DESK-TOP ASSESSMENT OF THE ARCHAEOLOGICAL IMPLICATIONS OF PROPOSED PIPELINE CONSTRUCTION BETWEEN BOURNE FEN AND WEST PINCHBECK, LINCOLNSHIRE (BWP97)

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ARCHAEOLOGICAL
PROJECT
SERVICES

DESK-TOP ASSESSMENT OF THE ARCHAEOLOGICAL IMPLICATIONS OF PROPOSED PIPELINE CONSTRUCTION BETWEEN BOURNE FEN AND WEST PINCHBECK, LINCOLNSHIRE (BWP97)

Work Undertaken For
Anglian Water Services Ltd

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CONTENTS

Appendices

List of Figures

List of Plates

1. SUMMARY

A desk-top assessment was undertaken to determine the archaeological implications of a proposed water pipeline scheme between Spinney Farm, Bourne and Parson Drove, Pinchbeck, Lincolnshire.

Investigation of the route of the proposed development has located numerous archaeological remains and findspots in the near vicinity. Prehistoric, Romano-British and Post-medieval activity has been identified within 500m on either side of the pipeline route.

Concentrations of archaeological remains have been recognised in several locations. Late Neolithic/Early Bronze Age (2400-1600 BC) activity has been identified north of Parson Drove, and may include the remains of a round barrow. Iron Age (800BC-AD43) pottery has been found on a number of Romano-British sites.

Remains of Romano-British date (AD 43-450) are most likely to be encountered along the entire route of the pipeline. Aerial photographs reveal a landscape of field boundaries and settlements interconnected by droveways, particuarly dense around Haconby and Dunsby Fen. A number of salt producing sites have also been identified in the region.

The Saxon (AD 450-950) Midfendic, the ancient boundary between Holland and Kesteven, is thought to be located in the vicinity, probably along the course of the South Forty Foot Drain. No archaeological remains of the medieval period are known from the pipeline route, although the fens were part of a managed landscape.

Post-medieval drainage led to new development in the fens, usually farms, of which several still survive.

2. INTRODUCTION

2.1 Planning Background

Archaeological Project Services were commissioned by Mr C. de Souza, of Anglian Water Services Ltd, to undertake a desk-top assessment of the archaeological implications of construction of a new water pipeline. This pipeline was proposed to run for approximately 6km between Spinney Farm, near Guthram Gowt (National Grid Reference TF 1580 2250), alongside the South Forty Foot Drain to the water works at the junction of Parson Drove, West Pinchbeck, Lincolnshire (National Grid Reference TF 1651 2270). The archaeological assessment was undertaken in accordance with a brief set by the Assistant Archaeology Officer, Lincolnshire County Council (Appendix 1).

2.2 Topography and Geology

The pipeline crosses two parishes, Bourne and Pinchbeck, and follows the district boundary between South Kesteven and South Holland which is marked by the South Forty Foot Drain. Other parishes that fall within the investigation area include Dunsby, Rippingale, Hacconby and Morton (Fig. 2).

The proposed pipeline route lies within the relatively level Fenland at a general height of approximately 3m OD. Within this are local variations in height where the pipeline crosses the raised levees of extinct creeks. Furthermore, there exists a general trend of the land surface reducing in height from north to south and from east to west.

At its southern end the pipeline commences on the edge of the silty levees of the prehistoric course of the Bourne Eau. From there it extends onto the glacial clays of Guthram island, the only patch of pre-

Flandrian soils on the route. Guthram island is part of a north-south aligned morainic ridge extending north from Guthram to beyond the destination of the pipeline. Although Guthram is the only place on the route where the pre-Flandrian surface protrudes the ridge is only shallowly buried for part of its length (eg close to the Forty Foot Drain in Hacconby Fen [Chowne 1988]).

Extensive field survey allied to a programme of palaeoenvironmental investigation and radiocarbon dating has provided detail of the development and use of the landscape in this area. The main build up of silts and clays occurred during a period of sustained brackish/marine inundation in the second millennium BC. A second phase of inundation is known from Morton and Pinchbeck Fens where estuarine silts seal peats, the upper contact of which provided a date in the 7th century BC. A further phase of more localised flooding occurred in this area and sealed a second century AD Roman saltmaking site near to the Forty Foot in Morton Fen. A Roman landsurface may well be sealed beneath these silts.

At the northern end of the silt spread north of Guthram island the pipeline route crosses a watercourse which connects into the Bourne-Morton Roman canal. Aerial photographs clearly demonstrate that this watercourse was subjected to the same water management regime as the canal in the Roman period and is therefore archaeologically significant.

North from the watercourse the land changes to a silty clay through which wound the original courses of the saltmarsh creeks in the second millennium BC and later.

The landscape then reverts to extensive spreads of course silts. Although the surface distribution of Roman sites is thinner at this point some shallowly buried Roman sites are known from the Fenland Survey fieldwalking results (Hayes and Lane 1992). In the west end of Rippingale Fen the course of a Roman canal has been recorded. Its route fades some 1.7km west of the Forty Foot but it is unclear whether the feature terminates or is masked by later silting. If projected eastward the course would be crossed by the pipeline south of Casswell's Bridge, at a point where the natural silt formations are uncommonly high.

At the northern terminus of the pipeline the pre-Flandrian surface again protrudes through the silts and clays to form another island within the Fenland. Beneath the glacial clays of the fen floor lies a solid geology of Oxford Clay developed during the Jurassic era.

The Fen soils have been categorised by the Soil Survey and are divided between the Wallasea 2 Association pelo-alluvial gleys developed on reclaimed marine alluvium (Hodge *et. al.*1984, 338) and Wisbech Association course silty calcareous soils on marine alluvium (*ibid.*, 361).

3. AIMS

The aims of the desk-top assessment were to establish the location, type and extent of archaeological activity present within a corridor of 1km width, approximately 500m either side, along the route of the proposed pipeline. In particular the expected survival and quality of any archaeological remains will be assessed. Such location and assessment of significance would permit the formulation of an appropriate response to integrate the needs of the archaeology within the proposals for the water pipeline construction programme.

4. METHODS

Compilation of the archaeological and historical data relevant to the area of the proposed development involved the examination of all appropriate primary and secondary sources available. These have included:

- historical documents, held in Lincolnshire Archives
- enclosure, tithe, parish and other maps and plans, held in Lincolnshire Archives
- Ordnance Survey maps
- the County Sites and Monuments Record
- the parish files of the Heritage Trust of Lincolnshire
- aerial photographs
- archaeological books and journals

5. RESULTS

5.1 Historical Data

The earliest reference to the area under investigation is to the village of Rippingale, dating from 675 AD, when King Æthelred gave the land of Rippingale, Swineshead, Louth and Bardney to Peterborough Abbey (Swanton 1996, 37). Referred to as *Hrepingas* the name is derived from the Old German 'Halh' or corner of the 'Hrepingas', a possible tribal name (Ekwall 1974, 388).

Bourne is mentioned in the *cartularium saxonicum* of the mid 10th century and the name is derived from the Old English *Burna* meaning stream (Ekwall 1974, 55).

All of the parishes are mentioned in the subsequent Domesday Survey of 1086. With the exception of Bourne and Rippingale, the remaining parishes all have Scandinavian elements in their names. It is possible that these settlements were first founded by Scandinavian settlers during the 9th and 10th centuries when their influence was strongest in this part of the country.

However, these early references to the parishes under investigation relate to the village centres that lay to the west on high ground, or, in the case of Pinchbeck, to the east where the village lay on higher marine sediments.

It is believed that the Saxon tribal boundary between the *Spaldas* and the *Bilmigas* ran through the area of investigation. Known as the *midfendic*, this boundary, thought to be a ditch flanked by banks, later marked the boundary between Holland and Kesteven and preceded the alignment of the present South Forty Foot Drain (Tom Lane *pers. comm.*).

The boundary between Kesteven and Holland was said, in 1337, to be '*so obscured that no certain knowledge could be thereof*' (Hayes and Lane 1992, 141). In 1525 the boundary was ordered to be '*made and digged*' and this was done between '*Gotheramscote unto Nestilholm corner*', or Guthram to Neslam in the parish of Pointon and Sempringham (*ibid.*).

The present South Forty Foot Drain was cut in the mid 17th century by the Adventurers, a group of people who cut drains in return for some of the reclaimed land (Wheeler 1896, 252). The route of this new drain between Bourne and Great Hale followed the course of the Double Twelves Drain, possibly a successor to the Saxon *midfendic*.

In 1765, the South Forty Foot was scoured by the Black Sluice Internal Drainage and Navigation Board after several years of

problems with flooding along the drain. This scouring was achieved by taxing the adjoining landowners (*ibid.* 257). The purpose of the South Forty Foot was to aid the drainage of the Fens and sixty three wind powered pumps were constructed along its route to lift the water of the parish drains into the South Forty Foot (Grigg 1966 28-9).

Following drainage of the Fens, settlements were established along the route of the South Forty Foot Drain. A model farm was established at Dunsby Fen Farm in 1771 by the Charterhouse charity. The farm was eventually taken over by Thomas Casswell who built the nearby Casswell Bridge. The present farmhouse dates to the late 19th century (BBC 1997).

Other buildings in the area of a similar date include Nunnerly House (DoE 1988, 49) and Engine Farm (DoE 1987, 90) which are both listed buildings. Eventually, places such as Casswells Bridge became a focus for the communities and it was here that a school was built by public subscription in 1892 and was demolished in 1956 (Lincolnshire Free Press 1956).

5.2 Cartographic Data

The area of investigation is alongside the South Forty Foot Drain between the northeast of Bourne and the north limit of Pinchbeck parish. Appropriate maps for the vicinity were examined.

Dating from 1771 and 1783 are a series of maps of the area of investigation surveyed by Edward Hare (Fig. 3). Basically, these are a set of parish maps and depict the lowlands or Fen of each parish. Little detail can be ascertained except for the position of field boundaries and the location of wind powered water pumps.

Bryant's map of Lincolnshire (1828) depicts the area of investigation in greater detail (Fig. 4). Field boundaries are not as readily apparent although buildings are shown for the first time. All roads are named, with the roads west of the South Forty Foot Drain as village drove roads whereas, to the east, a personal element is indicated by the road names. Only three wind powered pumps are shown as opposed to the nine depicted on earlier maps.

The 1st edition Ordnance Survey map (*c.* 1880), 25 inches to the mile scale, provides the first highly detailed representation of the investigation area (Figs. 5 and 6). Many more field boundaries are apparent. A sizeable community had, at this time, built up around the Dunsby Fen Farm area. Besides the farmhouse there are four 'estate' cottages as well as a building situated east of the South Forty Foot Drain. These buildings have access to each other via Casswell's Bridge. Further south the road named as Hixson's Drove on Bryant's map has changed name to Star Lode Drove. No windmills are apparent.

