Ancient Monuments Laboratory
Report 92/91

VINDOLANDA, BARDON MILL, NORTHUMBERLAND
REPORT ON GEOPHYSICAL SURVEY, 1991

G Fookes

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Summary

Resistivity survey over three small areas of Vindolanda has indicated that this prospecting technique can effectively identify major sub-surface structures on the site. The results indicate that buried remains - especially stone-built structures - are extensive, although the surveying coverage was insufficient to identify any satisfactory overall pattern.

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Report on Geophysical Survey 1991

INTRODUCTION

This survey (at NGR NY 770 664) was carried out at the request of the Vindolanda Trust. Its objective was to help in the further understanding of the area to the west of Vindolanda VII (stone fort II). Additional smaller areas of interest were indicated to the north and south and these were also surveyed.

The site surface was grassed and particularly damp, also containing several visible stone structures. The local cover is waterlogged loamy and clayey soils developed in drift underlain by the Middle Limestone Group.

Method

The survey was carried out in three separate areas (A-C on the location plan) and in each case a similar procedure was carried out. Each area was divided into 30m squares and a Geoscan RM4 resistivity meter was used to measure apparent resistivity values along successive parallel 30m traverses, separated from each other by 1.0m intervals. The Twin Electrode probe array was used, with a 0.5m separation between the mobile probes. The instrument readings were logged at 1.0m intervals along each traverse, using a Geoscan DL10 Datalogger.

The resulting data was stored on a portable computer and, after processing to optimise the information contained, was later converted into the plots reproduced here. Blank spaces that appear in the plots are areas that could not be traversed due the presence of obstructions such as stonework, fences and paths.

Results

Area A:

There appear to be several significant higher resistivity anomalies in this area which in these conditions can reasonably be interpreted as corresponding with buried stonework. Most readily apparent are several extended linear anomalies which might be interpreted as wall foundations or other stone-built structures such as drains. Elsewhere, especially in the north-eastern and north-western corners of the survey area, there are areas of more pronounced high resistance which are suggestive of more massive structures. These latter anomalies do not resolve themselves into any clearly recognizable pattern and clearly extend beyond the limits of the survey. Other more isolated groups of anomalies along the southern edge of the survey are also likely to be significant.

The lack of prominent low resistance anomalies that might identify moisture-retentive features may be explained by the

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masking effect of the very damp conditions at the site. Alternatively, such features could be located deeper than the instrumentation was capable of penetrating.

Area B:

Here again the plots indicate the presence of significant buried remains. Much of the eastern part of the area is occupied by a complex of interconnecting positive anomalies very suggestive of buried structures. Although some rectilinearity is apparent the survey has not been extensive enough to allow the recognition of a meaningful ensemble of features.

Although the level of activity falls off towards the western end of the area, archaeological features neverthless seem to be present and linear low resistance anomalies (aligned approximately NW-SE) could be indicative of one or more ditches in this area.

Area C

This final area encompasses similar activity to that noted elsewhere but any interpretation of this is seriously constrained by the very limited extent of the survey coverage. Whilst one may again assume that archaeological activity is represented it would be unwise to venture any further analysis.

