Chapter 6: *Discussion*

The Archaeological Sequence

This final chapter draws together the excavated evidence and discusses the remains found at Pode Hole in relation to the project aims as outlined in Chapter 1. Chapters 2 and 3 identified factors which have impacted upon the archaeology of Pode Hole, namely ground truncation, dewatering and post-depositional disturbance. In addition, the scarcity of datable artefacts and stratigraphic sequences between features hindered attempts to construct a narrative of the site's development. The potential impact of these biases must be borne in mind when considering the success of the project in fulfilling its research aims. Nevertheless, the emphasis of this chapter is to show that Pode Hole has made an important contribution to understanding how the Bronze Age inhabitants of the Fen-edge lived and how they fared in managing the resources of an environment that they themselves had partly created.

The later Bronze Age produced the greatest intensity of archaeological remains at Pode Hole, and the population was presumably thriving and relatively prosperous during this period. However, this activity did not suddenly occur in an undisturbed landscape, and despite the problems outlined above, a broad chronological sequence to the archaeology may be discerned. The first part of this chapter uses the archaeological development of the site to provide a framework for a discussion of the research themes identified in Chapter 1. A concluding discussion of perhaps the most informative evidence from Pode Hole, that relating to its Bronze Age economy and environment, then follows.

The barrow cemetery

The Early Bronze Age and preceding periods are not well represented in the archaeological record at Pode Hole quarry. In common with other sites in the vicinity, the excavation of Pode Hole has revealed only minimal traces of occupation and settlement at the turn of the third and second millennia BC.

The alignment of four ring-ditches forms the earliest landscape unit at Pode Hole, and the most substantial evidence of activity from this period. A barrow lying on the south-west extension of this alignment was excavated in 1996 (Cuttler and Ellis, 2001). Traces of three cremations were found dug into and next to that mound. Human remains were also found in association with Ring-ditch 1. It is because of the presence of these remains that all of the ring-ditches found within the project area have been interpreted as truncated barrows, and the ensemble interpreted as a barrow cemetery, extending for more than 700m. At least four further barrows have now been recorded at Bar Pasture Farm, approximately 0.5km to the south-west forming a continuation of this group (Richmond, pers. comm.).

However, a degree of dissimilarity is evident amongst the features that comprise this alignment. The barrow excavated by BUFAU in 1996 was unditched and was present as an upstanding earthwork, which measured around 25m in diameter and survived to a height of 0.25m. By contrast, those barrows revealed in the project area existed only as ring-ditches. Ring-ditches 1, 3 and 4 measured approximately 26m, 19m and 13m in diameter respectively. Ring-ditch 2 was an altogether slighter feature, consisting of an interrupted enclosure ditch never more than 10m in diameter. There is therefore the possibility that these features were not closely contemporary in construction, and may not even have served the same purpose.

The finds allude to a funerary function for Ring-ditch 1 at least: the left femur of an adult and four fragments of an adult cranial vault were recovered from features that cut it. In addition, a crouched burial of a young adult, oriented south to north (the head to the south) was found nearby. The pit cluster cutting Ring-ditch 1 also produced the only metalwork from the project area, and it is possible that these items are grave goods disturbed from their original context.

The location of the ring-ditches in the Early Bronze Age would have positioned them close to the contemporary Fen-edge. Deposits of alluvial clay revealed during excavation along the southern and eastern edge of the project area suggest that the Fen-edge was further inland at this time. The liminal location on the shifting margin between wet and dry land may have been deliberately chosen for these monuments, where passage from the world of the living to the world of the dead was perhaps envisaged. The alignment of ring-ditches thus accentuates a natural boundary, rather than creating an artificial one.

Following their construction, these features seem to have maintained their importance in the landscape for a considerable time. An effort was made to connect Ring-ditch 1 to the field system, and this monument, along with Ring-ditch 4, was later targeted by waterhole pit construction. This repeats the sequence recorded nearby at Fengate, at the Storey's Bar Way sub-site (Pryor, 2005, p.75-78). Whilst not all ring-ditches were slighted by waterhole pits, and not all waterhole pits were dug into ring-ditches, three incidences of this sequence (that the present writer knows of) does suggest meaning and intention at work, rather than mere coincidence.

All of the waterhole pits cutting ring-ditches were positioned squarely over the ring-ditch; they do not appear to represent an incidental or glancing blow. It would therefore appear that the pits were deliberately positioned, although the significance of this action is difficult to determine. The people who dug the pits may have been seeking to signal their lack of respect for the ring-ditch by digging into it, and therefore marking a deliberate break with the past. Conversely, they may have been seeking to 'bless' their feature by physically linking it to a pre-existing and revered monument. Whether the superimposition of waterhole pits onto ring-ditches signifies a reverential or a hostile attitude to the earlier features, it seems apparent that the action stems from an awareness of the special and continuing significance of ring-ditches.

A more prosaic interpretation is, however, also possible. The low ground of the ring-ditch base may have been chosen as the location for a waterhole pit, as it represented a 'head start' for the pit diggers, and allowed the water table to be reached with the minimum of effort.

Early Bronze Age occupation

The ring-ditches may have been monuments to the dead, but the remains of the living community, those who constructed the ring-ditches and lived alongside them, are altogether less apparent. Archaeological remains suggest the contemporary population may have been slight or transient and was probably both.

In the area around Pode Hole, evidence of Early Bronze Age occupation is present, and typically occurs as small artefact-bearing pits (e.g. Patten, 2003, p.10, Beadsmoore, 2005, p.64-66). Similar features, containing late Neolithic/ Early Bronze Age material and Beaker material, were found sealed beneath the barrow excavated by BUFAU in 1996. This date was reinforced by a radiocarbon date of 2340 BC to 2130 cal BC (Cutler and Ellis, 2001, p.23-24). Immediately north of Pode Hole, a similar radiocarbon date was obtained from a waterhole pit from the Thorney Borrow Pit site, which also yielded Early Bronze Age pottery (Phoenix Consulting Archaeology, 2007). Just to the south of Pode Hole lay Guy's Fen trackway. This was found associated with the deposition of the older Barroway Drove Bed fen clay, and represents a footpath '*built across shallow salt marsh conditions in the late third or early second millennium BC*' (French and Pryor, 1993, p.90).

The remains at Pode Hole were meagre even in comparison with these other finds, although certain comparisons can be drawn. Pit and Scoop Cluster 2 formed a north-west to south-east alignment, as did the alignment of Collared Urn pits recorded nearby at Tanholt Farm (Patten, 2003, p.18). In both cases, the pit alignment shared the line of the later field system, and it is possible that pits were used at this period to mark boundaries that were later more obviously marked by ditches. It is possible that the pits marked certain key locations in the Late Neolithic to Early Bronze Age landscape, locations that were subsequently marked by significant elements of the rectilinear field system. Pit and Scoop Cluster 1 was located adjacent to the area where a double-ditched boundary associated with the fragmentary fields intersected the cardinal boundary. Unfortunately, a lack of stratigraphic relationships and the sparseness of datable artefacts prevent this apparent landscape evolution being more fully understood. Pit-digging and artefact deposition in the Early Bronze Age are often interpreted as evidence of small-scale temporary seasonal occupation, or ceremonies concerning negations over land access and tenure (e.g. Lewis and Brown, 2006, p.91), but the evidence from Pode Hole is too slight to explore this theory.

Finds of CP1 pottery, the quantity of secondary and unstratified material recovered from the project area, in particular the flint assemblage, along with the funerary monuments, does bear witness to human activity at Pode Hole during the early second millennium BC. Yet, in common with other comparable sites in the region, of the people themselves, one is left with nothing more tangible than 'a sense of a presence in the landscape'.[1]

Later Bronze Age land division

As described in Chapter 3, at some point in the Middle Bronze Age, the enclosure of the Fen-edge embayment around Thorney island into a series of ditched fields began. The pollen studies suggest that during the second millennium BC the tree cover over the site declined (Langdon and Scaife, this report), and this may well be a result of the clearance and enclosure of the land that this period witnessed.

Character of the ditches

Individual fields were defined by segments of boundary ditch of various lengths. Fields could be defined by lengths of ditch that measured anything from in excess of 250m long to only 3m. Field boundaries also contained many interruptions. It is probable that the remains of slighter ditches or complementary boundary features such as fence lines or hedges, which would have completed this system, have been lost to ground surface erosion.

Typically the ditched boundary features were between 1 and 1.5m wide, just less than 0.5m deep and contained a single fill, which was almost always artefactually sterile. Where perpendicular sections of ditch converged, a gap was usually present, which further frustrated efforts to phase the development of the archaeology of the project area. Such gaps may have originally functioned as entranceways, although ditch termini may have abutted now-vanished banks.

1. Lecture by Alison Dickens on the Cambridge Archaeological Unit excavations at Langtoft quarry, given at Lincoln, 6th October 2007.

The generally shallow profile of the ditches meant that they did not penetrate the water table of the site, and so anaerobic soil conditions did not develop within them. This has adversely affected the survival of any organic artefacts present in the ditches and has probably distorted finds evidence from them. This perhaps creates a false contrast between the sterility of the ditches and the apparent richness of the deeper anaerobic waterhole pits.

The profiles of the ditches that made up the system were variable. Bowl-shaped or shallow U-shaped profiles, occasionally somewhat irregular, were typical. Recutting was only rarely recorded, but the slightly irregular profiles could also be evidence of this. Overall, there was no evidence of widespread seasonal recutting of the system.

