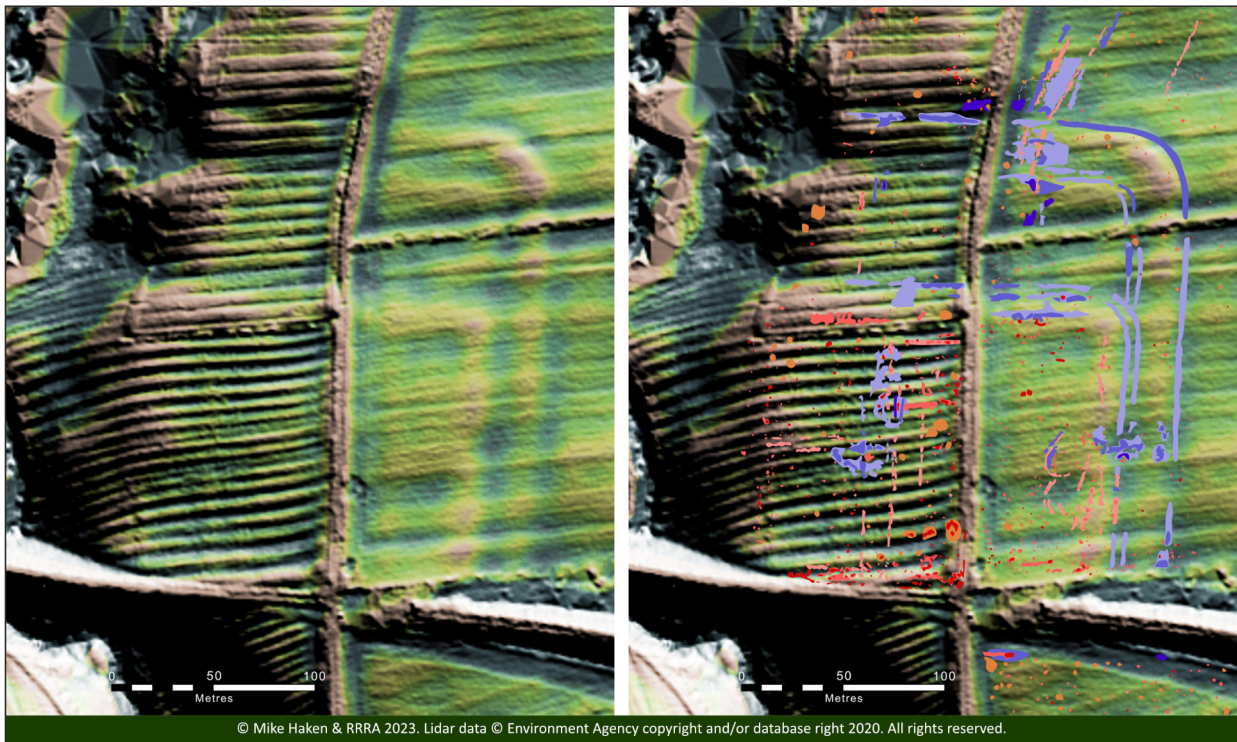
In the north-east of the survey are several hints of potential linear features, unrelated to the rig and furrow and trending in a NNE direction. These are quite ephemeral and do not appear on Figure 6: only those anomalies that are clear have been marked.

The usual anomalies along field edges caused by galvanised steel stock fencing and rubbish in the field margins are readily apparent.

#### 4.1.3. Anomalies relating to the Roman fort site

The ditches that had been previously seen as cropmarks can be seen as negative anomalies, mainly in the eastern part of the survey, as darker linear features in Figure 4, however this is very unusual. Ordinarily, a ditch will have organic material and rubbish deposited in it that creates a relatively strong positive response (lighter tones in Fig. 5), and ditches around habitation sites such as forts often display moderately strong positive responses, the so-called habitation effect, which are entirely absent here. Aitchison's letter to St Joseph suggests that the material filling the larger outer ditch was 'what was taken out of it, viz. sandy loam and clay' with no silt or black layer at the bottom. If so, this would certainly explain why the responses are so slight, but not why they are negative. However, if Aitchison had been mistaken, and the fill also contained material additional to 'what was taken out of it', such as a large number of stones amongst the clay, this could account for the negative readings. Richmond reported that the smaller ditches had also been deliberately filled, this time with with turf (JRS 1956, 206), which again would not normally account for the negative anomalies.

On viewing the results in Figures 5 & 6, it becomes immediately clear that Richmond's interpretation is not quite correct. Whilst his description of the smaller ditches being 8ft across with 8ft separation appears accurate, he had assumed that the pair of inner ditches heading south from the north east corner were one continuous phase, whereas in fact they were of two distinct phases (labelled I & II in Figure 6) that do not align perfectly. The ditches marked I appear to be of an auxiliary fort, with those to the north marked II most probably belonging to an annexe to the aforementioned fort. There



**Figure 7.** Lidar visualisation created using a combination of Local Relief Model and Hillshade showing slightly raised areas in yellow and pink, and slight depressions in a blue green and deep blue. The interpretations of the geophysics have been overlaid on the right hand image, showing how the ramparts and ditches of the auxiliary fort, annexe, and large fort all appear to extend west until the land starts to fall away down to the Coe Burn.

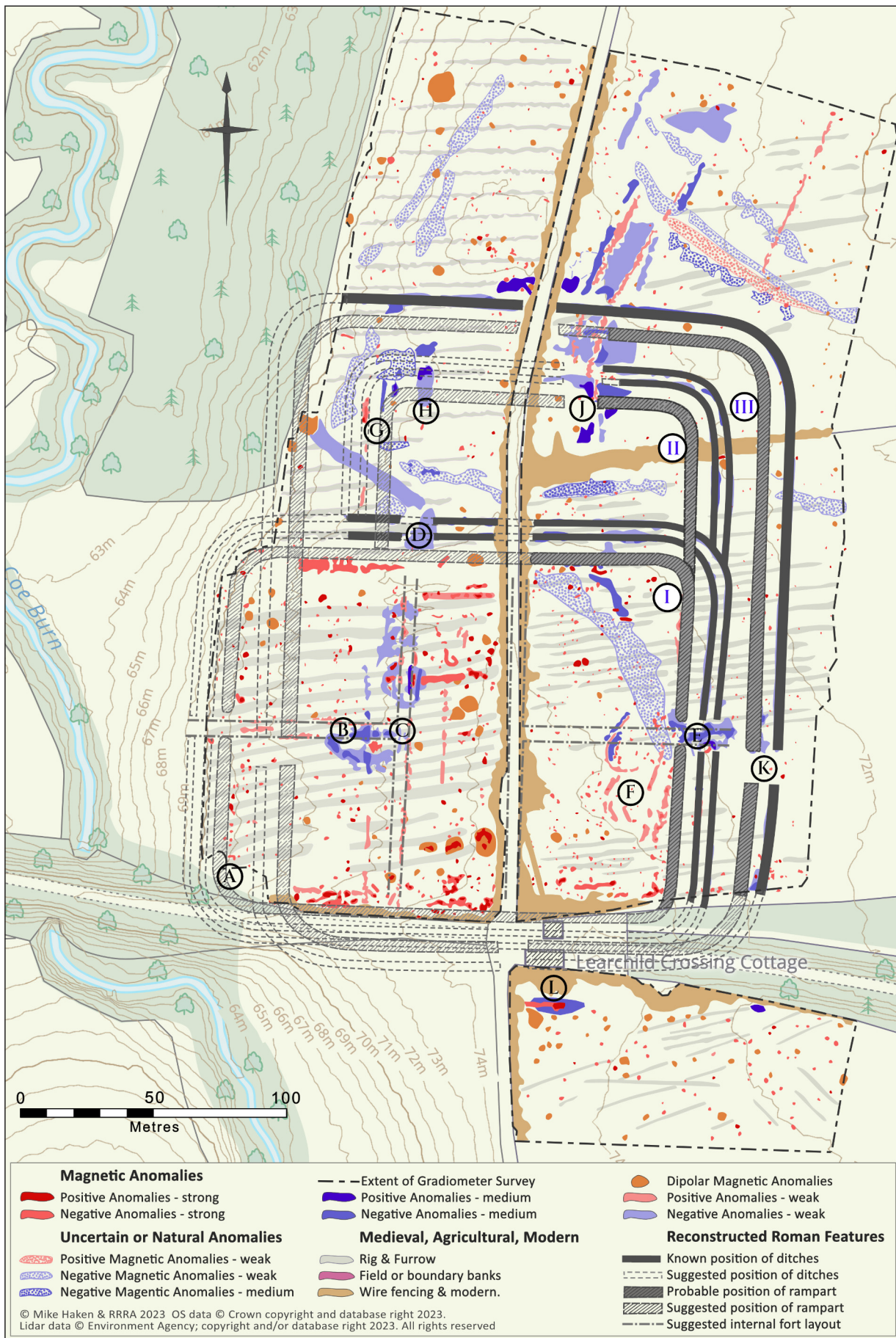
remains the slight possibility that the northern ditches (II) are actually the first phase, representing the remains of an earlier fort, perhaps even a slightly larger one that was reduced in size (Nick Hodgson, pers. comm.). Surrounding both early phases is another set of defences with a single ditch, which can just be traced west of the access road almost to the point where the land starts to slope down through modern woodland plantation towards the Coe Burn, confirming the results of the resistivity survey undertaken three decades ago (Anderson et al 1992).