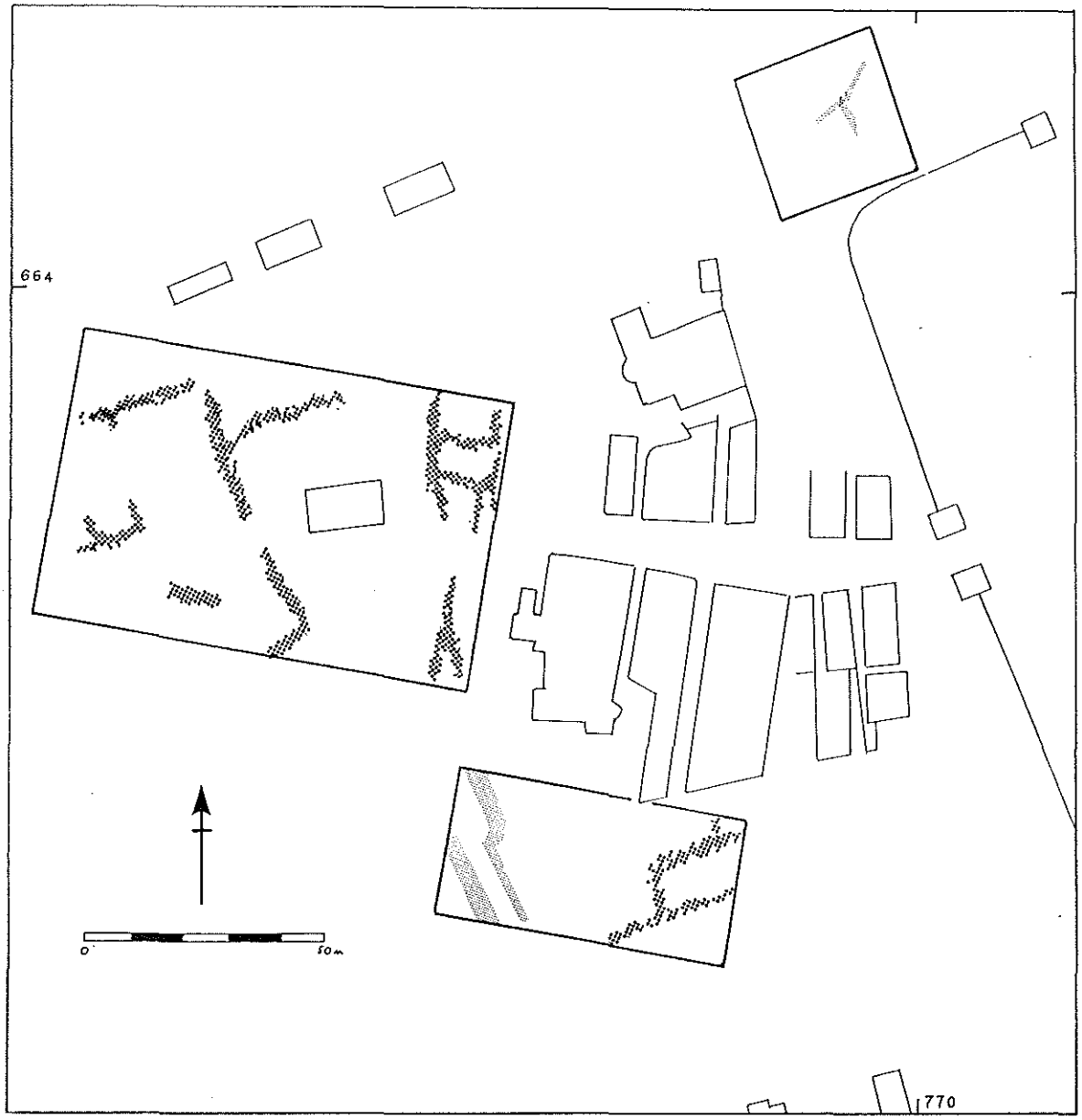
Conclusions

Despite problems posed by moisture saturation and the variable state of preservation - as well as depth and superposition - of archaeological features at Vindolanda, these resistivity surveys have shown the technique to be of considerable potential here. Whilst some phases of the site may be too deeply buried to be satisfactorily detectable, the more superficial and better preserved stone-built features appear to have responded well (see summary interpretation plan enclosed). There is good evidence for the presence of buried structures, and had larger contiguous areas been covered it is probable that a more coherent overall pattern would have emerged. It may be hoped, though, that with the requisite detailed local archaeological knowledge of the site, the results presented here will nonethless be of value.

Surveyed by: G Fookes A Payne 12-14 March 1991

Reported by: G Fookes 23 September 1991

Archaeometry Branch,
Ancient Monuments Laboratory,
Science and Conservation Services, TSG



