

Appendix 2 Aerial Photography Report

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Summary

This assessment of aerial photographs examined an area of some 888 hectares (centred TL4066 plus its access corridors) in order to identify and accurately map archaeological, natural and recent features.

The complete area, but for the original village cores, was cultivated in Medieval times and much of this remains visible from the air as ridge and furrow and headlands.

Traces of village earthworks were identified in Longstanton (TL396671 and TL401664) and south of the Assessment Area at Oakington (TL417646)

The distribution of pre-Medieval features as visible from the air appears to be dependent on the distribution of local gravel 'islands'. These archaeological sites have been mapped in seven places:

Three substantial ditched complexes are at TL385643, TL394678 and TL402670. The land between the latter two sites shows evidence of ditched features (TL398673 and TL400670) and settlement in this area may have been extensive.

Smaller sites occur at TL394657 and just beyond the Assessment Area at TL417649 and TL617656. The latter two sites may indicate adjacent archaeological features within the Assessment Area.

Photographs taken during and just after the Second World War have allowed details within the airfield to be mapped. These include the wartime aircraft dispersal points, munitions stores and their access, plus some nearby pill boxes.

One recent pipeline crosses the Assessment Area.

Photo interpretation and mapping was at 1:2500 level.

Introduction

This assessment of aerial photographs was commissioned to examine an area of some 888 hectares (centred TL4066, plus its access corridors) in order to identify and accurately map archaeological, natural and recent features and thus provide a guide for field evaluation. 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 archaeological features – including 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. On responsive soils in this part of Britain, these indications tend to be at their most visible in ripe cereal crops, in June or July, although their appearance cannot accurately be predicted and their absence cannot be taken to imply evidence of archaeological absence. The photographs of the Assessment Area indicate that most of the recorded sub-surface archaeological features are located on local gravel 'islands' in an area that is otherwise clay (SSEW 1983). Crops on clay soils are much less affected by differences in sub-surface depth and do not readily reveal what lies below the surface. Persistent observation elsewhere has indicated that cereals on clay do show buried features and this is especially the case just before harvest at the end of unusually dry summers. 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. However, there has been virtually no specialist observation over the Assessment Area at appropriate times of year. The optimum dates occur when the locally-based observers from Cambridge University would have worked their way up-country and most likely be flying in Northern England or Scotland to record later crop ripening in those parts, and vertical photography may be difficult due to haze and stubble burning.

Backfilled cut features on clay soils do not show the colour variations that can be visible above archaeological and natural features in winter bare soil condition, so little information may be recovered during those months. This time of year is good for recording upstanding remains which may survive in unploughed grassland. Sparse vegetation in winter and the low angle of the sun help 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 (see above) and usually indicates the presence of buried walls or foundations. 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, the list of dry summers does indicate years in which photographs taken from, say, mid July to the end of August may prove informative.

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 (CUCAP), Cambridgeshire Record Office (CRO) and the National Monuments Record: Air Photographs (NMRAP), Swindon. Photographs included those resulting from specialist archaeological reconnaissance and routine vertical surveys.

Photographs consulted are listed at the end of this report.

Base Maps

Digital data from survey at 1:2500 were provided by the client.

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 1:2500 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 figures in this report and digital copy has been provided to the client.

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 $\pm 1.50\text{m}$. 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 2002).

Commentary

Soils

The Soil Survey of England and Wales (SSEW 1983) shows the area to be located on Jurassic and Cretaceous clays of two subgroups (soil association 411c and 712b). This difference is unlikely to be significant in terms of crop response to sub-surface features: both will be equally unresponsive. A narrow band of Cretaceous sand and sandstone extends from Cottenham. Through the southern part of Oakington village and will be cut by any widening of the A14 just south of the Bar Hill junction. This deposit may be more responsive, but occurs only in this location.

Archaeological features

Features identified on aerial photographs can be divided into those of Medieval and pre-Medieval dates.

Medieval

Ridge and furrow with its associated headlands shows the pattern of open-field cultivation in this part of Cambridgeshire and formerly covered most of the Assessment Area.

Other earthworks have been identified close to the modern villages of Longstanton and Oakington and are likely to be of Medieval or post-Medieval date.

Longstanton: TL396671. Upstanding banks and ditches in 1949 that probably indicate former property boundaries and a track. Also quarries/ponds. Most are now under houses.

Longstanton: TL401664. A hollow way, adjacent earthwork features and quarries/ponds plus ridge and furrow. This area was previously assessed from aerial photographs prior to field work by Cambridgeshire Archaeological Field Unit (Palmer 1991a). Additional photographs examined for this Assessment add slight detail to the area. Features south of the hollow way are superimposed on the Medieval ridge and furrow and are likely to be of post-Medieval date.

Oakington: South of the village, area TL417646. Several fields south of Oakington (and outside of the Assessment Area) show traces of ridge and furrow and ditches of a field system that is of post-Medieval date. The apparent track or road to the east at TL417651 may be associated with one of these phases of activity or be more recent.

Pre-Medieval

Natural features – periglacial cracks and areas of pitted ground – indicate that most of the pre-Medieval features recorded from the air are located on gravel soils. These locations and soils also explain why those sub-surface features have become visible (see *Archaeological and Natural Features from Aerial Photographs* above) while others may remain undetected. All of the pre-Medieval features are likely to have been on ground used for cultivation since at least Medieval times and may have suffered damage or truncation through those actions.

TL385643 Superimposed ditches at this site shows there to have been more than one phase of construction, and there may be additional complexity in the

plan caused by mis-identification of Medieval furrows. One phase included the double-ditched curvilinear enclosure that appears to have a broad (?or eroded) inner ditch and a track or hollow way extending south from it. The broad-ditch morphology may indicate features of similar date, or it may occur for other reasons. Among the remaining features are smaller curvilinear enclosures and a series of rectangular structures that may remain from a field or paddock system.

TL394657 Slight indications of the mapped features – possibly originally a group of three conjoined enclosures superimposed on or by a fourth enclosure – were recorded in 1969 and are hinted at on photographs of one other date. An arc of a possible adjacent feature is west of the pipeline.

TL394678 The mapped features in the centre of the figure show a complex group of rectilinear enclosures that is likely to indicate a long-lived settlement that has been developed and modified over time. Some ditched features extend east of the main area where there are also many pits that have been mapped schematically as an ‘area of geological pits’. To the north is what appears to be a separate enclosure system but which is probably part of the larger settlement that has been ‘isolated’ by modern land division. Slightly to the north of the ‘separate’ enclosure are three ring ditches, one of which has (on some photographs) a grave-like internal feature. This is similar to another in the modern field south of the large settlement complex. Other features in the southern field are on a different alignment to the settlement features and may be unrelated. It is usually not possible to distinguish archaeological pits from those caused by periglacial action and all those mapped have been classified as natural – although this may not always be a correct identification.

TL398673 Features in this area have not been recorded clearly on air photographs but do indicate the presence of a fairly dense network of sub-surface cut features. Their alignments suggest them more likely to be archaeological than of geological origin.

TL400676 This small group of features was photographed only in 1949 although hints are visible on other photographs once the site is known. There appears to be one sub-rectangular enclosure with adjacent ditched features and pits. The main alignment is similar to that of features at TL398673 which adds credibility to the ‘possible ditches’ mapped.

TL402670 Features at this site were mapped (Palmer 1991b) prior to an earlier field evaluation by Cambridge Archaeological Unit. No cross checking has been made to that mapping and no new targeted oblique photographs have been taken of the site since that date. The site shows more than one phase of construction of which part (the straight parallel ditches) are similar to Romano-British sites elsewhere in eastern England (Whimster 1989; Jones 1998; Winton 1998). The eastern parts of this site are likely to be masked by deeper soil.

In the background of one oblique photograph, at TL40016690, is what appears to be a broad-ditched ring ditch. This did not appear to be wholly convincing as of archaeological origin and is adjacent to, and may derive from, former quarries.

TL417649 One ring ditch and an adjacent 'possible' are just south of the Assessment Area in a field that includes ridge and furrow and ditched post-Medieval field boundaries. Two other ring ditches are further south at TL420645. All of the ring ditches are close to a small stream that continues north roughly parallel to the railway. These ring ditches are likely to mark bronze age burials. Others may be present, but undetected by this survey, along the eastern fringes of the Assessment Area.

TL417656 One small site comprising two conjoined enclosures and another (incomplete, or incompletely recorded, but slightly larger) are located on local high ground flanking a small stream. These are just outside the Assessment Area but may indicate an unidentified archaeological presence west of the railway.

Military Features

The airfield had three runways arranged in an A-layout and, as such, is typical of a Second World War site. The runways had dispersals around their southern perimeter and a sprawl of tracks and munitions stores (the solid-filled squares) to the north. In 1943, the airfield appeared to be in use by four-engined bombers and the ground features were at the full extent as mapped. By 1949 the aircraft were Dakotas although the munitions stores remained extant. Building activity (or demolition) was evident as smeared ground surface on the northern side of the hangar area (mapped as a hatched area). In the 1950s the airfield was used by fighter squadrons (Meteors and Vampire/Venoms) and there was some removal of the more distant dispersal points. The last recorded use for active flying was in 1968 when use had returned to small transport or communications aircraft. By that date the eastern area of munitions depots had been levelled but the track system remained. Continued flying is suggested by the approach lights set from the south-west end of the main runway and recorded in 1969. From that date the airfield went out of flying use with runways marked as 'closed' but leaving a short surfaced area at the north end of the main runway.

The black hatched area indicates land that has been quarried or excavated and then used for waste disposal. Tracks leading from the airfield area, and the location of this site among the airfield dispersal areas, suggest that it may have been used for military disposal rather than for waste from the neighbouring Oakington village. Ground surface at this site remains uneven on the most recent photographs (2000).

A number of pill boxes have been identified and mapped on the west side of the railway. These are likely to remain extant as they also appear on the OS digital data.

Unsurfaced space within the perimeter track appears always to have been grass but with recent return to arable of the northern (munitions) area. These grass areas show some evidence of pre-airfield (and pre-railway) field boundaries that appear to respect the alignment of Medieval fields and headlands.

