

*NORTHAMPTONSHIRE ARCHAEOLOGY
NORTHAMPTONSHIRE COUNTY COUNCIL
JULY 2002*

*RUSHDEN AND HIGHAM FERRERS BYPASS
SITE 3*

*POST-EXCAVATION ASSESSMENT
AND UPDATED PROJECT DESIGN*

CONTENTS

1	INTRODUCTION	5
2	BACKGROUND	5
3	CONSTRAINTS	6
4	SUMMARY OF ARCHAEOLOGICAL RESULTS	7
	General	7
	Phase 1: Iron Age roundhouses	7
	Phase 2: later Iron Age enclosure	7
	Phase 3: mid to late 1st century AD boundary ditches	8
	Phase 4: mid to late 1st century boundary ditches	8
	Phase 5: late 1st to early 2nd century ditches	8
	Phase 6: late 1st to early 2nd century ditches	8
	Phase 7: late 1st to early 2nd century ditches	9
	Post-Roman land use	9
5	RESEARCH AIMS	9
6	ASSESSMENT OF RESULTS	10
	Quantification of Archive	10
	Statement of Potential	11
7	UPDATED PROJECT DESIGN	21
	Overview and revised research aims	21
	Proposals for analysis	22
	Publication proposal	23
	Costs of Analysis, Report and Publication	24
	Key Personnel	25
	Timescale	26
	Archiving	28
	Future investigation	28
8	POPULAR REPORT	29
9	REFERENCES	30
	APPENDIX 1: SITES AND MONUMENTS RECORD GAZETTEER	32

Illustrations

Fig 1	Site Location
Fig 2	Geophysical survey results
Fig 3	Site plan: all features
Fig 4	Site plan: Phase 1
Fig 5	Site plan: Phase 2
Fig 6	Site plan: Phase 3

Fig 7 Site plan: Phase 4

Fig 8 Site plan: Phase 5

Fig 9 Site plan: Phase 6

Fig 10 Site plan: Phase 7

Fig 11 Map of archaeological sites in the vicinity (from Sites and Monuments Record)

**A6 RUSHDEN – HIGHAM FERRERS BYPASS, NORTHAMPTONSHIRE
SITE 3, IRON AGE AND ROMANO-BRITISH SETTLEMENT
POST-EXCAVATION ASSESSMENT AND UPDATED PROJECT DESIGN**

SUMMARY

Excavations ahead of road construction on the A6 Rushden and Higham Ferrers bypass examined part of an Iron Age and Roman site lying to the east of Higham Ferrers. The results suggest a complex series of settlement-related enclosures dating from the middle Iron Age through to the 2nd century AD. Abundant pottery and animal bone were recovered together with a small quantity of other finds and environmental remains.

This report presents a provisional site description, and includes a quantification and initial assessment of the evidence. It is suggested that further analysis will contribute to an understanding of Iron Age and Roman settlement in the region. Proposals for academic and popular publication reports are presented.

1 INTRODUCTION

1.1 Northamptonshire Archaeology undertook an excavation on part of an Iron Age and Romano-British settlement in March and April 2002. The work was undertaken on behalf of White Young Green, Consulting Engineers, as agents for the Highways Agency, and formed the final fieldwork stage in a programme of archaeological mitigation ahead of the construction of the new A6 Rushden – Higham Ferrers Bypass.

1.2 This report conforms to the requirements for the analysis and reporting of the archaeological findings as stipulated in the Archaeology Brief as part of the Conditions of Contract (Volume 2, particularly Section 2.5 and Appendix E), and which formed the basis of Northamptonshire Archaeology's Project Design, submitted with the tender for the archaeological works (A6 Rushden – Higham Ferrers Bypass Rescue Archaeology Works Project Design, January 2002).

2 BACKGROUND

2.1 The site lay within the corridor of the new road to the south of Newton Lane, Higham Ferrers

(NGR SP 967682). The land here is relatively level at c. 80 m OD and the underlying geology is Boulder Clay. The site had been the subject of three previous phases of investigation in which it had been designated Site 3. The investigations had been reported on in the following Northamptonshire Archaeology documents:

- *A6 Rushden and Higham Ferrers Bypass Detailed Archaeological Desktop Study*, October 1996
- *A6 Rushden and Higham Ferrers Bypass Archaeological Evaluation: Stage 2 Fieldwalking and Geophysical Survey*, February 1997
- *Additional Geophysical Survey at Site 3, A6 Rushden – Higham Ferrers Bypass*, July 2001
- *A6 Rushden-Higham Ferrers Bypass Site 3 Archaeological Trial Excavation*, October 2001

2.2 This earlier work identified a pattern of enclosure ditches and gullies dating substantially to the early Roman period, extending for about 100 m along the length of the road corridor and covering its full width. The picture obtained from the detailed geophysical survey (Fig 2) indicated that the density of ditches lessened towards the east, suggesting that the main focus of settlement lay to the west of the road corridor. The subsequent trial trench evaluation confirmed that the enclosures appeared to be settlement-related, but did not find any structures or industrial features. Iron Age pottery was also retrieved from the evaluation, although no securely Iron Age features were identified.

2.3 Following the initial site evaluations and recommendations by Northamptonshire Archaeology, the Highways Agency required the excavation of an area of 90 m x 60 m within the CPO boundary. Two additional trenches (each 30 m x 2 m) to the south of the excavation were opened in order to examine isolated linear anomalies identified in the geophysical survey (Fig 2)

2.4 The excavations were carried out in accordance with the Archaeology Brief (Appendix F: Specification for Strip Excavation).

3 CONSTRAINTS

3.1 There were no constraints upon the excavation other than the trees on the western side of the site in the corner of Field 3 (Fig 2). These were to be retained as part of the landscaping proposals and soil stripping stopped c. 5 m short of them in order to avoid damaging roots

4 SUMMARY OF ARCHAEOLOGICAL RESULTS

General

- 4.1 The excavations resulted in the recovery of 2678 sherds (41.8 kg) of pottery dating to the Iron Age and early Roman periods. Most of the wares of both periods appear to be of fairly local manufacture. There were also 13.5 kg of animal bone and a smaller quantity of fired clay, stone and other materials. The remains are generally indicative of a small farmstead of modest status.
- 4.2 The site showed a complex pattern of intercutting ditches (Fig 3). The individual ditch sections have been grouped into higher order features (DG1, DG2 etc.) The preliminary site phasing, based upon stratigraphic relationships and pottery dating, suggests about seven phases of ditch digging (Figs 4 - 10). The ditches formed boundaries to small fields and enclosures whose positions shifted over time. There were also a small number of pits, including one large pit which may have served as a waterhole, and a few post-holes.
- 4.3 The two additional trenches to the south of the main excavation revealed a shallow ditch on a NW-SE alignment in Trench 2, and a post-medieval stone field drain in Trench 1. The ditch would appear to relate to the later phases of enclosures in the southern area of the site.

Phase 1: Iron Age roundhouses

- 4.4 The earliest phase of the site is not closely datable, but features yielded exclusively hand-made pottery in the middle Iron Age tradition. The features include curving gullies which can probably be interpreted as eaves-drainage gullies surrounding roundhouses (Fig 4). These are the only evidence of structures on the site.
- 4.5 The most complete of the ring-gullies (RD1) lay adjacent to a boundary ditch (DG12) running NE –SW. This was truncated by later ditches here and it is not known if it was continuous. It is probable that other Iron Age features lay to the north of the excavated area, but all these ditches were very shallow and were not evident on the geophysical plot.

Phase 2: later Iron Age enclosure

- 4.6 In the late Iron Age occupation appears to have been focussed in a larger, ?sub-circular enclosure further south-west (DG1) defined by a deep ditch (Fig 5). This was infilled during this phase and a stone surface laid over the eastern arm of the ditch. The purpose of this is not known. The NE-SW boundary ditch continued to be defined with perhaps two further

episodes of digging.

Phase 3: mid to late 1st century AD boundary ditches

- 4.7 By the later 1st century, the site was characterised by ditches of a more rectilinear character (Fig 6). The earlier enclosure (DG1) had gone out of use and the main axis of land division was defined by DG3, running NW-SE. The staggered ditch alignment to the north-east seems to be pre-figured by shallow segments of gully which were largely truncated by later digging.

Phase 4: mid to late 1st century boundary ditches

- 4.8 The main NW-SE land division was re-dug (DG2) and there also appears to have been redefinition of the staggered ditch alignment to the north-east (Fig 7). At this time there may have been some activity to the south with the laying out of some of the early-phase gullies. This included the deposition of a number of semi-complete vessels in gully 1122.

Phase 5: late 1st to early 2nd century ditches

- 4.9 After DG2 had gone out of use, a large pit, possibly a well (1323), was dug through the backfill (Fig 8). This contained exclusively late 1st/early 2nd-century pottery and does not appear to have been in use for very long. It was about 1.6 m deep. There was no waterlogging in its base and it is unclear whether it had been dug as far as the watertable.

- 4.10 The minor gullies to the north were replaced by a much larger staggered ditch system (DG6). There appear to have been two phases of this ditch. Five semi-complete vessels were recovered from ditch section 1262. There appears to have been a focus of activity in the southern part of the site, with a complex of shallow gullies forming small rectangular enclosures. A semi-complete vessel also came from gully 1207. A number of shallow pits also appear to belong with this phase.

Phase 6: late 1st to early 2nd century ditches

- 4.11 The shallow-ditched enclosures in the southern part of the site were replaced by DG7 (Fig 9). This was more substantial (about 0.8 m deep) and seemed to have followed the earlier ditches to create a staggered alignment. It may have been contemporary with DG 11 which formed three sides of an enclosure. The northern and western arms were substantial (1.6 m deep), while the southern arm was much shallower. The 'well' may also have been in use in this phase, together with a few other pits and the later phase of the eastern group of ditches.

episodes of digging.