Lidar visualisations produced from data released under the National Lidar Programme broadly confirm the results of the survey. Figure 7 shows clearly that despite being slighted and further levelled by ploughing, residual remains of the ramparts of all three stages survive east of the access road, with very slight depressions marking the positions of the former ditches. A vertical exaggeration factor of eight, along with use of local relief model, was needed to make the features stand out. West of the access road, the ramparts can just be traced to the point where the land begins to slope down to the Coe Burn, and the area of landslip begins north of the auxiliary fort.

#### 4.1.4. The Auxiliary Fort

Whilst heavily masked by the rig and furrow, lidar suggests a slight hint of the remains of the western defences of the auxiliary fort (Figure 7) running close to the 70m contour, suggesting that the rampart ran along the brow of the slope. Unfortunately, the remains of the north-west corners of both the probable annexe and the larger fort's defences appear to have been destroyed by a combination of landslip and multiple tree throws.

The gradiometer survey did not provide a high degree of internal detail for the fort, however there are a few scraps of detail which provide clues as to the possible size, orientation and layout. It has already been noted that there is a much higher density of small discrete positive anomalies within the auxiliary fort than in the rest of the survey. Their distribution within the fort is not entirely random, with a distinct band of anomalies running north from Point A (Figure 6). There is a similar band of anomalies



**Figure 8.** Suggested reconstruction of the Roman forts at Low Learchild, over the gradiometer interpretations. No gates are shown on the north or south sides of the smaller fort, since the orientation remains uncertain.

running east inside the northern defences, and another also trending west to east just north of the former railway, although many of those may relate to the railway itself. The most likely explanation is that these are from objects discarded or dropped along the inside of the rampart, and therefore could provide a fairly accurate indication of its position, which agrees very well with lidar on the northern side, and suggest an estimated enclosed area of about 165m x 130m (2.14 Ha). Furthermore, a series of linear positive anomalies run eastwards for 56 m (196 pedes) from the western band of anomalies, with a linear belt of negative readings running east from Point B, probably representing road metalling, strongly suggesting that this is the remains of an internal road along the long axis of the fort. The outer limits of these linears measure 57.5 m (201 pedes) from the northern band of anomalies just inside the rampart, and a similar distance (57 m) from the southern equivalent, so the identification of the position of this internal road is unlikely to be down to pure chance.

Two discontinuous linears run north of Point C, and appear to define another internal road. It is notable that between points C & D, there is just one small discreet anomaly along the line of this road, and the medium strength positive anomalies inside the northern rampart stop at its edge. There is also an amorphous area of negative readings at Point D in the area where the ditches should be, however since the strength of responses is similar to that from the ditches either side, it is impossible to determine whether or not there is a break in the ditches at this point. A straight band of negative readings heads north-west from this area, possibly a metalled trackway, now terminating at a large dipolar anomaly, although where this trackway ultimately led is unknown. A north-south aligned patch of negative readings north of point H, possibly metalling, aligns well with point D and could represent another track heading north from point D. Returning to the interior, the easternmost of the two linears (at point C) can also be traced southwards. It is also worth noting that the areas either side of the east-west road between the west rampart and the north-south road are almost exactly rhomboid (Figure 8).

Whilst these interpretations raise the possibility that the north gate could be at Point D, which would make the north-south road the *Via Principalis*, it must be recognised that if the fort faced east, there would still be a north-south road behind the central range. In short, the possible interpretation of a west facing fort is entirely dependent on their being a gate at point D, and whilst possible, this is far from certain. As will be seen shortly, there is evidence from the annexe to support this alternative interpretation.

There are several other linear anomalies within the fort west of the access road, along with areas of negative readings which may represent metalling. The area of negative readings south of Points B & C may well represent part of the *Via Principalis* of the later larger fort, which will be discussed shortly. Beyond that, the anomalies are too few and unrelated to enable any firm conclusions to be drawn.

East of the access road, the anomalies do not provide any evidence as to internal layout, other than an area of negative readings on the line of the defences (point E), exactly where the east gate should be. There is also a clear break in the responses from the inner ditch at this point (Figs. 5, 6) and an apparent gap in the rampart visible on lidar (Figure 7). There was insufficient time to extend the survey eastwards very far from the ditches, so it is unknown whether or not a road led out from this gate, or if the indications of metalling are just a stub, a common feature of many forts. It must be pointed out here that there is no known evidence of a road heading east from Low Leachild, and lengthy analysis of lidar for this report yielded no trace of any Roman road at any point between Low Leachild and the coast.

Around point F there are several positive anomalies which do not align with the fort, including a semicircular feature and other possible curvilinear features. The general orientation of the straight linear features is roughly SW-NE, some of which cut across the west-east axis of the fort. This suggests they do not relate to the military occupation of either the smaller and larger forts and may pre-date or post-date both. An area of weak negative readings runs from the east gate and cuts across the north-east corner of the fort, but if this is a trackway it cannot be part of the small fort layout. Whether or not it relates to the group of anomalies at point F is unclear.