Near the extreme north-west angle of the Assessment Area are other presumed military features that flanked Ramper Road and part of Over Road north of its junction with Ramper Road. On each side of those roads were laid a series of alternating concrete spurs between which were rectangular huts. The original

function of these is unknown but they appeared to remain extant into the 1970s and the metalled spurs are likely still to remain on the roadside verges. Those mapped provide an idea of the design of these features which originally extended along the northern part of Over Road and continued along Ramper Road beyond the western edge of the base map.

Non-archaeological features

A pipeline was recorded from 1969 that cuts through part of the Assessment Area on a roughly NNW- SSE course. The northern course and extent of this pipeline is unknown.

Many small hand-dug quarries have been identified in fields surrounding Longstanton. Many that are in grass fields remain in use as ponds, others have been backfilled and levelled.

In the grass field centred TL393670 a long rectangular lowered area appears to have been cut in recent years across what was recorded in the 1950s as good earthwork ridge and furrow. The purpose of this is unknown unless it is for access from the road corner.

Land use

Detailed notes of land use were not kept for this Assessment but, other than fields immediately adjacent to the villages, most of the land has been in arable use on all dates of photography. Major areas of permanent pasture have been fields in the bend of Over Road on the west of Longstanton and a smaller block of fields between Longstanton village and the airfield buildings.

Fields north of Longstanton, including those containing the archaeological features centred TL394678, have had changing use for shrubs or soft fruit. This was at its most extensive after the Second World War but was later reduced to a few narrow belts and then all converted to arable land. Some damage to archaeological features by roots may have occurred and, among the features mapped from aerial photographs, may be most evident in the area TL395678.

APPENDIX

Aerial photographs examined

Source: Cambridge University Collection of Aerial Photographs

Oblique photographs

TL385643	VR 1-4	13 July 1957
TL398666	ZC 22	26 June 1959
	AVD 94	9 July 1968
	AZC 20-21	26 July 1969
TL397673	AVD 94-95	9 July 1968
	AZC 22	26 July 1969
TL395680	RN 12-13	23 July 1955
	AZC 18-19, 22	26 July 1969
TL400664	CFK 18-19	11 February 1978
TL402672	RN 14-19	23 July 1955
	ZC 22	26 June 1959
	AVD 94-95	9 July 1968
	AZC 20-21	26 July 1969
TL413645	ARH 57-58	16 May 1967
	AWU 69-71	2 February 1969
	CHI 40	5 August 1978
	CQV 3, 5-6	9 July 1986
TL417646	AWU 68-71	2 February 1969
	AWU 73-74	2 February 1969
	CFK 17	11 February 1978
TL418648	CQV 5-6	9 July 1986
TL416653	CQV 5-6	9 July 1986
TL419651	ARH 52-56	16 May 1967
	AWU 68-72	2 February 1969
	AXB 23-24	10 February 1969
	BMJ 101-108	2 May 1973
	CFK 11-14	11 February 1978
	CFR 35-37	7 August 1978
	CLR 53, 55-56	10 May 1980

Vertical photographs

RC8-T 98-103	15 September 1970	1:10000	
RC8-T 106-110	15 September 1970	1:10000	
RC8-DO 64	30 July 1980	1:12600	
RC8-JL 64-66	30 June 1987	1:10000	
RC8-JL 93-97	30 June 1987	1:10000	
RC8-JL 125-129	30 June 1987	1:10000	
RC8-JL 151-156	30 June 1987	1:10000	
RC8-JL 189-191	30 June 1987	1:10000	
RC8Kn-BG 140-142	12 June 1988	1:10000	(even numbers)
RC8Kn-BG 206-210	12 June 1988	1:10000	(even numbers)
RC8Kn-BN 120-125	16 July 1988	1:10000	(even numbers)
RC8Kn-BN 166-169	16 July 1988	1:10000	(even numbers)
RC8Kn-BO 16, 18-19	26 August 1988	1:10000	
RC8-LK 273	3 July 1989	1:7000	
ZKn-GU 589-608	7 May 1998	1:5000	
ZKn- IX 249	11 October 1999	1:20000	
ZKn- JB 1-2	18 November 1999	1:20000	
ZKn-KL 277-280	11 September 2000	1:7500	

Source: Cambridgeshire Record Office

Vertical photographs

Fairey 200424-427	late summer 1949	1:6000	
Fairey 200462-467	late summer 1949	1:6000	
Fairey 200486-490	late summer 1949	1:6000	
Fairey 200520-525	late summer 1949	1:6000	
Fairey 200554-557	late summer 1949	1:6000	
Fairey 200563-564	late summer 1949	1:6000	
Fairey 200641-642	late summer 1949	1:6000	

Source: National Monuments Record: Air Photographs

Specialist collection

TL3864/1/184-185	24 July 1986	
TL3864/1/186-187	24 July 1986	
TL3963/3-6	6 July 1994	
TL3963/8-10	6 July 1994	
TL3967/1	15 July 1983	
TL3967/2/59-62	24 July 1986	
TL3967/3-6	15 July 1983	
TL3968/2/136-140	19 July 1979	
TL3968/3	15 July 1983	
TL3968/7-12	12 July 1989	
TL3968/13-17	15 July 1983	
TL4062/1	probably 1930s	
TL4064/1-3	5 March 1988	
TL4066/1/372	30 July 1975	
TL4066/2	15 July 1983	
TL4066/3/55-58	24 July 1986	
TL4066/4-5	15 July 1983	
TL4067/1/373-376	30 July 1975	

TL4067/2/224-225	8 August 1975
TL4067/3	15 July 1983
TL4067/10-13	15 July 1983
TL4164/1/365-70	30 July 1975
TL4164/2/446-448	26 July 1979
TL4164/3-6	5 March 1988
TL4165/1/226-227	8 August 1975
TL4165/2-4	16 July 1996

Vertical collection

US/7PH/GP/LOC126: 5001	29 December 1943	1:5000
106G/UK/1490: 3484-3489	9 May 1946	1:10000
106G/UK/1490: 4326-4331	9 May 1946	1:10000
106G/UK/1490: 4474-4479	9 May 1946	1:10000
106G/UK/1557: 1353-1358	7 June 1946	1:9800
106G/UK/1557: 2134-2139	7 June 1946	1:9800
CPE/UK/1952: 2016	25 March 1947	1:10000
CPE/UK/1952: 3016	25 March 1947	1:10000
CPE/UK/1952: 4015-4016	25 March 1947	1:10000
CPE/UK/1952: 4023-4024	25 March 1947	1:10000
CPE/UK/2021: 3035-3040	21 April 1947	1:9800
541/598: 3001-3004	27 July 1950	1:4200
541/598: 3036-3038	27 July 1950	1:4200
541/598: 4001-4003	27 July 1950	1:4200
541/598: 4036-4040	27 July 1950	1:4200
540/634: 3001-3009	30 November 1951	1:11000
540/634: 4003-4006	30 November 1951	1:11000
F21.58/1119: 30-35	11 May 1953	1:10000
F21.58/1119: 52-58	11 May 1953	1:10000
F21.58/1119: 59-62	11 May 1953	1:10000
F22.58/1119: 28-37	11 May 1953	1:10000
F21.540/1580: 1-7	13 April 1955	1:8000
F22.540/1580: 1-7	13 April 1955	1:8000
F21.540/1584: 14-21	14 April 1955	1:8500
F22.540/1584: 15-21	14 April 1955	1:8500
F21.58/1727: 22-28	19 April 1955	1:8500
F22.58/1727: 22-27	19 April 1955	1:8500
F21.58/4438: 40-43	5 June 1961	1:10500
F22.58/4438: 40-41	5 June 1961	1:10500
OS/67145: 13-14	5 June 1967	1:7500
OS/67145: 52-55	5 June 1967	1:7500
OS/67145: 63	5 June 1967	1:7500
MAL/68052: 104-105	4 July 1968	1:10000
MAL/68052: 107-108	4 July 1968	1:10000
MAL/68061: 8-12	12 August 1968	1:10000
MAL/68061: 46-49	12 August 1968	1:10000
MAL/69054: 19-21	8 June 1969	1:10500
MAL69068: 102-106	18 July 1969	1:10500
MAL69070: 160-161	22 July 1969	1:10500
MAL69070: 171-173	22 July 1969	1:10500
MAL69070: 207-212	22 July 1969	1:10500
MAL69071: 8-11	22 July 1969	1:10500
MAL71018: 174-177	11 April 1971	1:10000

MAL71018: 199-200	11 April 1971	1:10000
MAL71019: 6-8	11 April 1971	1:10000
MAL71020: 191-193	11 April 1971	1:10000
OS/71498: 8	8 September 1971	1:7500
OS/73253: 236-238	6 June 1973	1:7500
OS/73248: 581-585	8 June 1973	1:7500
OS/73316: 410-414	16 June 1973	1:7500
OS/73316: 415-419	16 June 1973	1:7500
OS/73316: 521-524	16 June 1973	1:7500
OS/77124: 5-11	29 August 1977	1:7500
OS/81003: 25-29	13 April 1981	1:7600
OS/91030: 2-5	12 April 1991	1:8000