Other characteristics of the Pode Hole field system were that double-ditched boundaries around fields were occasionally present, fields were generally straight-sided (although some meandering was evident), and ditches often 'kinked' at their termini. A 55m interval was a recurring, but not ubiquitous, unit of land measurement. Such an interval was present in Fields 1, 2, 8 and 9, and was also recorded in elements of the same field system exposed nearby on the Thorney Borrow Pit site (Phoenix Consulting Archaeology Ltd, 2007).

The overall impression is of a rectilinear, though not strictly gridded, pattern of land division. Such rectilinear field systems are commonly encountered around the prehistoric Fen-edge, and there is a growing awareness of their great extent throughout southern and eastern England (Yates, 2007).

Function of the ditches

Often consisting of short interrupted lengths of ditch, it would seem that the field boundaries were not initially intended to act as a drainage system, whereby each ditch would lead to a larger conduit designed to channel water away from the fields and out to the open Fen. Instead, it is thought that the ditches, whilst taking some drainage, principally served as quarries for linear banked boundaries that supported hedges. The existence of hedges within the project area is suggested by the presence of common hedgerow species such as brambles, elder and hawthorn within plant macrofossil and pollen assemblages, and also in the form of coppiced wood (Rackham, this report; Taylor, this report). This evidence complements that recovered from the Thorney Borrow Pit site (Phoenix Consulting Archaeology Ltd, 2007, Chapter 3). Thus, field boundaries were marked not only by ditches, but also by banks, and probably hedges also. Piecemeal repairs to short lengths of this system would explain the somewhat intermittent evidence of recutting that the field boundary ditches contain.

Well-managed hedges can provide a ready supply of fuel wood, fruit, nuts, bird's eggs and useful herbs, as well as animal fodder for winter feed (Williamson, 2002, p.36-39) and the area's Bronze Age inhabitants were seemingly aware of this. The plant macrofossil assemblage and pollen sequences recovered from Pode Hole reveal that wild foods such as hazelnut and fruits of plum/sloe/cherry type (*Prunus* sp.) were both locally available and exploited. The field boundaries would therefore have had a valued role in the subsistence economy of the area, and had functions beyond penning in livestock and defining parcels of land. Equally, they would have been more bustling and colourful than the drab grey runnels that were encountered during archaeological excavation.

Development of the field system

As outlined in Chapter 3, three basic stages have been identified regarding the development of the field system. Initially, the cardinal boundary was set out. This followed the path and alignment of a barrow cemetery which itself followed the north and western shore of a Fen-edge embayment. By following the path of the ring-ditches, the field system was therefore precisely based on a significant axis of the earlier monumental landscape. The notional link between the two patterns of land-use was manifested physically by the excavation of a length of ditch between Ring-ditch 1 and the cardinal boundary. Subsequent to the creation of the cardinal boundary large rectangular fields (Fields 1-4) were set out perpendicular to it. The field system at this stage would appear to represent a 'cohesive' pattern of land division (Fleming, 1989, p.151), regular and centrally planned and imposed. Later, to judge by form and dating from finds, the smaller Fields 5 to 10, and Enclosures 1 and 2, were added, marking an 'aggregate' (ibid.) extension to the existing framework of the initial cohesive plan. Significantly, the extension of the initial rectilinear field system was not marked by any great subdivision of its constituent units; only Field 4 shows any evidence of subdivision, and this is slight and fragmentary. This would suggest that the desire for more enclosed land that perhaps drove the creation of the later elements of the system was not so great as to force the breaking up of its larger original units into settlement areas and smaller allotments given over to an increased population or specialised production. This suggests that Fields 1 to 4 may have operated as a block of common pasture or a communal outfield, and was therefore not available for subsequent encroachment.

An early aim of the project was to investigate the relationship between the field system of the site and the supposed 'Romano-British' monuments preserved in an adjacent Scheduled Ancient Monument (SAM No. 20802). Excavation and aerial photographs (see frontispiece photo) reveal that the Bronze Age field system shares the alignment of, and is physically contiguous with, some of the scheduled earthworks. No Romano-British material whatsoever was recovered from project area; the absence of Romano-British artefacts seems to be evidence of the absence of settlement during this period. In reference to

the project aims, there was no relationship between the field system and the scheduled earthworks to the north because they represent the same monument in different states of preservation. SAM No. 20802 at least partly contains the earthworks of a Bronze Age field system, and is a rare survival.

Dating summary for the field system

Cardinal boundary

Construction

- Would appear to post-date Early Bronze Age ring-ditch alignment.

Use

- Context 6249, fill of Ditch 6245 contained eight sherds of pottery in a CP2 fabric used for both Early Bronze Age (Collared Urns) and early Middle Bronze Age (Deverel-Rimbury Bucket Urns) vessels in the project area.

Disuse

- Occasionally cut, but never transgressed, by Fields 1-4. Suggests that some of the ditches that marked the cardinal boundary had silted up when Fields 1-4 were dug, but the boundary itself, as marked by bank and hedges, was still extant.
- Presumably abandoned in the first millennium BC, when peat developed across the project area.

Fields 1-4

Construction

- Constituent ditches either cut or abut the cardinal boundary.
- Ditch 7081 cuts layer 6944, Fen clay deposit, thought to be the Older Barroway Drove Bed dated to the fourth millennium BC.

Use

- Ditch 7451 (fill 7452) was found to contain CP3 shell-gritted pottery dated to the mid-second millennium BC.
- Ditch 8209 (fill 8215) contained a fragment of later Middle Bronze Age briquetage pedestal.
- Ditch 8209 later cut by ditch 8208 which contained Late Bronze Age CP4 pottery, radiocarbon dated to 1270-1000 cal BC (SUERC-12862).
- CP5 pottery recovered from ditch 202 (Field 1).

Disuse

- Ditch Group 8465, (Field 4) was cut by Fen-edge Pit Cluster 5 which contained CP3 and CP3 or 4 pottery and was radiocarbon dated to 1520-1400 cal BC (Beta-238593). However, the boundary may have continued to stand following the incorporation of the pit into it.
- Presumably abandoned in the first millennium BC, when peat developed across the project area.

Fields 5-10

Construction

- These fields abut the cardinal boundary and Fields 1-4.
- Ditches 9337 and 9147, (both Field 9), fed into pond features that had themselves cut earlier pits which contained CP4 pottery.

Use

- CP3-4 pottery recovered from Ditch 9337 (Field 9).
- CP4 pottery recovered from Ditch 9147 (Field 9).
- CP5 pottery recovered from ditch 9525 (Field 9).
- Pond Cluster 1 situated in corner of Field 5 and may be contemporary. This contained CP3 pottery and was radiocarbon dated to 1460-1310 cal BC (Beta-238590).

Disuse

- Presumably abandoned in the first millennium BC, when peat developed across the project area.

Enclosures 1 and 2

Construction

- Appear subsidiary to, and therefore presumably later than, Fields 5-10.
- Enclosure 1 cut a waterhole pit that contained numerous fragments of CP4 pottery.

Use

- CP4 or 5 pottery was recovered from ditch 9546 (Enclosure 1).

Disuse

- Presumably abandoned in the first millennium BC, when peat developed across the project area.

Land-use at Pode Hole

Having examined the character, dating and function of the ditched boundaries, it is now necessary to consider the uses that the fields they defined were put to.

The rectilinear field system at Pode Hole bears certain similarities with the more well-known 'site type' field system exposed nearby at Fengate (Pryor, 2001a). There, parallel double-ditched droveways, with fenced paddocks between them, linked the seasonal pasture of the Fen to the higher ground to the west. A similar configuration of landscape boundaries has also been recorded to the north at Rectory Farm, West Deeping (Hunn and Rackham, forthcoming). Such field systems are interpreted as being used for intensive stock-rearing (Pryor, 2001a, p.418-20). However, on closer examination, the field system at Pode Hole does not conform to this pattern. Double-ditched features were present at Pode Hole, but these were often blocked by waterholes, and were too angular and too narrow (around 2m to 4m) for them to have functioned as droveways. It is more likely that they are the remains of simple boundaries with a central hedge flanked by ditches on both sides – although a droveway may have linked Field 9 to the Fen embayment to the east. The tendency of ditches to kink away slightly from the rest of their alignment at their termini may have had a functional purpose, facilitating the movement of animals by funnelling them into fields (although movement the other way would presumably have been more difficult). Despite the targeted investigation of gaps or entranceways in the field system, indisputable remains of stock-handling features, such as gates or pens, were not found. This is not to say that stock-rearing was not carried out at Pode Hole.

Rather, the morphology of the field system at Pode Hole is not of itself sufficient, on the basis of current models, to determine whether it hosted arable or pastoral agricultural regimes.

Fortunately, environmental remains are more informative for determining land-use at Pode Hole (see Rackham et al., this report). The data reveals that the fields contained an open, species-rich damp grassland environment. The presence of large herbivores is suggested by the relative abundance of dung beetles in the insect assemblage, with the animal bones suggesting that it was predominantly cattle grazing these fields. Sheep and pigs were also present, but cattle were apparently the mainstay of the economy. The cull pattern of the cattle suggests a non-specialised, subsistence agriculture where animals were exploited for various resources: milk, meat and hides, and possibly also for traction.

The landscape of Pode Hole may not have been wholly pastoral: cereal grains, pollen and chaff were recovered from several features across the project area, albeit in very small quantities. Barley dominates the cereal assemblages, with the range of cereals being comparable with other Bronze Age sites in the region. The paucity of cereal remains prevents a fuller understanding of the arable husbandry regime practised, and indicates that mass cultivation, processing or storage of grain products did not occur here. The arable pollen component is thought to be secondary, originating from waste food debris, floor coverings and human and animal faeces. Nevertheless, cereal remains are present and comparatively widespread. The probable ard from Fen-edge Pit Cluster 5 is also strong evidence of agrarian practices, and environmental evidence suggests that flax was also grown within the project area or nearby.