Phase 3: mid to late 1st century AD boundary ditches

- 4.7 By the later 1st century, the site was characterised by ditches of a more rectilinear character (Fig 6). The earlier enclosure (DG1) had gone out of use and the main axis of land division was defined by DG3, running NW-SE. The staggered ditch alignment to the north-east seems to be pre-figured by shallow segments of gully which were largely truncated by later digging.

Phase 4: mid to late 1st century boundary ditches

- 4.8 The main NW-SE land division was re-dug (DG2) and there also appears to have been redefinition of the staggered ditch alignment to the north-east (Fig 7). At this time there may have been some activity to the south with the laying out of some of the early-phase gullies. This included the deposition of a number of semi-complete vessels in gully 1122.

Phase 5: late 1st to early 2nd century ditches

- 4.9 After DG2 had gone out of use, a large pit, possibly a well (1323), was dug through the backfill (Fig 8). This contained exclusively late 1st/early 2nd-century pottery and does not appear to have been in use for very long. It was about 1.6 m deep. There was no waterlogging in its base and it is unclear whether it had been dug as far as the watertable.
- 4.10 The minor gullies to the north were replaced by a much larger staggered ditch system (DG6). There appear to have been two phases of this ditch. Five semi-complete vessels were recovered from ditch section 1262. There appears to have been a focus of activity in the southern part of the site, with a complex of shallow gullies forming small rectangular enclosures. A semi-complete vessel also came from gully 1207. A number of shallow pits also appear to belong with this phase.

Phase 6: late 1st to early 2nd century ditches

- 4.11 The shallow-ditched enclosures in the southern part of the site were replaced by DG7 (Fig 9). This was more substantial (about 0.8 m deep) and seemed to have followed the earlier ditches to create a staggered alignment. It may have been contemporary with DG 11 which formed three sides of an enclosure. The northern and western arms were substantial (1.6 m deep), while the southern arm was much shallower. The 'well' may also have been in use in this phase, together with a few other pits and the later phase of the eastern group of ditches.

Phase 7: late 1st to early 2nd century ditches

- 4.12 Activity appears to have been confined to the south-east corner of the site by the 2nd century (Fig 10). Ditch DG8 was a shallower re-cut of DG11, which continued south-west rather than turn like the earlier ditch. Its corner was cut by a slightly deeper pit.

Post-Roman land use

- 4.13 There was no evidence of occupation after the 2nd century and settlement is assumed to have shifted elsewhere. In the post-Roman period the land appears not to have been favoured for settlement. There is evidence of medieval ridge and furrow cultivation (clearly evident in Field 3 – Fig 2), and in more recent times there have been repeated attempts to drain the land. Three or more phases of land drains found during the excavations (Fig 3).

5 RESEARCH AIMS

- 5.1 Research aims for the Iron Age and Roman periods have been addressed in drafts of the continuing county and regional papers prepared as part of the East Midlands Archaeological Research Frameworks Project (Kidd, 1999.; Taylor, in prep., Willis, in prep.).
- 5.2 The Iron Age (c 700 BC – AD 50) is characterised by an increasing large scale organisation of the landscape in comparison with earlier periods, related to an expansion of settlement and agricultural production. Sites become increasingly frequent from at least the middle Iron Age (c 450 BC) onwards and are more commonly found on claylands. There is also a multiplicity of settlement forms such as enclosed, open and agglomerated settlements. Despite the increased numbers of sites, however, there is a general lack of precision on their dating and with regard to their social and economic significance
- Iron Age pottery forms are often long-lived and not chronologically diagnostic. It has been said that the middle Iron Age is as much a cultural phenomenon as a chronological entity (Willis, in prep.), with pottery types extending into the 1st century AD in parts of the East Midlands.
 - Environmental and economic data for Iron Age sites is not abundant in Northamptonshire, and the economic orientation of sites is often unclear, particularly on the claylands. There is some suggestion that more marginal sites may have only been occupied seasonally.
 - The significance of particular settlement forms and their social implications are not well understood. This applies to houses and other constructions, the layout of enclosures and

fields, and the way these elements developed and interacted as a whole.

- 5.3 There are many aspects of Iron Age landscape which appear to continue into the Roman period (c. AD 50 – 400), but in other respects there were radical changes. The specifically Roman developments of the immediate area include the nearby town at Irchester and the villa estate at Stanwick. The extent to which a distinctly Roman system of organisation affected or transformed the pre-existing Iron Age situation is one of the major topics of debate for this period. Concomitant with this is the need to examine whether social forms, expressed through structures such as roundhouses, and other aspects of material culture and belief, continued from Iron Age antecedents or were replaced. The distribution and organisation of industry, particularly with regard to pottery and iron production is also a key research theme (Taylor, in prep.). In particular there is a need to look at processes of production through to final distribution, and to address topics such as the social context of production.

6 ASSESSMENT OF RESULTS

Quantification of Archive

Numbers in brackets indicate quantity from evaluation phase

<i>Records</i>	<i>Quantity</i>
Contexts	358 (+ 44)
Plans	10 (+ 5)
Sections	80 (+ 4)
Colour transparencies	114 (+ 18)
Monochrome prints	111 (+26)
<i>Artefacts</i>	<i>Quantity</i>
Pottery	2678 (+ 32) sherds; 41.80 (+ 0.45) kg
Fired clay	1.14 (+ 0.09) kg
Tile	8 (+1) fragments; 0.17 (+ 0.15) kg
Brick	1 fragment ; 0.20 kg
Stone	1 (+1)
Flint	5 fragments

Coins	1
Copper alloy brooches	2
Other copper alloy objects	6
Iron objects	4
Glass objects	2
Iron slag	0.06g
<i>Environmental</i>	<i>Quantity</i>
Human bone	2 fragments
Animal bone	2 boxes; 13.4 (+0.35) kg
Soil samples	13
Shell	0.06g

Statement of Potential

6.1 This section comprises a summary statement of the value of the data gained in the excavation for addressing the research aims of the investigation. It starts with an assessment of the site as a whole, and then provides assessments of the individual classes of finds.

The Site

6.2 The provisional phasing of the site, using stratigraphic data and spot-dating provided by the pottery, indicates that the sequence of activities is reasonably clear. There are many intercutting features providing a good relative chronology, although it is possible that resulting re-deposition of material will have lessened the site's chronological clarity to some extent.

6.3 The main disturbances to the site come from the intrusion of modern land-drains which have made some archaeological relationships obscure. The site has also been truncated vertically by ploughing, although this does not appear to have been of more than average severity.

6.4 The chief drawback to an understanding of the site is the limited area exposed. The main area of settlement appears to have been to the west of the excavations, and the enclosures and other features are difficult to interpret in terms of function. There would also appear to be a significant chance of a focus of Iron Age settlement to the north or north-east, a pattern which was not evident from survey before the site was stripped.

- 6.5 The limited range of features, and the absence of interpretable structures, would also appear to restrict interpretations which can be placed upon the site.

Pottery

Introduction

- 6.6 The archaeological work resulted in the recovery of some 2678 sherds of pottery (41.8 kg) accompanied by a small amount of fired clay. The pottery includes material of middle Iron Age through to early 2nd century with just two post-medieval pieces recovered from the topsoil. Sherds were recovered from some 111 individual contexts comprising some 83 features, some of which can be grouped together.
- 6.7 For the most part the sherds were well preserved with an overall average sherd size of 15 g. There were many instances of joining sherds and a number of complete profiles could be reconstructed. The earlier material was less well preserved and featured pieces were sparse.
- 6.8 The range of fabrics present was relatively restricted with some types, notably the shelly wares, spanning the Iron Age and Roman periods. For the purposes of the assessment the material was broadly sorted into fabric types on the basis of the main inclusions in the clay and recorded by count and weight for each recorded context. A database summarising the main fabric groups along with a provisional date for each context is retained in archive.

Iron Age

- 6.9 At least 308 sherds can be dated to the Iron Age period. These mainly comprise shelly wares, limestone-tempered ware and grog and shell or limestone tempered material. These appear to be spread across some 19 features mainly concentrated in the north-west area of the site including pits, ditches and round house gullies. The assemblage comprises plain wares, mainly jars. Only two sherds were decorated; two rimsherds had finger depressed rims, (1029) and (1049). There were no fine wares present. Some vessels showed vertical streaking or scoring, a trait typical of MIA pottery. One rim from (1277) comes from a slightly ovoid jar again typical of the MIA. The use of finger-tip decoration is more typical of the early Iron Age period but the presence of vessels with this style of decoration have been noted in the middle Iron Age assemblage from Twywell (Jackson 1975, 70) so the tradition may continue slightly later in this region.
- 6.10 The large circular enclosure (DG1) in the south-west area of the site produced a small assemblage of just eight sherds from 1251. These included a rim from a large storage jar.

Provisionally this feature would appear to be later in date than the roundhouses to the north. Other features which appear to date to the later Iron Age on the basis of grog-tempered wares typical of the early 1st century AD include pits 1293 (1294), 1313 (1314) ditches 1310 (1297), 1155 (1156) (1224), gullies 1147, 1149 (1150). A fragment of a possible shale vessel base also came from (1156).