Most informative photographs

TL385643 VR 2, TL3864/2/186, OS/81003: 25

TL394657 MAL/69070: 210

TL394678 RN 13, AZC 18, RC8-LK 273, TL3967/2/61, TL3968/2/138,
TL3968/15

TL398673 RC8-LK 273

TL400663 RC8-T 102, CFK 18

TL400676 Fairey 200426

TL402670 RN 16, AVD 95, TL4066/3/56

TL417649 CQV 6, TL4164/2/447

TL417656 TL4165/3

Airfield US/7PH/GP/LOC126: 5001, Fairey 200463, 200489, 200521,
TL4066/2

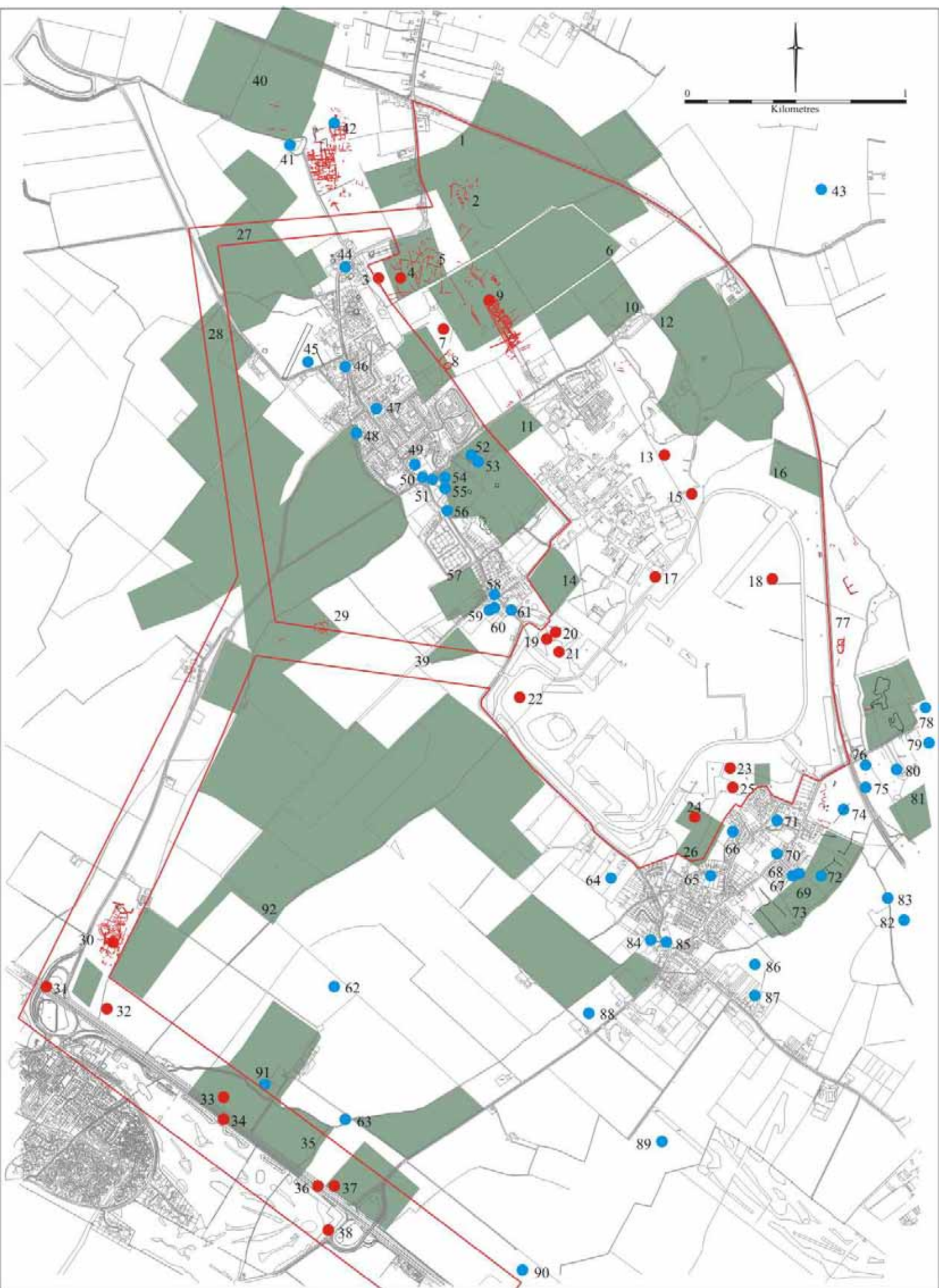


Figure 1: Gazetteer map

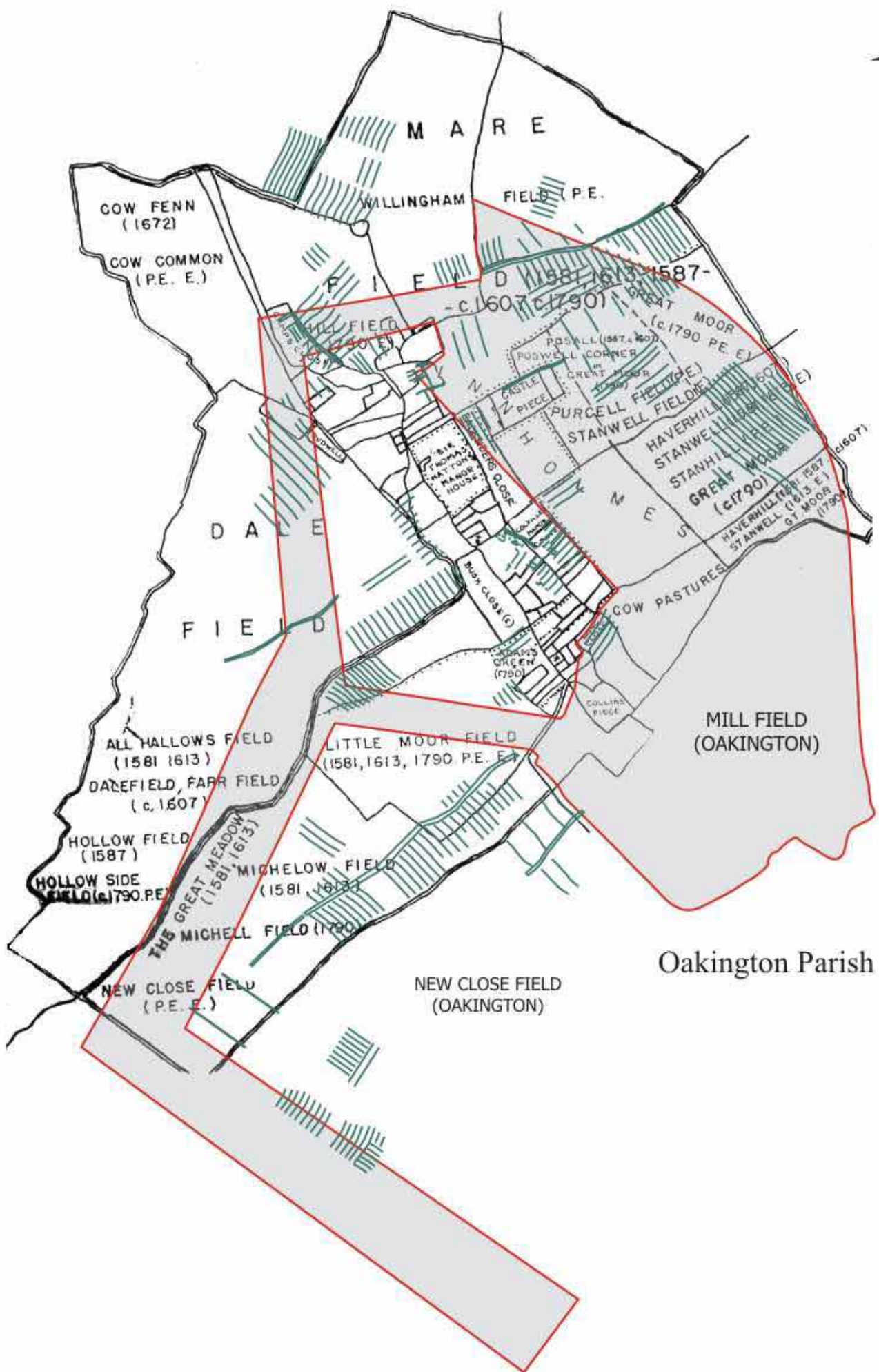


