

AIR PHOTO SERVICES
21 GUNHILD WAY
CAMBRIDGE
CB1 8QZ
PHONE/FAX 01223 572063

**WHISBY, NEAR EAGLE,
AREA CENTRED SK887662,
LINCOLNSHIRE:**

AERIAL PHOTOGRAPHIC ASSESSMENT

REPORT No: 2003/22

DECEMBER 2003

COMMISSIONED BY

**JOHN SAMUELS ARCHAEOLOGICAL CONSULTANTS
THE MANOR
SOUTH STREET
NORMANTON ON TRENT
NEWARK
NOTTS NG23 6RQ**

No EVENT

INTERVENTION: LI 10083

PRNs 63576

63577

63578

} medieval
ridge + furrow

**WHISBY, NEAR EAGLE,
AREA CENTRED SK887662,
LINCOLNSHIRE:
AERIAL PHOTOGRAPHIC ASSESSMENT**

SUMMARY

This assessment of aerial photographs examined an area of some 60 hectares (centred SK887662) in order to identify and accurately map archaeological and natural features.

Blocks of ridge and furrow remaining from medieval cultivation are the only archaeological features identified on the aerial photographs examined. The absence of pre-medieval features is similar to that noted in recent work south of the present Area at Eagle Hall Quarry.

Soil ridges and a scatter of periglacial features have been identified and mapped and these show fields in which crops have been photographed at times when sub-surface archaeological features may also be detected through their affect on crop growth.

Field drains and recent field divisions have also been mapped.

Original photo interpretation was carried out at 1:2500 level, with subsequent mapping undertaken at 1:10000.

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AERIAL PHOTOGRAPHIC ASSESSMENT

Rog Palmer MA MIFA

INTRODUCTION

This assessment of aerial photographs was commissioned to examine an area of some 60 hectares (centred SK887662) in order to identify and accurately map archaeological and natural features. The level of interpretation and mapping was to be at 1:2500.

ARCHAEOLOGICAL AND NATURAL FEATURES FROM AERIAL PHOTOGRAPHS

In suitable cultivated soils, sub-surface features – including archaeological ditches, banks, pits, walls or foundations – may be recorded from the air in different ways in different seasons. In spring and summer these may show through their effect on crops growing above them. Such indications tend to be at their most visible in ripe cereal crops, in June or July in this part of Britain, although their appearance cannot accurately be predicted and their absence cannot be taken to imply evidence of archaeological absence. In winter months, when the soil is bare or crop cover is thin (when viewed from above), features may show by virtue of their different soils. Upstanding remains, which may survive in unploughed grassland, are also best recorded in winter months when vegetation is sparse and the low angle of the sun helps pick out slight differences of height and slope.

Grass sometimes shows sub-surface features through the withering of the plants above them. This may occur towards the end of very dry summers and usually indicates the presence of buried walls or foundations. Such dry summers occurred in Britain in 1949, 1959, 1975, 1976, 1984, 1989 and 1990 (Bewley 1994, 25) and more recently in 1995 and 1996. This does not imply that every grass field will reveal its buried remains on these dates as local variations in weather and field management will affect parching. However, it does provide a list of years in which photographs taken from, say, mid July to the end of August may prove informative.

Such effects are not confined only to archaeological features. Disturbance of soil and bedrock can produce its own range of shadow, crop and soil differences and it is hoped that a photo interpreter, especially one familiar with local soils, is able to distinguish archaeological from other features. There may, however, remain some features of unknown origin that cannot be classified without specialist knowledge or input from field investigation.

Natural faults and deposits can cause similar differences in crop growth and may also appear as colour differences in bare winter soils. On the soils of this assessment area we may expect

indications of periglacial pits and cracks – which may be mistaken for archaeological features – and of patches of deeper and shallower soil. These can affect the growth of crops and become visible at the same times as archaeological features. The visible edges and extents of deep soil areas tend to vary from year to year with the amount of ground moisture content.

The most immediately informative aerial photographs of archaeological subjects tend to be those resulting from specialist reconnaissance. This activity is usually undertaken by an experienced archaeological observer who will fly at seasons and times of day when optimum results are expected. Oblique photographs, taken using a hand-held camera, are the usual product of such investigation. Although oblique photographs are able to provide a very detailed view, they are biased in providing a record that is mainly of features noticed by the observer, understood, and thought to be of archaeological relevance. To be able to map accurately from these photographs it is necessary that they have been taken from a sufficient height to include surrounding control information.