There is only limited evidence that wild resources were exploited for food. The plant macrofossils suggest that fruiting species were present and presumably eaten, but there is much less evidence for the consumption of wild animals. The wild animal bone assemblage predominantly comprises woodland species such as deer and aurochs. Remains of aquatic or Fenland animals were very rare and amount to only one duck, and water rodents, which may have been eaten. There was no evidence of fishing, but this may reflect the site's aggressive preservation conditions.

In summary, it is clear that stock, and cattle in particular, were reared at Pode Hole, although the field system as a whole is not an artefact of a 'ranching'-style economy. Pode Hole probably represents a predominantly, but not wholly, pastoral swathe in a mixed agricultural landscape. The combined evidence from Pode Hole and the Thorney Borrow Pit site (Phoenix Consulting Archaeology Ltd, 2007, p.75) confirms that the inhabitants of the Fen-edge embayment around Thorney island engaged in a mixed agricultural economy in a familiar patchwork landscape of paddocks, meadows and arable fields.

The meaning of differences

The initial period of discovery of the rectilinear field systems around the Fen-edge was partly accompanied by an appreciation of how widespread and ubiquitous the monument type appeared to be. However, as more and more acres of field system have been uncovered, largely as a result of developer-funded excavation in advance of gravel extraction, there is a growing awareness of dissimilarities between different systems, and of the variations that are possible around the theme of rectilinear enclosure (e.g. Knight, 2002, p.16-17, Phoenix Consulting Archaeology Ltd, 2007, p.70).

The field system exposed at Pode Hole consists of rectangular fields set out on a dominant north-west to south-east axis, with several large fields occupying an area of three to nine acres each. These appear to have been later supplemented to the east by smaller fields, each measuring around one acre. Even over as little a distance as 2km the excavated evidence differs. While the Bronze Age fields revealed at Eyebury quarry bear comparison to those at Pode Hole, they are certainly not identical.

Although the plots at Eyebury are rectangular, they are aligned on a perpendicular axis (north-east to south-west). The fields were also generally smaller, measuring 135m by 70m and so each enclosed an area of just under 2.5 acres. (Patten, 2002, p.11). The fields at Pode Hole are certainly larger than those at Bradley Fen, where an average enclosed area of 1.28 acres was recorded (Gibson and Knight, 2006, p.23). There, different field alignments were present on opposing sides of that site's dominant boundary.

Whilst it is straightforward enough to identify differences between the various field systems exposed, it is more difficult to understand the implications of this regarding property holding and land-use, especially at the level of the individual site. The field systems around the Fen-edge all appear to have been in use in the later part of the second millennium, and differences in their form cannot be related wholly to chronology.

Knight observed that the Fen-edge field systems are not terrain-oblivious, but rather their dominant orientations are related to topography and pre-existing land-use (2002, p.17). This is seemingly borne out at Pode Hole. The excavation here suggests that the field system was based on an alignment of ring-ditches that themselves reflected the position and orientation of the nearby Fen margin.

There may be a link between enclosure size and land-use as Patten suggests (2002, p.12), and individual field systems may be the products of different farming practices employed by separate communities (ibid.). As discussed above, it may be possible to identify the pattern of landholding diagnostic of purely arable or purely pastoral agriculture. In reality, the picture is obscured by the fact that a mixed agricultural regime was seemingly

practised on the Fen periphery. Even at Fengate, with its paddocks, drafting gates and droveways (Pryor, 1996) the pollen sequence contains cereal and suggests that mixed agriculture was probably being practised throughout the Bronze Age (Scaife, 2001, p.366-368).[2]

Duration and intensity of use may alter the appearance of different field systems. Variations in the form and complexity of the ditches exposed at Fengate by the Cambridge Archaeological Unit have been interpreted as indicative of 'stress', the amount the system was used and the volume of animal traffic it was exposed to (Beadsmoore, 2006, p.80-81). This explanation may be appropriate for some aspects of the development of field systems. Combined evidence from both Pode Hole and the Borrow Pit site suggest that the land around Thorney embayment was more intensively used later in the second millennium BC: the earlier field system grew by abutment and accretion, and certain areas within the new fields came to be intensively worked, such as Pond Cluster 2 and its associated area of recut pitting.

A wide-ranging synthesis incorporating a detailed study of excavated data is necessary in order to further test inferences between the form and function of field systems.

The difference of meanings

Various models have been offered to explain what the creation of large scale field systems means, and why this happened when it did. These are briefly discussed below.

Fleming believes that rectilinear systems were not so much an event as a process, '*an attempt at regulation of land-use by communities with traditions of collective land-use and cooperative labour*', partly in response to increasing population (1989, p.160 and 157). Yates identifies complex socio-political causes for the systematic land enclosure and agricultural intensification of the second millennium BC (2007): agricultural surplus was generated to be converted into material wealth, necessary in a new prestige goods economy, in which a person's renown was established by valuables received and given in competitive exchange events. Rectilinear field systems are artefacts of this struggle to maximise productive capacity whereby individuals gained status through consumption. The concentration of rectilinear field systems in southern and eastern England close to river and sea trading links identifies a cross-Channel culture that participated in this new economy.

Both these models, very coarsely categorised as 'population growth' vs. 'status' assume that rectilinear field systems involved intensification of agricultural production. It is certainly beyond dispute that the rectilinear field systems bounded landscapes in which settled agriculture was practised. Can we go further and declare the new land division was consciously designed to facilitate and improve agricultural productivity? This may not always have been the case; arguments have been put forward questioning the economic necessity of some field systems. Evans and Knight suggest that the dispersed and low density settlement in the field systems of the Barleycroft and Over landscape argue against intensification, and point out that large-scale gridded field systems did not occur on the Continent, despite comparable and probably higher populations there (2001, p.86 and 94).

However, it seems widely accepted that rectilinear field systems enabled greater agricultural productivity, by allowing diversification and specialised management regimes of defined parcels of land (Fleming, 1989, p.159; Pryor, 2006, p.79). It has also been pointed out that rectilinear field systems were part of a broadly contemporary 'package' of agricultural innovations, including metalled trackways, the establishment of artificial waterholes and salt production (Yates, 2007, p.120-121). That the agricultural productivity of the field systems was a concern of their creators is further suggested by the fact that it was often the most fertile lands that were enclosed, and that soil conservation and improvement was undertaken within them (ibid. p.137-138). The overall impression is that with enclosure, the landscape was finally being 'put to work'.

The excavated evidence from Pode Hole suggests that an intensification of activity occurred in the later Bronze Age. The amount of pottery fragments from the later ceramic phases, as well as the quantity and range of features that they were recovered from far outweighs that from earlier periods. The bulk of this material was recovered from Fields 5-10 and Enclosures 1 and 2. However, the older Fields 1-4 remained 'archaeologically quiet' during this period. That this western part of the site was not subjected to occupation (as witnessed by finds density) or elaborate subdivision of holdings does argue against a model of increasing population pressure.

The new patterns of landholding may have reflected, and would almost certainly have led to a shift in attitudes to the land. The co-incident change in pottery technology at this time, with grog-tempered wares being replaced by shell-tempered wares may be symptomatic of this cultural shift, '*the land or landscape itself, the ownership of it… became more important…the land itself needed to be recognised as part of the materiality of pot-making, to become part of the pottery more visibly, and this was achieved by using naturally occurring fossil shell-gritted clays*' (Morris, this report).

Yates suggests that the co-occurrence of findspots of elaborate metal work (such as war gear and/or 'founder's hoards') and field systems is evidence of their

2. Pollen analysis from the site at Rectory Farm suggests that the landscape there consisted almost exclusively of pastoral fields (Hunn and Rackham, forthcoming, p.269) and the form of this site may come to define a typical 'pastoral site type'.

interrelationship in a prestige goods economy (2007, p.112-120). Very little metalwork was recovered as evidence of this economy from Pode Hole: only a fragment of pin and a blade were found (see discussion of pits cutting Ring-ditch 1) [3]. However, an unusual and rare Bronze Age palstave-adze was recovered from a small irregular pit or tree throw on the neighbouring Thorney Borrow Pit site (Phoenix Consulting Archaeology Ltd, 2007, p.60). Therefore, there is some evidence in the area of the type of metalwork used in the prestige goods economy as posited by Yates.

The enclosed field systems of the second millennium BC may have arisen partly as a response to functional imperatives, and were superimposed onto landscapes that had hitherto been dominated by funerary monuments. But some writers argue that the new landscape was itself a stage for ritual behaviour: '*People did not simply substitute a landscape of ritual monuments with the more pragmatic monuments of fields and farms. Rather, their ritual and spirituality were incorporated... into dwellings in which they lived*' (Parker Pearson, 2005, p.6). At Barleycroft, Evans and Knight have identified post alignments set within a pre-existing field system that formed part of a '*vast ceremonial space...possibly related to large-scale gatherings*' (2001, p.85). Regarding field systems in general, '*the ditched boundaries...were also the favoured location for special deposits around entranceways*' (Yates, 2007, p.136).

There is some evidence of the 'ritualisation' of the fieldscape of Bronze Age Thorney. Principally, the field system of the Pode Hole project area was based around a boundary that was itself overlain onto the alignment of four ring-ditches and at least one barrow mound. However, there is almost no surviving evidence of special deposition in field boundary ditches. At the neighbouring Thorney Borrow Pit site a probable shell necklace was recovered from the terminus of one ditch (Phoenix Consulting Archaeology Ltd, 2007, p.60). No such evidence was recovered from Pode Hole, where 10% of the length of ditches was hand-excavated, with a concentration on termini. It is not known whether an expansion of this methodology would have produced evidence of ceremonial deposition of objects within the field system. One inhumation was recorded in a gap in the boundary of Enclosure 1, and there is occasional evidence of special deposition of exotica into some of the waterhole pits that were contemporary with the field system. The suggestion that field systems were judged suitable locations for ceremonial behaviour is therefore borne out by the results of the excavations at Pode Hole. But significantly, this behaviour is not visible in the contents of the boundary ditches themselves.