Figure 2 16th /17th century Field-names with Ridge and Furrow

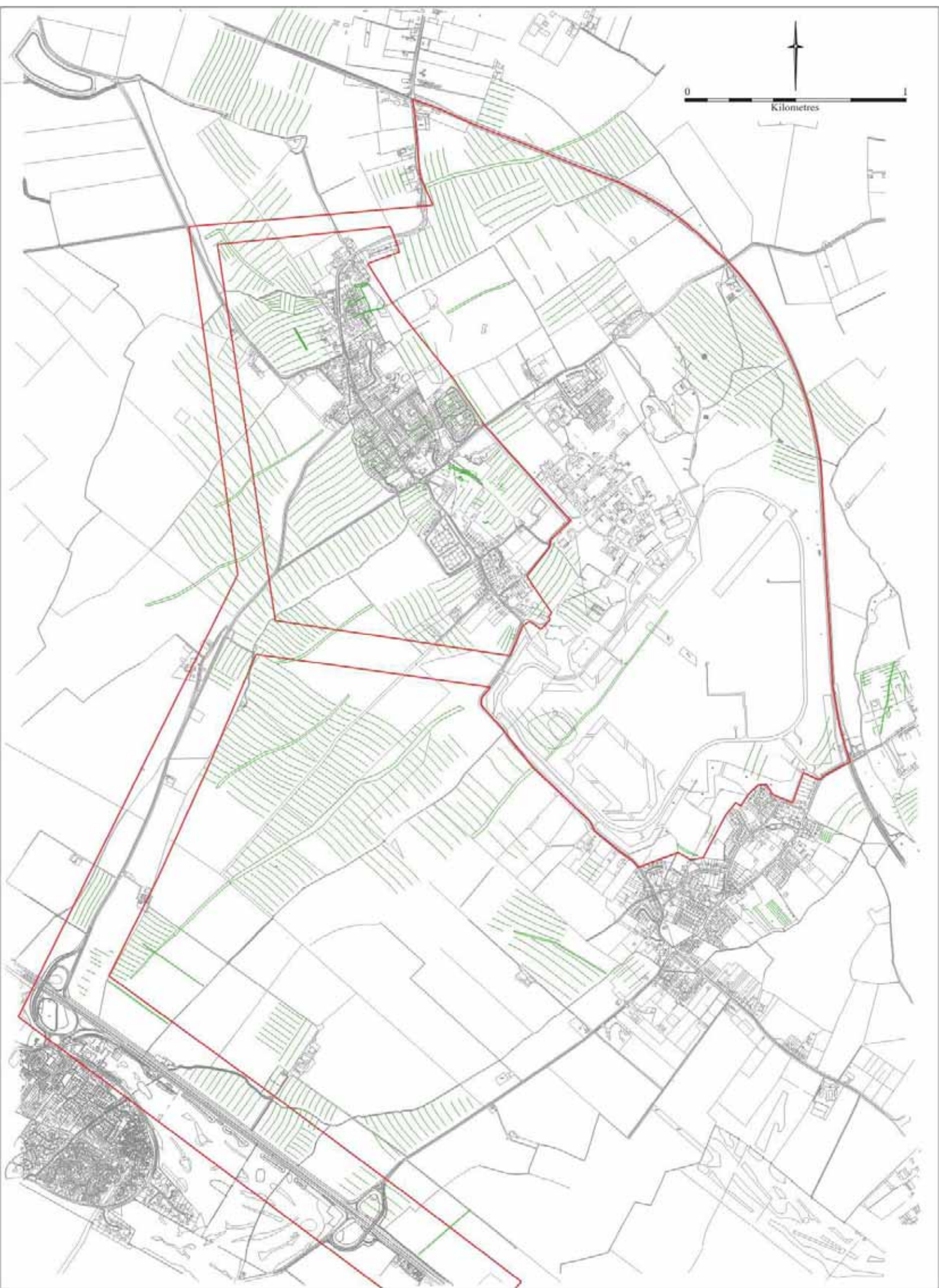


Figure 3: Ridge and Furrow

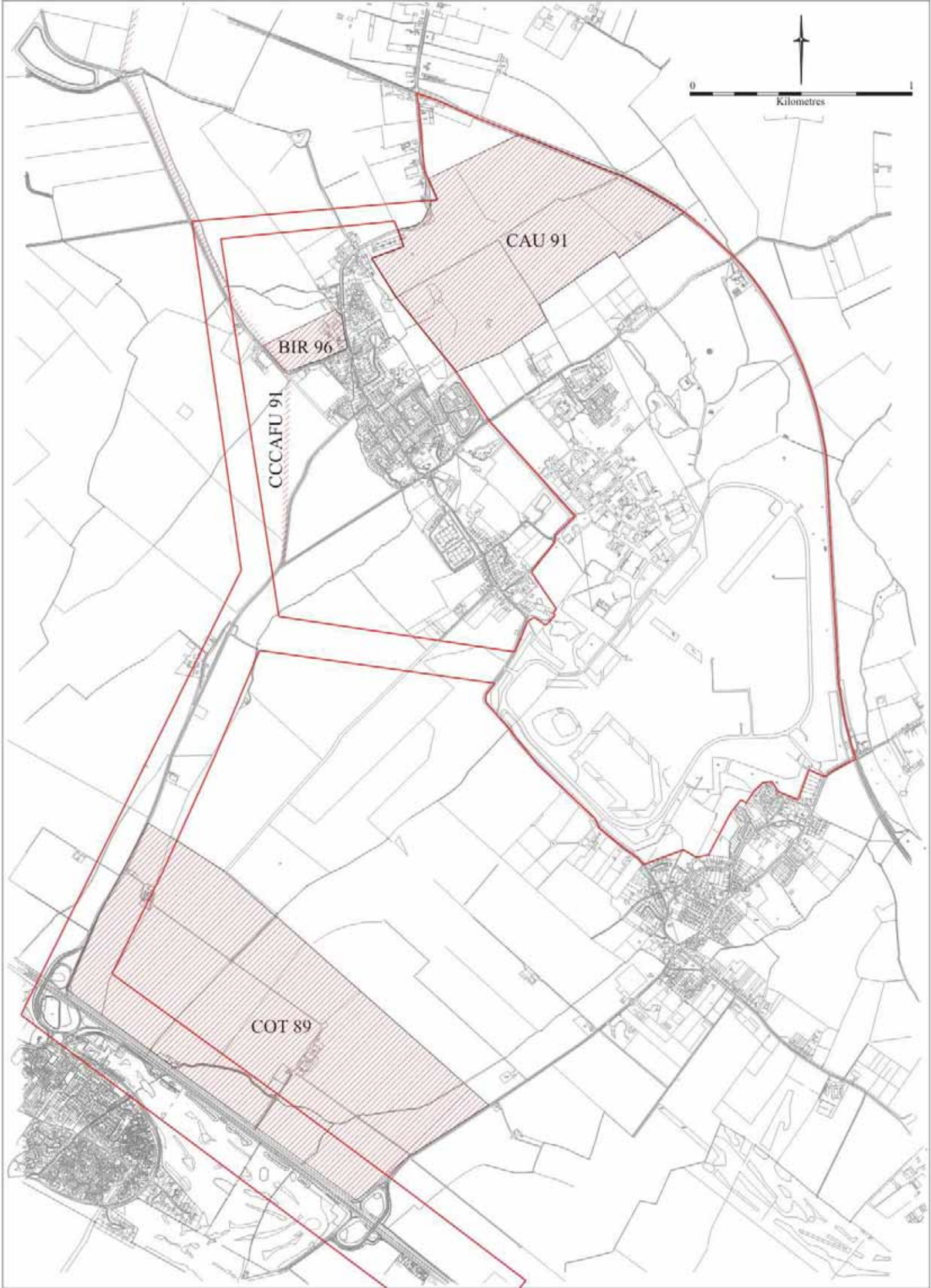
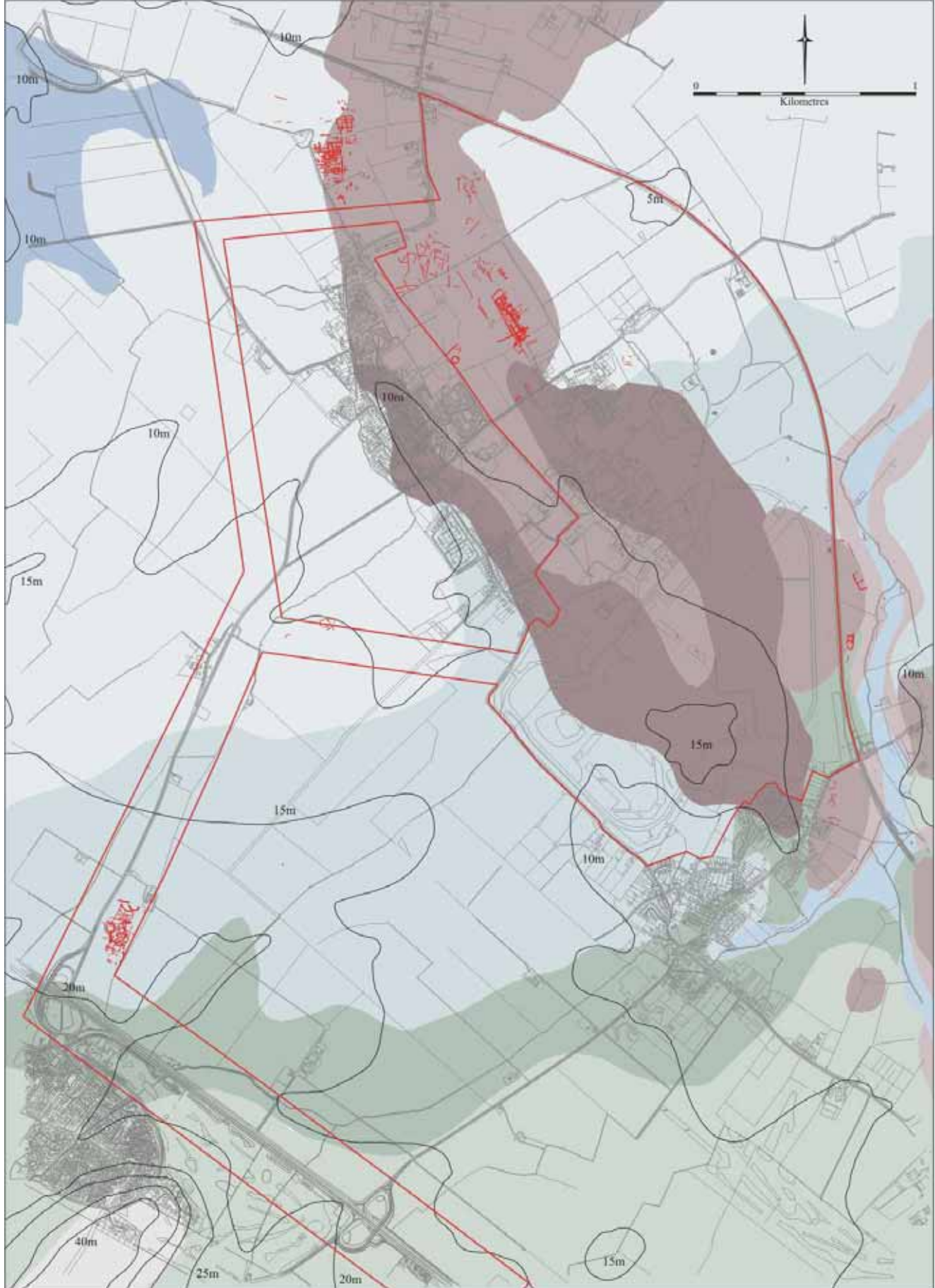


Figure 4: Archaeological Investigations



Legend

- | | | |
|--|--|---|
|  Alluvium |  4th Terrace Gravel |  Boulder Clay |
|  Alluvium on 2nd Terrace Gravel |  Greensand |  Gault |
|  2nd Terrace Gravel |  Amptill Clay |  Cropmarks |
|  3rd Terrace Gravel |  Kimmeridge Clay |  Settlement Area |