Roman

- 6.11 The bulk of the assemblage appears to date to the early Roman period. There are a few imports to the site, mainly South Gaulish and Central Gaulish samian of which there were 13 sherds and a single colour-coated beaker sherd possibly a Gaulish import. Amongst the samian is a stamped Dragendorff 18 platter from (1327). The stamp is probably that of Germanus from La Graufesenque placing the date of manufacture of the vessel between AD 70-85. Although it is interesting to note its presence, the samian forms less than 1% of the total assemblage and is unaccompanied by other imports such as amphorae and mortaria. This suggests a relatively modest status site. There are very few regional imports to the site most of the wares appearing to be of relatively local manufacture.
- 6.12 The earlier Roman features can probably be distinguished by the absence of grey sandy wares which are presumably a feature of the later 1st or early 2nd century. Grog-tempered wares accompanied by shelly wares are a feature of the late Iron Age and early Roman period.
- 6.13 The post-conquest assemblage includes local copies of butt beakers and platters similar to those found at nearby Rushden although there are no exotic painted wares present in this assemblage comparable with those from Rushden (Wood and Hastings 1984). Two finewares of note include a bobble beaker from (1172) and a sherd with incised compass-style decoration from (1121). A small amount of fine white sandy ware, probably flagon, may also be imported into the site.
- 6.14 A sandy grog-tempered ware dominated the assemblage with oxidised and white fired sherds, the latter often with a black exterior. The fabric is well-known in the region being present on most early Roman sites, for example, the recent A43 sites, which included a kiln producing a very similar ware at Brackley Hatch and Ashton. A particularly well preserved group of material was recovered from gully 1262 (1263) which included at least five complete profiles. Of particular note is a closed form base from this gully with a cross in relief on the underside for which the author can recall no parallel. The average sherd size for this group is 23 g, considerably higher than the site average. Further semi-complete vessels were also present in

[1122] (1123) and gully 1207 (1208)

Conclusions

- 6.15 It is clear that the site has undergone a number of changes in a relatively short time span. The earliest datable material appears to be middle Iron Age. It is slightly unclear whether the site shows complete continuity of use or whether there is a slight hiatus in the ceramic record between the middle and latest pre-Roman Iron Age. The most intense use of the land on the basis of the ceramic evidence comes in the later 1st and early 2nd centuries AD. There is no late Roman material present suggesting a shift in focus by the later Roman period and a likely abandonment of this area by the mid 2nd century or earlier. The quality and range of material suggests a relatively modest agricultural settlement with some access to imported goods.

The flint

- 6.16 A total of five pieces of flint was recovered, comprising three flakes, a shattered pebble and a small core (with later damage). The flakes and the shattered pebble could all derive from fortuitous accidental striking, and the two large flakes are both from nodules evidently exposed to surface weathering. The small pebble core has a single platform and has been subsequently shattered, perhaps suggesting that it is a residual find derived from earlier activity.
- 6.17 This small assemblage requires no further work.

Catalogue of flint

1167	2 large flakes (from weathered nodule)
1232	flake
1326	core (single platform), later damage
1327	Shattered pebble

Other Finds

Introduction

- 6.18 The excavations produced a collection of finds of the late Iron Age/early Roman and post-medieval periods. Mainly Roman finds are represented, the datable objects providing a date range of late 1st century through to the late 2nd century. There is little to characterise the nature of the settlement, most of the finds appear to be small items which may have been casually lost. Most came from the southern area of the site where the 1st – 2nd century occupation was

concentrated, although small quantities of fired clay and daub were retrieved from a wider area of the site, including the Iron Age occupation to the north.

Quantity of material

- 6.19 There were 16 individually recorded small finds, together with quantities of ceramic tile, fired clay, slag and flint recorded under the bulk finds system. All the common materials are represented. There are no objects of gold or silver. The finds are quantified in the table above (Quantification of Archive)

Data collection

- 6.20 All finds were recorded on site manually following NA guidelines. Most of the finds were recovered by hand, while three objects were located by a metal detector. Metal detectors were used in advance of machining, and at regular intervals through the excavation, by undertaking the systematic coverage of the exposed surface of the site and scanning the spoil heaps. The position of all excavated finds was recorded by three-dimensional co-ordinates, and the metal detected finds were given co-ordinates where possible.
- 6.21 A basic catalogue has been compiled, comprising material type and object identifications, together with stratigraphic information. All finds have been boxed by material type, in numerical small find order

Condition

- 6.22 The copper alloy is in a stable condition, and no further work is required. The ironwork is in a reasonable state of preservation, much of it is encrusted in corrosion products and some of the items are impossible to identify. No waterlogged organic material was found.

Copper alloy objects

- 6.23 With the exception of a single coin, identifiable objects are represented by items of jewellery miscellaneous fragments and an unidentifiable fitting. A Denarius of Septimius Severus (193-211AD) was retrieved using a metal detector from the surface of Ditch 1143 (DG2). Items associated with personal ornament include two brooches and a finger ring. The brooches both date from the late first century, they are represented by a penannular brooch with coiled terminals, complete with a pin, and a fragment of a fibula (head, side wings and part of bow). The remains of an axis bar are still housed within tubular wings and the bow is decorated with a central longitudinal rib, ornamented with equidistant transverse notches. The finger ring is complete, the bezel comprises a crude stylistic representation of two opposing snakes heads; a

symbol of health and healing, rebirth and the spirits departed (Johns 1998/2000, 7). This came from Gully 1122 associated with several semi-complete pottery vessels. Other objects worthy of note include part of an octagonal stud with raised edge/rim and a circular keying cup at the centre, suggesting that it had once been decorated with glass (metal-detected find). There was also an unidentifiable fitting decorated with ring and dot motifs (unstratified).

Iron

- 6.24 There are four iron objects, two undiagnostic rod fragments, an iron nail (Manning Type 3, 1985, R99), and part of a Georgian shoe buckle. No further work is required.

Glass

- 6.25 There are two small undiagnostic fragments of blue/green vessel glass, both from late phase ditches. No further work is required.

Stone

- 6.26 There is one rectangular-shaped piece of cut marble and a pounding/grinding stone with pecked terminal. Both came from ditches. To this can be added a quernstone recovered in the evaluation.

Fired clay

- 6.27 In total there are 108 fragments of fired clay weighing 1.350 kg. Much of the assemblage comprises amorphous and abraded fragments which cannot be attributed to structural features. A small number of fragments retain one or more smooth surfaces, some visibly burnt, suggesting that they may relate to the use of ovens, while others retain organic impressions. The material was distributed generally about the site. No further work is required.

Ceramic roof tile

- 6.28 There are seven abraded fragments of post-medieval roof tile, all were retrieved from post-medieval features. No further work is required.

Shell

- 6.29 Two oyster shells and one bivalve were retrieved from 1st-century features.

Potential

- 6.30 The assemblages are of some interest but have little potential for a great deal of further analysis. Two of the copper alloy objects would repay further research to identify them. The marble is

also of interest and its provenance may be identifiable.

Slag

6.31 The excavation produced a very small quantity of iron slag, total weight c.80g, from four contexts (1037, 1150, 1277 & 1343). This is too small a quantity to indicate that iron working had any significance in the economy of the settlement, although iron smithing may have been practised on a small scale.

6.32 No further work is required

Economic and environmental indicators

6.33 Thirteen soil samples were hand collected from the site. Ten litre sub-samples of each sample were processed using a siraf tank fitted with a 500micron mesh and flot sieve. The resulting flots were examined under a microscope. Frequencies of charred plant remains and snails were estimated but not quantified in detail.

Results

6.34 Samples 3 (context 1304) and 10 (context 1326) were sterile.

6.35 For the remaining 11 samples charcoal, charred seeds and snails were recorded. Preservation was fairly good with little fragmentation and surface abrasion.

Ecofacts by sample

No.	Context	Vol	Feature	Phase	Charcoal	Cereal	Chaff	Other seed	Snails
1	1294	20	Ditch 1293	3		***		*	*
2	1307	20	Ditch 1067	4	*	*			
4	1120	10	Pit 119	5	*	**	**		
5	1341	20	Ditch 1340	6			*		***
6	1064	20	Ditch 1038	6/7		*			****
7	1327	20	Well 1323	5/6		**	*		
8	1192	20	Ditch 1191	6		**			
9	1325	20	Well 1323	5-6			**		***
11	1343	15	layer	2-3	**			*	
12	1356	15	Ditch 1358	2		*			*
13	1263	10	Gully 1262	5		**			*

Key *Occasional (1-10) **moderate (10-20) ***Frequent (20-40)
**** very frequent (40+)

- 6.36 The snail species present included *Bithynia*, *Pupilla muscorum*, possibly *Succinea putris*, *Cochlicopa Lubrica/lubricella* and *Vitrea* sp?
- 6.37 The cereal species included naked barley (*Hordeum vulgare*), spelt (*Triticum spelta*) and breadwheat (*Triticum aestivum*). The wild/weed species included cleavers (*Galium aparine*), nipplewort (*Lapsana communis*), fat hen (*Chenopodium album*), buttercup family (*Ranunculaceae*), pink family (*Compositae*) and possible alder (*Alnus* sp).

Discussion

- 6.38 Snails where identified to species appear to suggest moist conditions although further identification and quantification would be required for confirmation.
- 6.39 The cereals present are typical Iron age/Roman crops. The wild/weed species present are typical crop weeds and plants of disturbed ground, although fat hen can be ground for flour and nipplewort has several medicinal uses.

Potential

- 6.40 The charcoal present is too fragmented for further identification.
- 6.41 Only one sample of apparently secure late Iron Age date produced ecofacts. The value of further analysis would be limited to demonstrating the presence of various cereals during this period. However, the general lack of samples and low frequencies of cereals from the late Iron Age for the region (Willis in prep.) suggest that further work would yield useful results.
- 6.42 Several samples of Roman date produced enough material to suggest that further processing and analysis would provide meaningful information about the arable economy of the site (eg. dominant crop, crop-processing stage). The importance of this work lies in the fact that for the Roman period smaller rural sites have previously been neglected (Taylor 2001).

Animal bone

Method

- 6.43 13.483 kg of animal bone from 86 contexts was scanned rapidly to gain an idea of the species present, the state of preservation and the potential for further analysis.

Preservation

- 6.44 Surface abrasion was low and fragmentation was average. Burning was low with only 7 examples noted suggesting this was not the preferred method of disposal. Canid gnawing was very low with only three instances observed. Only a single occurrence of butchery was noted. The low level of canid gnawing and surface abrasion suggests burial rapidly followed discard.