By 1902, the Ordnance Survey 6 inch map showed little change (Fig. 7). Field boundaries remained unaltered. A school had been established adjacent to Casswell's bridge and development, though minimal, had occurred at Guthram Gowt.

Later editions of Ordnance Survey maps indicate occasional field boundary changes made to accommodate the larger fields required by modern agriculture. Some farms have been demolished as has the school established near Casswell's Bridge.

5.3 Aerial Photograph Data

Aerial photographs taken along the route of the pipeline, published or transcribed in

secondary sources were examined for evidence of archaeological remains.

Dating from 1975 are a series of photographs in the various parish files of the Heritage Trust of Lincolnshire. Taken vertically and at high altitude, these represent blanket coverage of the area under investigation (Code: CUCAP. RC8-EY 12, 45, 47, 49 and 51). Readily apparent are the lighter coloured soils of the former creeks that once covered this landscape. The presence of former settlements and field boundaries are also visible.

A single photograph from the Heritage Trust of Lincolnshire parish files, and taken from a lower altitude, depicts the Casswell Bridge area (Code: CUCAP. K17-D104). Being at a lower altitude, more detailed cropmarks can be made out including a number of former field boundaries beneath the area now occupied by the Anglian Water Plant, the eventual northern terminus of the pipeline. The date of this photograph is estimated as being between 1956 and 1975.

An oblique photograph (Code: BIR12) of the Morton and Bourne parish boundary clearly shows the former winding course of the drain that demarcates the boundary, although the drain has since been straightened. Located northwest of the proposed pipeline route is a complex pattern of cropmarks indicating the position of a Romano-British settlement with associated drove roads and field systems, some of which are bisected by the proposed pipeline route.

An undated photograph by the RCHME depicts the area at which Morton Drove Road meets the South Forty Foot Drain and shows three ditches on a parallel arrangement and aligned northwest to southeast. This arrangement of ditches would suggest a substantial boundary, although no trace of this can be seen further north or east of the South Forty Foot drain.

Due to the complexity of the aerial photographs these have been digitised on to Figures 8 and 9 and will be further discussed with reference to the archaeological data obtained from the area.

5.4 Archaeological Data

Records of archaeological sites and finds held in the Lincolnshire County Sites and Monuments Records and the parish files of the Heritage Trust of Lincolnshire were consulted. Other, secondary, sources were also examined. Details of archaeological and historical remains falling within 0.5km of the proposed pipeline are collated in Table 1 and committed to Figures 8 to 9.

The area of investigation lies within an area surveyed by Sylvia Hallam (Hallam 1970) and later by the English Heritage funded Fenland Survey (Hayes and Lane 1992).

In summary, the proposed pipeline route traverses an area of known archaeological activity dating from the Neolithic to medieval periods. Generally, the prehistoric land surface in the fens lies buried beneath several metres of alluvium (clay, silt and peat). However, in the investigation area, the prehistoric surface rises and appears as a series of small islands in the landscape. This may be due to an underlying moraine or other glacial feature that later proved suitable for prehistoric settlement. Such a prehistoric settlement has been recognised in Pinchbeck where a possible Bronze Age round barrow is associated with a Late Neolithic/Bronze Age site comprising pits and gullies (Fig. 8, Nos. 1 and 2). Bronze Age flints have also been recovered from

Bourne parish (Fig. 8, No. 30) as well as pottery (Fig. 8, Nos 33 and 40). Occupation would appear to have ceased by about 1000 BC when marine flooding and developing fens occurred in the area (Hayes and Lane 1992, 112).

Due to increased flooding, Iron Age activity is scarce although finds of pottery are known. The finds of Iron Age material may suggest a date for the onset of resettlement of the fens or perhaps the survival of native traditions into the Romano-British period. Excavations of a Romano-British saltern in Morton Fen retrieved pottery that appeared to be Iron Age but was possibly 2nd century AD in origin (Trimble 1993, 32-3). This would appear to confirm the survival of native traditions in the Romano-British period.

It is during the Romano-British period that the area under investigation sees a major increase in activity. Many of the marsh creeks begin to silt up and form raised strips of land in doing so. These raised strips, or 'roddons' provide attractive areas of settlement for Romano-British communities who were quick to exploit them from the mid 2nd century onwards. Aerial photographs indicate an elaborate field system across the landscape interspersed with small settlements that are interconnected by droveways.

The Fenland Survey further enhanced the knowledge of the Romano-British landscape by detailed fieldwork (Hayes and Lane 1992). Artefacts found on the settlement sites indicate occupation from the 2nd century to the 4th century and also found evidence of salterns, places where salt was obtained from seawater. That some of these settlements were economically successful was obtained by finding evidence of stone buildings thus demonstrating a degree of wealth not usually seen in the Fenland at this time (e.g. SMR 34402, Fig. 9, No. 22), most buildings being constructed of wattle and daub and other locally derived materials.

By the end of the Romano-British period, it appears that development of freshwater fen continued to occur to the west of the South Forty Foot Drain, causing an increased development in freshwater Fen. To the east marine flooding occurred, although Saxon and later settlement occurs in Pinchbeck. No Saxon activity is recorded from the proposed pipeline route, although, the *Midfendic* is believed to have been constructed along the line of the South Forty Foot Drain to mark the boundary between Holland and Kesteven.

This scarcity of remains continues into the medieval period. However, this scarcity of remains belies the fact that the Fens was part of a managed landscape in which stock rearing, hunting and fishing all took place. This would have remained the case until the construction of the South Forty Foot Drain in the mid 17th century.

Table 1: Archaeological Sites in the Proximity of the Proposed Pipeline

Map code	Parish	SMR No.	Description	Grid Ref.
1	Pinchbeck	20198	Neolithic/Bronze Age round barrow	TF16512817
2	Pinchbeck	20199	Late Neolithic/Bronze Age site, excavations revealed pits and gullies	TF16512817
3	Pinchbeck	20202	Roman pottery and fired clay from soilmark	TF16702810
4	Pinchbeck	20200	7 Iron Age pottery sherds	TF16892796
5	Pinchbeck	20201	Roman pottery etc from area of cropmarks	TF16892796
6	Pinchbeck	20216	Romano-British cropmarks	TF16702810
7	Pinchbeck	20203	Romano-British settlement	TF16822760
8	Pinchbeck	20215	Romano-British pottery	TF16602740
9	Pinchbeck	23595	Undated ditch, field boundary	TF16572765
10	Pinchbeck	20218	Romano-British cropmarks	TF17202710
11	Pinchbeck	20205	Roman settlement and saltern	TF16762614
12	Pinchbeck	20211	Soilmarks and linear features of Roman site	TF16722589
13	Pinchbeck	20222	Undated cropmarks of droves and field systems	TF17402555
14	Pinchbeck	22405	Roman finds, pottery bone and quern	TF17002390
15	Pinchbeck	22498	Possible T-shaped building on cropmark	TF17132409
16	Pinchbeck	22406	Romano-British finds, pottery, bone and stone. Also a possible skeleton	TF17302410
17	Pinchbeck	22478	Romano-British cropmarks of settlement and field systems	TF17402400
18	Rippingale	30041	Roman settlement, SAM 220	TF15502780
19	Dunsby	33116	Romano-British settlement and saltern remains	TF16302620
20	Dunsby	34400	Romano-British settlement site	TF16232621
21	Dunsby	34401	Romano-British saltern and settlement site	TF16182623
22	Dunsby	34402	Romano-British settlement site	TF16262636
23	Dunsby	34403	Romano-British settlement	TF16242629
24	Dunsby	34404	Romano-British settlement site	TF16302627
25	Dunsby	34405	Romano-British settlement	TF16382635
26	Haconby	34415	Romano-British settlement	TF15952600
27	Haconby	34921	Romano-British field system	TF16202575
28	Haconby	33156	Romano-British settlement site	TF15902510

Map code	Parish	SMR No.	Description	Grid Ref.
29	Morton	32969	Undated triple ditch cropmark	TF16702460
30	Bourne	34118	Bronze Age flints and Iron Age pottery	TF15952268
31	Bourne	34119	Romano-British settlement site	TF15952268
32	Bourne	34120	Romano-British settlement site	TF16052257
33	Bourne	34121	Prehistoric potsherd	TF16222252
34	Bourne	34122	Romano-British settlement site	TF16222252
35	Bourne	34123	Romano-British settlement site	TF16282255
36	Bourne	34124	Romano-British settlement and saltern site	TF16382256
37	Bourne	34125	Romano-British settlement site	TF16852294
38	Bourne	34126	Romano-British saltern site	TF16792278
39	Bourne	34127	Romano-British saltern site	TF16532238
40	Bourne	34154	Bronze Age pottery	TF16802270
41	Morton	33171	Romano-British field system	TF15302290
42	Morton	33173	Romano British settlement site	TF16102450
43	Morton		Romano-British saltern site	TF16492430

Few archaeological investigations have taken place along the proposed pipeline route. The earliest was an evaluation that took place before expansion of the Anglian Water works at the west end of Parsons Drove (HTL 1991 and 1992). Following a geophysical survey that identified a number of infilled dykes two trenches were excavated that revealed an infilled and ploughed over boundary ditch.

A watching brief was also conducted for Anglian Water along Hacconby Drove, over and then alongside the South Forty Foot Drain (APS 1996). This investigation revealed several ditches associated with the Romano-British field system along Hacconby Drove. However, due to the prevalent conditions at the time detailed examination along the South Forty Foot Drain did not occur.

Investigations also took place on the site of Late Neolithic/ Early Bronze Age finds found north of Parsons Drove during 1993. Although few features were found quantities of pottery and flint tools were recovered, some from beneath layers of alluvium and buried soil (Lane 1993, 26).

6. SITE RECONNAISSANCE

In April 1997 the proposed course of the pipeline was walked. The proposed pipeline will run entirely through agricultural land. Most of the land is currently under crop and unsuitable for fieldwalking except for three lengths that total 1.2km. Reconnaissance of these fields did not locate artefacts, except in the field east of Casswell's Bridge, where a thin scatter of demolition debris marks the former position of the school and an

adjacent building. Geophysical survey is considered possible along much of the route.

Where crops are presently growing, vague cropmarks can be seen. However, the time of year and because they were viewed at ground level means that nothing can be ascertained as to their nature or layout.

Two areas of higher ground were noted, one at the western end of Blackhole Drove and the other around Dunsby Fen Farm. These higher areas of ground indicate former roddons.