#### 4.1.5. The Annexe to the Auxiliary Fort

Whilst the eastern defences of the annexe are clear from a combination of aerial photography, geophysical survey, and lidar analysis, there is only limited information to suggest a possible western limit. Lidar is unclear; it is possible that the rampart may extend to the tree line but equally the impression that it could do so may be due to the rig and furrow. Three positive anomalies aligned south to north near point G, could potentially be indicative of the inner ditch of the annexe. This is the interpretation represented as a possibility in Figure 8, adding a usable area of about 111m x 56m (0.62 Ha), although it must be stressed that this is a tentative interpretation at best.

Moving eastwards along the suggested line of the annexe defences, a short band of weak negative readings runs north from Point H, crossing the predicted line of the rampart and inner ditch, with a second area of medium strength negative readings immediately to the north. As already mentioned, these two areas align with the putative north gate and possibly represent part of the metalling of a road or track running from point D. Unfortunately, due to the poor and negative response from the ditch fills, it is impossible to determine the relationship between the putative trackway and the annex defences and consequently whether or not there was a gate at point H.

Further east at point J, we can be much more confident that a gate was present. Again, there are areas of negative readings probably caused by road metalling, however there are also a pair of positive linear anomalies, with a further pair of linear anomalies giving negative readings immediately outside them, almost certainly ditches relating to a road heading NNE. It seems unlikely that the road was just a stub, since the two pairs of anomalies do not quite align, suggesting two phases of construction and a degree of importance. It should also be noted that the outer ditches are approximately 17m apart (57 *pedes*), close to what is now being recognised as the typical ditch spacing for a Roman military road in northern Britain, which is roughly 18.5m on average (Haken 2021, 301-2). A possible interpretation is that the outer ditches came first, being deliberately infilled (hence the negative readings) before the road was narrowed, possibly to allow it to pass through the annexe gate. If that interpretation is correct, then the original road does not align with the proposed north gate of the smaller fort, rather it aligns roughly with the point where the modern access road cuts the smaller fort's defences. This could be seen as suggesting that the fort actually faced east, with the modern access road preserving the line of the *Via Principalis*.

The road has so far only been traced northwards for 60m, and analysis of lidar along the projected course is so far inconclusive, with a possible section of road between NU16511986 and NU17052077, which if correct would suggest a road heading to somewhere near Seahouses. On the other hand, there are considerable stretches of braided trackway trending in a SSW to NNE direction across Wandylaw Moor (but no trace of a Roman road), heading towards (and beyond) the late Iron Age defended settlement known as Isabella's Mount, which would fit well with a routeway from Low Learchild to Bamburgh or Budle Bay, that was never formalised as road.

The other anomalies within the annexe give no indication of internal features and there are no discernible patterns in the distribution of the small number of discrete anomalies.

#### 4.1.6. The Large Fort

The work of both Aitchison and Richmond established that a large Roman fortification ran outside the defences of a smaller fort. It can now be demonstrated that this fortification fits perfectly around the north and east of the earlier fort and annexe (see Figure 8). The greyscale plot appears to show the ditch of the large outer fort cutting the features of the road heading NNE, which would seem to suggest that the outer fort is later, as both Aitchison and Richmond claimed. However, there is a problem, since the road's inner ditches, showing as positive linears, change alignment slightly at the ditch, suggesting that the ditch, or a feature on the same line, was there first. This is an excellent example of the difficulties in interpreting phasing from gradiometer surveys alone; the best that can be said is that the relationship between the road and the defences of the large fort is unclear.

The gradiometer survey has established that the ditch of the large fortification continues west at least as far as the limit of survey, just as was suggested by the previous resistivity survey (Anderson et al, 1992). There is no visible break in the northern ditch, which suggests that the north gate (assuming one existed) must have been where the modern access road cuts through the fort. Its southern equivalent cannot be seen, although its likely location can be estimated.

Figure 8 shows a reconstruction of the three suggested phases, and as can be seen, the position of the south western corner can be estimated from the original topography, prior to the construction of the railway embankment. Any further west or south and the fort's corner is forced down a steep slope, something that could easily be avoided and we have to assume that it was. If roughly correct, then the reconstruction predicts an enclosed area of some 226m long and 168m wide (3.8 Ha). Crucially, the half way point of the proposed southern defences is on the access road, just east of centre, suggesting that the south gate is obliterated by the railway, and in line with the access road. The access road was certainly in existence when the first 6 inch OS map was surveyed in 1864, and could be much older, potentially fossilising the north-south road (ie *viae Praetoria* and *Decumana*) through the large fort.

On the eastern side, there is a very clear break in the ditch at Point K, a little over two thirds of the way along, which is almost certainly the site of the East gate, suggesting the fort faced south. A line drawn through here and a corresponding theoretical position on the west side, passes through a band of negative responses south of Points B and C. It is therefore conceivable that these responses represent road metalling of part of the *via Principalis* of the larger fort.

No other anomalies can be identified which give any certain indications of internal layout, however if Aitchison's observations are correct, the fort was only occupied for a very brief time; the occupation may have been too brief to leave any significant magnetic anomalies on the site.

#### 4.1.7. South of the forts

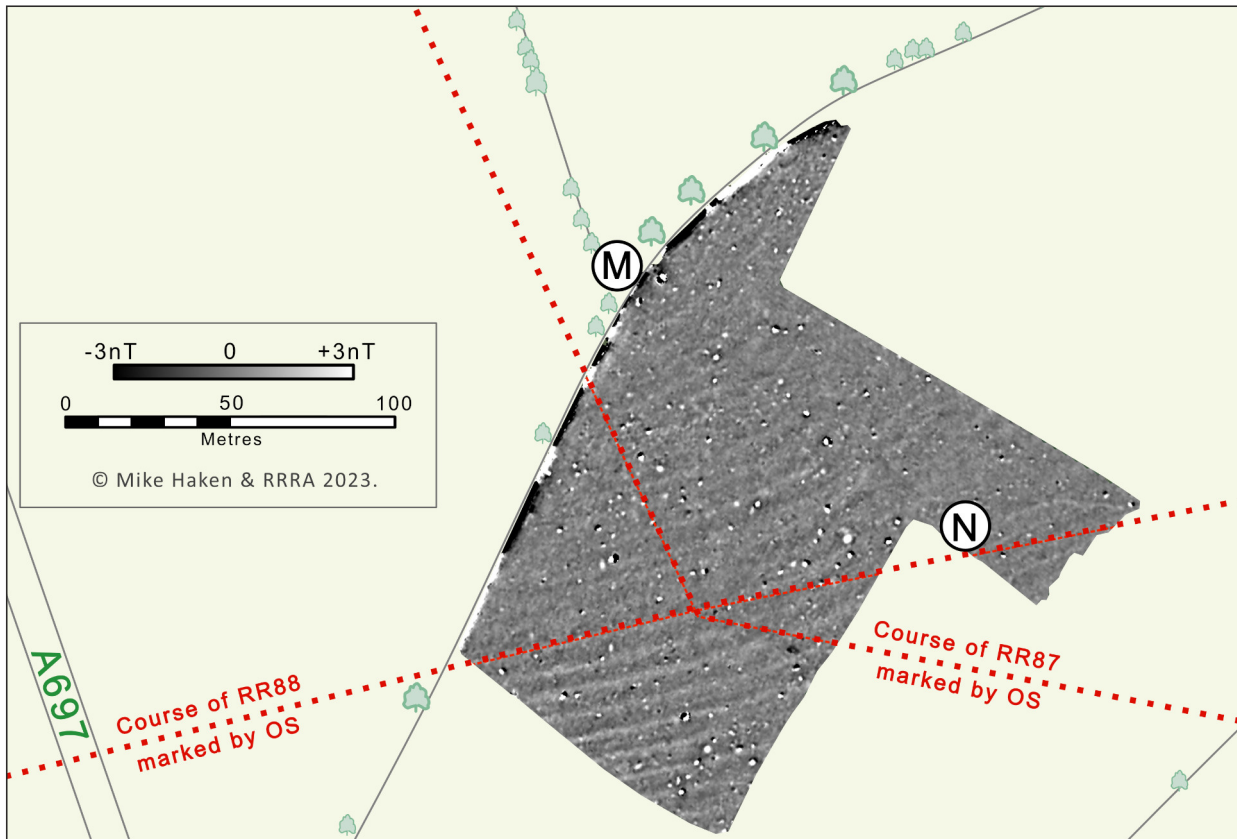
Part of the field south of the old railway and east of the access road was surveyed in order to assess the likelihood of there being any extra-mural settlement here. There are clear traces of rig and furrow, but the only significant anomalies appear at point L. The area corresponding to the anomalies is slightly raised, and gave the impression of being the remains of a former access road into the field. There were no other anomalies that appeared to be archaeological in origin.