The species present

Summary of species

<i>Equus</i>	<i>Bos</i>	<i>Ovicaprid</i>	<i>Sus</i>	<i>Canis</i>
13	47	32	5	3

- 6.45 The assemblage appeared to be dominated by cattle followed by ovicaprid (sheep/goat) with smaller numbers of horse. Pigs and dogs are present in very low frequencies only. However, the exact frequency of species remains to be confirmed. No neonates were noted. A single pathology was noted. A range of body parts was seen although elements with low meat yields seem to be dominant however this remains to be confirmed. A partial dog skeleton was seen in context 1068 (ditch) with adult dentition present.

Discussion

- 6.46 The species present are typical for both Iron Age and Roman periods (Kidd 1999). The order of dominance (cows followed by sheep/goats) is also expected in both periods. Again, the dog burial is also typical as several instances of canine burials near farmsteads are recorded (e.g. Cram 1978). The absence of wild species suggests little reliance on local game resources. The lower frequencies of horse and dog reflect their more usual status of work and companion animals during the later Iron Age/early Roman periods. The relative low occurrence of pigs could be due to preservation bias as pig remains are less durable than those of cow (Stallibrass 1985).
- 6.47 The assemblage is particularly important as only a small amount of excavation has been published for the middle Iron Age in particular (Willis in prep.). In terms of the Iron Age in general the assemblage would provide the opportunity to study material from a period where previously the amount of bone recovered has been low (Willis in prep.). It would also contribute to the recently expanding corpus of knowledge of Iron Age faunal studies. Finally for the Roman period the assemblage's importance lies in the fact that Roman rural farmsteads and their associated enclosures have been previously overlooked (Willis in prep.). Therefore an opportunity to study material from a lesser-documented site type is presented.

Potential

- 6.48 This appears to be a domestic assemblage typical in its range of species with potential for further analysis. Approximately 50-60 % of the assemblage would be identifiable to species level. This would be enough material to confirm or overturn the estimated (see above) frequencies and to give some idea of herd structure. This in turn would allow for basic comparisons with other sites.
- 6.49 The material was collected from features covering the middle Iron Age to early Roman periods. This would allow for some temporal analysis. Any changes from the Iron Age into the Roman period could be investigated. Does the site show continuity from the Iron Age as is often the case with small “native “sites (Condrón 1995) or can some evidence of Romanization be detected (e.g. higher percentages of cattle and lower of sheep in the Roman period and a possible increase in horse numbers)?
- 6.50 Material was collected from a range of features therefore spatial analysis could be undertaken. This analysis could help to establish where butchery taking place. Evidence from other sites suggests butchery occurred on the periphery of occupation sites. As much of the bone was from enclosures, peripheral to the main occupation area, the material should confirm this pattern. Also for the Iron Age it has been observed that preservation was better in pits than in ditches (Robinson and Wilson 1983). Comparisons with other sites may help to determine whether this was the case here.
- 6.51 A more detailed inspection of fragmentation may reveal that it is due to heavy-handed butchery techniques, as evidence for more subtle forms of butchery (i.e. knife marks) appears to be lacking from the assemblage.

7 UPDATED PROJECT DESIGN

Overview and revised research aims

- 7.1 The assessment of the excavated evidence presented above indicates that despite a number of limitations, the excavations have a significant potential to address some the research aims of county and regional scope.
- 7.2 The nature of the Iron Age occupation, which had been hinted at but not defined in the evaluation phases of work, has now become clearer. The presence of ring-gullies and ditches both stratigraphically early and containing exclusively Iron Age (ie. local, hand-made) pottery, indicates that there was a pre-Roman settlement on the site. The evidence is, however, fragmentary and the size and form of the settlement was not defined in the excavation. The wider geophysical survey is also unhelpful in this regard since these earlier ditches are too subtle and too truncated to be identifiable with any security.
- 7.3 The date of this Iron Age settlement remains problematic due to the undiagnostic nature of the pottery. On the basis of the pottery types alone, it is possible that there was a hiatus between the Iron Age and Roman occupations, although the site plan rather suggests a continuous evolution of settlement. The resolution of this problem has significance for questions concerning the date of settlement on the Boulder Clay, and the degree of influence which the Roman occupation had on rural sites of this nature. These are regional research priorities. The problem may be resolvable through radiocarbon dates from the Phase 1 occupation.
- 7.4 The subsequent occupation shows a complex development of the site during the 1st and 2nd centuries AD, spanning perhaps 150 years. There is abundant pottery from these phases and a lot of it is well preserved. There would appear to be a good potential for refining the ceramic chronology through a seriation of the pottery typology in relation to stratigraphy. This would provide an important resource for studies in the chronology of regional pottery use. An analysis of pottery types throughout the duration of the occupation may also help to highlight significant changes in vessel usage, reflecting aspects of 'Romanization' related to changing ways of food storage and preparation.
- 7.5 The environmental and economic evidence is also significant particularly as it is not common from rural sites on the claylands in this period. An analysis of the faunal assemblage may help to define trends in herd composition and structure across the Iron Age to Roman transition.

Proposals for analysis

Site structure

- 7.6 Analysis of the site structure will continue in order to achieve a full assessment of the stratigraphic sequence for the ditches. There are a number of minor isolated pits and gully segments which would seem to have limited potential for further work.
- 7.7 The phasing will be completed as far as judged reasonable to provide a database which can be used as a reference for specialists for analysis.
- 7.8 Summary descriptive texts will be prepared for the ditch groups and other significant features. These descriptions will form the basis of the site narrative for eventual publication, with editing and the inclusion of finds and environmental evidence as appropriate.

Pottery

- 7.9 A more detailed analysis is required of the individual assemblages against the site stratigraphy to try and define ceramic trends more closely. It is clear that there are a number of intercutting features which may allow some form of seriation to be undertaken.
- 7.10 The smaller quantity of material from the evaluation will be included if of secure provenance.
- 7.11 This site is one of several from the area of this date and some comparison of material is warranted, although many of the previously excavated sites are either unpublished in full or not quantified. Several vessels (30-35) warrant illustration in view of their completeness or association.

Other finds

- 7.12 Research analysis will aim to:
- 1 Identify and research two copper alloy objects of individual interest.
 - 2 Obtain provenance for piece of marble (if possible).

Economic and environmental indicators

- 7.13 Proposed Analysis:
- 1 Samples 1, 4, 6, 7, 8, 9 12 and 13 to be further processed.
 - 2 Cereal, chaff and weeds to be identified and quantified in detail from these eight samples. These have the potential to provide information on crop husbandry from

Phase 2 to Phase 6/7.

- 3 Snails to be identified and quantified from Samples 1, 6, 9 and 12. These have the potential to provide information on the local environment from Phases 2, 3, 5 and 6/7.

Animal bone

7.14 Proposed analysis:

- 1 Basic quantification to establish relative abundance of species.
- 2 Recording of pathology.
- 3 Ageing of mandibles to determine herd structures.
- 4 Analysis of changes through time (for items 1-3).
- 5 Analysis of distribution.
- 6 Analysis of fragmentation.
- 7 Comparisons with other assemblages.

Radiocarbon dating

- 7.15 It is proposed to obtain high precision AMS radiocarbon dates from animal bone in two Iron Age contexts. These are context 1273 (Gully 1272) DG5 and 1053 (Gully 1054) RD1. Gully DG5 is Phase 2 and yielded a large assemblage of Iron Age pottery. RD1 is Phase 1 and stratigraphically one of the earliest features on the site. The technique involves calculating the weighted mean of three replica dates from each sample, characteristically giving a precision of +/- 40 years.

Synthesis

7.16 This will comprise:

- 1 An integration of the finds, dating and environmental evidence with the site narrative.
- 2 An overview and interpretation of the occupation.
- 3 A wider discussion with reference to published and unpublished sources, particularly in relation to Northamptonshire, and also other regional comparisons as appropriate.

Publication proposal

- 7.17 The results of the investigation are of county interest and warrant publishing as a short article in the journal *Northamptonshire Archaeology*. It is proposed that summaries of the results from the earlier phases of work, and from the watching brief (the excavation at Site 4) are included. Background context will be provided, as appropriate, by other sites in the vicinity. The length of the report will be around 50 pages, inclusive of figures and tables.

Costs of Analysis, Report and Publication

TASK NO.	TASK	DAYS	RATE/DAY (£)	COST
1	Site description	4	130	520
2	Check/integrate digital information	2	100	200
3	Additional soil processing	3	100	300
4	Pottery analysis & report	6	140	840
5	Site analysis & final phasing	5	130	650
6	Animal bone analysis & report	5	100	500
7	Human bone analysis & report	1	100	100
8	Charred plant analysis & report	6	130	780
9	Snail analysis & report	2	220	440
10	Other finds report	1	120	120
11	Radiocarbon selection	1	130	130
12	Pottery illustration	3	120	360
13	Archaeological background	3	130	390
14	Report synthesis & discussion	6	130	780
15	Drawing brief preparation	3	130	390
16	Site illustrations	5	120	600
17	Compile report	4	130	520
18	Internal edit/QA	3	160	480
19	Internal refereeing	2	130	260
20	Corrections to text	2	130	260
21	Corrections to illustrations	2	120	240
22	Management/liasion with editor	2	160	320
23	Proof reading	1	130	130
24	Publication (50 pages)		30/page	1500
	TOTAL			10 810 + VAI

7.18 Two radiocarbon determinations will be obtained, in accordance with the contingency arrangements in Appendix F (Specification for Strip Excavation) of the Archaeology Brief. The cost for these is £1500

- 7.19 The Priced Staff Cost Schedule is to be adjusted by the Retail Price Index on the anniversary of the contract award, in accordance with the Part B: Payment Arrangements, Section 2.3.
- 7.20 A copy of the report will be sent for inclusion in the Northamptonshire Sites and Monuments Record

Key Personnel

- 7.21 The following staff will contribute to the report:

Andy Mudd, Senior Project Officer, Northamptonshire Archaeology. Main author and project manager.