Figure 5: Geology

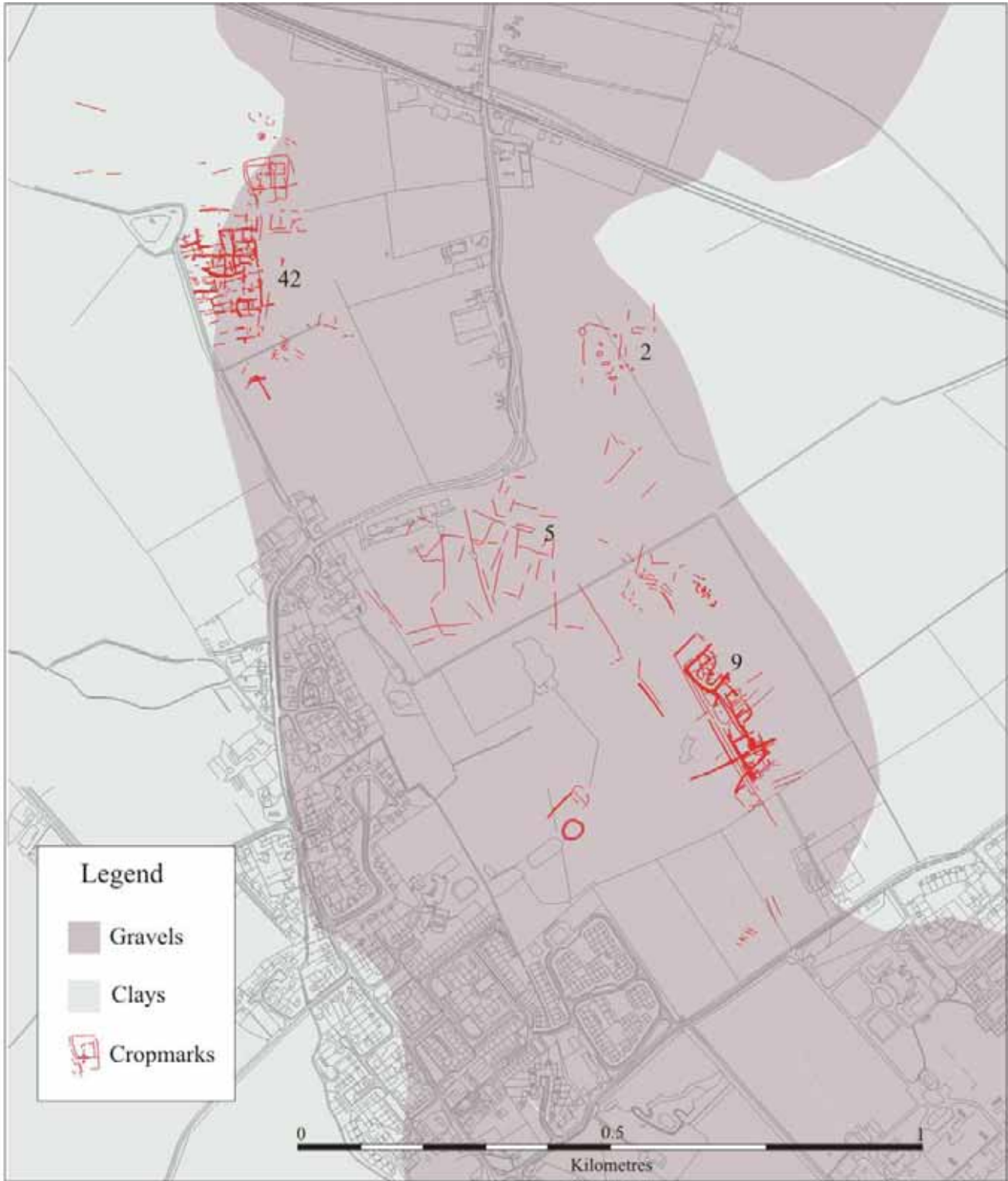


Figure 6: Cropmark Complexes

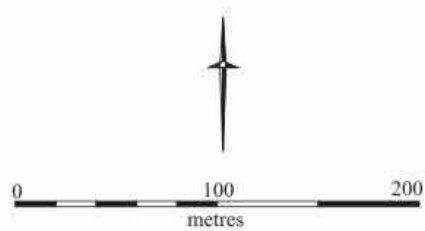
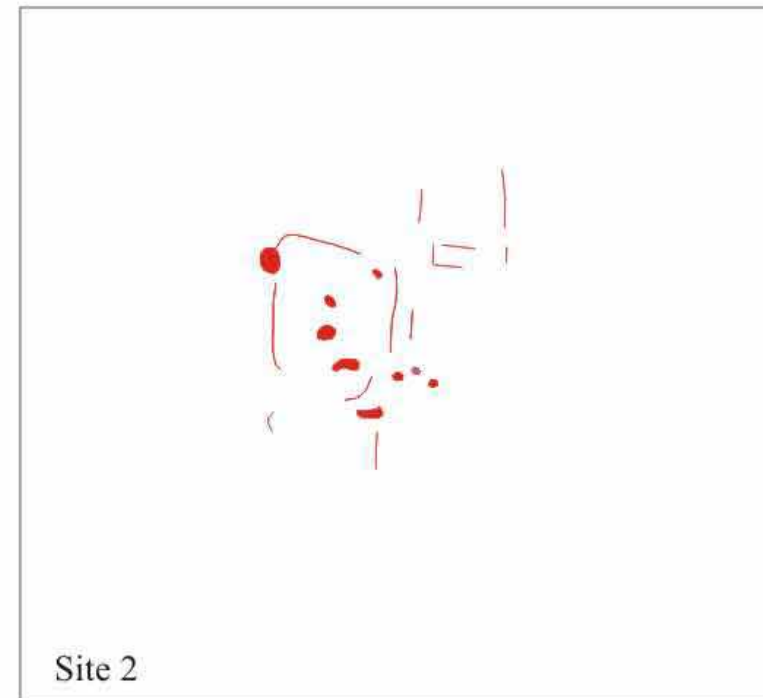
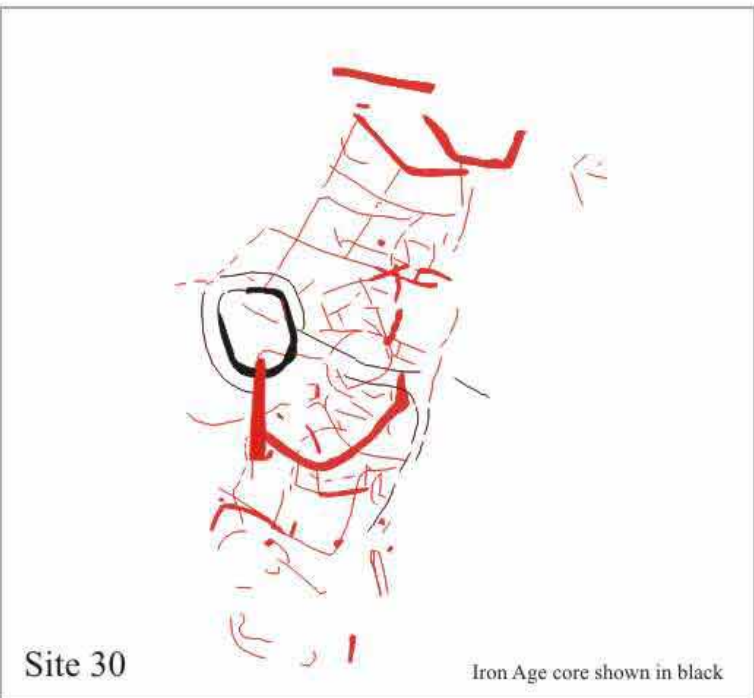
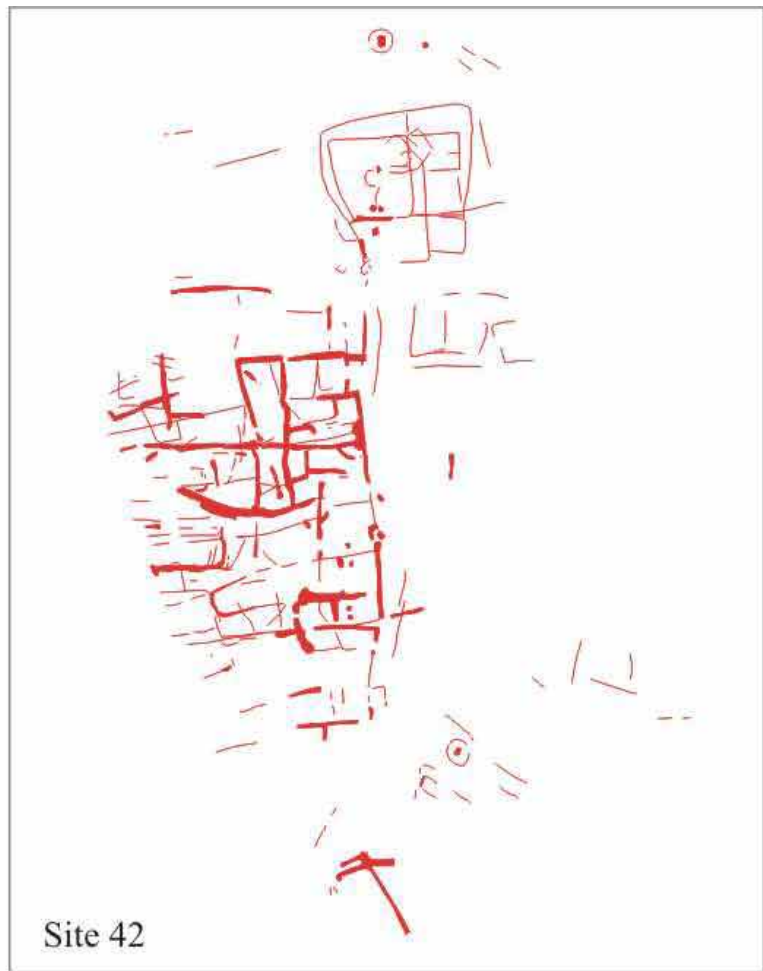
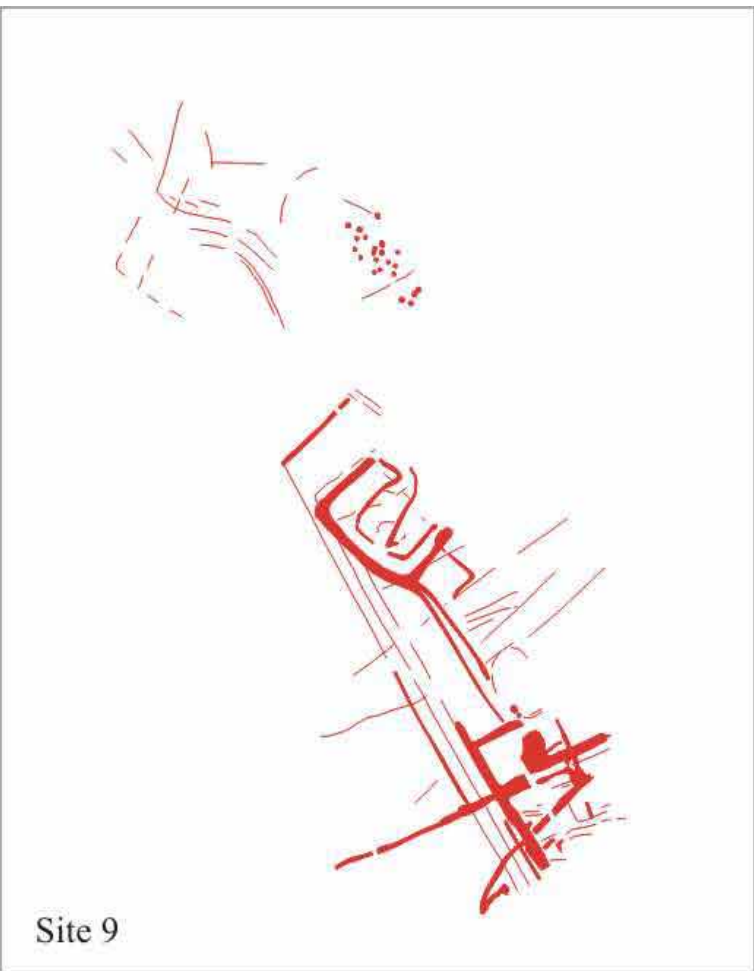