Vertical photographs cover the whole of Britain and can provide scenes on a series of dates between (usually) 1946-7 and the present. Unfortunately these vertical surveys are not necessarily flown at times of year that are best to record the crop and soil responses that may be seen above sub-surface features. Vertical photographs are taken by a camera fixed inside an aircraft and adjusted to take a series of overlapping views that can be examined stereoscopically. They are often of relatively small scale and their interpretation requires higher perceptive powers and a more cautious approach than that necessary for examination of obliques. Use of these small-scale images can also lead to errors of location and size when they are rectified or re-scaled to match a larger map scale.

PHOTO INTERPRETATION AND MAPPING

Photographs examined

Cover searches were obtained from the Cambridge University Collection of Aerial Photographs and the National Monuments Record: Air Photographs, Swindon. All photographs identified were from routine vertical surveys.

Photographs consulted are listed in the Appendix to this report.

Base maps

A paper base map at a scale of 1:2500 was provided by the client. As this had been folded and included some modern boundaries that had been overdrawn using a thick line its accuracy no longer had the precision expected at that scale. Since no archaeological features were identified, a copy of the OS 1:10000 map was obtained and used as the background for the illustration in this report.

Study area

Photographs were examined in detail for an area extending one modern field beyond the assessment area.

Photo interpretation and mapping

All photographs were examined by eye and under slight (2x) magnification, viewing them as stereoscopic pairs when possible. Interpretations, made at 1:2500 level, were marked on overlays to individual prints following procedures described by Palmer and Cox (1993). These overlays were then scanned and transformed to match a 1:10000 base map using Irwin Scollar's AirPhoto program (Scollar 2002). The transformed files were set as background layers in AutoCAD Map, where features were overdrawn using standard conventions. Layers from this final drawing have been used to prepare the figure in this report.

Accuracy

AirPhoto computes values for mismatches of control points on the photograph and map. In all transformations prepared for this assessment the mean mismatches were less than $\pm 2.50\text{m}$. These mismatches can be less than the survey accuracy of the base maps themselves and users should be aware of the published figures for the accuracy of large scale maps and thus the need to relate these mismatches to the Expected Accuracy of the Ordnance Survey maps from which control information was taken (OS 2003). Mapping originally undertaken at 1:10000 does not have the inherent accuracy to be used to locate features on the ground with precision.

COMMENTARY

Soils

The Soil Survey of England and Wales (SSEW 1983) shows the area to be entirely of glaciofluvial drift (soil association 821b: Blackwood). This soil has been identified as one on which crop growth is responsive to variations of sub-surface depths such as may be due to filled ditches (Carter 1998, 98).

Archaeological features

The only archaeological features identified on the photographs examined are areas of medieval ridge and furrow cultivation on land immediately south and east of the modern village of Eagle. This was likely to have been more extensive. One isolated field next to Cocked Hat Plantation (SK888656) also shows ridged cultivation which is closer spaced and does not show the reverse-S curve that typifies the medieval strips. It may result from post-medieval steam ploughing. Within the Development Area, all modern fields holding the above features are now under cultivation.

No pre-medieval features were identified through differential crop growth and in this respect the present Development Area is similar to that about 1km to the south at Eagle Hall Quarry. Aerial photographs covering the latter area were examined recently and this resulted in the

identification of periglacial features, bands of deeper soils, hand-dug quarries and a scatter of what were assumed to be recent field divisions (Palmer 2000). Photographs of Eagle Hall Quarry included targeted obliques taken by local aviator James Pickering and it is likely that his airborne observations would also have included the present Development Area. If so we must assume that no obvious archaeological features were identified by this experienced observer.

It should also be noted that only three of the vertical sorties were taken at times of the year when crop-marked information may be visible (June 1966 and 1973, August 1995). Two of these recorded fields in which periglacial features were affecting crop growth but there remain a number of modern fields that have not been photographed under suitable crops at appropriate times of year and in which archaeological and other features may remain undetected. These are the blank fields on the map.

One other factor may have affected the activity of aerial observers and that is the proximity of the Whisby area to the restricted airspace centred on RAF Waddington (Carter 1998, Fig 1). This does not make it impossible for low-altitude observation but there are likely to be times when civilian aircraft are excluded from the controlled airspace. This may create a negatively-biased effect on site distribution.