## 4.2 Gradiometer survey at the supposed Roman road junction

The greyscale plot of the results of this survey are shown in Figure 9. The supposed lines of the two Roman roads, the Devils's Causeway (RR87) and the road from High Rochester (RR88), as marked on modern Ordnance Survey maps are shown as red dotted lines.

Only five linear positive anomalies can be seen, three of which probably relate to post medieval agricultural activity. The nature of the other two cannot be determined. The former rig and furrow in this field is clearly visible, most of which appears to stop along a very weak band of negative readings between points M and N. There are no anomalies that appear to bear any relationship to the courses of the Roman roads as marked by the OS, routes based largely on MacLauchlan's survey (1864).

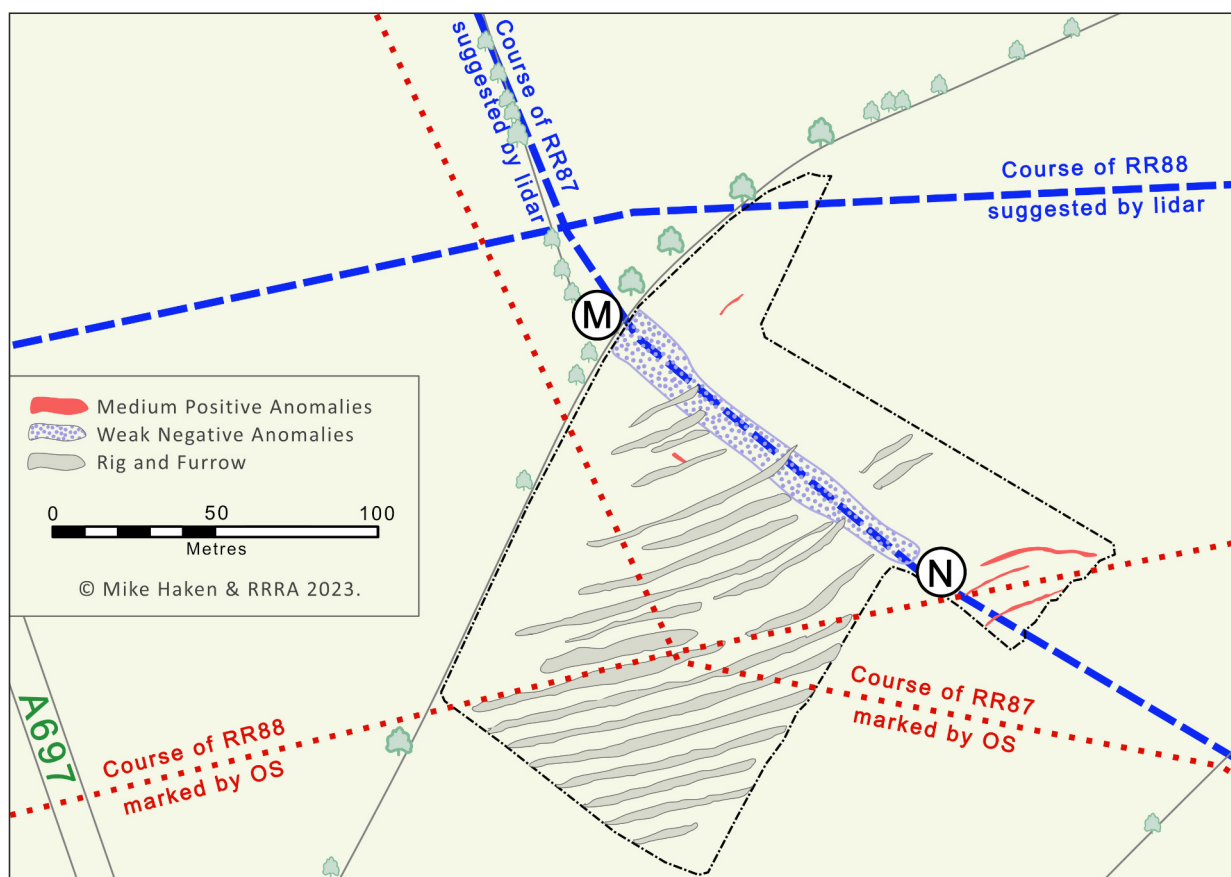
After what appeared to be a failure to locate evidence of the two Roman roads, a close examination was made of newly released lidar data from the Environment Agency's National Lidar Programme to assess whether the OS marked lines were actually correct; a visualisation is shown in Figure 10. It rapidly became clear that the marked course of RR88 from High Rochester was incorrect, with a very clear stretch of agger visible between NU07511059 and NU07921075, at the extreme left of Figure 10. When this alignment was projected eastwards, further fragments of ploughed out agger could be seen, suggesting that this alignment was followed almost as far as the modern A697. A broad linear feature could be traced east of this point, apparently aligned with the proposed west gate of the auxiliary fort. Similar analysis of the course of the Devil's Causeway (RR87) revealed a broken line of broad slightly raised features which strongly suggested that the Roman road west of the Coe Burn was up to 40m



**Figure 9.** The results of the gradiometer survey superimposed upon a map showing both the routes of the Roman roads marked on OS maps, and the routes suggested by lidar. The blue dotted area is probably the remains of road metalling.



**Figure 10.** Lidar visualisation using a local relief model combined with hillshade, showing the probable courses of RR88 & RR87. The supposed routes of the roads recorded by the Ordnance Survey are shown as red dotted lines



**Figure 11.** Greyscale plot of the results of the gradiometer survey at the supposed road junction

north east of where it was marked by the Ordnance Survey.

This all suggested that the actual crossroads was 135m north of the assumed point marked by the Ordnance Survey. When the proposed new line was plotted over the gradiometer results (Figure 11), the band of negative readings at the limit of much of the rig and furrow fall perfectly on to the new proposed line. It seems reasonable to conclude that the negative readings are being caused by the remains of road metalling. The lack of positive responses from road ditches is not unique, and should not be interpreted as suggesting no ditches are present. A survey conducted by the RRA in 2019 at Aldborough Moor Farm, Marton-cum-Grafton, North Yorkshire (on the Roman road from York to Aldborough), also failed to locate the road ditches (Haken 2019, 3), at a site where the ditches were clearly visible on aerial photos and later confirmed by excavation. It is noteworthy that both sites are in areas of glacial till, and it is suspected that this effect may be caused by certain types of underlying clay deposit.