Attention has been drawn to the fact that field systems are frequently set out on a north-east to south-west orientation, in locations as diverse as Salisbury Plain, Dartmoor and the Thames valley (Yates, 2007, p.136, and references cited therein). It is suggested that this possibly had a symbolic meaning, perhaps an '*acknowledgement of the life giving permanence of the sun*' (ibid.). This is of course the orientation of the cardinal boundary at Pode Hole. However, in this instance, the landscape alignment is dictated by the position of the shoreline of a small Fen-edge embayment. That topographical considerations rather than any astronomical factors dictate the alignment here is proven by the fact that the field system recently exposed just 300m to the east of the project area (and beyond the Fen-edge) has an altogether different east to west orientation (Richmond, pers. comm.). Finally, one must observe that, with few cardinal points available, probability suggests that 25% of rectilinear field systems will have a more or less north-east to south-west orientation.

The social implications of the construction of rectilinear field systems are numerous. As Yates says, their construction '*reflect*[s] *confidence in the future and sign that people were there to stay*' (2007, p.134). Certainly, their planning and execution was the work of people who could 'think big' and conceive of, and manage, their surroundings on an ambitious level (Fleming, 1987, p.153). It is likely that their construction was planned at the executive level, and carried out by many people working in unison. The nature of the political system that ordained this has not yet been identified. Some writers see such effort as the result of communal co-operation (e.g. Fleming, 1987, p.160; Pryor, 2005, p.97). An alternative possibility is that the prestige goods economy empowered certain individuals in an increasingly stratified later Bronze Age social order, and it was such 'strong men' who were behind such works, which may have been carried out with a degree of coercion. Yates has pessimistically commented that '*the possibility of an enslaved workforce cannot be ruled out*' (2007, p.144). Somewhere between these extremes, it has been argued that permanent land divisions may have been organised at the communal level, but in response to the demands of exploitative rulers (Fleming, 1994, p.64, cited in Yates, 2007, p. 128). However, it is almost certain that to attempt to identify a single underlying political system would be a gross over-simplification, as separate field systems in different territories were created by various groups who organised themselves in different ways at different times. As Yates says, '*different regional prehistories are apparent in the record*' (2007, p.128).

With specific regard to Pode Hole, to identify the political order responsible for the archaeological record of a single (prehistoric) site is highly problematic; such work requires thorough synthesis at the regional scale at least and is therefore beyond the scope of this report. The archaeology of Pode Hole records an absence of the spectacular hoards of votive metalwork present at other Fen-edge sites such as Flag Fen and Bradley Fen (Gibson and Knight, 2006). In addition, it has neither the categorical evidence of house structures present at the latter site (although it is not known how much has been lost to ground truncation),

3. One can only speculate what would have been recovered if the project area had extended slightly further to the south east and into the Fen-edge water margin.

or the large enclosure ditches and associated evidence of nucleated settlement that characterise the nearby site at Welland Bank (Mouraille, 1996; Pryor, 2006, p. 113-123). As such, the occupants of the Bronze Age Fen-edge at Thorney were probably also on the periphery of the regional political system, although it is not yet apparent what that was.

Waterhole pits

The waterhole pits contained within the field system were a distinctive component of its archaeological record; over thirty were recorded, along with a number of ponds. Artificial water sources are commonly encountered feature types, not only around the Fen-edge, and are often found in conjunction with Bronze Age land enclosure (Yates 2007, p.16). Where dated, the vast majority of the waterhole pits from Pode Hole contained CP3-4 material (later Bronze Age), with two features, pit 7214 and Fen-edge Pit Cluster 1 seemingly dating to earlier within the Bronze Age.

It is generally assumed that these features operated as sources for drinking water, with humans accessing the steep waterhole pits, and animals utilising the more gently sloping ponds. Cattle hoofprints have been found preserved around waterholes on other Fen-edge sites (Knight, pers. comm.[4]) indicating their use in this way. However, evidence from the Pode Hole insect assemblage is slightly anomalous, as the range of species present indicates that whilst animals grazed the fields, they do not appear to have had direct access to either the waterhole pits or the ponds. Yet the water needs of cattle are large[5], and assuming they were present, they must have drunk somehow. It may be that drinking troughs were used, although the practical benefits of such an indirect method are unclear. More probably, differential preservation of insect remains has distorted the picture.

The lifespan of these features is similarly uncertain. The environmental remains do, however, record that the waterholes stood open long enough for aquatic species of plant to become established, and for caddis flies and gnat-like insects to complete their breeding cycles. One waterhole (pit 9375 from Pond Cluster 2) was found to contain stickleback remains (Rackham, this report).

Both ponds and pits typically contained layers of organic-rich detritus at their bases, the product of the latter period of their use phases when they would have contained dirty water. These deposits were generally gleyed clays with lenses of sand and gravel.

The remains of wooden lining or revetting were occasionally found in waterhole features, preserved in these basal deposits. These wooden structures were almost always extremely fragmentary, suggesting that they were deliberately removed when the waterhole was decommissioned. Where wooden linings survive, it appears that rather than revetting the sides of pits for their entire depth, such structures were designed to maintain a small clear area in the base of the pit. Planks pinned back by stakes were used for this, and the re-use of the bucket as a ground water tap in Pond Cluster 3 was a significant find. The features in this cluster were unique in the project area in that they were lined with wattlework. This was generally much more intact than the plank and stake linings, presumably because it would have been too difficult to remove and re-use. If this was the case, then one may assume by extension that its use here was a rare occurrence, and that plank and stake revetting was more commonly used.

The disuse of a waterhole was marked by thick deposits of gravelly sands and clay and silt mixes. In many cases this was interpreted as the re-use of the original upcast to deliberately backfill the features. A thick layer of homogeneous material, generally a compact mid-grey-brown sandy silt, formed the final fill of these features. Peat was often present filling small hollows on the surface; this material had dipped in from above as the fills of the feature had settled and subsided. A considerable period of time may have elapsed between the first cutting of a pit and its final levelling.

The final stages of a waterhole's disuse was occasionally marked by the excavation of a small, subsidiary feature into the largely backfilled pit or pond. These were typically sub-circular in plan, 0.7 to 1.5m in diameter and their depths varied from 0.5 to 0.9m. In profile they were steep-sided with flat bases and their fills tended to be dark and loose with wood inclusions. At least four such features were encountered in the project area, cuts 7246 (Fen-edge Pit Cluster 2), 8067 (Pond Cluster 1), and 9563 and 9687 (both Pond Cluster 3). A similar feature was recorded on the nearby Thorney Borrow Pit site (cut 193, Phoenix Consulting Archaeology Ltd, 2007, p.15). As far as is known, these features have not been recognised as a 'type' before. Their function is currently unknown. Nothing in their fills was particularly remarkable, and if they did once hold posts to mark the positions of the waterholes, then they were removed in antiquity. It is nevertheless interesting that waterholes continued to attract activity long after they had fallen out of use.

Aside from these minor features, waterhole pits were often repeatedly recut in the same location, suggesting that their location was an important part of their utility. This is also apparent by the non-random nature of their distribution in the project area (Fig. 6.1):

- *Pits generally avoided the interiors of Fields 1-4, but a distinct alignment of them is visible following the Fen-ward boundaries of these fields.*

4. 'Settling enclosure in the Welland and Nene Valleys'. Lecture given at Cambridge 10th May 2008.

5. Studies indicate that a modern lactating cow in temperate climates require approximately 50 litres of drinking water per day (Spörndly and Wredle, 2005).