Figure 7: Comparative 'Early' Cropmark Sites

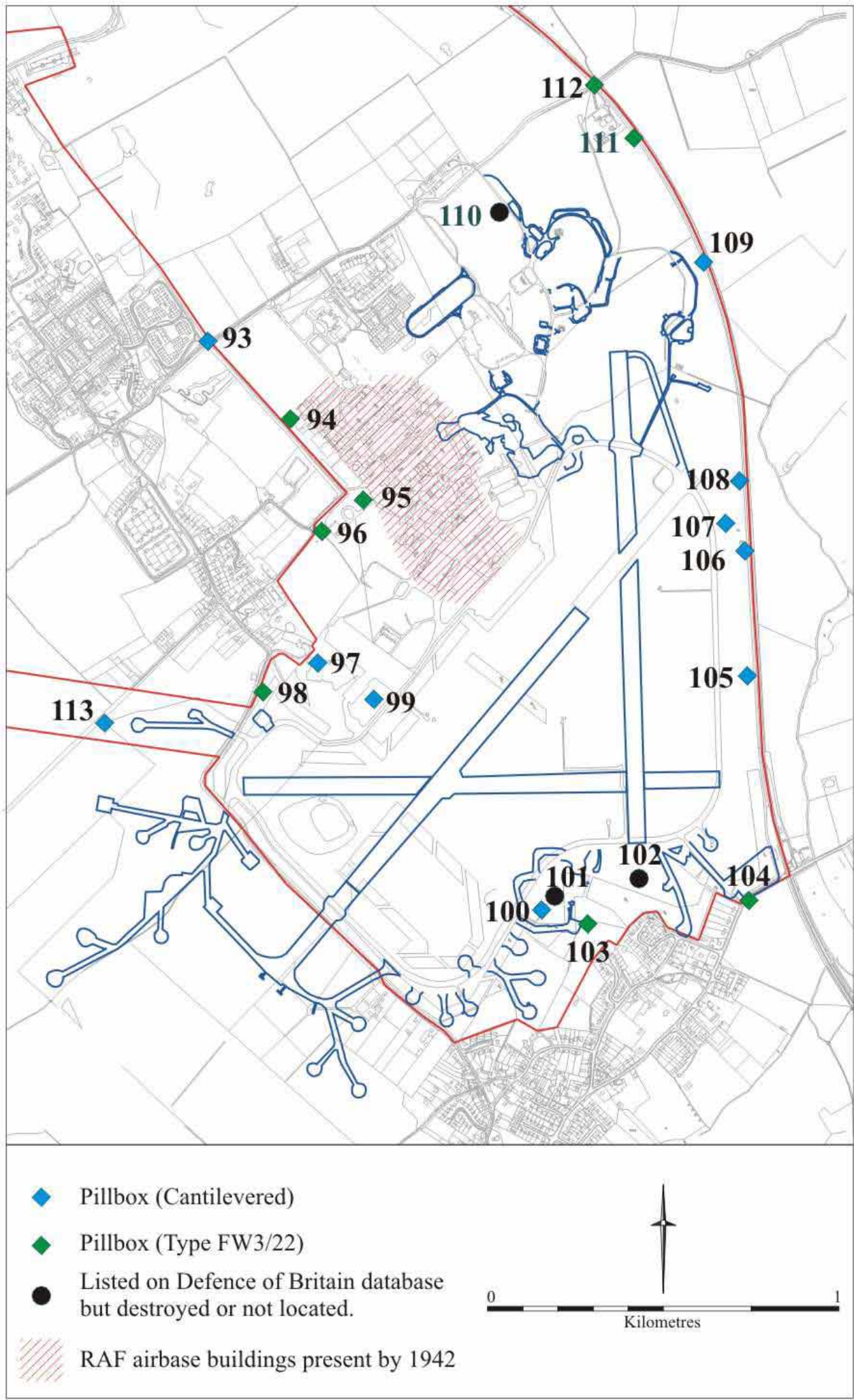


Figure 8: Air Field Features



Passage from buried shelter to pillbox 106



Pillbox 100



Stanton shelter by pillbox 100



Pillbox 108