KEY

Existing stone structures

Grid position

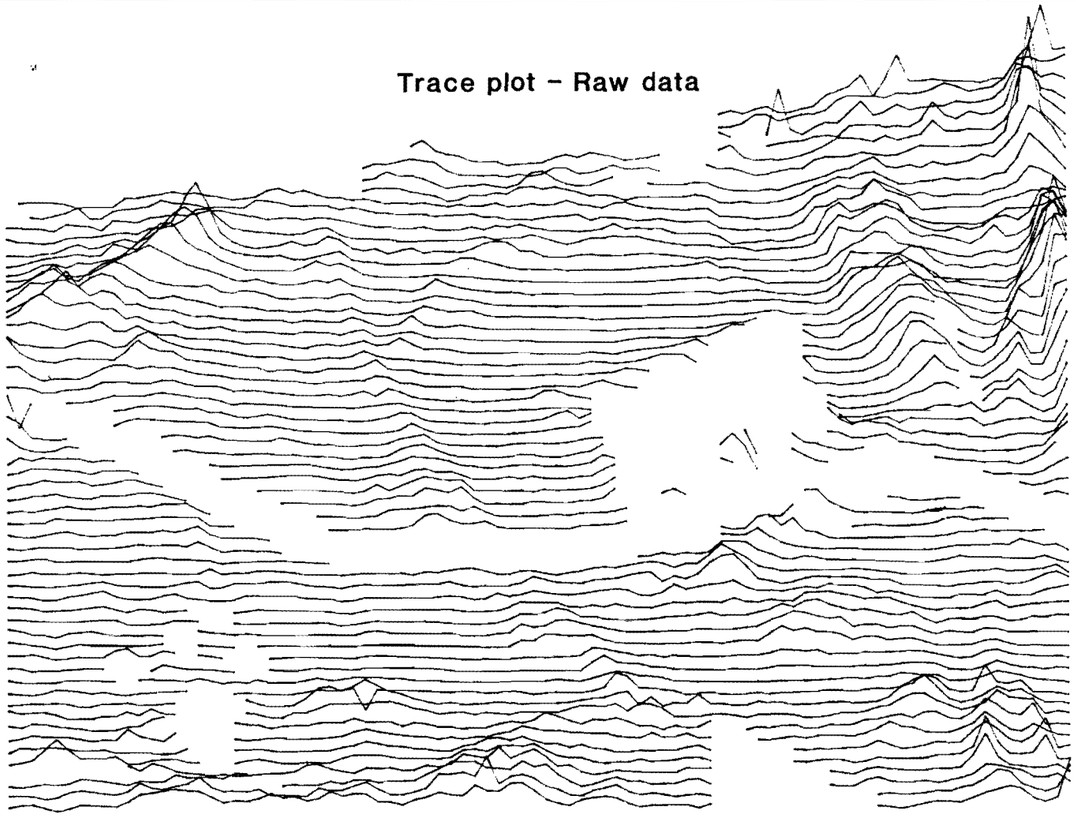
High apparent resistivity values

Low apparent resistivity values

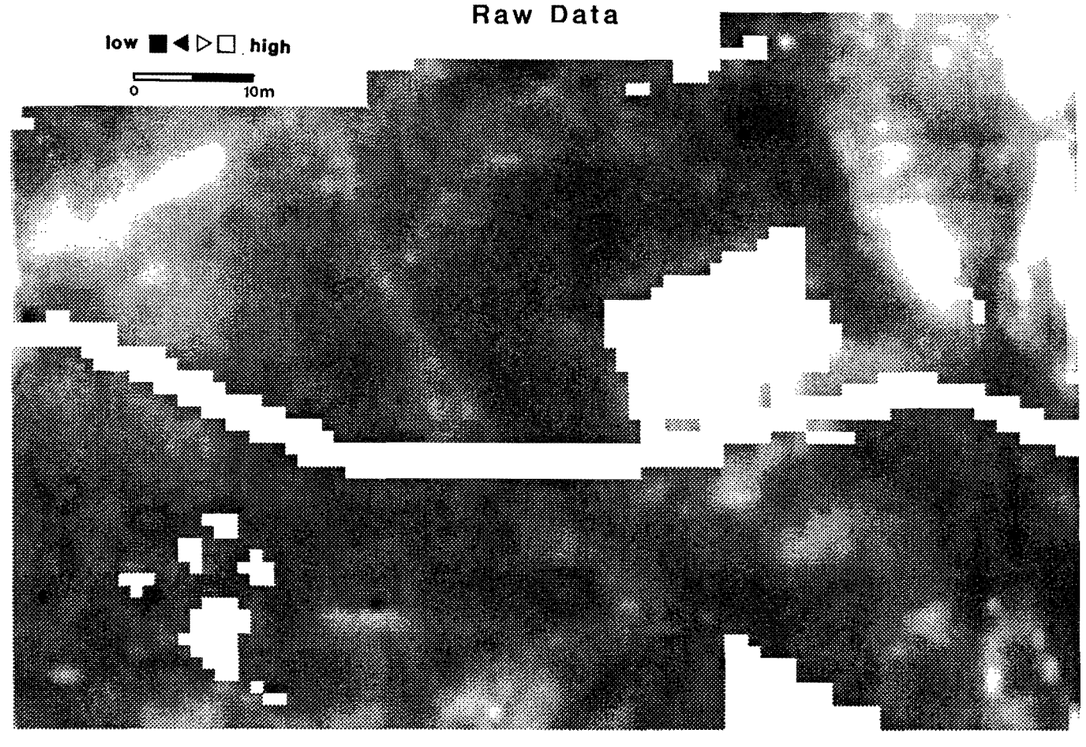
SUMMARY – showing significant anomalous areas