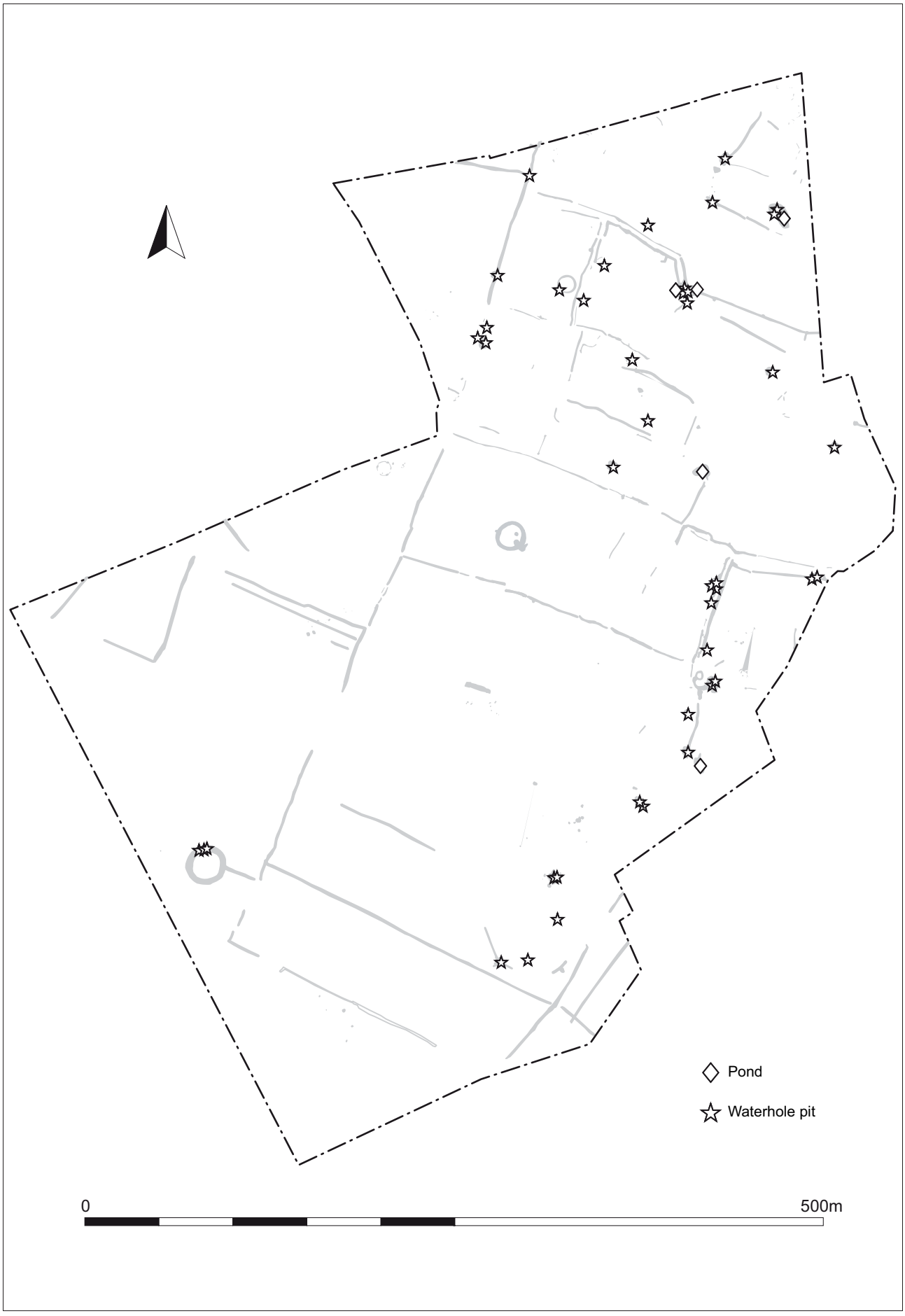

Figure 6.1: Distribution of waterhole pits and ponds.

- *Pits were scattered more randomly throughout Fields 5-9 and Enclosures 1-2, but were often located close to their edges or corners.*
- *Areas lying outside of the field system did not generally contain waterhole pits, which suggests a functional relationship between the two.*
- *Two of the four ring-ditches found on site had later waterhole pits dug into them.*
- *The cardinal boundary was marked, but generally respected by waterhole pits. Five were found along its length, but all except one of these were found in gaps within it. Only one directly impinged on the feature itself.*

The coincidence of the alignment of waterhole pits with the path of the Fen-edge suggests either that pits were used to mark boundaries, or that they could be set out along boundaries that already existed. Their linear distribution may also represent awareness that excavations along a certain contour were guaranteed to strike fresh water at the required depth. Alignments of waterhole pits have also been recorded at the nearby quarry sites of Eye (Patten, 2003, p.18) and Langtoft (Webley, forthcoming, p.17).

The ponds and waterholes were thus deliberately placed components that coincided chronologically and spatially with the planned and ordered agricultural landscape. By augmenting the water supply to the area's inhabitants and their stock, they would have had an important role in enabling the intensification of production in the newly enclosed landscape. The repeated recutting and clustering of waterholes marks an investment in place carried out by a static, or at last regularly revisiting, population. Yates has described waterhole pits as '*central to economic prosperity*' (2007, p. 136) and their integration into the working landscape of the Thorney Fen-edge suggests that this is an accurate view.

Some waterholes came to have a role beyond the mere supply of water. The distribution of artefacts within waterhole pits is not uniform, either across the project area or within individual features. Many ponds and waterholes were almost entirely artefactually sterile, yet others contained significant concentrations of finds. Where artefacts were present, they were generally found in a feature's upper fills. The concentration of artefacts in any particular feature may relate to its proximity to occupation, but it does not appear that the pits were used as simple middens. Rather, a degree of control appears to have been exercised over what came to be placed in them:

- *They contain a generally limited range and amount of material.*
- *Where pottery is present, less than 5% of individual pots are represented (Morris, this report)*
- *They came to contain special items such as human skull fragments, burnt quernstones and antique objects, possibly heirlooms*[6].

6. See Lewis and Batt, 2006, p. 139-145, for well-illustrated further examples of this practice from elsewhere in the country.

Waterholes were important to the agricultural success of the native population. This and the fact of their duality as surface/underground structures, which could be both wet and dry, may have encouraged their incorporation into the local belief systems. The deliberate targeting of ring-ditches as the location for waterhole pits is probably further evidence of this. Waterholes would appear to have been important for both the physical and spiritual well-being of the communities that constructed them.

Saltmaking

The archaeological record of the project area presents apparently contradictory evidence for saltmaking being carried out during the second millennium BC. All of the environmental evidence indicates the existence of freshwater conditions, and the location of the site places it on the Fen-edge during the Bronze Age, rather than within the intertidal zone (Hall, 1987; French, 2003).

Conversely, over 14kg of briquetage was recovered from a variety of features across the extraction area. The assemblage contains both pedestals and container fragments, as well as miscellaneous unidentified materials, in several different fabrics. Much of this material is salt-bleached, indicating that it had been used in the saltmaking process; the argument that briquetage was merely produced at Pode Hole, for use elsewhere, cannot be sustained. Yet, significantly, what is lacking from this assemblage are fragments of hearths, or the indisputable remains of salterns themselves.

There are several explanations to account for the presence of this material. It is possible that, for a short period, a shift in drainage patterns saw saltwater carried to the site at high tide via temporarily tidal creeks, as has been recorded nearby on a channel of the River Welland at Market Deeping (Lane, pers. comm.). This resource may then have been exploited by the opportunistic inhabitants of the Bronze Age Fen-edge. Alternatively, it may have been the case that, whilst the collection and primary boiling of salt occurred off site, the resultant concentrate was then brought back closer to habitation for further refining. Admittedly, this seems unlikely given the effort involved in transporting the presumably burdensome brine, although this is what may have occurred at the Langtoft quarry site (Dickens, pers. comm.). A third explanation is that equipment from saltern sites was brought back to the home, possibly with the expectation that it would be re-used elsewhere in the future. However, for reasons unknown, it was disposed of in pits and ponds rather than being taken back to the areas of salt production. This disposal presumably occurred on a number of occasions, given the number and range of features from which briquetage was recovered.

A significant quantity of briquetage was recovered from a variety of contexts, many of which were found to contain material securely dated to the Middle and Late Bronze

Age. To identify the location of salt production is perhaps secondary to acknowledging that, whilst Pode Hole may not have been a saltmaking site, it was probably inhabited by saltmakers, and this resource was both available and exploited on the Bronze Age Fen-edge. The finished product would have enabled the longer-term storage, and trade, of meat, as well as being a tradeable commodity in its own right. Salt may have contributed much to the local economy in the second millennium BC.

Decline and abandonment

The occupation of the project area seems to have ended fairly abruptly some time around the turn of the second and first millennia BC. CP5 pottery, the last phase of the prehistoric ceramic types, is rarely encountered, and represents less than 5% of the ceramic assemblage. Environmental data suggests that obsolete waterholes filled with plant detritus from adjacent or overhanging vegetation, and that some became overgrown with willow. Whether this reflects the disuse of individual features or the landscape as a whole is uncertain, but the processes are likely to have been the same.

The flat and low-lying Fens have always been vulnerable to climate change. Wetter conditions and a deterioration in drainage seem to have prevailed in the late second and early first millennia BC. At Pode Hole this is indicated by the peat, which spread across the project area and was commonly observed filling the upper parts of features. Where it sealed Pond Cluster 3, the lower part of the peat sequence was radiocarbon dated to 1120 to 910 cal BC (Beta-244198).

The combined geoarchaeological and excavated evidence therefore suggests that an area of Fen-edge that was affected by inundation in the late third or early second millennium BC (French and Pryor, 1993, p.89-90) had become dry enough for habitation in the Early Bronze Age, but became waterlogged again by the start of the first millennium BC. A 'window of opportunity' was therefore quickly exploited by the area's inhabitants. During the Middle and later Bronze Age, the briefly habitable strip of Fen-edge at Pode Hole came to be enclosed by the rectilinear field systems characteristic of that period, until renewed climatic deterioration led to a retreat of occupation from the Fen-edge. The scale of the impact inland of the relocated population is unknown; the actual numbers of people affected may have been small, and the timescale long. Nevertheless territory inland would presumably need to have been shared or subdivided, or new land brought under cultivation, and access would need to have been negotiated and agreed on. The departure of the Late Bronze Age population of Pode Hole has been identified archaeologically; its arrival elsewhere has not. This event may offer a model to interpret apparent intensification of settlement and land-use in the wider landscape.

The complex interrelationships between climate, coastline and human settlement form a continuum from the acute concerns of the present day, back into prehistory. The Fens remain particularly vulnerable to rising sea levels, and the issue is a current one (Cambridgeshire County Council, 2008; DEFRA, 2005).

Deposition

Distribution of finds

In lieu of the remains of domestic structures, a basic mapping of finds density was undertaken in the hope of identifying likely locations of occupation. This mapping assumed that pottery, worked flint, animal bone and heat-affected clay (both daub and briquetage) are the find-types most indicative of occupation, and that such debris was disposed of close to the settlement that had originally produced it. The combined weights of these finds-types in features, or intercutting clusters of features, was therefore calculated, categorised and plotted out, and the results are presented in Fig. 6.2.