It was also noted that Guthrum Farm (TF 169 237) had recently been demolished.

7. DISCUSSION

Investigation of the area immediately surrounding the route of the pipeline has revealed evidence for numerous archaeological remains occurring in the near vicinity.

Prehistoric activity in the area of investigation is represented by artefacts of Late Neolithic to Iron Age date. Late Neolithic and Early Bronze Age activity is restricted to 'islands' within the fen, where the pre-Flandrian or glacial land surface rises through later deposits. The nature of this activity is hard to discern, although burial may have occurred in Pinchbeck Fen. Excavation by the Fenland Survey found that at Parsons Drove, Pinchbeck, the Bronze Age land surface was buried beneath alluvium and this has implications for the pipeline route. Later, Iron Age activity has also been recorded, generally on Romano-British sites, where the finding of Iron Age pottery may indicate the beginning of settlement in the fens or the survival of native traditions.

Romano-British activity is well represented in this region of the fens. Evidence from aerial photographs appear to indicate areas of settlement surrounded by field systems and interconnected with droveways. Saltern sites have also been recorded and represent industrial activity in the area during this period. A certain degree of wealth has been speculated for the settlements of this period as evidenced by stone and ceramic roof tiles, normally associated with substantial buildings, an unusual aspect of the Romano-British Fens.

The development of freshwater fens ceased settlement activity throughout the Saxon and medieval periods, although occupation was continuing in the villages to the east and west of the proposed pipeline route. However, the South Forty Foot Drain is believed to follow the course of the Saxon *Midfendic*, the ancient boundary between Holland and Kesteven.

The mid 17th century saw the first serious attempt to drain the fens with the construction of the South Forty Foot Drain. Beleaguered with problems it was not until the mid 18th century, after the scouring of the South Forty Foot that drainage was successful. Drainage was assisted by wind powered water pumps, which eventually was replaced by steam powered pumps. Soon after, reclaimed land became developed and farms appear along the proposed pipeline route. Some farms obviously grew, such as Dunsby Fen farm and a small community evolved here that lead to the construction of a school in the late 19th century.

Cartographic evidence indicates that little change occurred in the area of investigation since 1771. Gradual settlement can be seen to occur and few boundary changes are apparent, the most significant being within the last 50 years due to modern agricultural methods.

8. ASSESSMENT OF SIGNIFICANCE

For assessment of significance the *Secretary of State's criteria for scheduling ancient monuments* has been used (DoE 1990, Annex 4; see Appendix 2).

Period:
Remains dating to the Late Neolithic to Romano-British periods have been identified in close proximity to the proposed route of the pipeline. Romano-British rural settlements and saltern sites are characteristic features of this region. Salt-production sites are regionally typical, and are characteristic on the silt fenlands from the Romano-British to the medieval periods.

Period value may be enhanced by remains of the Saxon *Midfendic*, a boundary between Kesteven and Holland believed to lie beneath, or adjacent to, the South Forty Foot Drain.

Rarity:
Prehistoric settlement, especially of Late Neolithic/Bronze Age date is moderately rare. However, the location of such sites in the fens, where prehistoric material is usually buried beneath several metres of alluvium, makes these sites regionally important.

Romano-British rural settlement and saltern sites are common features of the fenland landscape and their distribution has been well-documented (Phillips 1970). However, very few Romano-British settlements have been examined in enough detail to ascertain the nature and economy of settlement within the Fens.

Documentation:
Numerous archaeological finds have been made on and in close proximity to the route of the pipeline. Records of these sites and finds are kept in the Lincolnshire Sites and Monuments Record and the parish files of the Heritage Trust of Lincolnshire. Previous archaeological investigations on and in proximity to the site are the subjects of several reports. Furthermore, the area of investigation has been subject to intensive archaeological survey (Phillips 1970; Hayes and Lane 1992).

Additionally, some historical documentation and cartographic evidence exists, although tends to date from Post-medieval times onwards.

The present report provides a synopsis of the historical and archaeological evidence for the area of investigation.

Group value:
Prehistoric activity has been identified although the nature of material remains indeterminate. However, the presence of prehistoric material in the Fens increases group value.

Romano-British activity is typified by field systems and settlement enclosures that, in complement, have moderate group value. This is further enhanced by possible industrial remains in the form of salt-making sites of both Roman and Iron Age date.

Survival/Condition:
Previous archaeological intervention in proximity to the route of the pipeline have demonstrated that survival of archaeological remains is fairly good. However, it has been noted that ploughing has had a detrimental effect at some localities.

Fragility/Vulnerability:
Any development is likely to impact the investigation area, possibly into natural strata. Consequently, any and all archaeological deposits present along the pipeline route are extremely vulnerable.

Diversity:
Moderately high period diversity is provided by the remains Late Neolithic to Romano-British activity in close proximity. Post-medieval activity is also recorded along the pipeline route, though largely of 19th century character.

Functional diversity is high with general settlement, industrial (salterns) and agricultural evidence of Romano-British and later date. The nature of prehistoric activity in the area has not yet been determined.

Potential:
Potential exists for prehistoric activity, associated with 'islands' to be found along the pipeline route. Furthermore, any deep excavations have the potential to expose the prehistoric land surface which normally lies at depth below later alluvium.

The plots of settlements and agricultural boundaries of the Romano-British period demonstrate that these features will be disturbed by the construction of the pipeline.

Although no Saxon activity has been recognised, potential for revealing the route of the *Midfendic* is possible along the southern part of the proposed pipeline route.

8.1 Site Importance

In summary, the criteria for assessment have established that Romano-British settlement and saltern sites are locally important, and can be expected to augment the understanding of the origins and development of local settlement. However, such sites can be expected to further enhance the knowledge of economic and cultural activity for this period, and are thus regionally important.

Prehistoric remains have been identified from along the pipeline route. The nature of these sites cannot be fully determined due to the limited fieldwork carried out on them. However, such sites are considered to be very important both regionally and nationally.

The pipeline may well disturb deposits associated with Roman watercourses, including the Rippingale canal, and also the *Midfendic*.

9. OPTIONS FOR FURTHER WORK

In consideration of the results of the assessment, several options for further work suggest themselves as most worthy of attention.

9.1 Rescue Priorities

Preservation of the archaeological deposits intact is, perhaps, the foremost rescue priority. This is achievable in only one section of the proposed pipeline route, along the parish boundary where an infilled dyke has the potential to protect archaeological deposits. All other areas appear to cross Romano-British field boundaries and preservation by record must be given due consideration. Prehistoric activity is not always discernable on the surface and due regard should be given to archaeological deposits of this date.

9.2 Research Priorities

Definition of the location and density of archaeological remains on the site is necessary for establishing research possibilities. Under appropriate site conditions, fieldwalking and/or geophysical survey may be used as tools towards defining the density of archaeological remains present in various parts of the

pipeline route.

Patterns of Late Neolithic to Romano-British occupation in the area, and geomorphological restrictions to such settlement, are not clearly understood. Consequently, any further archaeological investigations in the area should have regard for establishing the nature and location of settlements of the period, together with the topographic parameters in which it occurs.

10. CONCLUSIONS

The desk-top assessment has indicated that the area of land traversed by the route of the proposed water-pipeline contains remains of Prehistoric, Iron Age, Romano-British, Saxon and Post-medieval activity.

Regionally important Late Neolithic/Early Bronze Age activity has been located north of the proposed pipeline terminus at Parson Drove. Occupying slight rises that represent underlying glacial deposits, two such 'islands' exist within the area of investigation.

Regionally important Iron Age and Romano-British remains are common in the vicinity of the pipeline. Occupation of the Iron Age period is likely to be associated with salterns while, during the Romano-British period is likely to occur as small farmstead settlements and enclosures linked by droveways. Industrial activity, primarily salt-production, has also been identified in the region of the pipeline.

Saxon activity is restricted to the *Midfendic* which is believed to follow the course of the present South Forty Foot Drain.

Place-name evidence suggests that many of the settlements have a Scandinavian origin although some date to Saxon occupation of the area (AD 450-650). Physical evidence of such settlement is absent from the pipeline course, due to the freshwater fens that covered the low lying ground. This fenland continued as an uninhabited area until drainage and land reclamation took place in the 17th century.

Post-medieval activity is represented by the South Forty Foot Drain. The construction of this drainage feature led to the gradual development of farms along the pipeline route and eventually a school at Casswell's Bridge. Cartographic evidence indicates that the proposed course of the pipeline has been largely open land throughout the post-medieval period. In consequence, archaeological deposits present in the area are expected to survive in generally good condition, though intensive agricultural use of the land may have damaged archaeological remains that lie close to the surface.

11. ACKNOWLEDGEMENTS

Archaeological Project Services wish to acknowledge the assistance of Mr C. de Souza who commissioned the assessment on behalf of Anglian Water Services Ltd. This report was edited by Tom Lane and Gary Taylor co-ordinated the work. Paul Matthew produced the illustrations. Access to the Lincolnshire County Sites and Monuments Record was kindly provided by Mark Bennet and Sarah Grundy.

12. REFERENCES

All of the following sources were consulted in the data-gathering exercise. However, as some references duplicated information available in others, not all of them have been specifically referred to in the text.