Jane Timby, independent ceramic specialist. Pottery report.

Wendy Carruthers, independent palaeo-botanist. Charred plant remains report.

Mark Robinson, University Museum Oxford. Palaeo-environmentalist. Snail report.

Karen Deighton, Environmental Supervisor, Northamptonshire Archaeology. Animal bone report.

Trevor Anderson, independent palaeo-osteologist. Human bone report

Tora Hylton, Finds and Archive Manager, Northamptonshire Archaeology. Finds and archive.

Mark Roughley, Senior Illustrator, Northamptonshire Archaeology. Illustrations.

Archiving

- 7.22 An archive of the fieldwork (which includes records, electronic data, finds and environmental material) will be compiled in accordance with Northamptonshire Heritage and English Heritage guidelines (NH *Policy and Guidance for Archaeological Fieldwork Projects in Northamptonshire 1995, Section 5*; EH *Management of Archaeological Projects 1991, Appendix 6*).
- 7.23 The research archive is to include catalogues of stratigraphic, artefact, environmental and other records derived from work during the analysis phase. It will also include the site narrative and analytical reports prepared as part of the publication.
- 7.24 The complete archive will be made available for transfer to a suitable repository within three months of the submission of the publication report.

Future investigation

- 7.25 The mitigation carried out affected only that part of the site within the CPO boundary of the new road, and it is clear that directly related remains lie to the east and west of this line. Those to the west have been partly examined by geophysical survey. It is apparent that the main focus of Roman period occupation lay in this direction, although its extent has not been defined. The excavation also showed that features ran off site to the east but it is unclear how extensive or important any remains here might be. It is possible that the Iron Age occupation was concentrated in this direction. This was not definable in the geophysical survey within the CPO boundary, and the features may generally be too subtle to be detected by this means.
- 7.26 Any future investigations should use a range of prospection techniques to discover the extent of archaeological deposits in these areas. It is possible that there was a gradual shift in settlement down the slope from the east towards the present town. Geophysical survey has been shown to be successful in defining the pattern of deeper (mainly Roman) ditches, but may not identify the shallower and more scattered features which appears be more characteristic of the Iron Age. If there are any Saxon remains further to the west, these too may be relatively invisible. Any geophysical survey results should therefore be tested by trial trench excavations.
- 7.27 Sites recorded in the county Sites and Monuments Record are shown in Figure 11, while a gazetteer of the closer sites is presented in Appendix 1. The vast majority of the numbers refer to buildings in Higham Ferrers dating from the medieval to modern eras. Many are

associated with boot and shoe and related manufactories.

- 7.28 Those adjacent to the site are mainly Roman and Iron Age remains, both those associated with the current project and earlier more random discoveries.

8 POPULAR REPORT

- 8.1 A popular report is to be prepared in accordance with Archaeology Brief (Clause 2.5 and Appendix H). This is to be a relatively short publication reflecting the local and regional significance of the site and is to be 12 pages (including front page) in full-colour A5 booklet form on Gloss art 130 g/m² paper.

- 8.2 It is recommended that the results of the site excavated in the Watching Brief (Site 4) be included.

- 8.3 The structure of the report is to be based upon up to 13 colour photographs and illustrations, with a text commentary accounting for about 50% of the report. The following is a provisional list of illustrations.

- 1 Site 3 geophysical survey plot with brief commentary on technique and results
- 2 Site 3 plan showing middle Iron Age, late Iron Age and early Roman phases in 3 colours and locations of pottery vessels illustrated below
- 3 Colour photo, general view of Site 3, frame 136
- 4 Colour photo, close up of broken pot in Gully 1122, frame 64
- 5 Colour photo, pottery from ditch 1263 being excavated, frame 144
- 6 Illustration of semi-complete vessel, with commentary on type and manufacture
- 7 Illustration of semi-complete vessel, with commentary on type and manufacture
- 8 Illustration of semi-complete vessel, with commentary on type and manufacture
- 9 Close up photo of Roman coin
- 10 Drawing of bronze fitting (SF7) with ring and dot motif
- 11 Site 4, aerial photo, frame 29
- 12 Site 4, site plan
- 13 Colour photo, excavation of enclosure ditch 1, frame 10

9 REFERENCES

Condon F, 1995 When is a town not a town? "Small towns "on the Nene and Welland in their context, in A.E. Brown (ed) *Roman Small Towns In Eastern England and Beyond*

Cram C L, 1978 Report on animal bone, in Broddrib et al *Excavations at Shakenoak Farm, near Wilcote, Oxfordshire*

Jackson D A, 1975 An Iron Age site at Iwywell, Northamptonshire, *Northamptonshire Archaeology*, 10, 31-93

Johns C, 1998/2000 *Roman Iconography: a Brief Introductory Guide*

Kerney M P and Cameron R A D, 1994 *Land Snails of Britain and North-West Europe*, London Harper Collins

Kidd A 1999, *Northamptonshire: The First Millennium BC A Resource Assessment*, East Midlands Regional Research Frameworks Project

Robinson M and Wilson R, 1983 *An Environmental Survey of the South Midlands*

Schoch W, Pawlik B and Schweingruber, 1988 *Botanical macro-remains*, Stuttgart, Paul Haupt

Stallibras S M, 1985 Some effects of preservation biases on interpretations of animal bones, in N R J Fieller, D D Gilbertson and N G A Ralph (eds) *Palaeobiological Investigations*, BAR. Int. Series 266, 65-73, Oxford

Taylor J in prep., *The Roman Period Research Agenda* East Midlands, Regional Research Frameworks Project

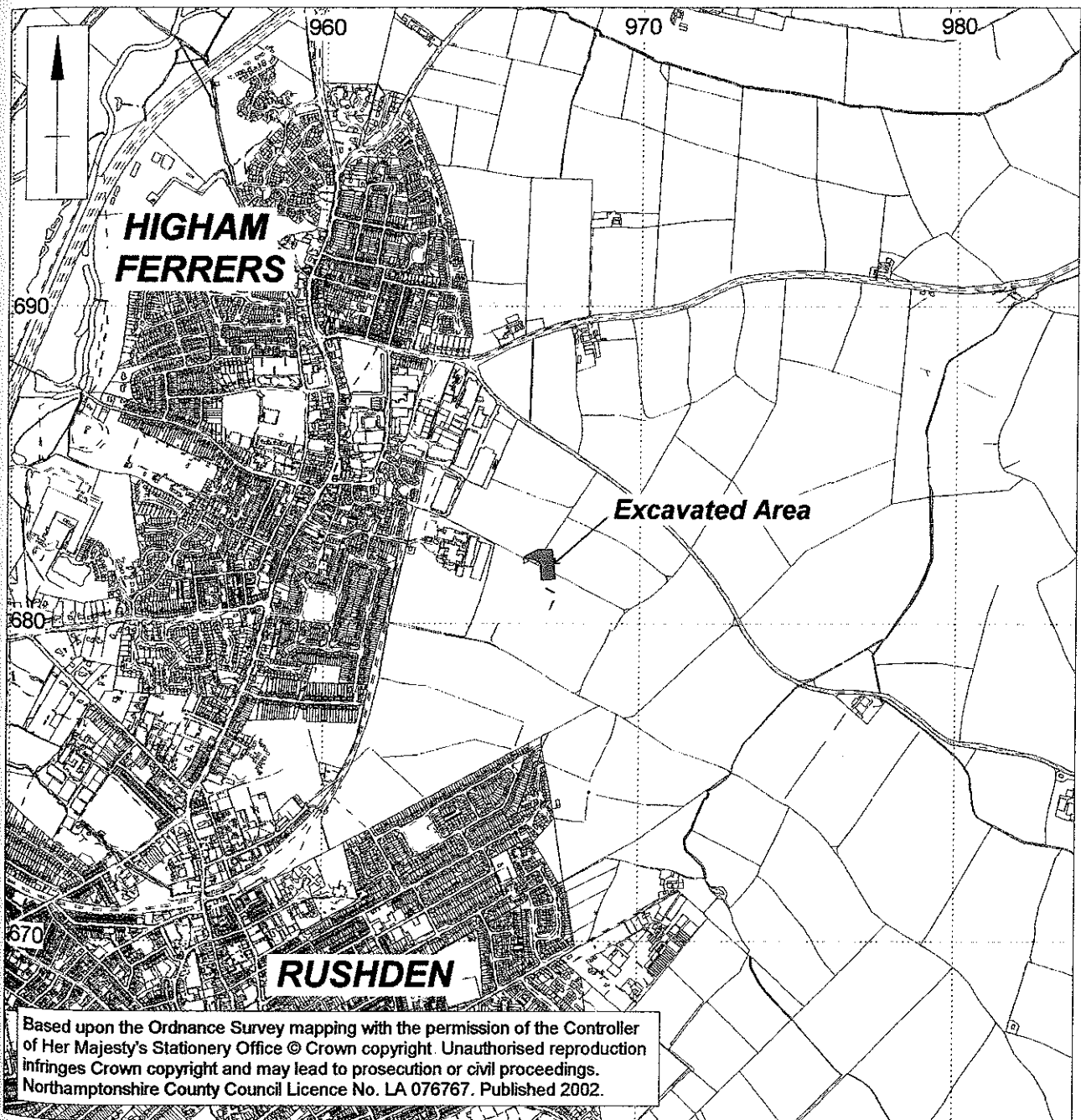
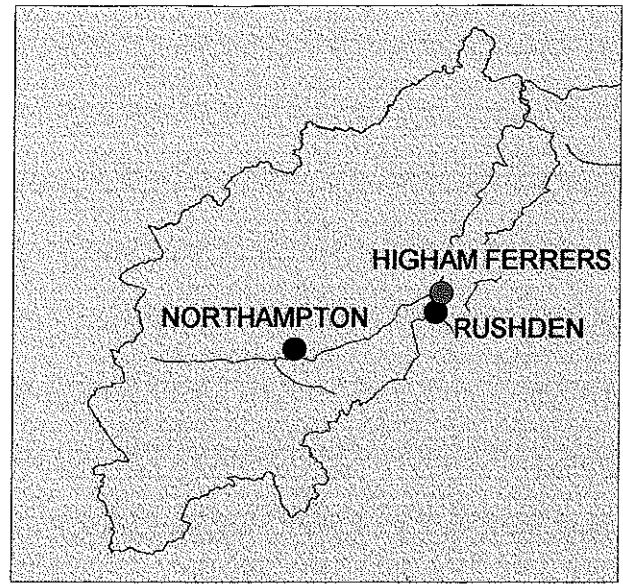
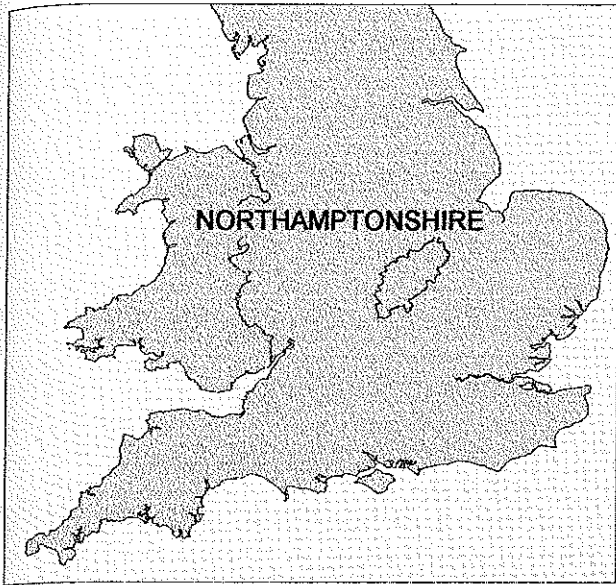
Willis S in prep., *An Archaeological Research Agenda for the later Bronze Age and Iron Age (The first Millennium BC) in the East Midland Counties of England*, East Midlands Regional Research Frameworks Project