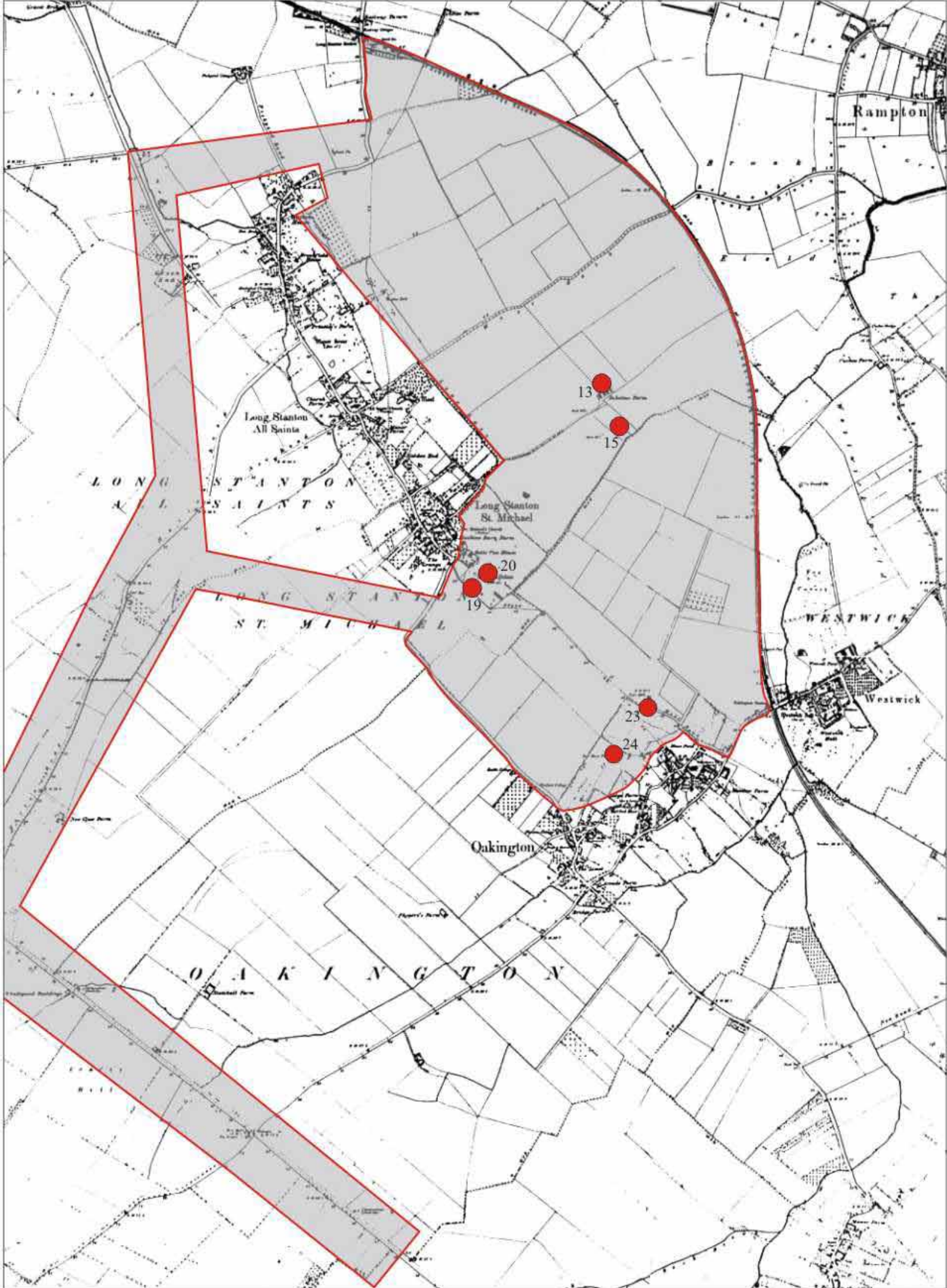


Figure 10 Ordnance Survey (1st Edition) 1886

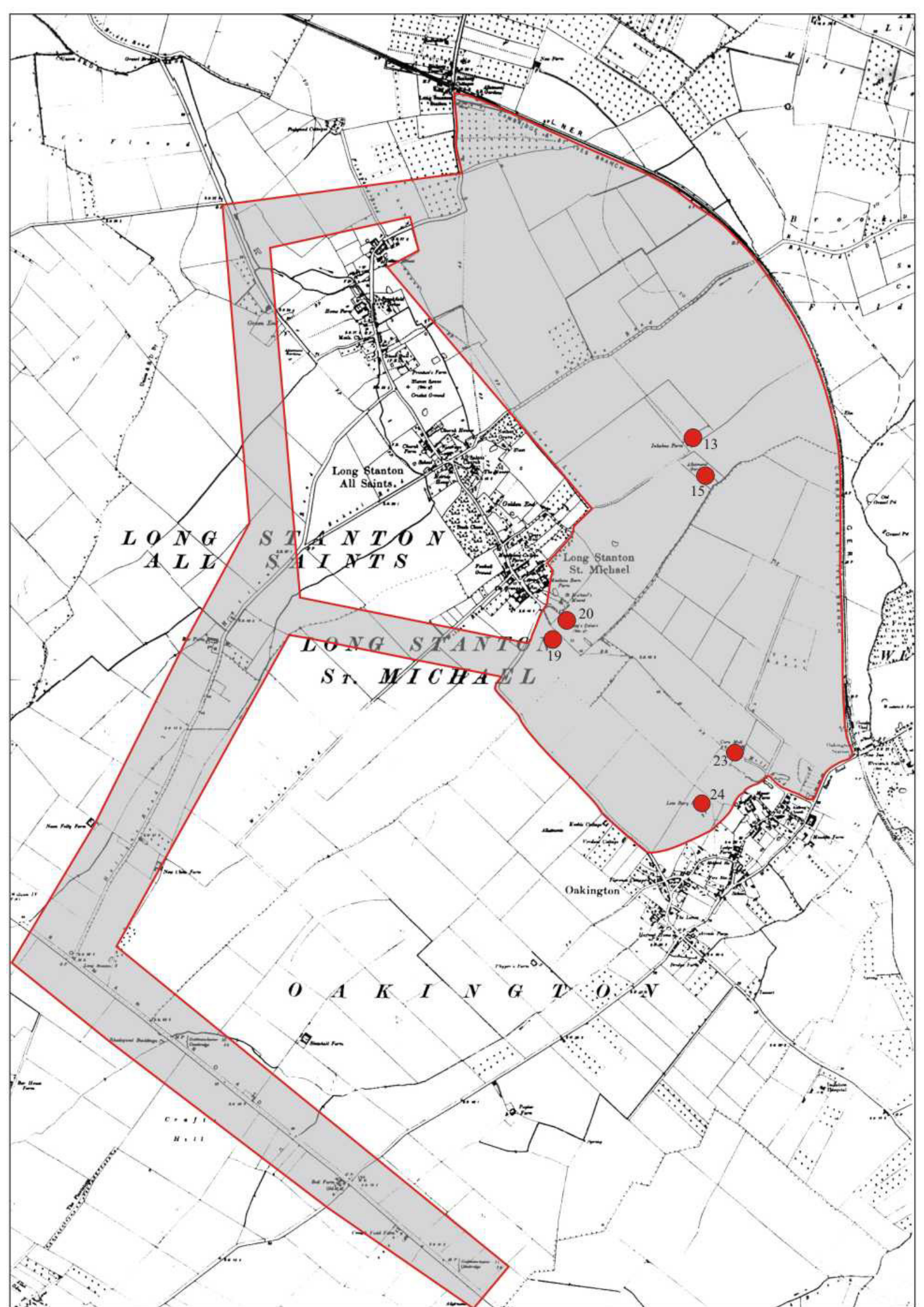


Figure 11 Ordnance Survey 1927

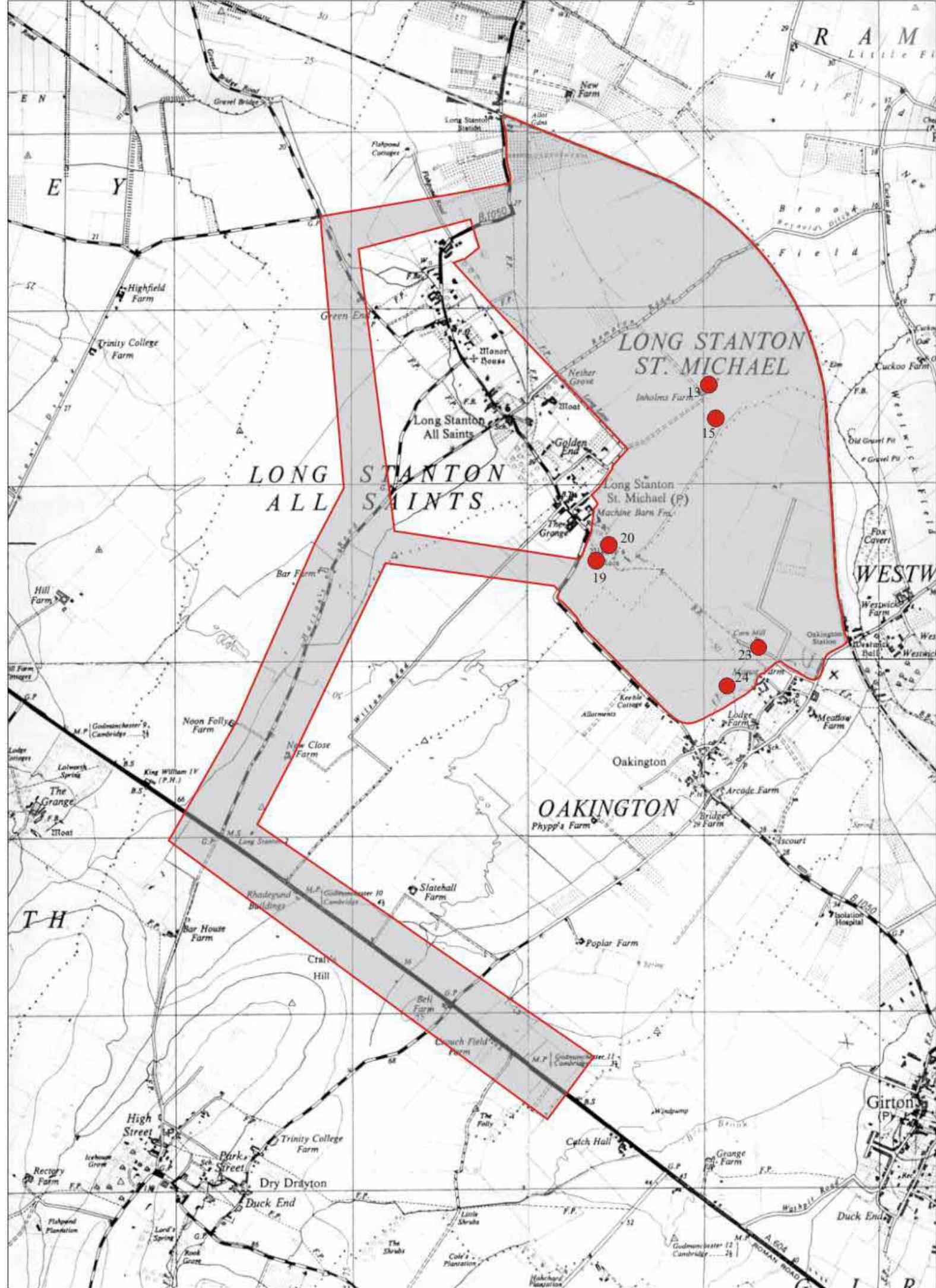
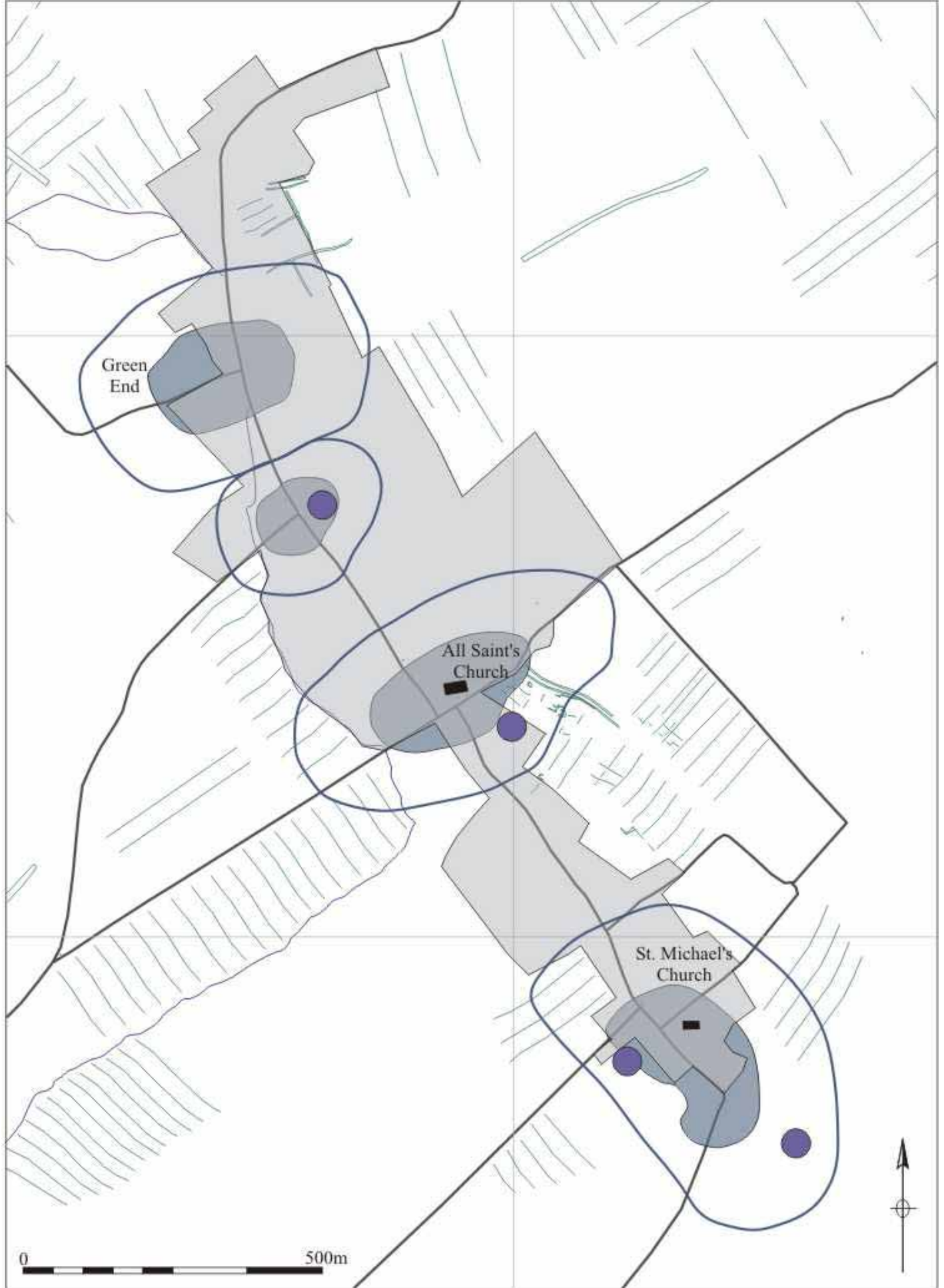