Non-archaeological features

A series of parallel ridges, some of which show an 'internal' band of deeper soil, have been mapped and are most probably of natural origin. The sparse contours on the 1:50000 map suggest that these ridges follow the contours and they may thus show local variations in bedrock. Similar explanations have been accepted for a number of 'geological hillforts' recorded from the air whose origin is entirely natural (Wilson 2000, 167). The photographs suggest the ridges to be of shallow or compact soil but the medieval fields take no visible account of them and they are likely to be insubstantial.

The Area also shows a scatter of periglacial cracks and pits but no areas of deeper soil, such as remain from former watercourses, were identified. Periglacial features also may occur in those fields that have not been photographed under responsive crop conditions (see above).

Field drains were identified in the modern field centred SK892660 and two recently removed field boundaries have been mapped north of the railway (SK880663 and SK884663).

Land use

Within the Development Area only one small field, immediately south of Thorpe Lane Farm (SK886664), has been permanently pasture. Fields forming a block between Thorpe Lane Farm and Poplar Farm remained as pasture between 1947 and 1965/6 but had been converted to arable use by 1973. The field south of the railway at Eagle and Thorpe Crossing (SK891661) was pasture until first recorded in arable use in 1965. Others within the Development Area have been in arable use on all dates of photography.

REFERENCES

- Bewley, R. H., 1994. *Prehistoric Settlements*. Batsford/English Heritage, London.
- Carter, A., 1998. The contribution of aerial survey: understanding the results. In R.H. Bewley (ed), *Lincolnshire's Archaeology from the Air. Occasional Papers in Lincolnshire History and Archaeology* **11**, 96-104.
- OS, 2003. <http://www.ordnancesurvey.gov.uk/productpages/landline/positional-background.htm>
- Palmer, R., 2000. *Eagle Hall Quarry, area centred SK8765, Lincolnshire: aerial photographic appraisal. Air Photo Services Report 2000/20* (for Archaeological Project Services).
- Palmer, R. and Cox, C., 1993. *Uses of aerial photography in archaeological evaluations. IFA Technical Paper 12*.
- Scollar, I., 2002. Making things look vertical, in Bewley, R.H. and Rączkowski, W., (ed). *Aerial archaeology: developing future practice*. NATO Science Series, Vol **337**, 166-172.
- SSEW, 1983. *Soils of England and Wales: sheet 4: Eastern England (1:250,000)*. Soil Survey of England and Wales, Harpenden.
- Wilson, D. R., 2000. *Air Photo Interpretation for Archaeologists*. Tempus, Stroud.

APPENDIX

Aerial photographs examined

Source: Cambridge University Collection of Aerial Photographs

Oblique photographs

None

Vertical photographs

Zkn-EV 36 10 August 1995 1:10000

Source: National Monuments Record: Air Photographs (cover search 63226)

Specialist collection

None

Vertical collection

RAF/CPE/UK/2009: 2222-2223	16 April 1947	1:9800
RAF/CPE/UK/2009: 4223-4225	16 April 1947	1:9800
RAF/CPE/UK/2541: 3170-3171	25 March 1948	1:10000
RAF/CPE/UK/2541: 3172	25 March 1948	1:10000
RAF/CPE/UK/2541: 4173-4174	25 March 1948	1:10000
HSL/UK/65/321B: 331-333	29 March 1965	1:10000
OS/66126: 87-88	3 June 1966	1:7500
OS/66127: 170-172	3 June 1966	1:7500
OS/66130: 650	3 June 1966	1:7500
OS/73033: 142-143	23 March 1973	1:7500
OS/73327: 437-439	18 June 1973	1:7500
MAL/77033: 162	11 October 1977	1:10000
MAL/77033: 163	11 October 1977	1:10000

Most informative photographs

Zkn-EV 36

OS/73327: 438

MAL/77033: 163

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Air Photo Services has consulted only those aerial photographs specified. It cannot guarantee that further aerial photographs of archaeological significance do not exist in collections that were not examined.

Due to the nature of aerial photographic evidence, Air Photo Services cannot guarantee that there may not be further archaeological features found during ground survey which are not visible on aerial photographs or that apparently 'blank' areas will not contain masked archaeological evidence.