## 5. CONCLUSIONS

In general, the results from the two surveys may not have yielded as much information about the sites as was hoped, but have still significantly increased our understanding of the Low Learchild site. The magnetic responses from archaeological features were generally weak, which may suggest that the superficial geological deposits and subsoils are not particularly magnetically susceptible, but could equally be indicative of only brief occupation ending with very efficient removal of all usable material from the site.

The negative responses from the fort ditches are harder to explain. However, given that we only have very brief accounts from Richmond's and Aitchison's excavations, it is possible that their accounts of

fills of turf for the inner ditches, and ‘what was taken out of it’ for the outer ditch may only give a partial picture. The local superficial deposit, diamicton, is very variable in nature, so if in fact most of the ditches had been filled with material quarried specifically for the task, it is quite possible that the density of stones, rocks and boulders may have been higher than that immediately surrounding the fill; this could have created the negative responses recorded.

## 5.1 The Roman Forts

The survey has confirmed that there were at least two Roman forts at Low Learchild, although what had been thought to be the corner of a small fort appears to actually be part of an annexe on the northern side of a fairly large auxiliary fort, sited further south than previously assumed. Richmond had assumed that this fort was succeeded by a much larger fort, the defences of which were confirmed by the survey and by lidar as running outside the smaller fort and its annexe on their eastern and northern sides. The survey did not, however, establish a clear chronological relationship between the two forts, and whilst Richmond was probably correct, the possibility that the larger fort came first cannot yet be entirely ruled out.

The internal arrangement of the smaller fort cannot be determined with any certainty, except for the lines of two internal roads, one running south from point D, and the other forming the long axis, ie the line of the *viae Praetoria & Decumana*, running west to east. It is possible that there was a gate at point D, making the north-south aligned internal road the *via Principalis* of a west facing fort, however another plausible interpretation, perhaps slightly less likely, places the *via Principalis* beneath the modern access road, which would indicate an east facing fort. It is also possible, albeit unlikely, that both interpretations are correct and that we are actually seeing the remains of two forts built on the same basic footprint but on opposite orientations.

The smaller fort seems to have enclosed an area approximately 165m x 130m (2.14 Ha), much larger than previously assumed. The fort was surrounded by a pair of ditches, about 3m wide and 3m apart. It appears to have been deliberately sited so that its western defences were sited right on the brow of the slope down to the Coe Burn, utilising the slope for defensive purposes, in common with many other forts. The fort was just about big enough for a *cohors milliaria peditata*, ie a double sized infantry cohort of approximately 1000 men (Campbell 2009, 28), although it could also be appropriate for a *cohors equitata* (part cavalry cohort), or perhaps a standard infantry cohort plus a detachment of cavalry. A sherd of Dr29 (AD40 - 85) from Aitchison’s excavation could be indicative of a Flavian date for a fort on the site. Attempting to draw firm conclusions from a single unstratified sherd would be unwise at best, but it should be noted that the earliest fort at High Rochester (*Bremenium*), thought to be Agricolan in date (AD 78-85), is just a day’s march away at the western end of RR88 and is of a very similar size at 2 Ha, raising the possibility that they may be contemporary.

Some time after the smaller fort was built, an annexe was added to the north, which had at least one gate on its northern side, possibly two. The western extent of the annexe cannot be deduced with certainty, although for the reconstruction (Figure 8) a linear positive anomaly, probably a ditch, has been tentatively suggested as being part of the western defence. If so, the annexe enclosed an area of about half a hectare. The interior appears somewhat sterile with no visible internal features, but a road originally flanked by ditches 17m apart heads out of the probable gate at point J in a NNE direction, destination unknown. Richmond suggested that both fort and annexe were demolished, and the ditches deliberately filled with turf (JRS 1956, 206).

The large fort enclosed an area of approximately 226m by 168m (3.8 Ha), and appears to have faced south, with its *via Principalis* slightly south of the line of the *viae Praetoria and Decumana* of the smaller fort. The new fort was surrounded by a single large ditch, set on the north and east sides about 20m outside the outer ditch of the earlier fort and annexe, one set of defences clearly respecting the other on these sides. This is an unusual phenomenon but one which may have a partial parallel at the poorly understood fort at Washingwells, Gateshead, where a large outer ditch is about 10m outside a pair of small ditches, perfectly parallel, with another single ditch inside the pair.

Other than the probable position of the main internal roads, nothing is known about the interior of this large fort. Some anomalies within the smaller fort may potentially relate to it, although given that the areas outside the smaller fort but within the large fort's defences appear sterile, including the annexe, this seems unlikely.

The large fort's ditch was certainly much broader than those of the smaller one, Aitchison's sketch showing a Punic type ditch 26ft (7.9m) wide, which seems very unlikely. Richmond on the other hand suggests a 15ft wide ditch (4.6m), which agrees fairly well with the weak anomalies from the survey, which are about 3m across. Forts with a single ditch are far from commonplace, but there are other parallels in the region, for example the Agricola phase at High Rochester (*Bremenium*), and the largest fort at *Vindolanda* (Phase IV), occupied from AD105 - AD117/8. The size of the larger fort, which encloses 3.8 Ha, is only 14.4% less than *Vindolanda* phase IV (which encloses 4.44 Ha), another possible parallel. If the large fort was indeed an early 2nd century replacement of the smaller one, as Aitchison and Richmond thought, this raises the possibility that both *Vindolanda* and Low Learchild may have been radically increased in size at the same time (c. AD105), potentially for the same reason. *Vindolanda* Phase IV is known to have held the same *cohors milliaria* as it did previously, with the addition of a cavalry unit, and Low Learchild may well have been the same.

Aitchison's description of the ditch fill suggests that the large fort was very short lived. Whilst there is no mention of it in contemporary sources, evidence from *Vindolanda* suggests that there was a major rebellion in the north of the province in the first year of Hadrian's reign (AD 117-8), the Phase IV fort at *Vindolanda* being abandoned in a great hurry, with many valuable items left behind and substantial evidence of burning. It took about three years before the area was fully under Roman control again (Birley 2023). It is therefore very tempting to wonder if Low Learchild suffered the same fate as *Vindolanda*. The pottery potentially supports this idea, since all but one of the sherds showing indications of intense burning were consistent with 1st and early 2nd Century occupation, and the identification of the exception (as Cranbeck reduced ware) is no more than tentative.

An alternative possibility is that Low Learchild may have had a very slightly longer life (or was perhaps briefly re-instated) as one of a group of forts north of the Wall that supported the Wall system in its earliest stage (Bidwell 2022, Fig. 2 & 104), helping to explain why the Wall stopped at Newcastle rather than continuing to the mouth of the Tyne (ibid 102-3, 106). In this scenario, the Devil's Causeway and military sites along it maintained the role they may have played as part of a Trajanic 'frontier' providing protection to the rich and well populated agricultural land east of the road (Hodgson 2012, 213). This role finally came to an end in the AD120s, probably during the governorship of A. Platorius Nepos, when forces east of Corbridge were greatly augmented and the Wall extended to Wallsend with the construction of several new forts (ibid 109).