Figure 12 Ordnance Survey 1949







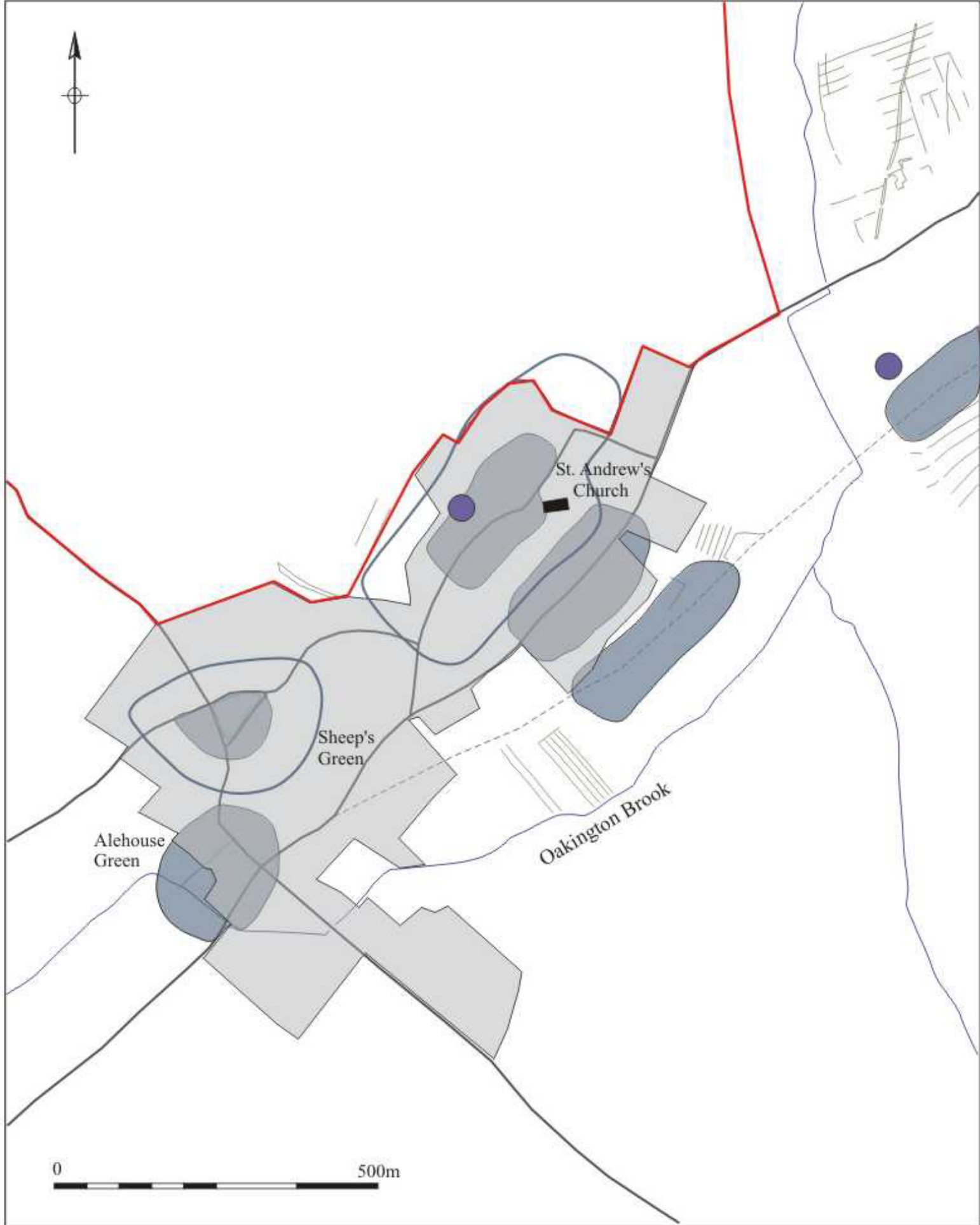
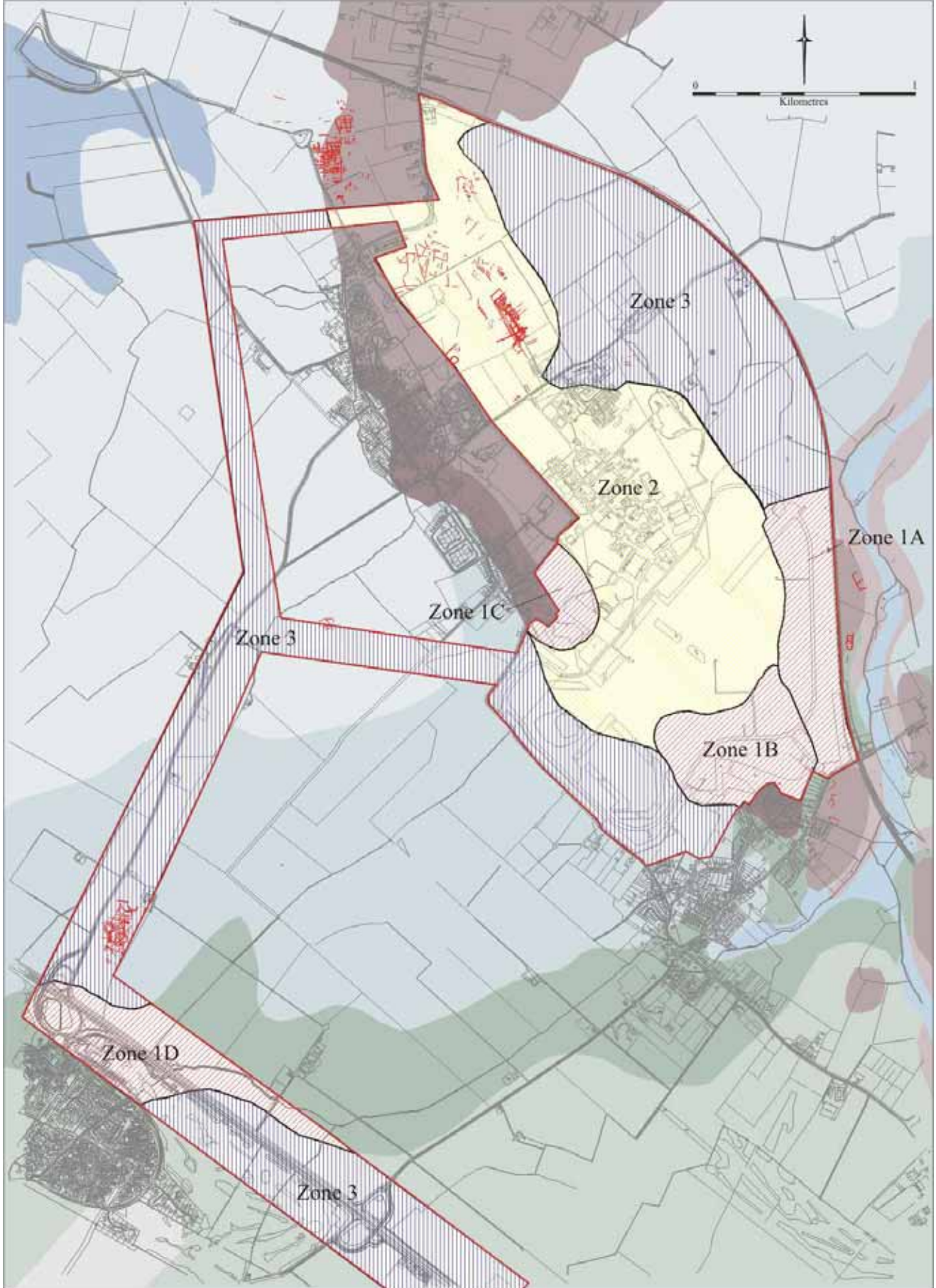
- | | |
|---|--|
|  Early Settlement |  Manor Houses |
|  Modern Village |  2x Expansion Zone (see text) |

Figure 13 Longstanton: Early Settlement (after Taylor 1998: 61)



- Early Settlement
- Manor Houses
- Modern Village
- 2x Expansion Zone (see text)

Figure 14 Oakington: Early Settlement (after Taylor 1998: 67)



Legend

- | | | |
|--------------------------------|--------------------|-----------------|
| Alluvium | 4th Terrace Gravel | Boulder Clay |
| Alluvium on 2nd Terrace Gravel | Greensand | Gault |
| 2nd Terrace Gravel | Amptill Clay | Cropmarks |
| 3rd Terrace Gravel | Kimmeridge Clay | Settlement Area |

Figure 15: Landscape Ranking