Area A

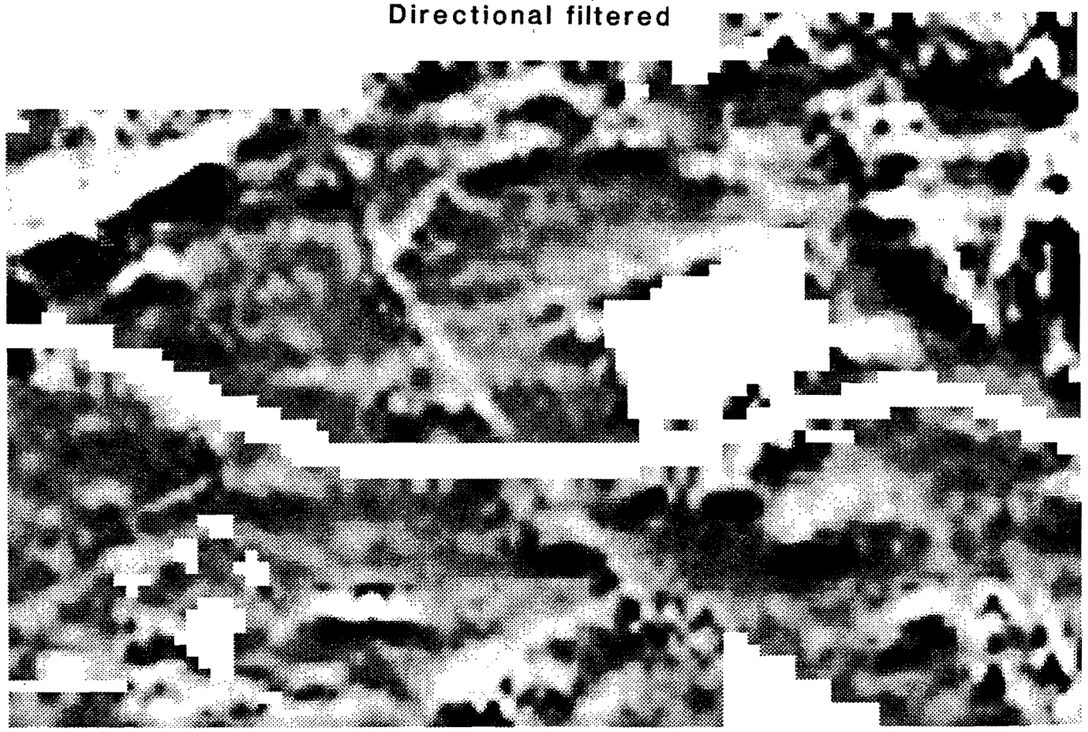
Trace plot – Raw data



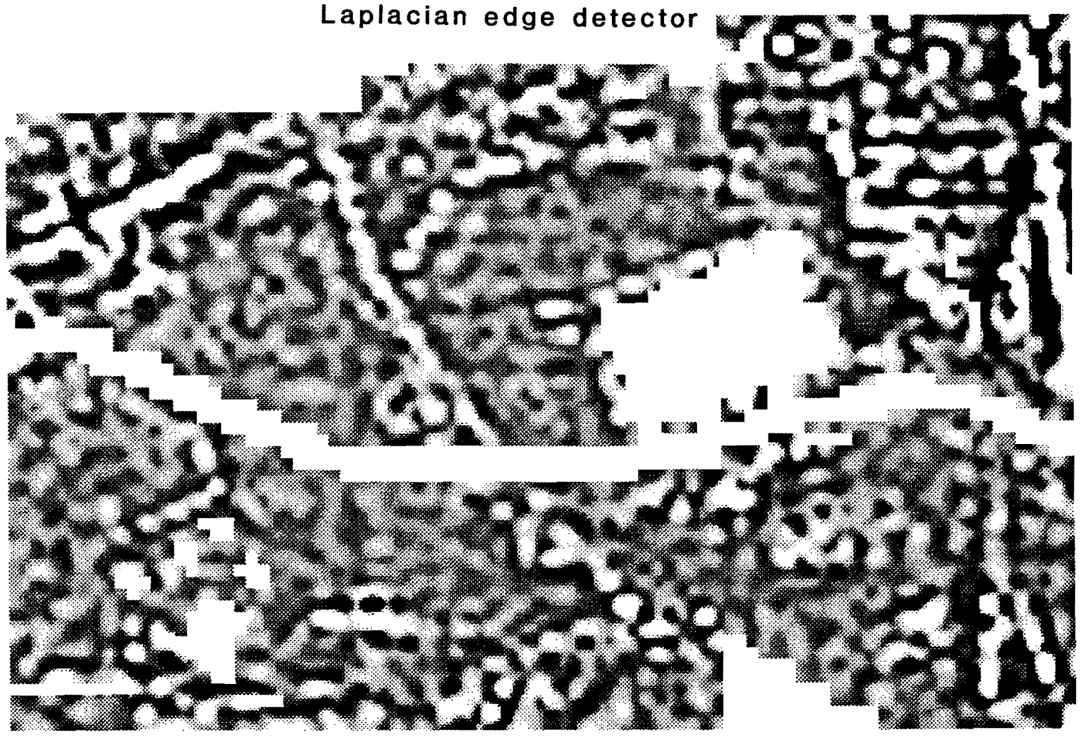
Raw Data



Directional filtered

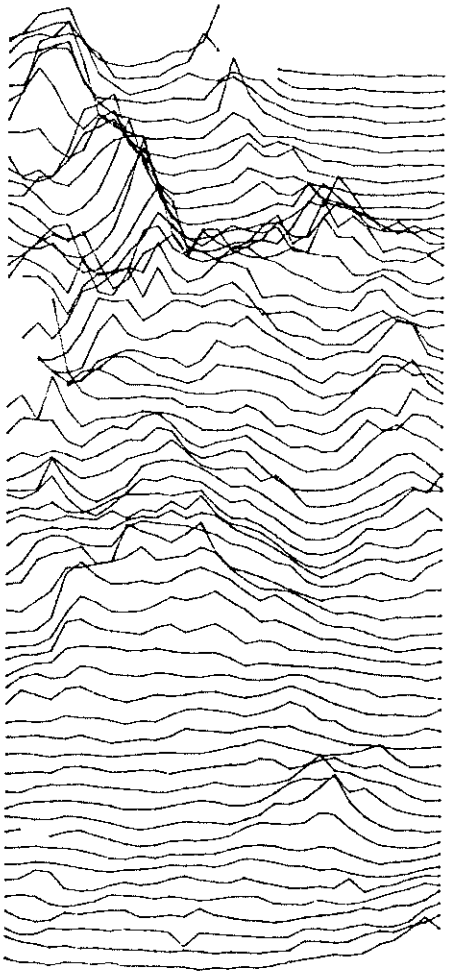