Wood P and Hastings S, 1984 *Rushden: the early fine wares*, Northamptonshire County Council

Northamptonshire Archaeology
A service of Northamptonshire County Council
16th July 2002

APPENDIX 1: SITES AND MONUMENTS RECORD GAZETTEER

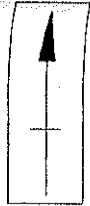
<i>SMR No.</i>	<i>Grid Ref.</i>	<i>Type</i>	<i>Description</i>
3184/1/1	SP96806910	Round Barrow?	Indistinct ring-ditch or possible geological feature
3185/0/0	SP96466881	Finds	Roman pottery sherds found during road works
3186/0/0	SP96576804	Finds	Roman-type quernstone found in 1984
3186/0/1	SP96406830	Finds	Roman pottery sherds found
3186/0/2	SP96506820	Finds	10 Roman pottery sherds and 1 prehistoric flint found
5354/0/1	SP96506810	Settlement	Romano-British settlement discovered during 1997 field survey
5997/0/1	SP96506870	Feature	Possible ditches
7196/*/*	various	various	Sites, particularly buildings, recorded as part of Extensive Urban Survey for Higham Ferrers
7196/64	SP9660468933	Farm	Duchy Farm, Chelveston Road
7994/0/1	SP967684	Settlement	Romano-British and Iron Age settlement recorded in evaluation in 2001



Based upon the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Northamptonshire County Council Licence No. LA 076767. Published 2002.

Scale = 1:20,000

Fig.1



966

967

968

683

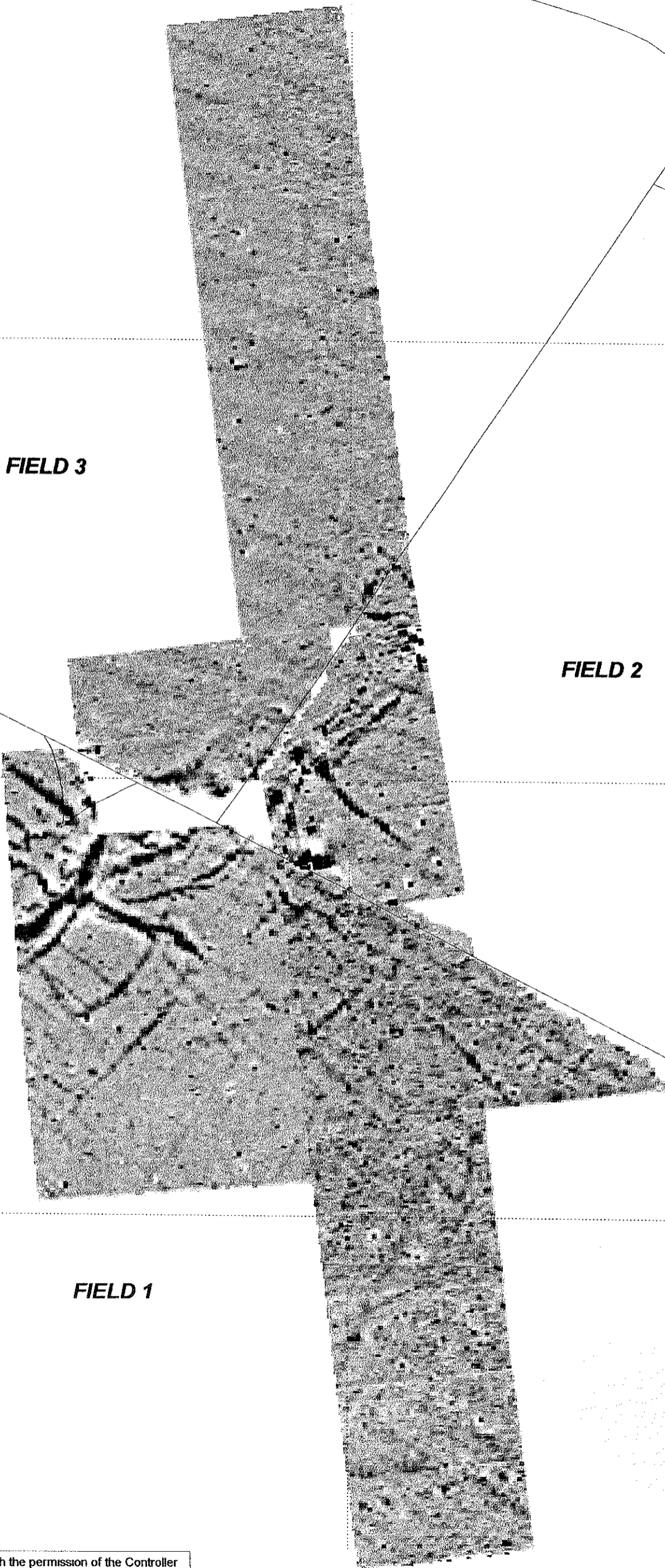
FIELD 3

FIELD 2

682

681

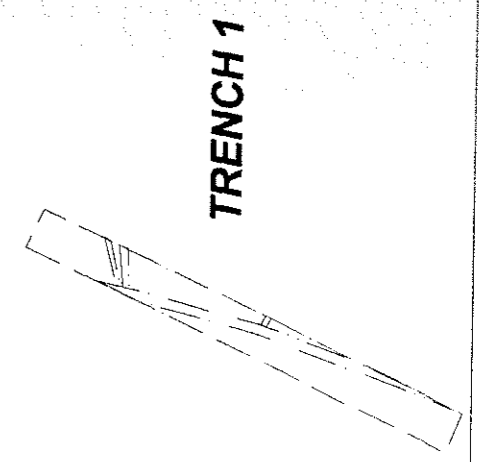
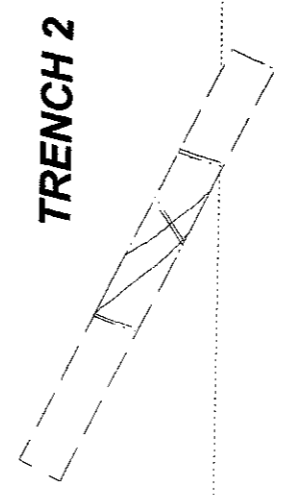
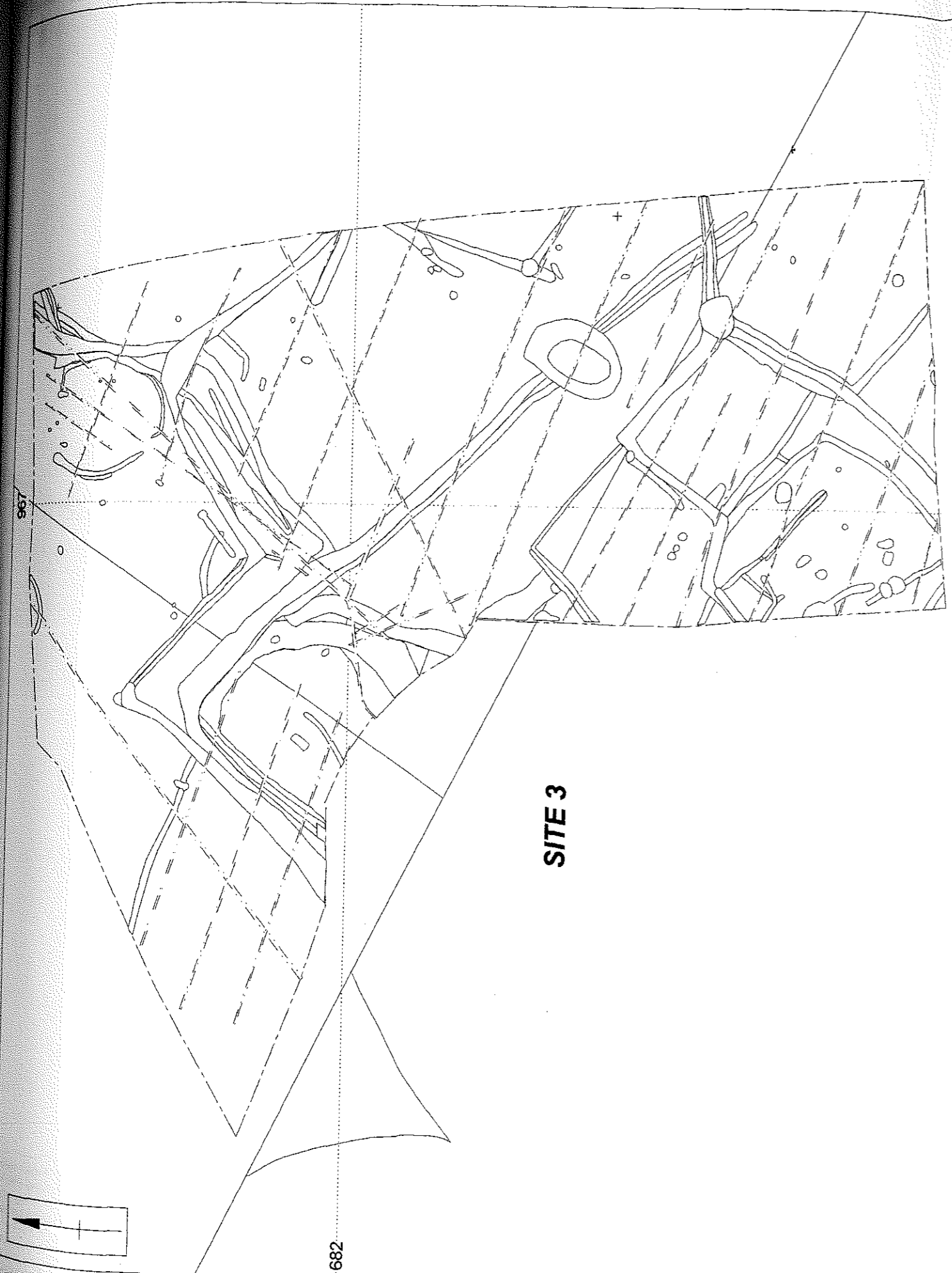
FIELD 1