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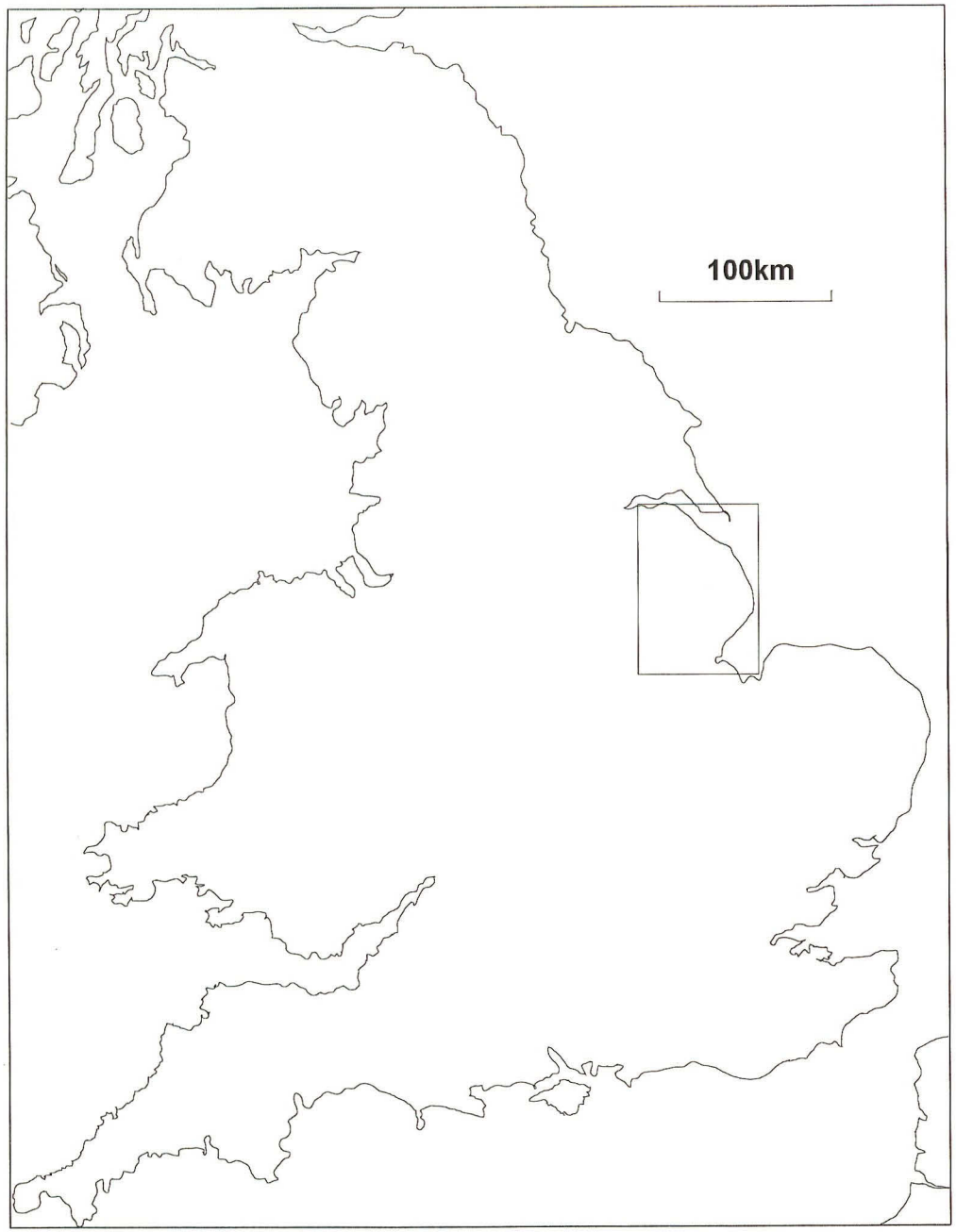
13. ABBREVIATIONS

CUCAP	refers to aerial photographs belonging to the Cambridge University Collection of Aerial Photographs.
DoE	refers to publications by the Department of the Environment.
HTL	Heritage Trust of Lincolnshire
SMR	refers to records maintained by the County Sutes and Monuments Record