## 5.2 Extra-mural and other settlement

There is no indication from the survey of an extra-mural settlement either north or south of the fort. If one existed, it could have been to the east, where due to time restrictions the survey did not extend far enough to fully rule that out, although without a road in that direction settlement on the east would seem unlikely.

A more likely possibility is that a settlement developed about 70m west of the fort immediately west of the Coe Burn, or even at the road junction, but this is merely speculation. One thing is certain, however; even if the fort went out of use in the early 2nd century, the site was occupied at some point later in the Roman period, since the four sherds of greyware demonstrate occupation some time between the late 2nd and mid 4th Centuries. Two of the sherds are probably of east Yorkshire origin, possibly Holme on Spalding Moor (which would tend to suggest the later end of the above range), although the other two could well be of local production. Whilst we have no information as to where on the site the greyware was found, it would be no surprise if the sherds originated in the south-eastern corner of the fort site, where several anomalies, some curvilinear, suggest structures and features unrelated to either fort on a south-west to north-east orientation.

### 5.3 Roman Roads, Tracks, and Routeways

It is assumed that the road from High Rochester (RR88) approached the west gate, as the revised route derived from lidar suggests (Figure 10), although we were unable to continue the survey down the slope westwards far enough to find any evidence to support this conclusion. Similarly, there was insufficient time to establish whether or not a road ran on from the east gate, as has sometimes been postulated. Since there is no known reason for a road to head east, and no sign of such a road on lidar imagery between Low Learchild and the coast, it is regarded as unlikely that there was anything more than a lightly metalled stub outside the east gate.

The possible straight metalled trackway running north-west from point D of the smaller fort is probably no more than a local track, perhaps running to shrine or maybe to a bathhouse. The possible track that may have run north from the same point could be more significant, if it is real, being possibly the antecedent of the road that can be seen leaving the fort heading NNE.

This road can only be traced on the survey plot for a short distance. It appears to have two phases, suggesting some importance, and was certainly in use when the annexe was added to the smaller fort, passing through gate in the annexe defences. Its relationship with the ditch of the larger fort is less than clear, but the road seems to have been ultimately replaced by a road leading north from the *Porta Decumana* of the larger fort. Indeed, the interpretation of the larger fort suggests that the modern access road effectively fossilises the line of the *viae Praetoria* and *Decumana* of the larger fort, with the implication that it must therefore have remained in use throughout the Roman and medieval periods, at least through the Low Learchild fort site. If so, it seems reasonable to assume that there will have been a continuation from the *Porta Praetoria* of the large fort (south gate) to the Devil's Causeway to give better access to the route south, effectively creating a branch from the Devil's Causeway running through the site.

Whilst it remains possible that the road north was merely a stub, this seems unlikely given the two phases of ditches, and the probable continuity of use up to the modern era. Whilst nowadays the access road goes no further north than the modern west to east aligned road, Garmintedge Bank, it seems probable it continued onwards, even if it was never fully formalised into a surveyed and engineered road. Logically, for this to happen its destination must have been a major site whose importance was retained through the centuries, Bamburgh and the nearby sheltered anchorage at Budle Bay being the obvious candidates.

Recent evidence from Bamburgh has clearly established Roman period occupation there, interpreted not as a military installation but as a client site, presumably having some relationship with Roman authority in the area (Graeme Young pers. comm. email 20 March 2023). For Bamburgh to have become a power centre in the medieval period, it must have a very good land connection southwards, one that is currently unknown. Whilst the route that has become the modern A1 is a possible candidate, the putative route/road to Low Learchild may well have been it. Indeed, the considerable stretches of braided trackway across Wandylaw Moor near the defended settlement at Isabella's Mount, fit well with a routeway from Low Learchild to Bamburgh or Budle Bay. Another possibility would be a destination somewhere near Seahouses, based on an apparent linear feature visible on lidar and running beneath medieval rig and furrow between NU16511986 and NU17052077.

To the west of the fort, the survey, along with lidar analysis, has established with reasonable confidence that the Ordnance's Survey's mapping of the courses of the Devil's Causeway and RR88 from *Bremeniun*, all based upon MacLauchlan's surveys in the 1850s, is inaccurate. This did not come as any great surprise, since Wright could find no trace of either road by probing on those lines in 1938 (Wright 1940, 73), although he did suggest that the true line was to the west of that marked on the OS map, whereas it appears that it is actually slightly to the east. Since MacLauchlan based all his mapping in the area from farm tenants' accounts of finding stony material during ploughing or drain cutting, inaccuracies were inevitable and both lidar analysis and our survey suggest that the true position of the road junction is 135m to the north.

## 5.4 Suggested further investigation

Further gradiometer survey both in the field immediately west of the Coe Burn opposite the fort, and around the suggested road junction, may potentially provide evidence of RR88 heading west and possible extra-mural settlement. Similarly, a gradiometer survey could be carried out east of the fort defences to determine whether or not anomalies exist resulting from Roman period settlement in that area. Whilst quite difficult to do, due to large areas of rushes, it would be certainly worth attempting to survey the slope down to the Coe Burn west of the current survey. However, whether or not any such surveys would be likely to yield useful results is a matter of some debate., given the very weak magnetic responses from archaeological features on both sites already surveyed.

## 6. ARCHIVING

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Whenever possible, the RRRRA has a policy of making all reports available online on its website, as well as providing the appropriate Historic Environment Record(s) with digital copies in PDF-A format, and contributes all reports to the ADS Library via OASIS (also in PDF-A format).

The RRRRA is examining cost effective archiving methods of preserving survey data and making it freely available, to ensure that future researchers are able to reprocess and manipulate the data in the most up to date and appropriate manner. In the meantime, the RRRRA has a policy of making the survey data freely available on request. Availability may potentially be subject to a time embargo dictated by the landowner, or if a site is considered particularly sensitive or potentially at risk.

## 7. ACKNOWLEDGEMENTS

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We are extremely grateful to Charlotte Goodall, Classics Librarian for the Bodleian Library in the University of Oxford, for locating the relevant material in Sir Ian Richmond's archive, and for granting us permission to reproduce that material here.

Finally, the authors wish to recognise the contribution to the RRRRA made by the late Paul Bidwell. His support and encouragement for the Association and its work and for volunteer and community archaeology more widely, should be recognised and applauded. He is greatly missed.