Scale = 1:1000

Based upon the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Northamptonshire County Council Licence No. LA 076767. Published 2002.

Fig 2



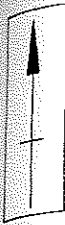
Modern Land Drains

Based upon the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Northamptonshire County Council Licence No. LA 076767. Published 2002.

Scale = 1:500

Fig. 3

967



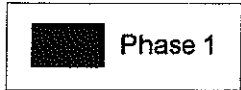
RD1

DG12

682

SITE 3

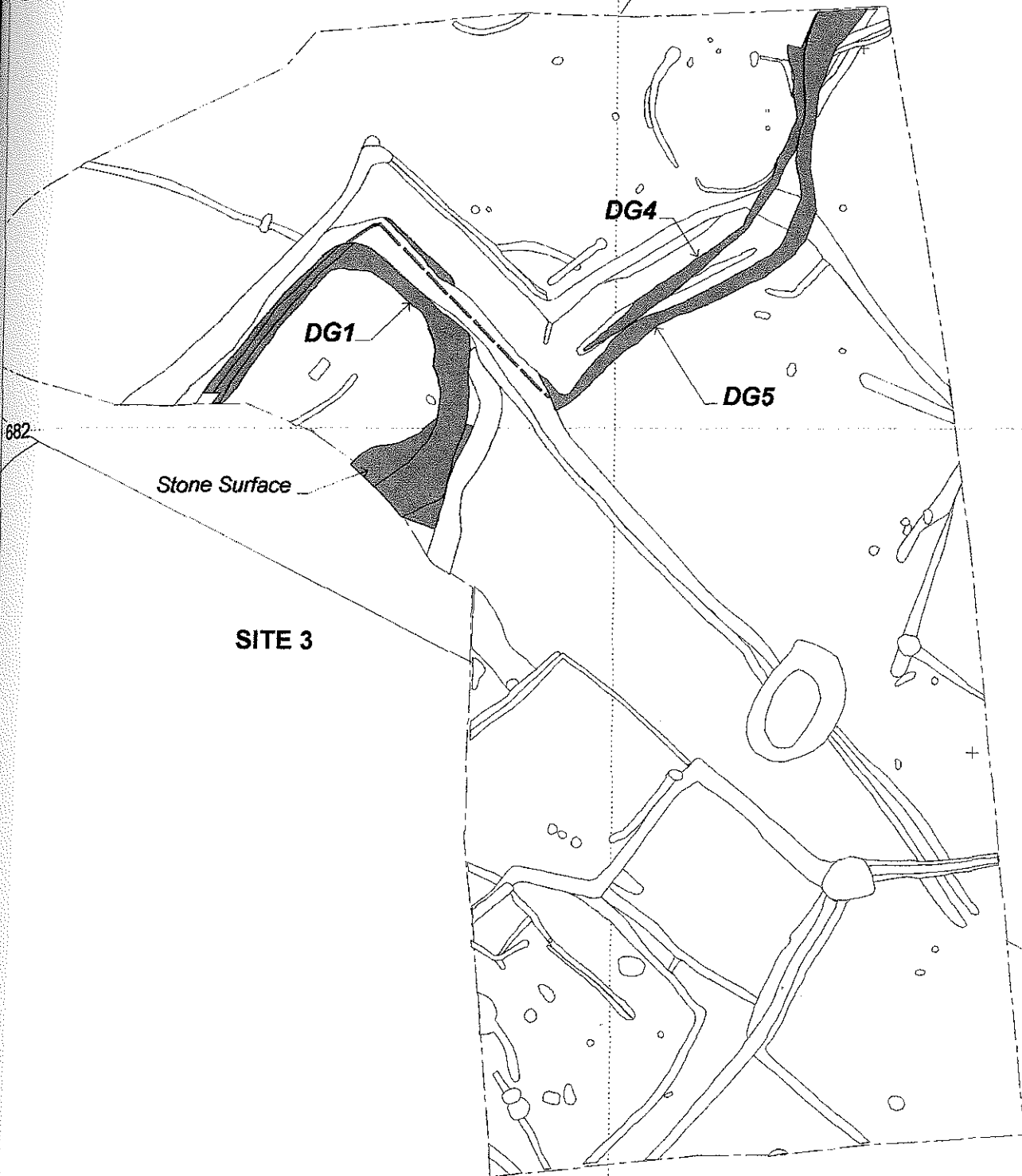
Based upon the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Northamptonshire County Council Licence No. LA 076767. Published 2002.



Scale = 1:500

Fig. 4

967

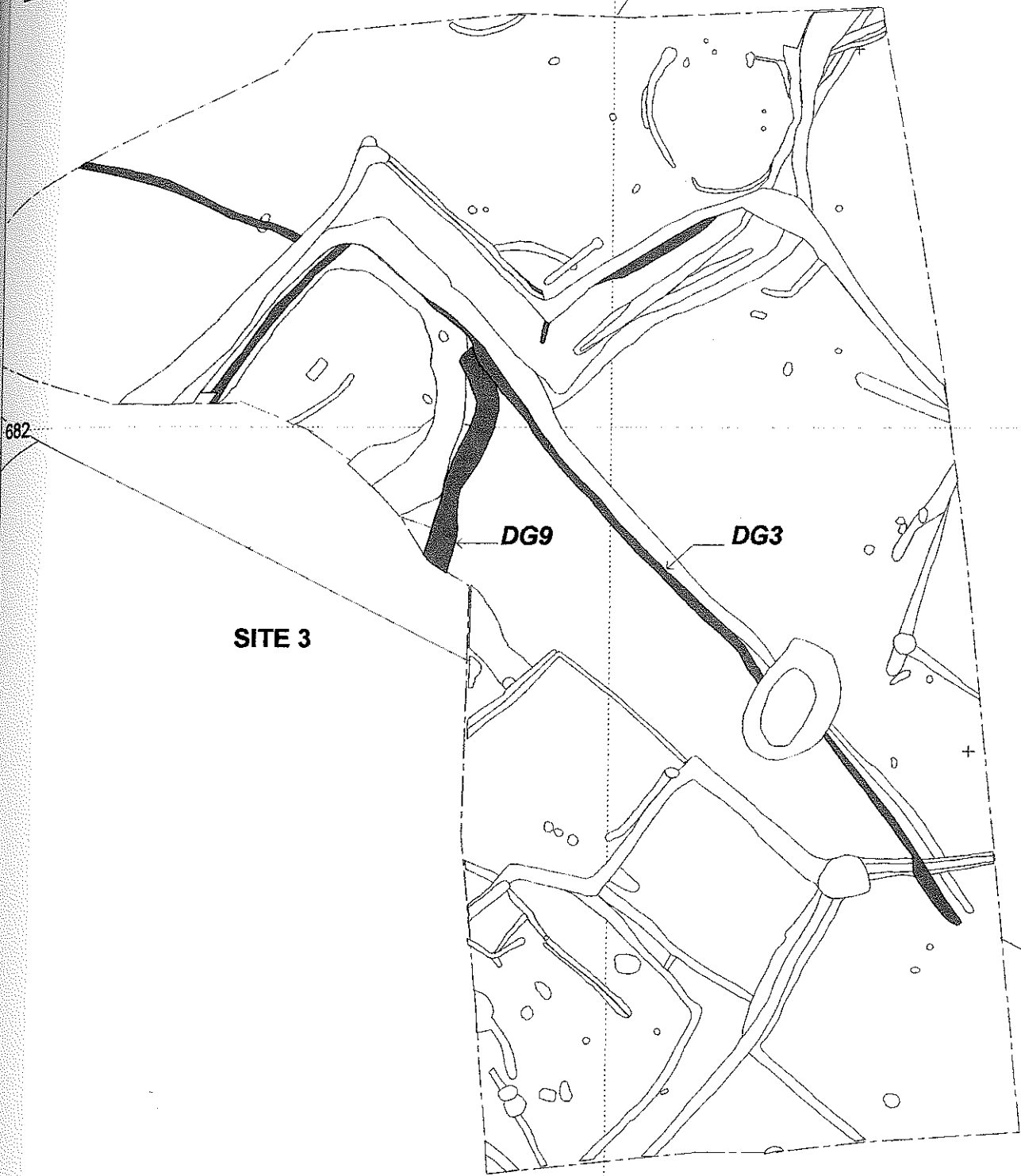
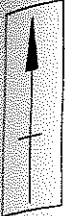