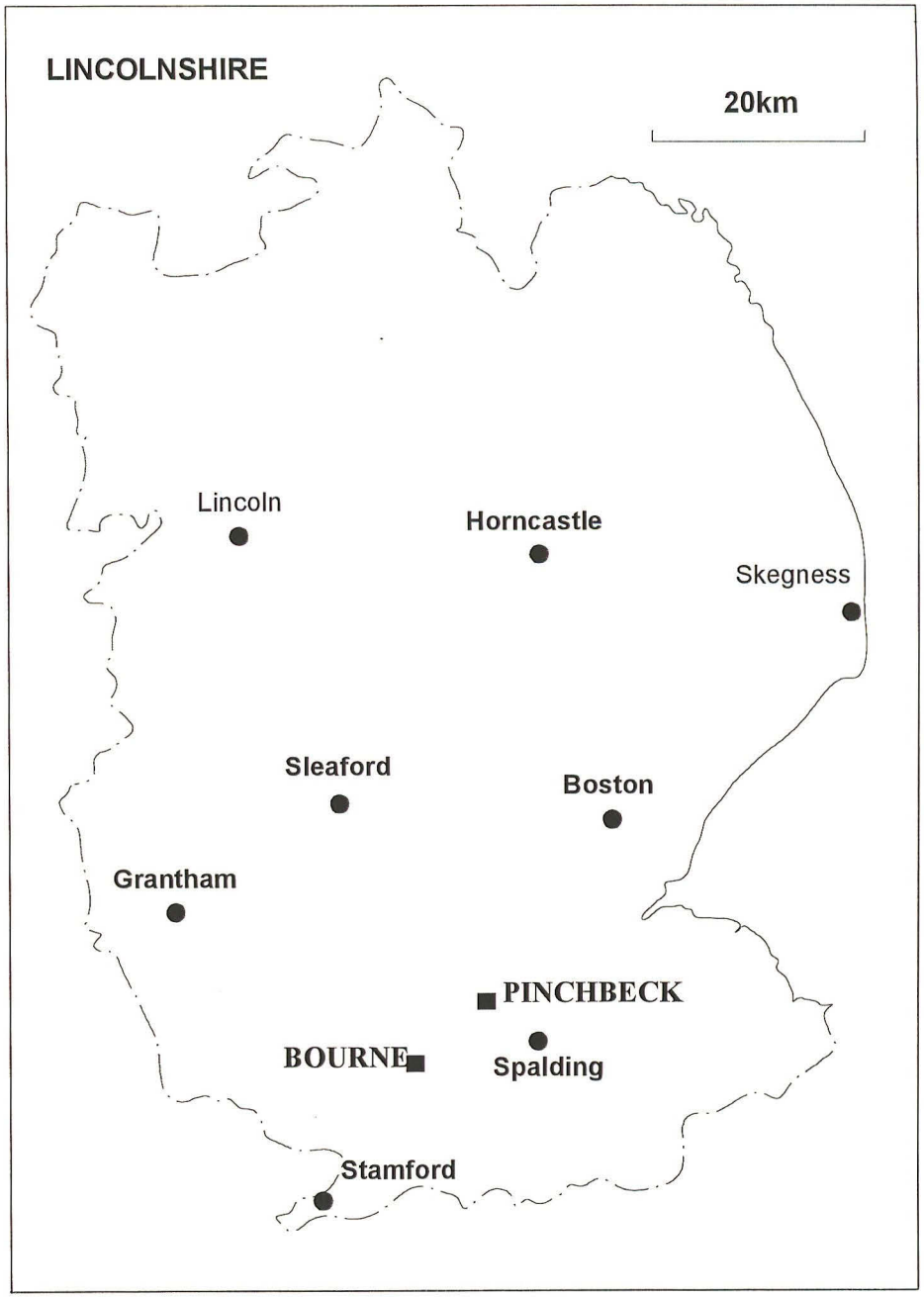


Figure 1 - General Location Plan

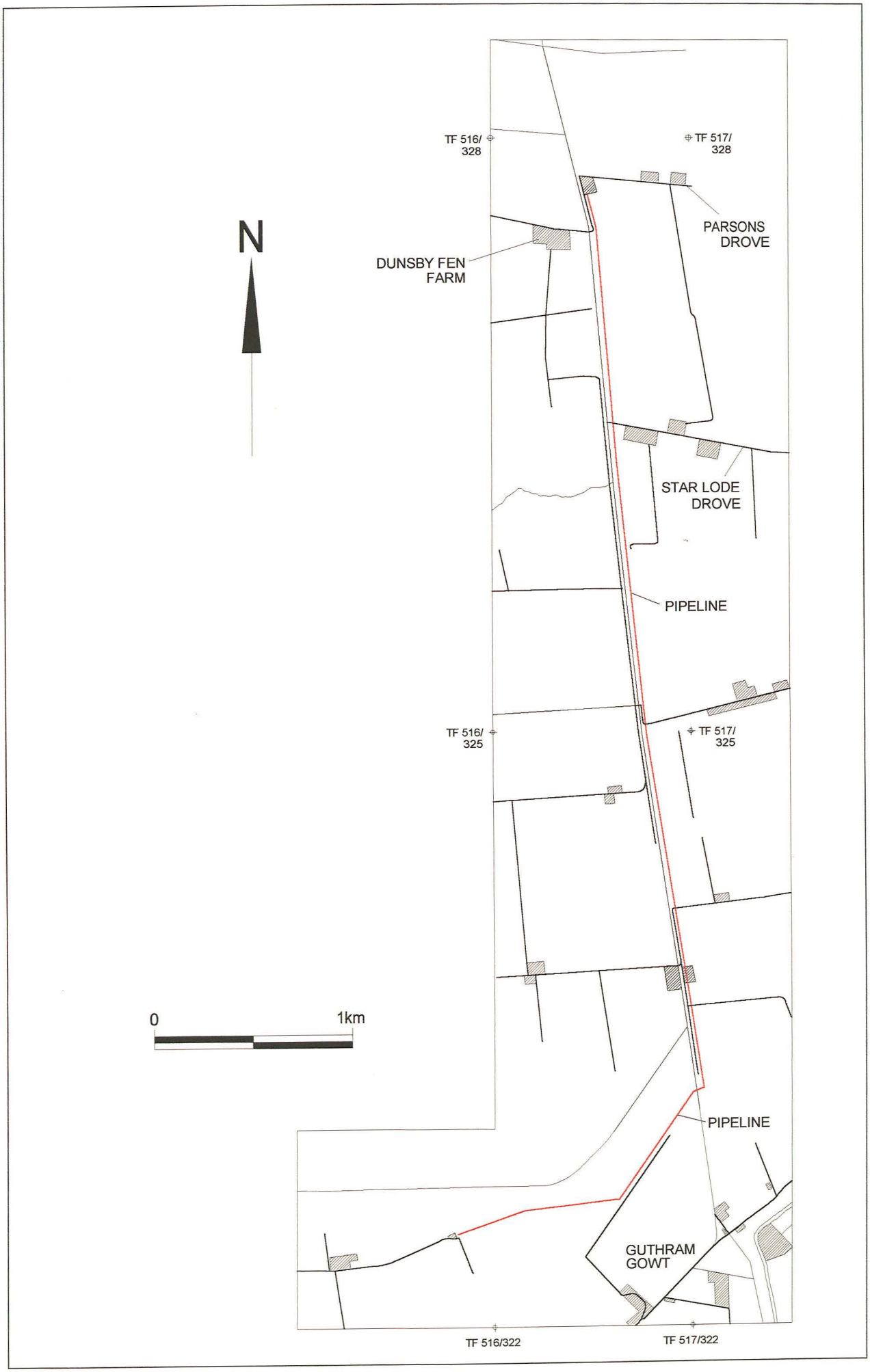


Figure 2 - Site Location Plan

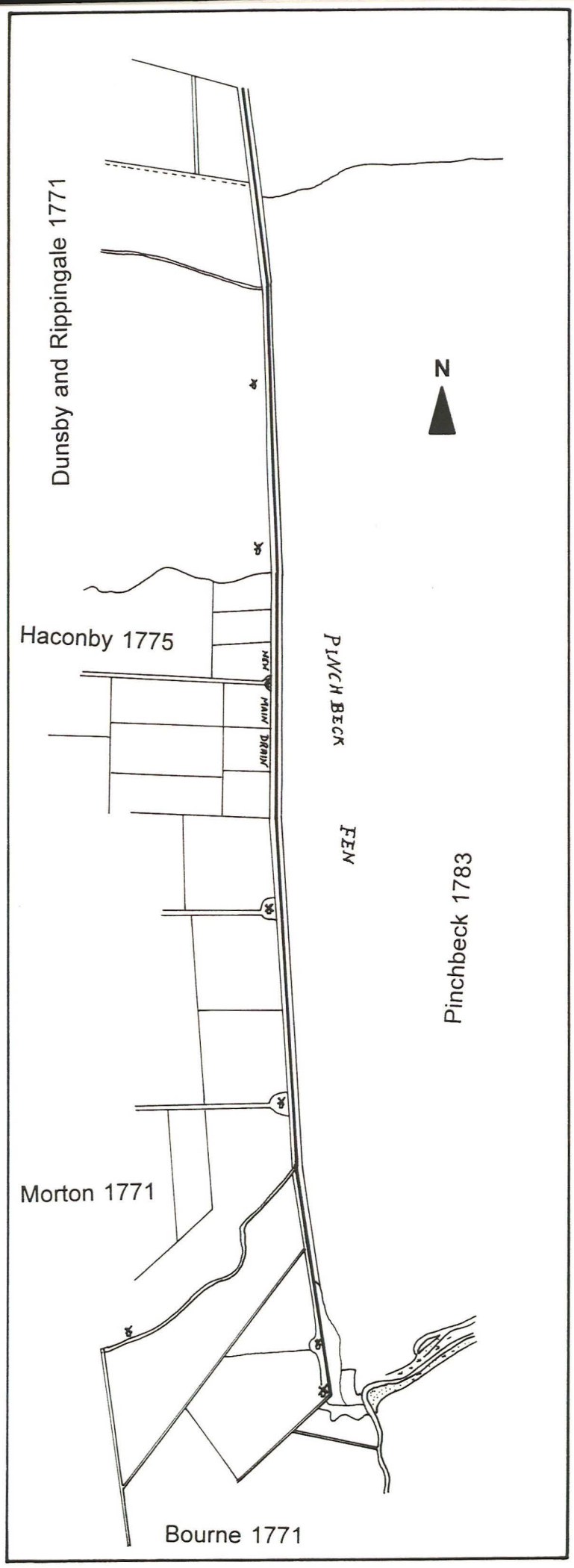


Figure 3 - Extract from Edward Hare's surveys.

(N.B. This represents an almagamation of five parish surveys taken between 1771 and 1783, the date of each parish is given next to the parish name)

(no scale available)

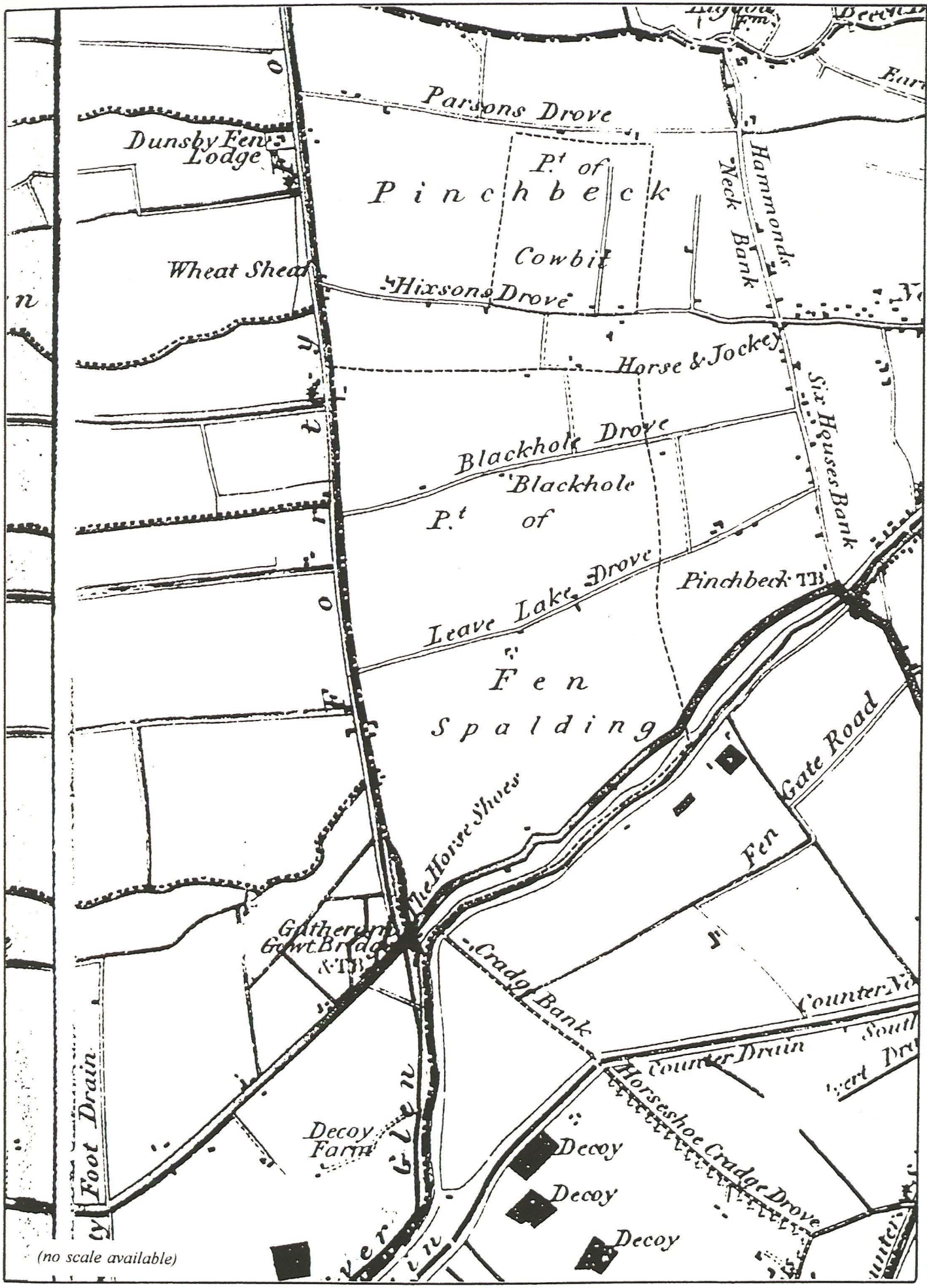


Figure 4 - Extract from Bryant's Map of the County of Lincoln, 1828

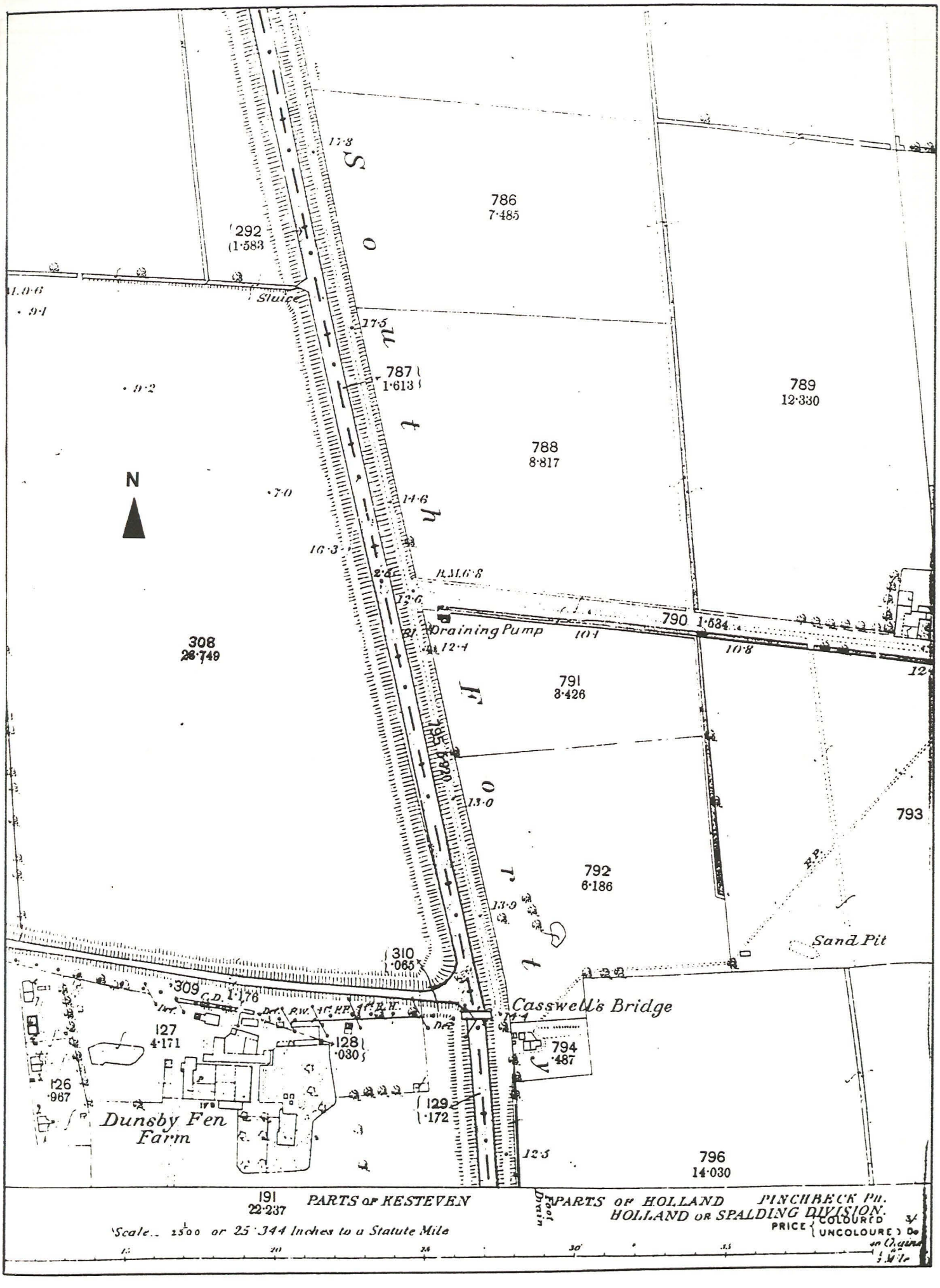


Figure 5 - Extract from 1st Edition Ordnance Survey Map, *c.* 1880. Dunsby Fen Farm Area