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## 9. APPENDIX 1

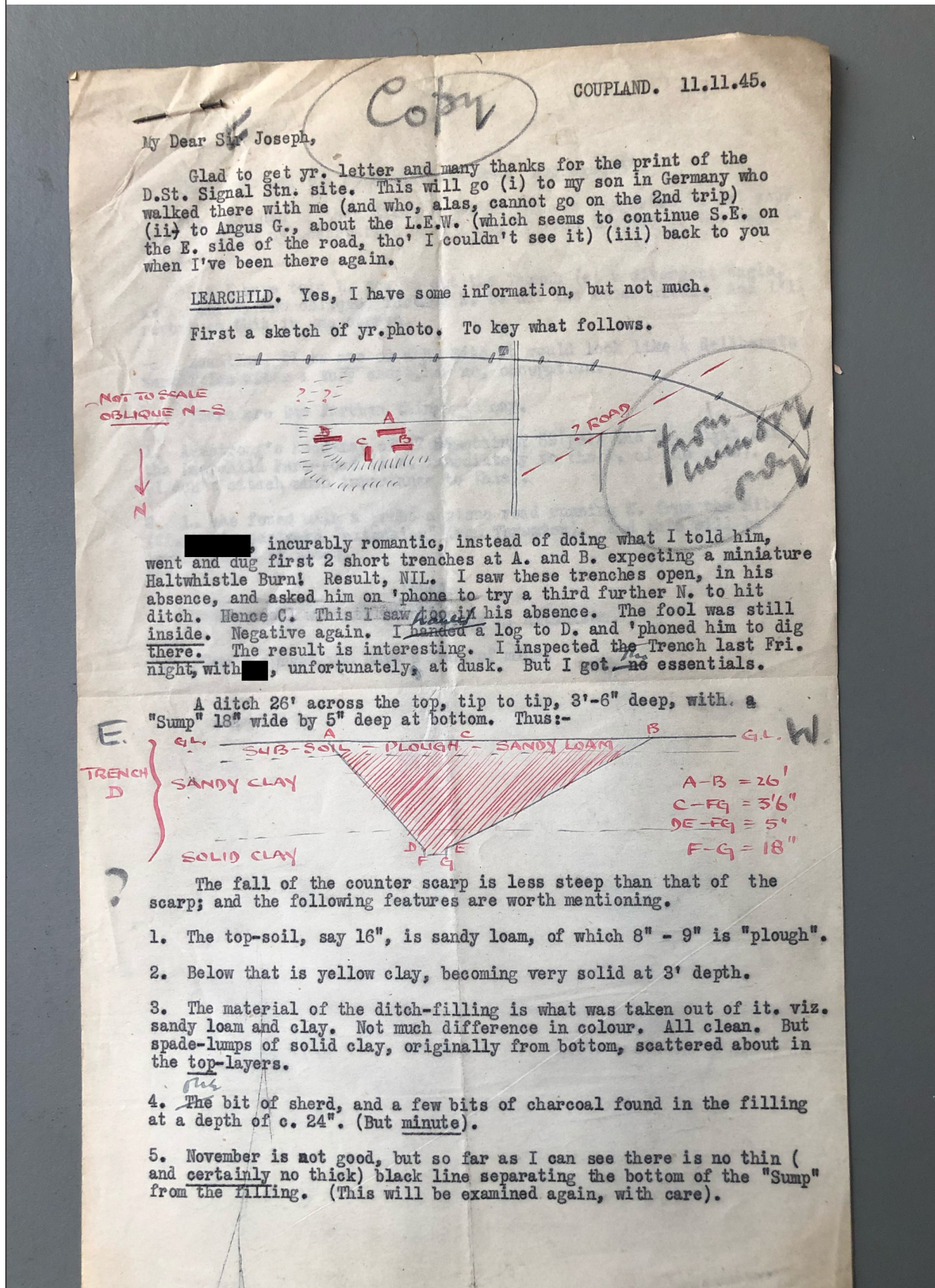
The material reproduced below is all that survives relating to Low Learchild in Sir Ian Richmond's archive held by the Bodleian Libraries in Oxford. The authors wish to thank the Libraries for granting permission to reproduce the images here.

### 9.1 Aerial photograph of Low Learchild

This RAF photograph was taken in 1945 by Dr. Keith St. Joseph, and revealed the cropmarks of Roman ditches at the site for the very first time.



9.2 Draft of letter from Sir W de L Aitchison to Dr. K. St. Joseph



6. The Sherd and the charcoal have been "segregated".

The top-span of this ditch is wider than is suggested in (a) your photo and (b) my observation when I saw it from the top of the rig to the E.

But I have told L. now to cut the Trench (at a divergent angle, as he may be now oblique) further E. to hit the outer ditch. And I'll report on this in due course.

Meantime, if we are on a R. Site it would look like a deliberate demolition after a very short, or no, occupation.

There are two further things to say.

1. Armstrong's Road-map of 17 Something? 69) puts the Dc. right onto the Learchild Farm-road (i.e. immediately to the W. of the site). (I don't attach much importance to this).

2. L. has found with a probe a stone road running W. from the Site (Cf. McC's eastward "extension" from Thrumton). And this will be investigated by spade.

Yours,

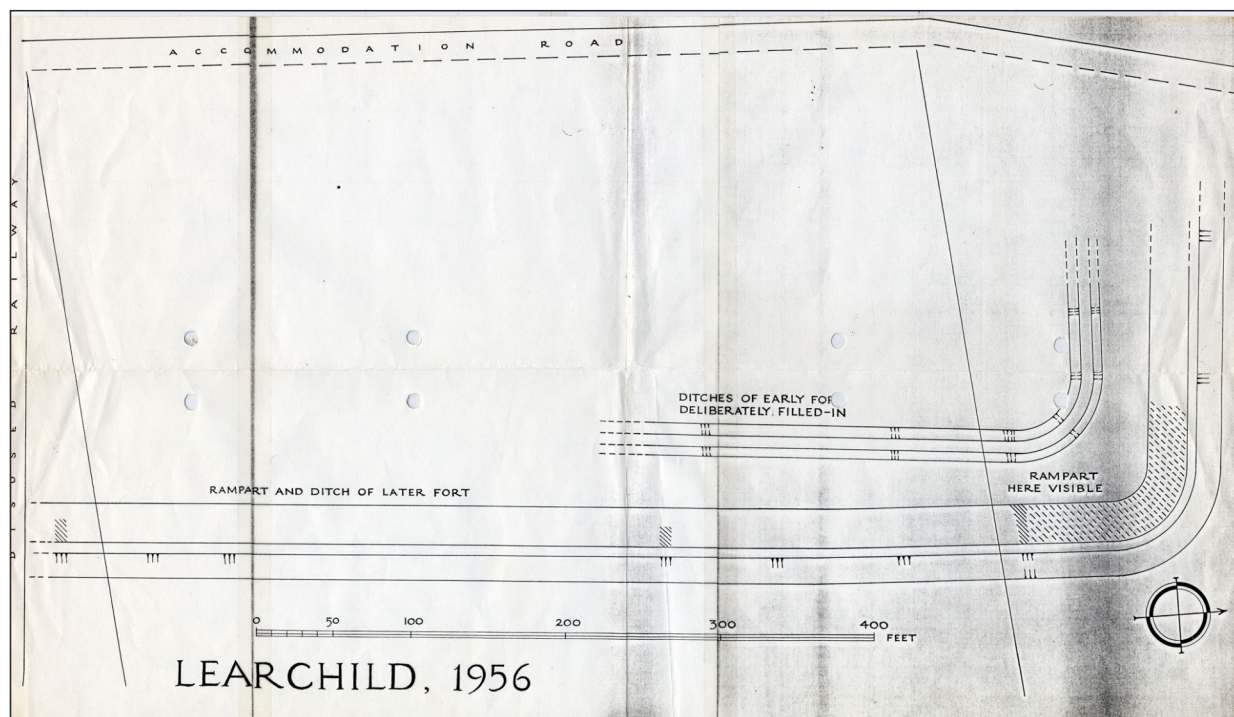
W. de L. Aitchison.

P.S. Don't forget you have a McC. of mine!

This draft, dated 11.11.45, is the only surviving documentation relating to Aitchison's work at Low Learchild, other than the very brief entry in the Journal of Roman Studies (1946, 167). We have reproduced the letter below, with the name of an individual redacted.