Two particularly intense concentrations of finds are apparent. The first is Field 10, which contains two one metre pits, and is ringed by clusters of waterhole pits, as well as the possible saltern. No structures that may have been the sources of these finds were present. Investigations of possible post-built structures in this area foundered during fieldwork as their component features were revealed to be vanishingly indistinct or natural disturbances. It is likely that surface truncation has removed the evidence of any such, probably ephemeral, dwellings.

A second set of features particularly rich in finds is located in the north-west of the project area, where a number of waterhole pits associated with the cardinal boundary and a nearby midden (Midden Area 2) were excavated. Again, no evidence of domestic structures was apparent, but these may be preserved in the scheduled earthwork area immediately to the east.

No other discrete, isolated concentrations of finds-rich features are immediately apparent. Instead, it is clear that such features occur in a dispersed swathe running approximately north-east to south-west across the project area. This swathe generally corresponds with the position of waterhole pits and ponds, as these features contained the majority of the artefacts recovered during the archaeological investigations. This 'belt of occupation' seems to follow the likely orientation of the Fen-edge, indicating that this formed a focus of settlement and/or depositional activity. Finds concentrations therefore appear along the Fen-edge boundary and its accompanying clusters of waterhole pits, as well as in Fields 5-9 and Enclosures 1 and 2. In these enclosed spaces, finds concentrations are mostly confined to the corners of fields. In the absence of stratigraphic relationships between the field system components and occupation features, this positioning indicates that occupation activity was taking place in spaces *already defined* by the creation of the field system.

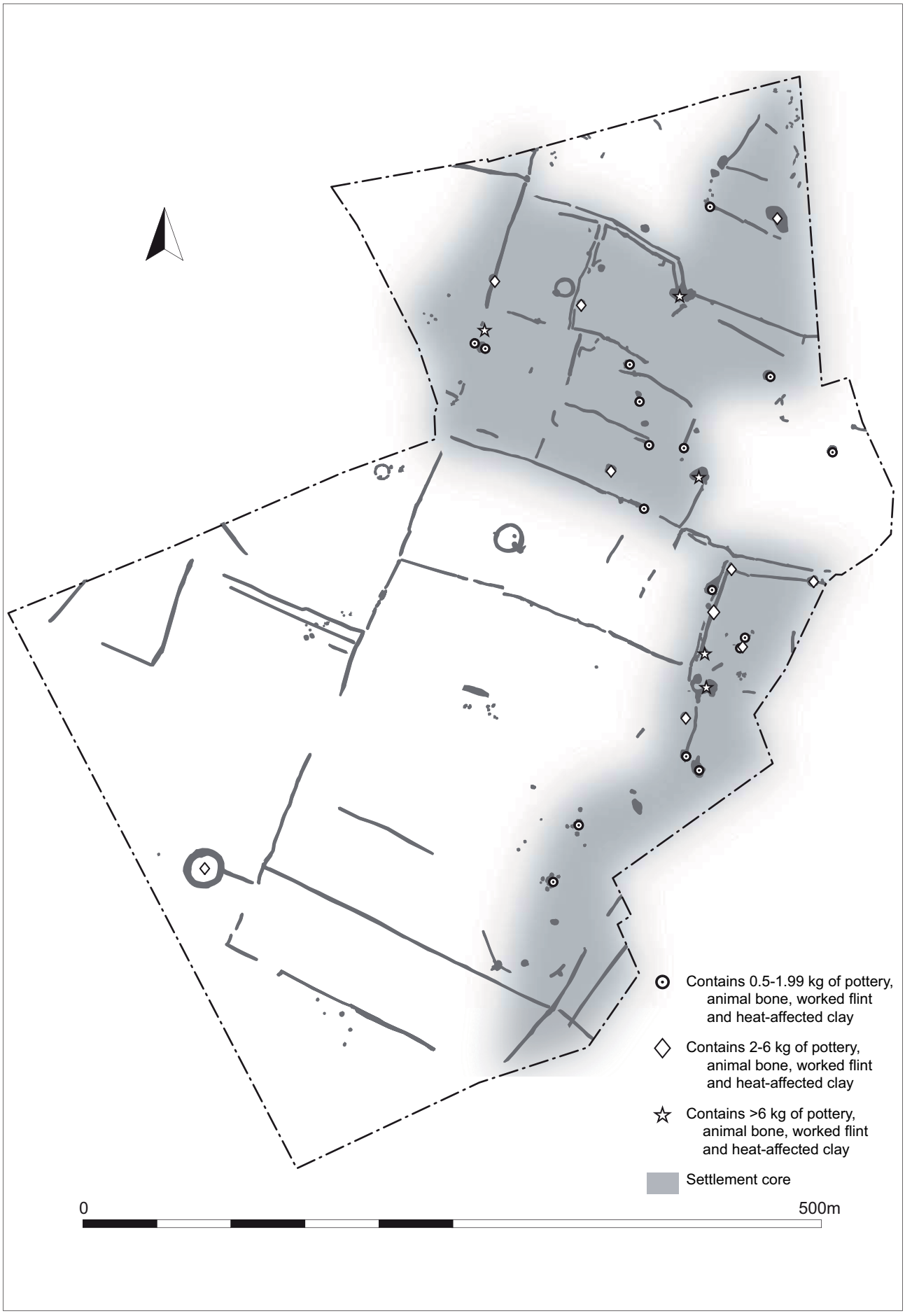

Figure 6.2: Finds concentrations.

By examining the locations of finds concentrations, a coarse zoning of the project area becomes apparent (Fig. 6.2). Away from the Fen-edge boundary, Fields 1-4 seem mostly devoid of finds concentrations, as does a block of land in the extreme east of the project area. Finds were of course recovered from these areas, but not in sufficient quantities to count as a 'concentration' for the purpose of mapping. It would appear that these outlying areas were probably not occupied in the Bronze Age.

The double-ditched boundary that forms the north-eastern boundary of Fields 4 and 10, and marks the northern terminus of the Fen-edge waterhole pits, also seems to separate the area of land that was intensively settled from one that was somewhat archaeologically 'quieter'. The special importance of this boundary in the past is perhaps underlined by the discovery of an uprooted wooden orthostat in one of the waterhole pits along its course (Fig. 5.4). It has been postulated that field systems were aligned on upright timbers in post holes (McFadyen, 2000, p.13) and this unusual object may once have served this purpose. Mapping of finds density thus suggests that this double-ditched boundary may have separated a settlement core from an outfield area during the second millennium BC.

Distribution of human remains (Figure 6.3)
The distribution and quantity of human remains across the project area are similar to other Fen-edge Bronze Age sites, where such remains are spatially dispersed and rarely encountered. At Pode Hole, human remains were variously found:

- *In a gap within a field system (skeleton 9655);*
- *In close proximity to a ring-ditch (skeleton 508);*
- *As apparently deliberately placed skull fragments in a cut feature (Pond Cluster 1);*
- *As a 'token' burial of cremated material, representing less than a complete individual.*

The nature of the remains and the locations in which they were found conform to a broader repertoire of later Bronze Age mortuary practice (Brück, 1995). This typically rendered the dead archaeologically invisible. Where interment did occur, this was decentralised (i.e. bodies were not gathered together in large cemeteries) and often involved the deposition of selected body parts in certain spatially significant locations. Brück notes that the increase in the scale of votive deposition coincided with the decline of an archaeologically visible burial rite in the later Bronze Age (1995, p.250). The inference is that, when the dead did enter the archaeological record, this was itself a further manifestation of votive practice. Body parts may have been used as props in ritualised behaviour, possibly in an effort to link ancestor worship with agricultural fertility, and thus maintain or gain social control.

At Pode Hole, human remains were found equally spread between those areas within, and outside of, the postulated settlement core. This confirms that there was no inviolable prohibition concerning depositing human remains in settlement areas, but the situation is a complex one.

The Bronze Age Economy and Environment of Pode Hole

by James Rackham

The results of the study of the environmental archaeological data presented in this report are considered within two themes, that of the palaeoenvironmental reconstruction of the site and its palaeoeconomic character. The palaeoenvironment is considered first since the conclusions from this are likely to be relevant to a consideration of the economy of the site.

One of the primary palaeoenvironmental indicators is evident in the excavated field system plotted on Fig. 3.1. It shows a landscape divided into small ditched rectilinear fields, apparently postdating an earlier monumental landscape, with numerous large waterhole pits and ponds often located across the boundaries between the fields, or at junctions or corners. Some parallel ditches give the impression of trackways or droveways, and numerous pits and occasional scoops and post holes suggest residential occupation, although no traces of any buildings were found. The chronology of the site and the concentration of archaeological debris in particular phased deposits suggest that the main period of occupation, at least its densest, was Middle to Late Bronze Age, although earlier activity is evident. The radiocarbon dates might suggest a period of perhaps no more than 250 years for the active use of this field system and its associated waterholes, although a few waterholes and ditches have been dated by ceramics to the Early Bronze Age. The saturation of the area and the development of peat across the whole site by perhaps the end of, or soon after, the second millennium BC is suggested by the dating evidence and the occurrence of peats in the upper fills of most of the deeper features.