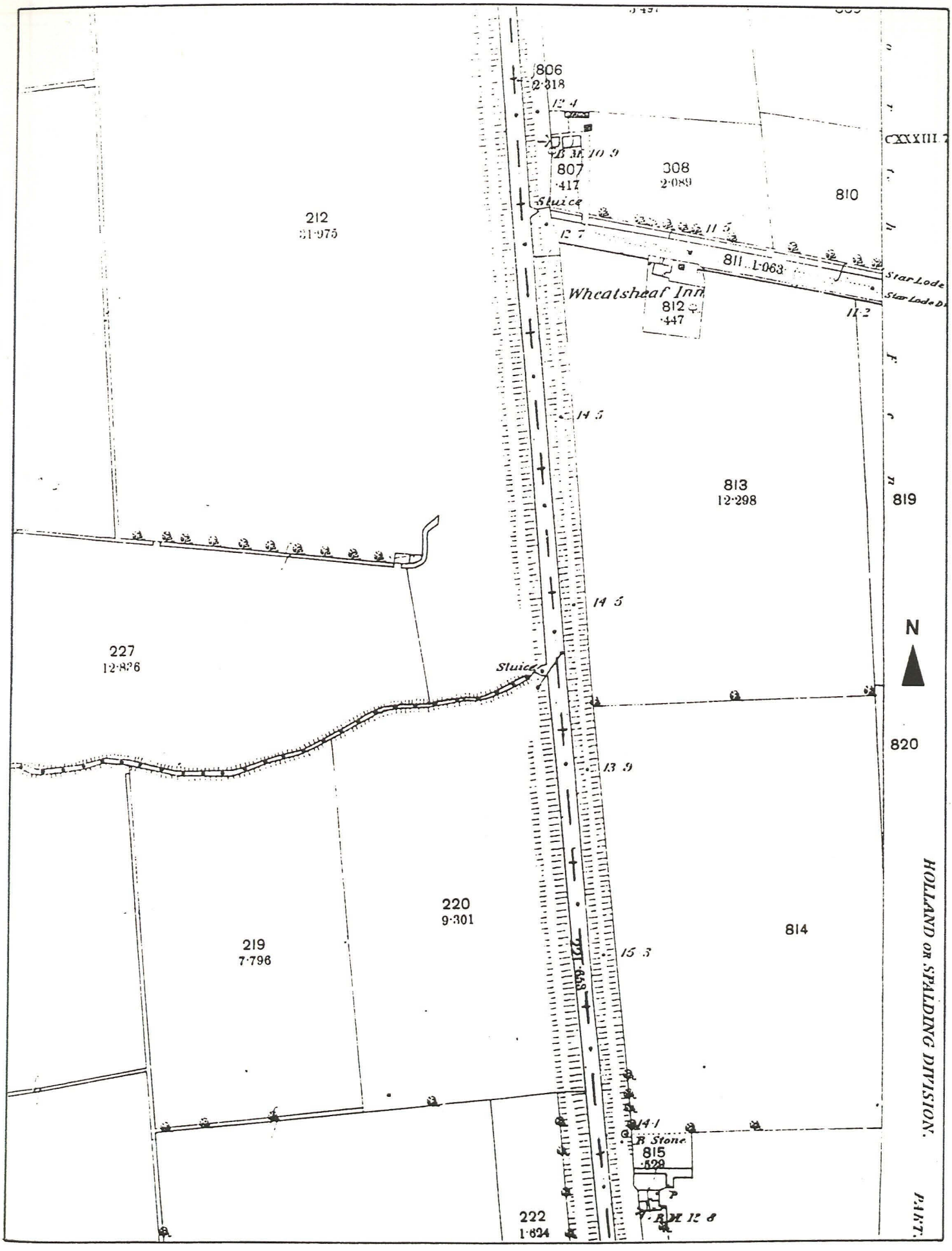


Figure 6 - Extract from 1st Edition Ordnance Survey Map, *c.* 1880. Star Lode Drove Area

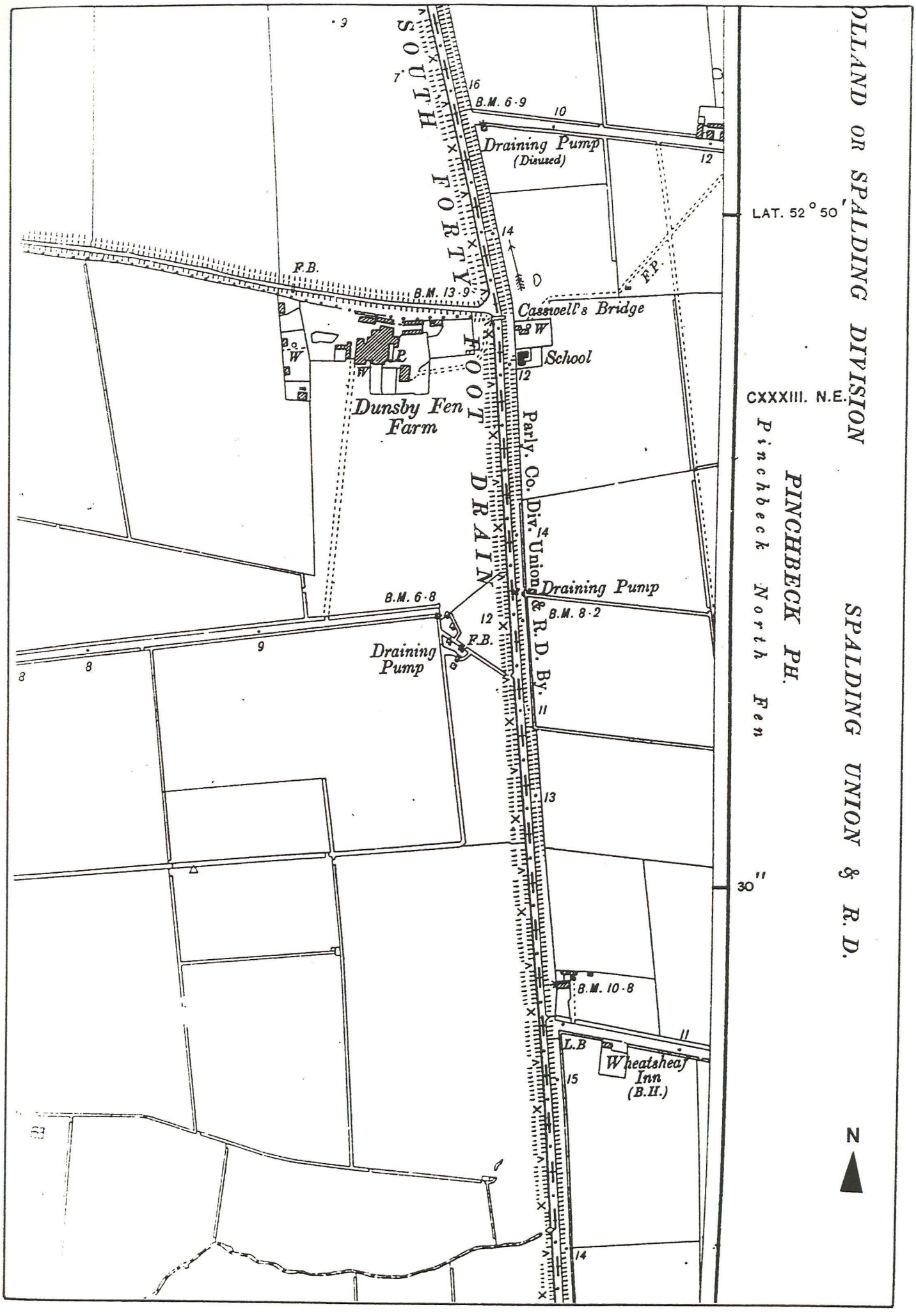


Figure 7 - Extract from 2nd Edition Ordnance Survey Map, 1902. Casswell's Bridge Area