Based upon the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Northamptonshire County Council Licence No LA 076767. Published 2002



Scale = 1:500

Fig. 5



SITE 3

DG9

DG3

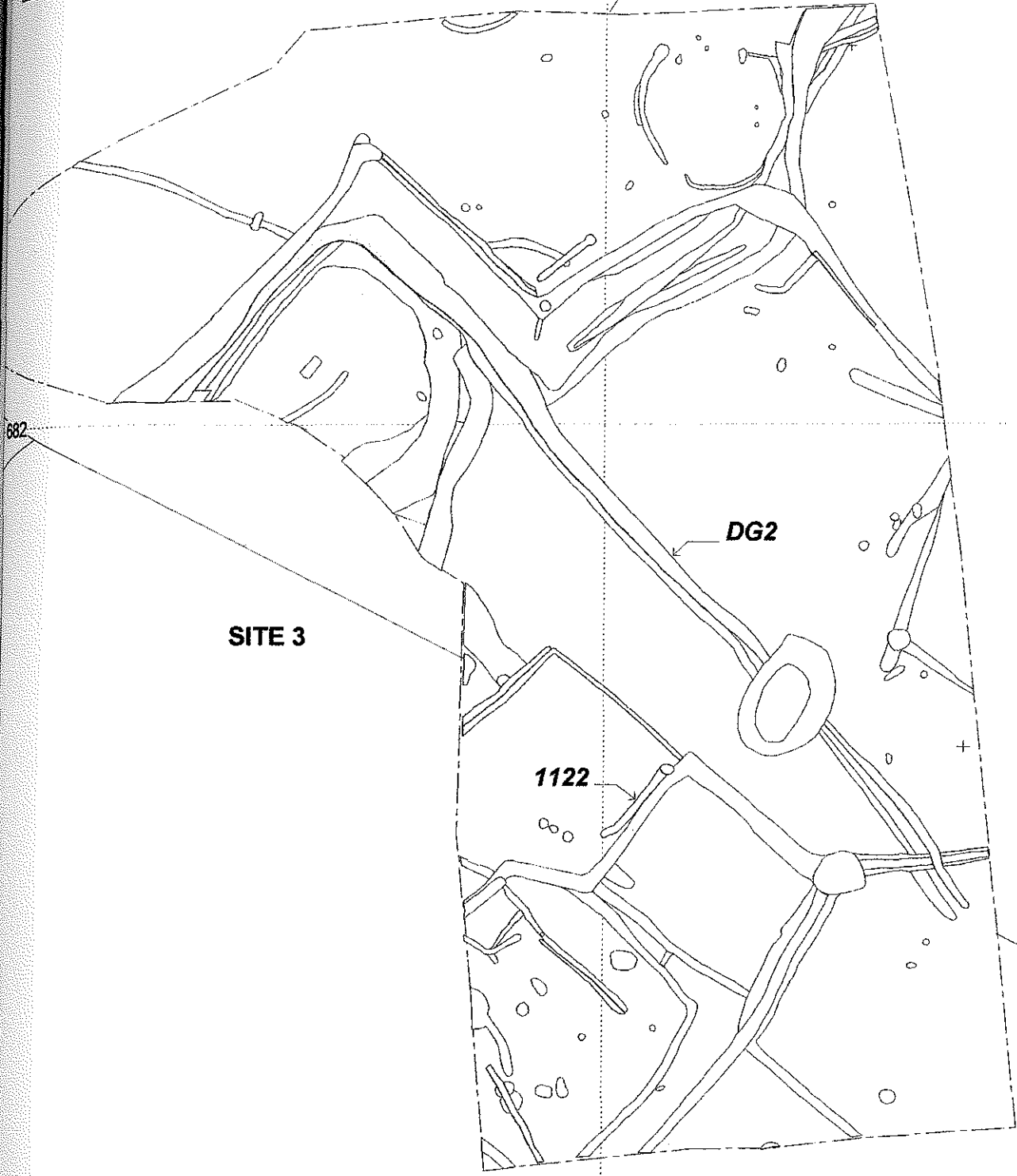
Based upon the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Northamptonshire County Council Licence No. LA 076767. Published 2002.

 **Phase 3**

Scale = 1:500

Fig. 6

967

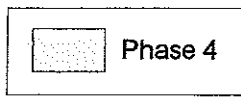


SITE 3

DG2

1122

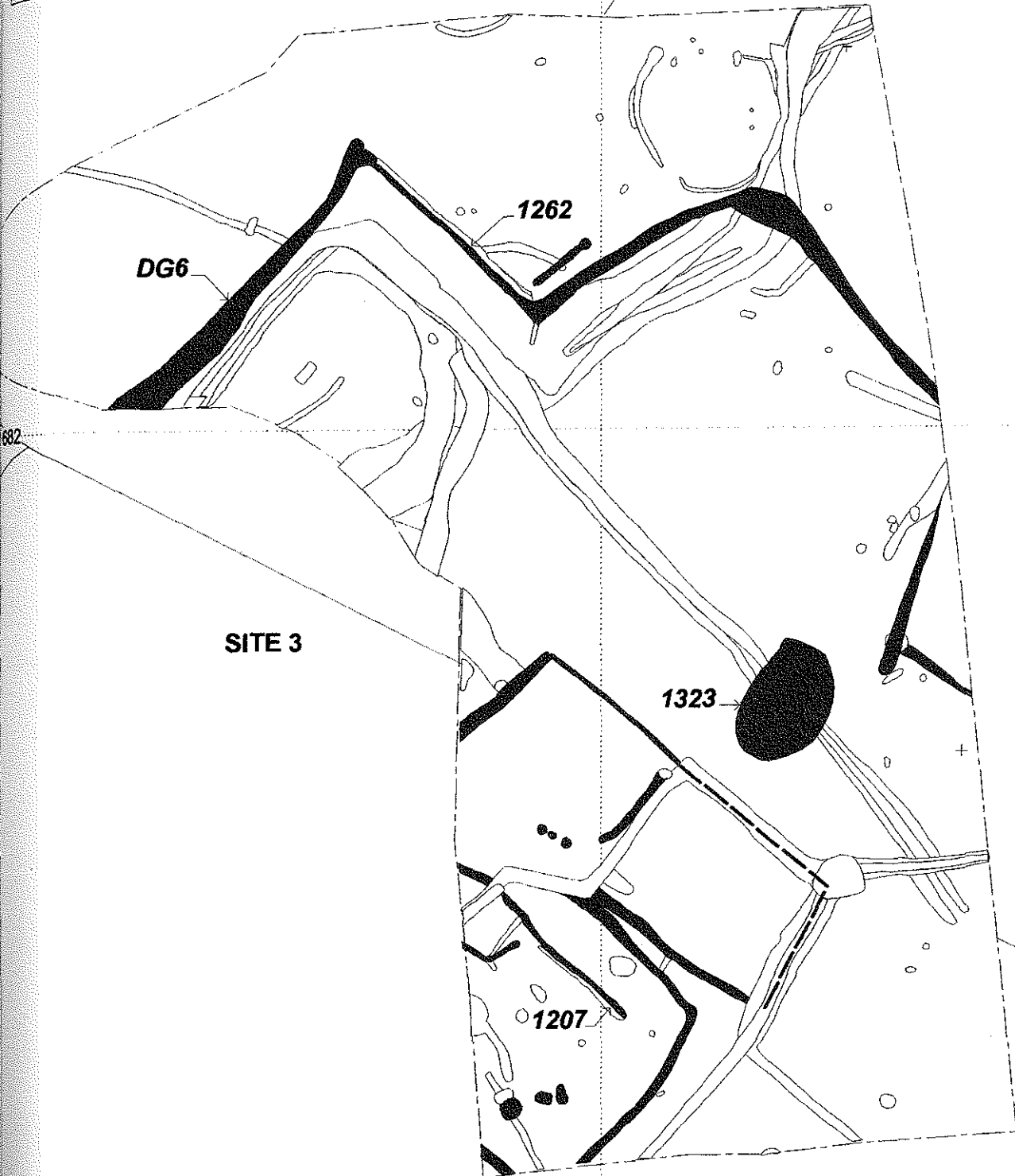
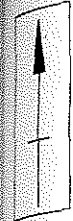
Based upon the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Northamptonshire County Council Licence No. LA 076767. Published 2002.



Scale = 1:500

Fig. 7

967



SITE 3

DG6


1262

1323

1207

682

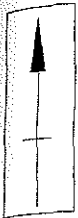
Based upon the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Northamptonshire County Council Licence No. LA 076767. Published 2002

 Phase 5

Scale = 1:500

Fig. 8

967



682

SITE 3

1323

DG7

DG11

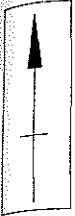
Based upon the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Northamptonshire County Council Licence No. LA 076767. Published 2002.



Scale = 1:500

Fig. 9

967



682

SITE 3

DG8

Based upon the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Northamptonshire County Council Licence No. LA 076767. Published 2002.



Scale = 1:500

Fig. 10