French (2003) has constructed a regional picture of this area with the major topographical feature being Thorney island and the thin peninsula of land running westwards from it which opens out towards Eye. In the Early Bronze Age the site of Pode Hole was situated on the margins of the 'skirtland' that lay between the saltmarsh and the dry land to the west on this ridge of slightly higher land that runs out to Thorney island. A major marine incursion occurred in the early second millennium BC at the time of the Early Bronze Age activity at Pode Hole and the construction of the round barrows on the site. This must have brought the sea and saltmarshes fairly close to the site and, where the land drops slightly south of the southern edge of the excavated area towards Priors Fen, must caused a margin of freshwater fen to develop around the encroaching salt marsh and tidal creeks. Hall (1987) describes a roddon running close to Thorney island on the south side, which was recognised in the auger transect between the Nene Washes and Thorney carried out by the Fenland Project (Waller, 1994). Although deposits associated with this

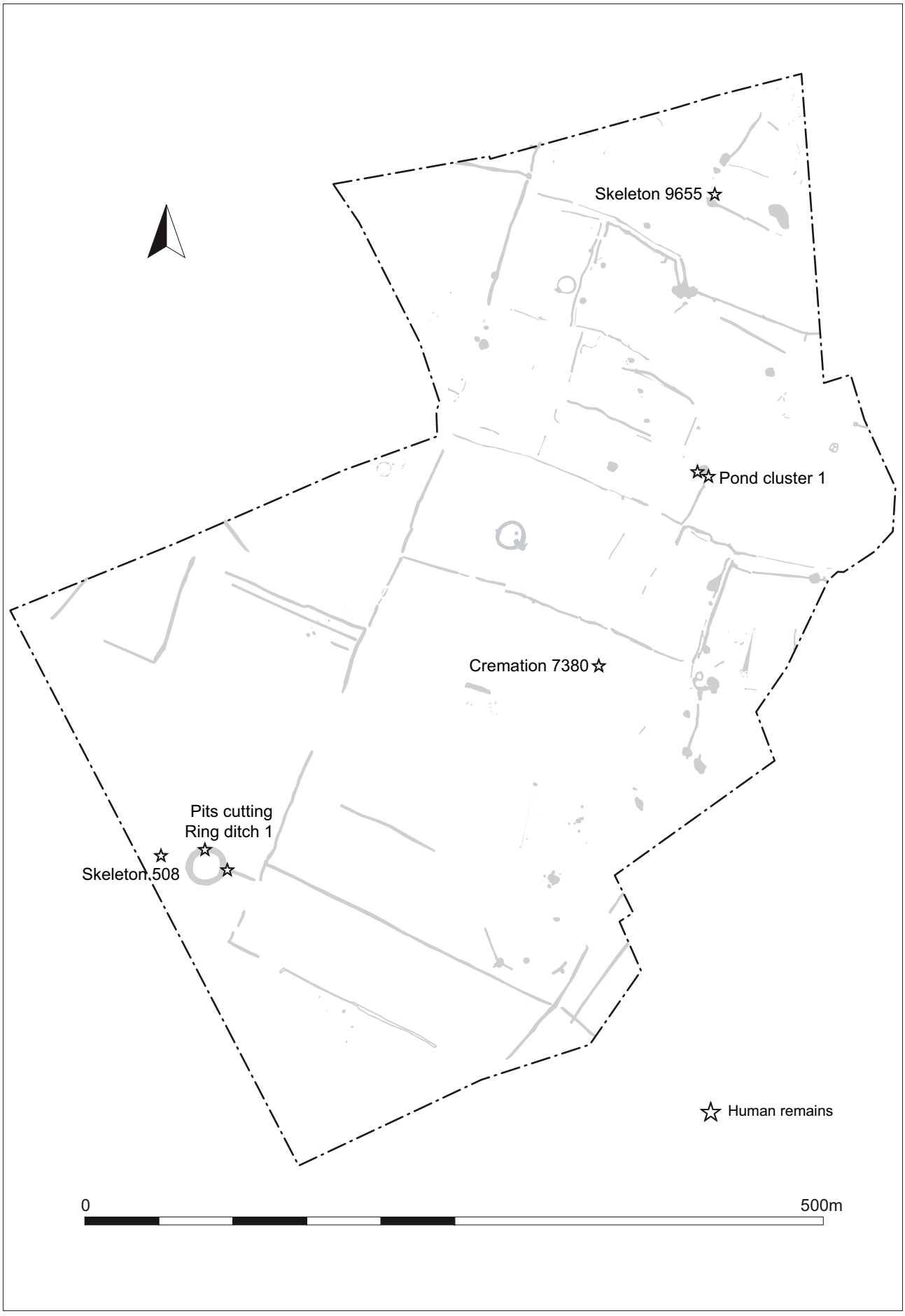

Figure 6.3: Distribution of human remains.

creek were not dated, a date from what is interpreted as the same system suggests that the tidal creek represented by this roddon had penetrated along the south side of Thorney island by the end of the third millennium BC, in the Early Bronze Age. The presence of briquetage on the site clearly suggests some proximity to the coast, but there appears to be no extant evidence for this or any later transgression inundating, or even edging onto, the site at Pode Hole. The pre-Flandrian surface model produced by the Fenland Project (Waller, 1994, Fig. 10.19) would suggest that by the middle of the second millennium BC the saltmarshes may have lain, at their closest point, about a kilometre or so south-east of the site and a similar distance to the east-north-east. Peat deposits encroached on to the site at the end of the second millennium BC and presumably covered it in the succeeding millennium, although most of the peat has since been lost.

There is very little evidence indeed for brackish water or marine indicators in the environmental evidence. A few shells of *Hydrobia ulva* and *H. ventrosa* in a few of the snail assemblages, the presence of the halobiontic hydrophilid beetle *Paracymus aeneus* and the hydraenid *Ochthebius marinus*, a beetle that favours brackish conditions, are the only macrofossil indicators. The pollen data shows no evidence for saltmarsh either although a slightly higher Chenopodiaceae count in the basal half of profile 8090 and an associated rise in Cyperaceae may reflect the proximity of saltmarsh and fen. Two fragments of possible cockle and mussel shell are most easily explained as archaeological debris rather than tidal. On this basis there is no evidence that marine waters ever came near or onto the site and the briquetage recovered must surely have been carried to the site from a saltmaking location elsewhere.

The major environmental studies cover the period from the middle to the end of the second millennium BC. The pollen diagrams from Pond Cluster 1 and waterhole pit 9075 probably overlap, but there may be a gap between these and the diagram from Pond Cluster 3 which dates towards the end of the millennium. LPAZ 1 of sample 8022 from Pond Cluster 1 is probably the earliest of the deposits studied for pollen. In this sample there is evidence for the last vestiges of the extensive woodlands that must have covered much of the area in earlier times. The pollen indicates alder, oak and hazel woodlands with a little lime and ash. By the middle of this sequence the woodland is largely lost and remains absent throughout all three series indicating a largely unwooded landscape throughout the second half of the second millennium BC. Willow however appears more abundant near the top of profiles 8022 and 8090 (waterhole pit 9075) and by the later second millennium BC in profile 8172 (Pond Cluster 3) it occurs consistently throughout the studied sequence. With the Fen-edge probably no more than a few hundred metres to the south this could mark the expansion of willow carr on the Fen-edge as the area becomes wetter, although growth of willow around the waterholes and along the hedge or ditch boundaries is also probable. Willow is certainly the dominant taxon among the unworked wood assemblages from the studied waterholes, occurring in all the samples, which suggests that it was growing around the margins of these features. Two of the beetle taxa are also specific to *Salix* (Table 5.8).

The regional woodland flora is poorly represented in the pollen diagrams. Oak and hazel occur consistently throughout the series with occasional ash, beech, holly and lime. Alder occurs at low levels throughout, perhaps reflecting wet woodland on the margins of the fen or trees along the wetter ditches and field boundaries. The occasional catkin of alder in the plant macrofossils and identified alder wood suggest some local growth by the waterholes or along the ditches. The occasional tree taxa are generally poorly represented in pollen assemblages and, along with privet and blackberry, could also indicate local growth in hedgerows flanking the fields. Several of the taxa identified from the wood remains, such as holly, hazel, Maloideae and ivy, and from the macrofossils samples, such as hazel, hawthorn, *Prunus* and Maloideae, might be best interpreted as hedgerow trees and shrubs, and there is no reason why the willow and oak identified from the wood could not have been standards in the hedges. The presence of rodent-gnawed fruit stones and hawthorn seeds, some with flesh still attached, certainly implies the growth of these trees in the immediate locality of the waterholes and ditches where they were found. A few of the insects also confirm the presence nearby of trees (Table 5.8) such as ash, alder, oak, willow, hawthorn and tree and shrub Rosaceae which would support the occurrence of these taxa in hedgerows. Interestingly hedgerow, scrub and woodland plants make a significant contribution (Table 5.6) in the waterlogged plant macrofossil assemblages offering further support for hedgerows, although they could equally reflect the development of overgrown conditions and scrub in and around the waterholes. The general lack of woodland is nevertheless clear but despite this absence of environmental data, bones of red deer, roe deer, aurochs and pine marten all indicate that woodlands must have lain within reach of the site, or that material was exchanged between communities in different vegetational zones.

Overall the pollen assemblages are herb-dominated, suggesting grassland with associated pastoral taxa, such as ribwort plantain and buttercups (*Ranunculus*), a picture supported by the beetle remains which suggest a damp, weedy meadow, with perhaps scattered trees and some large herbivores. The character of this grassland is perhaps best reflected in the macrofossil remains. The waterlogged plant remains indicate the presence of a few meadow plants such as selfheal, lesser stitchwort, creeping/meadow buttercup and sheep's sorrel. Beetles specific to docks, grasses, clovers and vetches, and ribwort plantain occur. The terrestrial land snails suggest a meadow environment, and the ground beetle fauna is what might be found in damp grassland, ranging to the edge of wetlands, the latter probably specifically the environment around the waterholes. A relative lack, but not absence, of dung beetles in the samples suggests that the animals did

not have access to the waterholes, a conclusion established from the steep-sided character of most of them, but the numbers are low enough to suggest only light grazing of the adjacent grasslands. One might hazard the conclusion that many of these fields were meadows from which hay was cut for winter fodder for the cattle, and grazing may have been restricted to the autumn, winter and perhaps early spring, with animals grazed on the fens to the south in the summer. The possible droveways would allow control of the stock and keep them out of hay fields. The droveways extended to the south-east from the fields, and would lead to the slightly lower ground, where the fenlands were probably located.