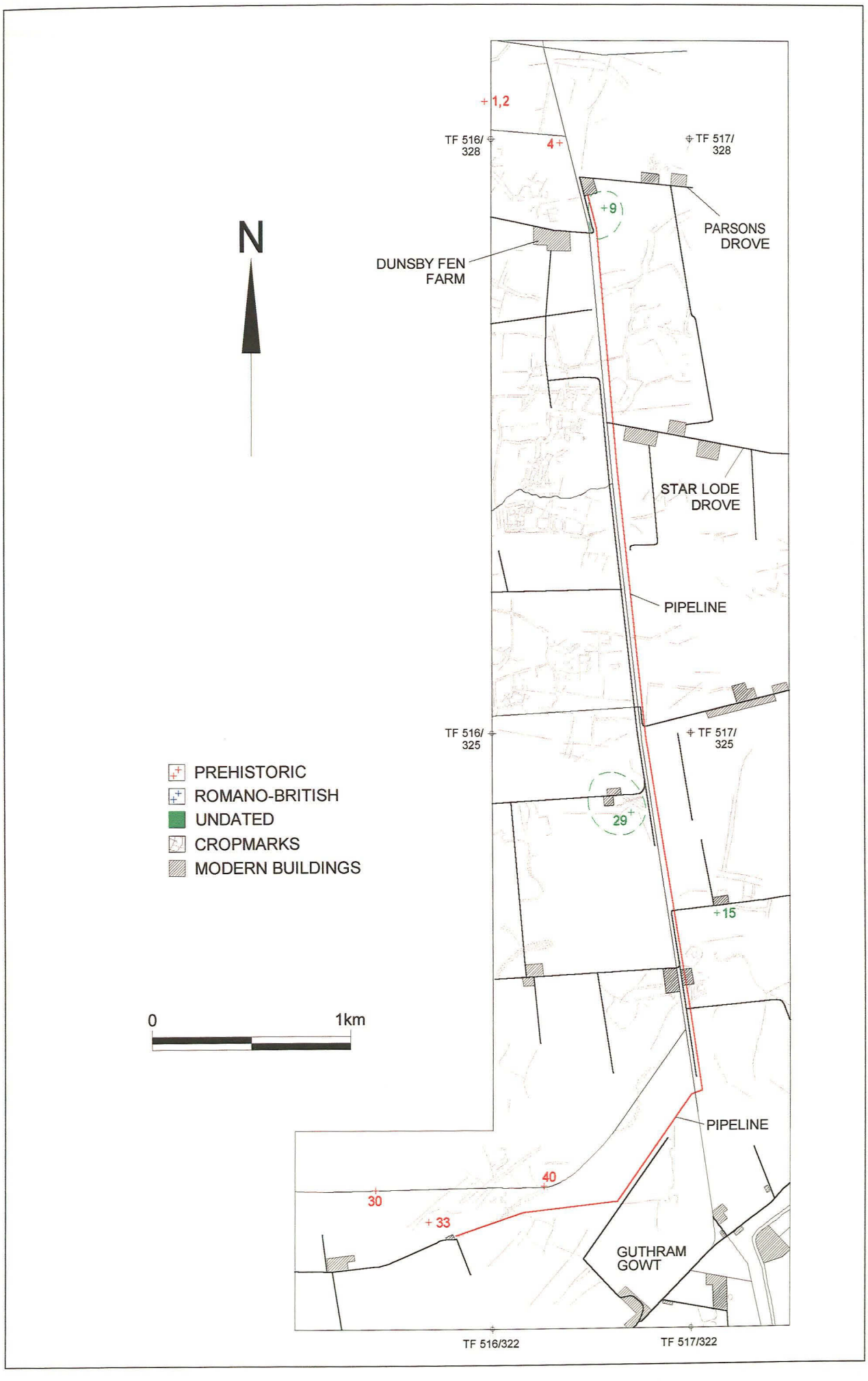


Figure 8 - Immediate Vicinity of the site with Prehistoric Archaeology

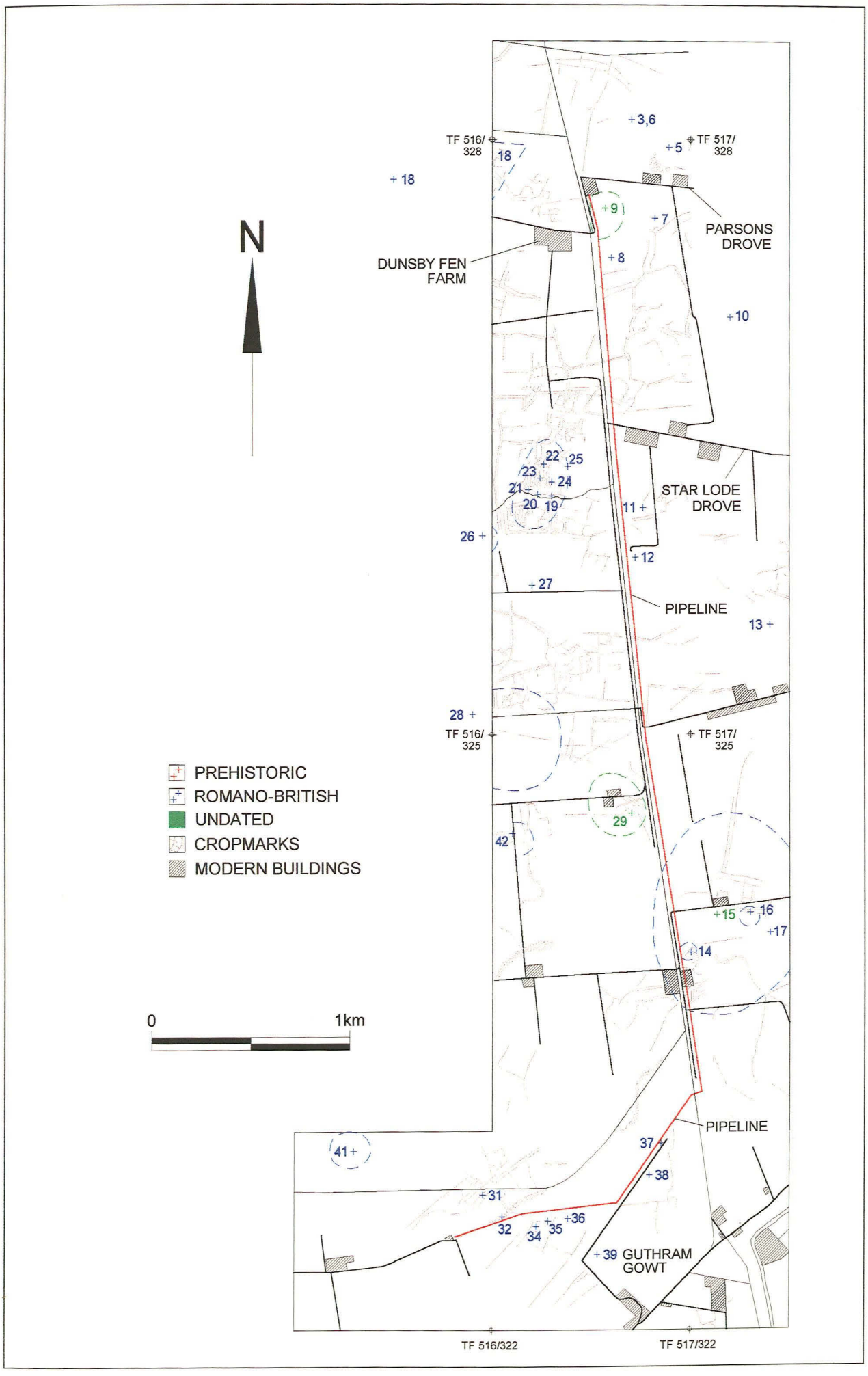


Figure 9 - Immediate Vicinity of the site with Romano-British Archaeology

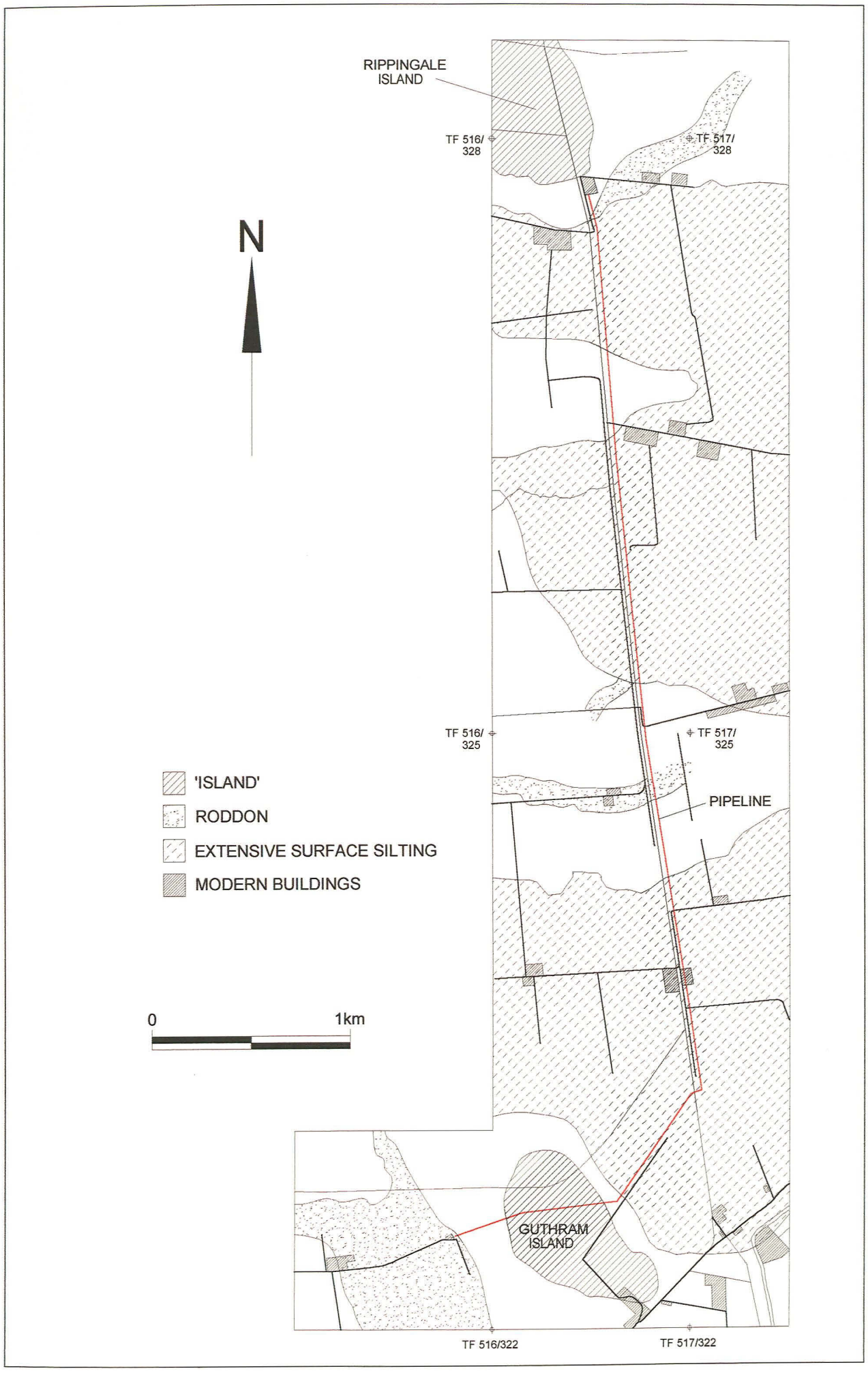


Figure 10 - Immediate Vicinity of the site with local Typography

Plate 1 - Aerial view of the northern extreme of the proposed pipeline route. The infilled channels of former creeks or 'roddons' can be seen as lighter soil marks over the landscape. The darker, linear bands represent archaeological features, probably former field boundaries. (CUCAP: RC8-EY 45)