Laplacian edge detector

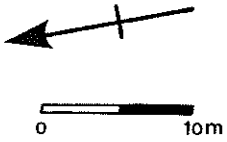


Area B

Trace plot – Raw data



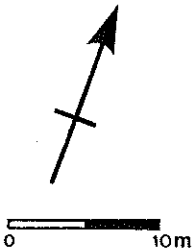
Enhanced data



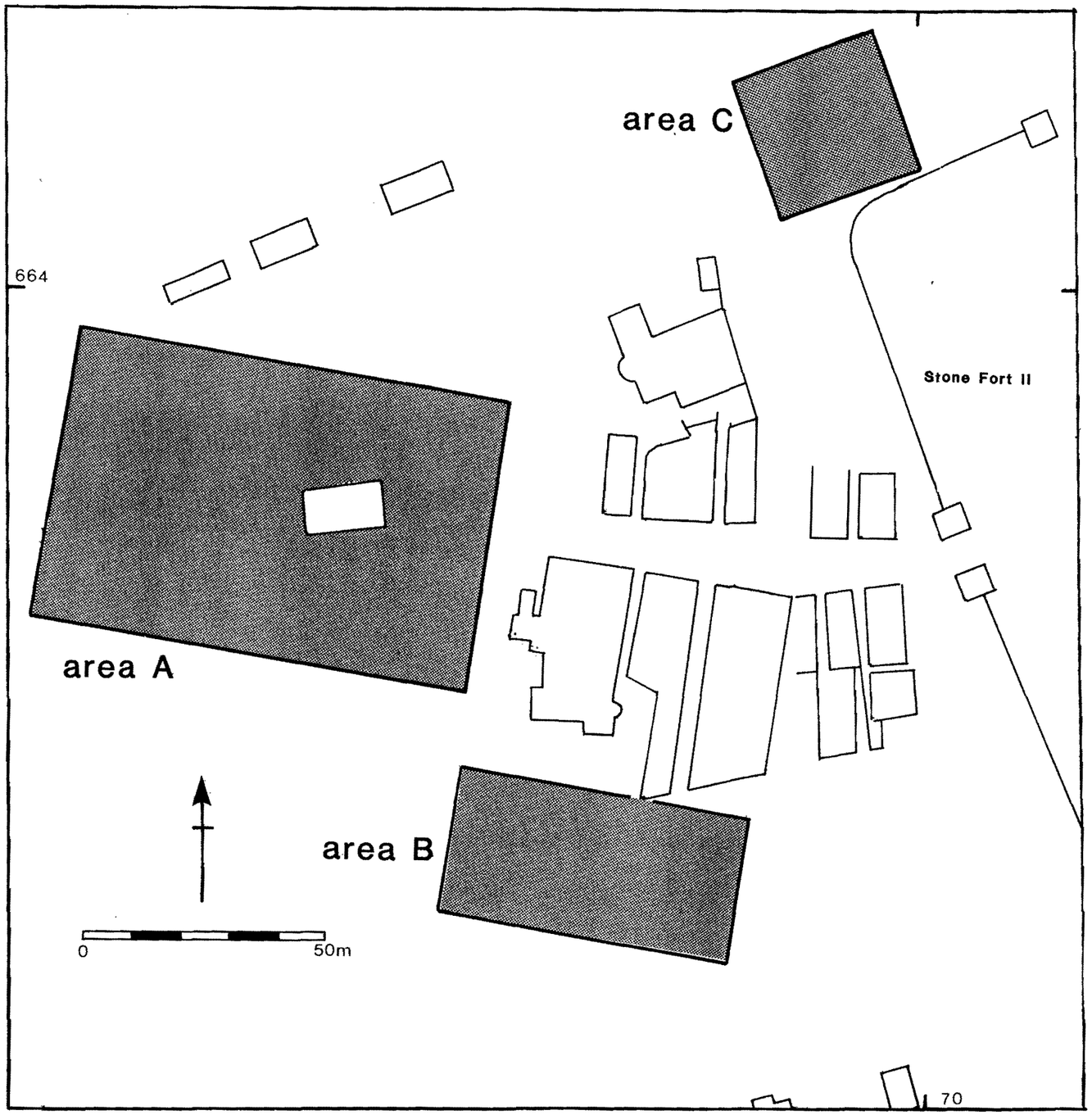
Area C

Raw data

Enhanced data



VINDOLANDA - Roman Fort



Site Plan – Existing stone structures & grid location

Location