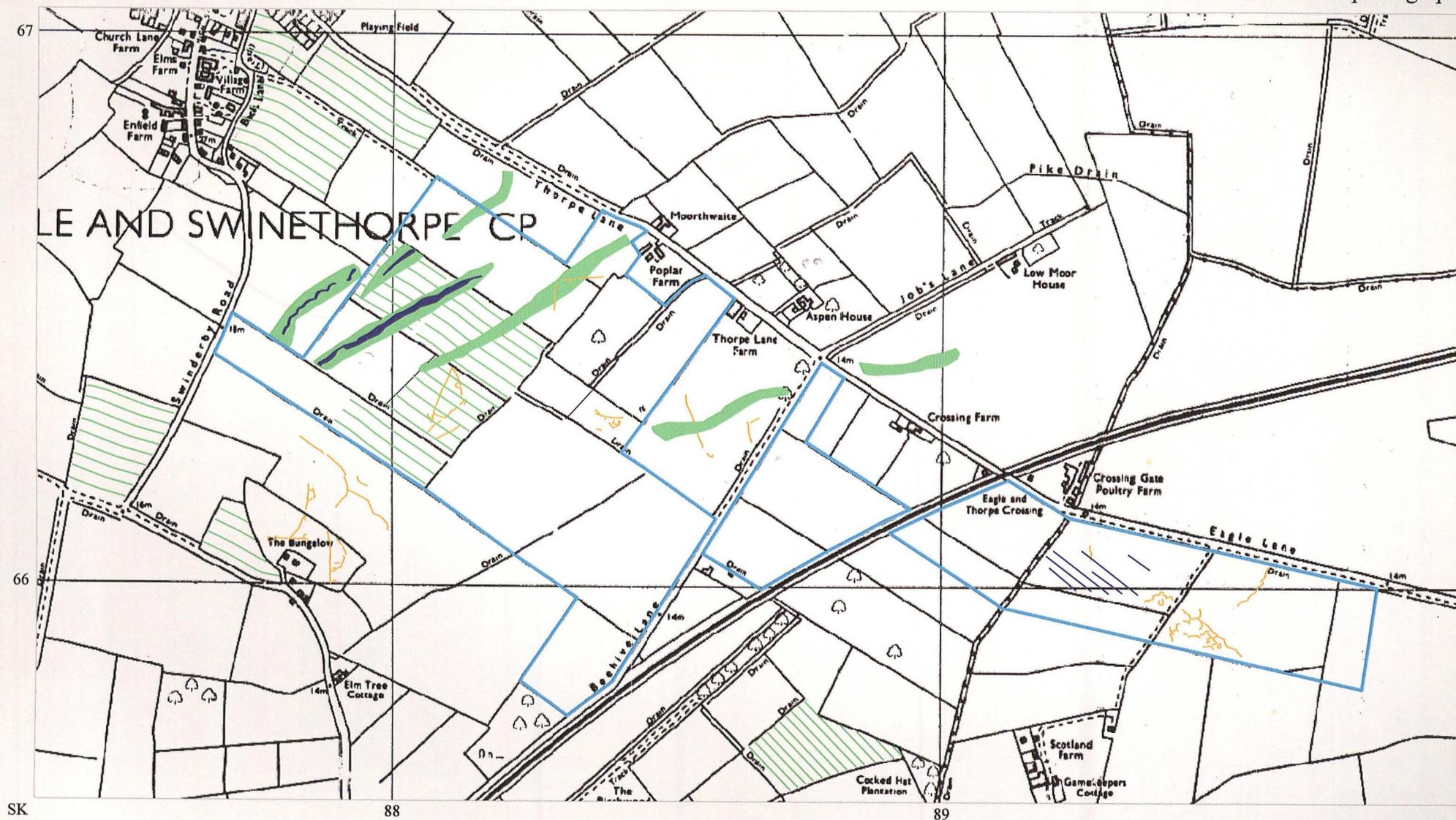
We suggest that if a period of 6 months or more elapses between compilation of this report and field evaluation new searches are made in appropriate photo libraries. Examination of any newly acquired photographs is recommended.

That the original working documents (being interpretation overlays, control information, and digital data files) will remain the property of Air Photo Services and be securely retained by it for a period of three years from the completion date of this assessment after which only the digital files may be retained.

It is requested that a copy of this report be lodged with the relevant Sites and Monuments Record within six months of the completion of the archaeological evaluation.

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Whisby, Lincolnshire:
Features identified on aerial photographs



- | | | |
|-------------------------|--------------------------------|-------------------------|
| Archaeological features | — Ridge and furrow (schematic) | — Assessment area |
| Recent features | — Field boundary | — Natural features |
| — Field drain | — Deeper soil | — Ridge or shallow soil |
| — Periglacial crack | | |

Original photo interpretation at 1:2500 level with mapping at 1:10000.
Based on photographs at CUCAP and NMRAP.
Air Photo Services, Cambridge.
December 2003
Drawing: 0322Whisb.dwg
Background from OS 1:10000 map SK86NE
Licence AL 100028850