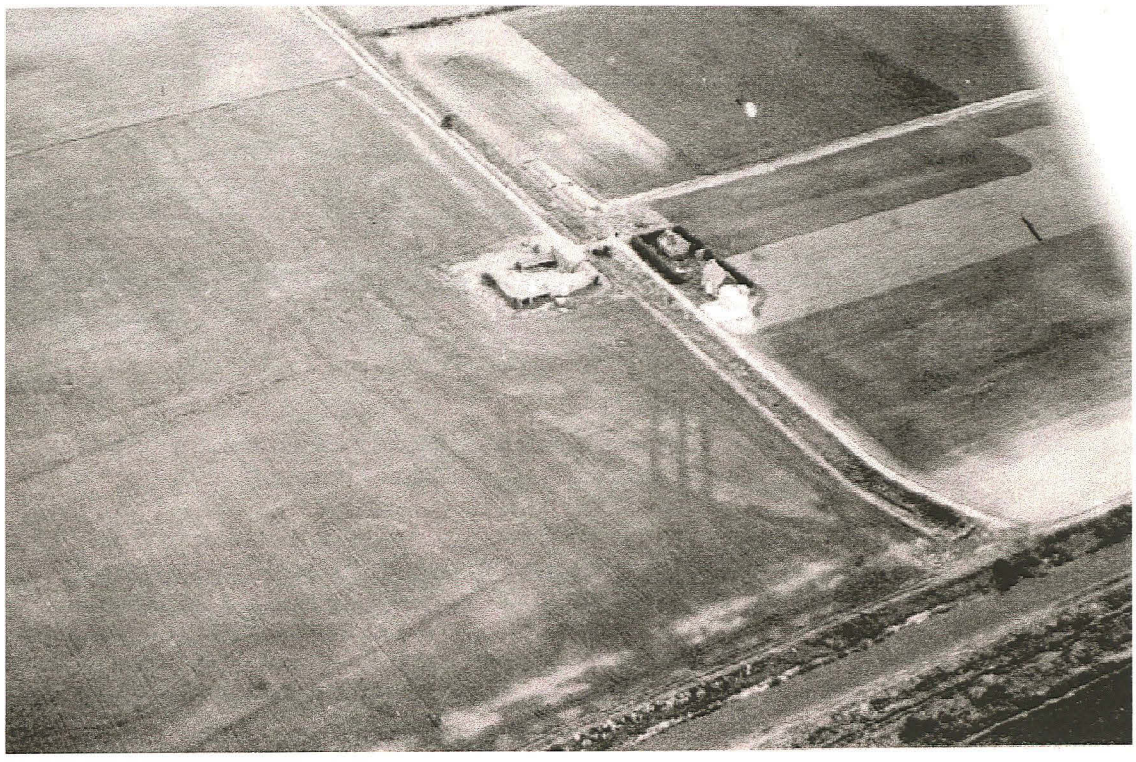


Plate 2 - Aerial view of the triple ditch boundary (Site 29 on Figs. 8 and 9). Looking northwest, this feature is cut by the South Forty Foot Drain (bottom right of photo) and may continue eastwards where it is crossed by the proposed pipeline route.

Appendix 1

BRIEF FOR AN ARCHAEOLOGICAL DESK-TOP ASSESSMENT

SITE: Bourne to West Pinchbeck Pipeline
COMPANY: Anglian Water
LOCATION: Bourne & Pinchbeck
PLANNING APP. NO.: N/A

1. Summary

1.1 This document is the brief for archaeological desk-top assessment of the route of a new pipeline from Spinney Farm, Bourne to Casswell Bridge, Pinchbeck on behalf of Anglian Water.

1.2 This brief should be used by archaeological contractors as the basis for the preparation of a detailed archaeological project specification. In response to this brief contractors will be expected to provide details of the proposed scheme of work, to include the anticipated timescales, staffing levels and sources of information.

1.3 The detailed specification will be submitted for approval of the Archaeological Officer of Lincolnshire County Council. If more than one, the client will be free to choose between those specifications which are considered to adequately satisfy this brief.

2. Site location and description

2.1 The route of the new pipeline, approximately 6000m, crosses the parish of Bourne in South Kesteven and Pinchbeck in South Holland District. The line starts from land near Spinney Farm at NGR TF15802250 from where it will head east to the South Forty Foot Drain at NGR TF17002315. The line then goes north along the east side of the South Forty Foot Drain to the water works at the junction of Parson Drove, NGR TF16512770.

2.2 This area is predominantly a transitional landscape zone where there is a merging of clay fens to the west and the flat siltlands to the east comprising deposits of silts and silty clays.

3. Planning background

3.1 Consultation from Anglian Water regarding this pipeline was made to the Lincolnshire County Council Archaeology Section. It was agreed that a desk-top assessment of the route of the pipeline should be carried out in order to mitigate the impacts of the line on any archaeological remains.

3.2 The exact line of the pipeline route is not yet fixed and there is scope for variation. The pipe diameter is 600mm laid by open cut method with a 1.2m depth of cover. The working width of the line is to be 20m wide with a width of stripped topsoil of 10m.

4. Archaeological background

4.1 This is an archaeologically rich area which has good aerial photographic coverage and was part of the area included in the English Heritage funded Fenland Survey.

4.2 Finds of prehistoric date (Mesolithic to Bronze Age) have been made in the vicinity of the route, particularly to the north of Parson Drove, as well as Iron Age saltmaking sites around Guthram in Bourne.

4.3 There is good evidence for Roman period settlement and saltmaking sites along both sides of the South

Forty Foot Drain from the Fenland Survey and from aerial photographic evidence although marine silt and clay covers much of the landscape making identification and interpretation of sites problematic.

5. Requirements for work

5.1 Prior to this scheme of development being undertaken a detailed desk-top assessment must be carried out. Any adjustments to the brief for the assessment should only be made after discussion with the County Archaeological Officer.

5.2 The purpose of the archaeological desk-top assessment should be to examine existing information in order to establish the likely archaeological potential of the site and particuarly the expected survival and quality of any archaeological remains. The results of this assessment should seek to enable a decision on whether further information can reasonably be required through implementing a designed field evaluation.

5.3 In particular the project should seek to establish the presence of archaeological sites along the route and the probability of further sites being encountered as well as implications of moving the line of the pipeline.

6. Methods of work and techniques

6.1 The desk-top assessment should include an assessment of the site within the local, regional and national context. It should highlight any particular relevant research priorities which may be addressed by this project.

6.2 In order to ensure that all possible archaeological constraints are evaluated all secondary sources must be consulted as part of the desk-top assessment. Sources to be consulted should include:

6.2.1 the Lincolnshire Sites and Monuments Record;

6.2.2 all Ordnance Survey maps;

6.2.3 Tithe, Enclosure Award and Parish maps (where available);

6.2.4 historical documents, particuarly those held by Lincolnshire Archives Office;

6.2.5 archaeological books and journals;

6.2.6 unpublished reports and archives (where appropriate), particuarly that of the Fenland Survey;

6.2.7 aerial photographs;

6.2.8 a survey of available borehole and other geophysical and/or geotechnical information;

6.2.9 any other sources deemed apprpriate;

6.2.10 a visit to verify site conditions

6.3 The specification will be expected to contain:

6.3.1 a projected timetable of work

6.3.2 The staff structure and numbers.

6.3.3 Conventions to be used in the representation of survey information and methods of plotting aerial photographs.

7. Reporting requirements

7.1 The report of the desk-top assessment must:

7.1.1 summarise all available information;

7.1.2 sprovide a comprehensive list of all sources consulted, along with an explanation if sources detailed in paragraph 6.3 above are not consulted;

7.1.3 provide plots of fieldwalking and aerial photographic information within a 100m width east from the south Forty Foot Drain at a suitable scale to allow for movement of the pipeline route to be made accurately. A scale of 1:1250 has been suggested and acquisition of suitable maps should be discussed with Anglian Water.

Brief prepared by Jim Bonnor, Assistant Archaeological Officer, Lincolnshire County Council, 13th March 1997

Appendix 2

SECRETARY OF STATE'S CRITERIA FOR SCHEDULING ANCIENT MONUMENTS

Extract from *Archaeology and Planning* DoE Planning Policy Guidance note 16, November 1990

The following criteria (which are not in any order of ranking), are used for assessing the national importance of an ancient monument and considering whether scheduling is appropriate. The criteria should not however be regarded as definitive; rather they are indicators which contribute to a wider judgement based on the individual circumstances of a case.

i *Period*: all types of monuments that characterise a category or period should be considered for preservation.

ii *Rarity*: there are some monument categories which in certain periods are so scarce that all surviving examples which retain some archaeological potential should be preserved. In general, however, a selection must be made which portrays the typical and commonplace as well as the rare. This process should take account of all aspects of the distribution of a particular class of monument, both in a national and regional context.

iii *Documentation*: the significance of a monument may be enhanced by the existence of records of previous investigation or, in the case of more recent monuments, by the supporting evidence of contemporary written records.

iv *Group value*: the value of a single monument (such as a field system) may be greatly enhanced by its association with related contemporary monuments (such as a settlement or cemetery) or with monuments of different periods. In some cases, it is preferable to protect the complete group of monuments, including associated and adjacent land, rather than to protect isolated monuments within the group.

v *Survival/Condition*: the survival of a monument's archaeological potential both above and below ground is a particularly important consideration and should be assessed in relation to its present condition and surviving features.

vi *Fragility/ Vulnerability*: highly important archaeological evidence from some field monuments can be destroyed by a single ploughing or unsympathetic treatment; vulnerable monuments of this nature would particularly benefit from the statutory protection that scheduling confers. There are also existing standing structures of particular form or complexity whose value can again be severely reduced by neglect or careless treatment and which are similarly well suited by scheduled monument protection, even if these structures are already listed buildings.

vii *Diversity*: some monuments may be selected for scheduling because they possess a combination of high quality features, others because of a single important attribute.

viii *Potential*: on occasion, the nature of the evidence cannot be specified precisely but it may still be possible to document reasons anticipating its existence and importance and so to demonstrate the justification for scheduling. This is usually confined to sites rather than upstanding monuments.

Appendix 3

GLOSSARY

Anglo-Saxon	Pertaining to the early part of the Saxon period and dating from approximately AD 450-650.
Bronze Age	Part of the prehistoric era characterised by the introduction and use of bronze for tools and weapons. In Britain this period dates from approximately 2000-700 BC.
Cropmark	A mark that is produced by the effect of underlying archaeological features influencing the growth of a particular crop.
Geophysical Survey	Essentially non-invasive methods of examining below the ground surface by measuring deviations in the physical properties and characteristics of the earth. Techniques include magnetometery survey and resistivity survey.
Droveway	Area between two parallel ditches that was designed specifically for the corralling of livestock.
Enclosure	Area bounded by a ditch along the majority of its perimeter.
Iron Age	Part of the prehistoric era characterised by the introduction and use of iron for tools and weapons. In Britain this period dates from approximately 700 BC - AD 50.
Medieval	The Middle Ages, dating from approximately AD 1066-1500.
Natural	Undisturbed deposit(s) of soil or rock which have accumulated without the influence of human activity.
Neolithic	The 'New Stone Age' period, part of the prehistoric era, dating from approximately 4000-2000 BC.
Post-medieval	The period following the Middle Ages, dating from approximately AD 1500-1800.
Prehistoric	The period of human history prior to the introduction of writing. In Britain the prehistoric period lasts from the first evidence of human occupation about 500,000 BC, until the Roman invasion in the middle of the 1st century AD.
Romano-British	Pertaining to the period dating from AD 43-410 when the Romans occupied Britain.