### 9.3 Plan of the site and location of trenches by Sir Ian Richmond, 1956

This is the only surviving document relating to Richmond's excavations, other than a single paragraph in the Journal of Roman Studies (1957, 206). A 'cleaned' version has been used in Figure 3. It is assumed that the hatchures and grey areas in the large rampart represent the locations of Richmond's trenches/test pits, suggesting he opened as many as fifteen. The authors are grateful to Dr. Nick Hodgson, for permission to use his photograph of the plan, which was taken c.1990 of a copy then at the Great North Museum but which can no longer be located.



## 10. APPENDIX 2 - FINDS SUMMARY

The following table is a summary of an assessment of the few finds recovered from Sir Walter Aitchison's excavations in 1945/6, Sir Ian Richmond's excavations in 1956, and by local residents in 1980 and 2002. The sherds are held by the Great North Museum: Hancock in Newcastle-upon-Tyne, and were viewed in March 2023. This was a preliminary assessment only, was made by Dr. Reb Ellis-Haken. No samples were taken and microscopic analysis not made.

| Type  | No. items | Year found | Description   | Box No.              | Acc. No. | Period             | Date Range                               |
|---|-----------|------------|---|----------------------|----------|--------------------|--|
| <b><i>Finds presumed to be from ditch fills in Aitchison's excavations, April &amp; May 1946. - note and photos referred to on Accession card (which may provide contextual data) are absent from box, a sherd of DR 29 also missing.</i></b> |           |            |   |                      |          |                    |  |
| Pottery Sherd   | 1         | c. 1946    | Sherd of decorated Samian bowl, supposedly Dragendorff 29, now missing from box   | 117                  | 1956.25  | Roman              | AD40 - AD85                              |
| Pottery sherds  | 3         | c. 1946    | Samian sherds, Curle 15 Shallow Bowl. Sherds fit together along recent breaks, perhaps made during recovery.  | 117                  | 1956.25  | Roman              | AD 70 - AD150                            |
| Pottery sherds  | 6         | c. 1946    | Oxidised fabric sandwich, grey core, non slip, orange. Includes two rims  | 117                  | 1956.25  | Roman              | C1 <sup>st</sup> /C3 <sup>rd</sup> AD    |
| Tegula sherd  | 1         | c. 1946    | Well fired, good quality, burnt   | 117                  | 1956.25  | Roman              | AD 71 - AD410                            |
| Glass sherd   | 1         | c. 1946    | Possible part of a glass jug - form unidentified - perhaps distorted by reheating?  | 117                  | 1956.25  | Roman              | AD 71 - AD410                            |
| Glass waste?  | 1         | c. 1946    | An irregular blob of cobalt(?) blue and white glass. The white glass is sandwiched between two blue layers  | 117                  | 1956.25  | Roman?             | ?  |
| CBM   | 3         | c. 1946    | Nondescript CBM   | 117                  | 1956.25  | Roman              | AD 71 - AD410                            |
| Iron nail   | 1         | c. 1946    | Large headed iron nail, very corroded   | 117                  | 1956.25  | Roman              | AD 71 - AD410                            |
| <b><i>Surface finds made by Aitchison or his tenant c. 1946, then held by Richmond - no further information</i></b>   |           |            |   |                      |          |                    |  |
| Pottery sherd   | 1         | c. 1946    | Samian, burnt, unidentified   | 7                    | 1956.4   | Roman              | Mid C1 <sup>st</sup> /C3 <sup>rd</sup>   |
| Pottery sherds  | 3         | c.1946     | Fine drinking beaker, single line decoration, pink/orange oxidised fabric   | 7                    | 1956.4   | Roman              | Poss. C1 <sup>st</sup> /C2 <sup>nd</sup> |
| Pottery sherds  | 4         | c.1946     | Pink/orange oxidised fabrics  | 7                    | 1956.4   | Roman              | ?  |
| CBM or industrial   | 1         | c.1946     | Modern fabric, probably drain or roof-tile  | 7                    | 1956.4   | Post-med. / Modern | 1850-1945                                |
| <b><i>Finds from Richmond's excavations 1956, probably surface finds - no further information</i></b>   |           |            |   |                      |          |                    |  |
| Pottery sherd   | 1         | 1956       | Black moulded and decorated, not Wedgwood as previously described.  | 11                   | 1956.41  | Post-med           | C18 <sup>th</sup> /C20 <sup>th</sup> AD  |
| Fragment of copper alloy statue   | 1         | 1956       | Cast copper alloy lifesize human ear, with curls in front of the ear. Broken from larger object. Previously identified as part of a parade helmet, which would be impractical. More likely part of a bust or statue | On Permanent Display |          | Roman              | AD43-410                                 |
| Token or Gaming Piece   | 1         | 1956       | Roughly circular jet disc, probable token or gaming piece, 46mm diameter  | 11                   | 1956.41  | Roman?             | AD43 - AD410                             |
| Token or Gaming Piece   | 1         | 1956       | Roughly circular lead disc, probably a token or gaming piece, 42mm diameter.  | 11                   | 1956.41  | Roman/ Medieval    |  |

| Type                                      | No. items | Year found | Description   | Box No. | Acc. No. | Period             | Date Range                             |
|---|-----------|------------|---|---------|----------|--------------------|--|
| <i>Surface finds by local residents -</i> |           |            |   |         |          |                    |  |
| Pottery sherd                             | 1         | 1980       | Small sherd from Samian footed bowl?  | 23D     | 1981.24  | Roman              | AD40 - AD260                           |
| Glass sherds                              | 4         | 1980       | Thick dark green glass, almost certainly C19th or modern  | 23D     | 1981.24  | Post-med. / Modern | 1800 - 1980                            |
| Cremated Bone                             |           | 1980       | Small fragments, unidentified   | 23D     | 1981.24  | Roman to Modern    | AD43 - AD1980                          |
| Pottery sherd                             | 1         | 2002       | Poss. Burnt Samian or imported fineware - burning was very hot, effectively re-fired                      | 150D    | 2003.6   | Roman              | AD40 - AD260                           |
| Pottery sherd                             | 1         | 2002       | Burnt sherd - possibly Cranbeck reduced?  | 150D    | 2003.6   | Roman              | C4 <sup>th</sup> AD                    |
| Pottery sherd                             | 1         | 2002       | Coarseware rim - Ebor ware?   | 150D    | 2003.6   | Roman              | AD71 - AD250                           |
| Pottery sherd                             | 4         | 2002       | Greyware, inc. one rim, well fired. 2 sherds poss. Holme on Spalding Moor? 2 unidentified, perhaps local? | 150D    | 2003.6   | Roman              | C2 <sup>nd</sup> / C4 <sup>th</sup> AD |

## Recommendations

Most importantly, it is hoped that the photographs, note, and sherd of Dr29 that should be in Box 117, along with the original of Richmond's plan, can be located, since it is possible they contain valuable information about the site.

It is recommended that pXRF analysis be conducted on the copper alloy ear to determine whether it is bronze or brass - if bronze it is most likely part of a statue.

The two pieces of Roman glass should be assessed by a specialist, with a particular view to determining whether or not recycling was taking place on site.

Ideally, the pottery should be viewed by a specialist with a specific knowledge and understanding of Roman military assemblages from Northumberland, although the lack of contextual data means that even with a clearer understanding of the pottery, it would be unlikely to better inform about the site.