Much of the environmental data reflects the immediate environment of the waterholes from which the samples were collected. An aquatic component is particularly evident in Pond Cluster 1 (monolith 8022). Pollen of water milfoil (*Myriophyllum*), bog bean (*Menyanthes*), flowering bulrush (*Butomus*), bur reed and/or reed mace (*Typha angustifolia* type) and sedges (Cyperaceae) occurs in many samples: one or two aquatic taxa occur among the plant macrofossils, and beetles and other invertebrates, such as the larval stages of caddis and chironomids (midges), and an occasional stickleback prove the presence of pools of water, although aquatic gastropods and bivalves were rare. The macrofossil component – plants, insects and snails – does not, however, reflect permanent or significant open water that would indicate permanent ponds. It is possible that even these waterhole pits may have been wet or damp, rather than waterfilled, during the summer months. Intermittent waterlogging or a limited lifespan could account for the absence of some aquatic plants and those animals that need time to colonise new habitats. Damp and wet muddy habitats certainly occurred around the waterholes, as shown by the marshy waterside vegetation with its associated invertebrate faunas. An abundance of water voles in the small mammal assemblage indicates that this species could readily obtain access by travelling up damp or wet ditches. One of the biggest components of the waterlogged plant macrofossils consists of weeds of cultivated or disturbed ground and these taxa and some of the hedgerow or scrub taxa must have colonised the sides of the waterholes and the upcast from their digging. If there had been herbivore access to the waterholes then dung would have been abundant around their margins, and the generally low density of dung beetles in most of the samples suggests that animals did not regularly drink from them.

Aspects of the farming economy have been discussed above. The site illustrates a pattern of small fields which were probably hedged, may well have been meadows from which hay was cut, and could have been seasonally grazed between autumn and spring. Pollen evidence suggests that on the lower ground to the south there may have been fen, a suitable environment for summer grazing.

Cattle were clearly the mainstay of this farming economy, probably being husbanded for a range of products including milk, meat and hides, but perhaps also draught, although there is no positive evidence for this in the form of pathologies that could be associated with ploughing. The absence of trees and the evidence for meadows suggests that the animals were foddered during the winter on hay, and may have been grazed on the fens in the summer. Animals may have been kept in the field system in spring for calving, before being led out onto the fens. The sheep appear to have been kept for meat, wool and probably their skins, but occur in much lower numbers than cattle, and their wool and skins may have been more important in economic terms than their meat. Finds of possible clay loomweights and bone awls from the project area may well be related to the processing of secondary products from domesticated stock. Pigs, probably kept exclusively for their meat and their suitability for slaughter in the winter months, could have supplied more meat than the sheep.

Other dietary contributions were made by occasional red and roe deer, an aurochs and the odd duck. The deer and aurochs suggest that some hunting was carried out, but with the environmental evidence indicating very little woodland around the site one might question how far the hunters would have had to go to hunt these animals. It remains possible that some of this material was exchanged or traded, and a similar argument could be put forward for the antler.

Apart from one roe deer antler broken from the skull, this is shed antler or worked or waste pieces, and would have been collected from the forest floor. This evidence and several worked bone fragments indicate bone working, which on the basis of the antler waste fragments and apparently unworked antlers was undertaken on site. Some woodworking is also indicated by the wood chips, stake ends and other pieces of wood in the waterholes.

Evidence for arable cultivation is limited. The charred plant assemblages have produced evidence for emmer wheat, spelt wheat, possible bread wheat, six-row barley and possible oats, although the latter may be wild. Of these, barley occurs with the greatest frequency, but considering the volume of soil processed, the resulting assemblages are very poor. This is typical for most Bronze Age sites and is probably not significant. Barley was presumably the most important crop, since emmer and spelt are positively identified from only a few grains. The positive identification of a single grain of spelt wheat suggests that this species was already being cultivated in the Middle to Late Bronze Age. There are indications from the charred plants, the waterlogged plants and also the pollen that flax, *Linum usitatissimum*, was also being cultivated and the occurrence of *Cannabis*-type pollen might indicate the cultivation of hemp, although this could be from wild hops. There was no positive evidence for crop processing on the site, although charred cereal chaff and charred seeds of arable weeds are present. There is a question as to whether these crops were grown on site or elsewhere. Cereal pollen occurs at low levels in all three pollen sequences, as do several taxa that might be associated with cultivated ground. Many of the weed seeds from the waterholes are also characteristic of disturbed or

cultivated ground, but the terrestrial snail fauna shows little evidence for disturbed soils. The few samples with a little chaff and charred arable weeds do suggest crop processing, which might imply cultivation on site.

The environmental picture presented above sees the fields on the site as pasture and meadows, rather than arable, and with no positive indications to the contrary one is inclined to assume that the arable land might lie to the north or north-west of the site. Two interesting artefacts, a complete antler digging stick from Fen-edge Pit Cluster 4 and the probable ard from Fen-edge Pit Cluster 5, might imply cultivation of some sort on site. Whether *Cannabis* or flax was grown is also problematic, although both charred and waterlogged seeds of flax have been identified. The waterlogged remains could have derived from cultivars seeding on the disturbed ground around the waterhole, which might imply cultivation at one time on the site. There is a general impression that the area of the site must have been too wet for cereal cultivation, but little of the environmental data positively indicates waterlogged ground, unless around the waterholes themselves. If the waterholes, some of which were quite deep, were prone to nearly drying out in the summer then there is no reason why a crop could not have been cultivated in the fields. Crop debris is generally at low densities on Bronze Age sites and its scarcity at Pode Hole do not preclude the fields being used for arable. Small farmsteads require much more pasture and meadow land than arable land: it would be difficult to recognise arable activity in fields that might have lain fallow for most of their existence and were only intermittently cultivated. Nevertheless, although we know that cereals, and possibly flax and *Cannabis*, were eaten or utilised, we cannot say whether or not they were grown on the site.

Several of the plants that are interpreted as being in the hedgerows afford seasonal food resources. Sloe, cherry, bramble, hazel, hawthorn, elder and apple/pear/whitebeam could all have been harvested in season to supply food and may have been encouraged in the hedgerows. If hedgerows were present they would have afforded other resources. A quantity of the wood studied was charcoal, and several pieces were worked. Worked wood included oak, alder and willow, while the most frequent charcoal was willow, followed by alder, hazel, oak, Maloideae and ivy. Most of these species are likely to have been available in the hedges, growing around the waterholes or on the nearby Fen-edge. This suggests that fuelwood and the wood for the simplest uses such as wattling, posts, pegs and stakes could be obtained from local resources and may not have required access to woodlands. The growth ring data indicates small roundwood consistent with prunings, coppicing or gleanings from hedgerows, scrub or willow on the Fen-edge. The willow has many uses that are unlikely to leave any trace in the archaeological record, and its harvesting for basketry and rope using stems or bark is certainly a possibility. The twisted honeysuckle rope, discovered around the wooden bucket, was a rare survival; it is apparent that this plant was available and utilised in the later Bronze Age.

It is possible that the distribution of the charred cereals and animal bone, when considered with the pottery and other finds, can give some indication of whether there were buildings on the site. This occupation debris is never very abundant on Bronze Age farming sites, although there are 'specialist' sites where bone and pottery assemblages can be very large, such as the midden at Potterne (Locker, 2000). Some of the richer charred plant assemblages derive from features at the eastern end of the site, and several of the waterholes have relatively large animal bone assemblages (over 100 recorded fragments per feature). The sample data indicates that, by volume, the smaller 'midden' pits contain the highest concentrations of bone, pottery and flint per litre of sediment. It is difficult not to see these features as associated with adjacent occupation. The upper fills of Pond Cluster 1 accumulated when the waterhole had long since filled in, and produced a relatively large sample of animal bone, including worked and waste antler fragments. The bones from these features are not heavily fragmented, which one might expect if they were being thrown out with middened material as a manure – the usual explanation for a scatter of cultural debris in the fields. It should be remembered that there is no evidence that these fields were being cultivated and therefore manured. Some of the bones have chop marks indicating butchery. This is surely all occupation debris and therefore, despite the absence of any visible structural remains, one is inclined to conclude that houses were present on the site. Although the distribution of this material is not strongly focused, it does occur at specific locations across the whole site. If the spatial concentrations of cultural material identified on Fig. 6.2 are taken to indicate occupation, then one can envisage several buildings, with the fields representing a number of small farmsteads with access to the fens to the south and possibly further fields to the north. Some of the environmental evidence would appear contradictory to this suggestion, such as the lack of anthropogenic indicators among the beetles, and the general lack of charred plants except in Pond Cluster 1. Yet if there were no buildings on the site then the occurrence of occupation debris across it is somewhat anomalous.

The picture that has been put together for this site differs in several respects from that presented for the contemporary Thorney Borrow Pits site nearby (Phoenix Consulting Archaeology, 2007). The pond there appears to have been wetter with fringing alder and willow carr. The surrounding dry land was a mosaic of open woodland, shrubland and grassland, in contrast to the conclusions for Pode Hole, where woodland is not thought to figure, by the later Bronze Age except for willow carr along the Fen-edge. The agricultural economy was probably similar, although Pode Hole produced no evidence for the cultivation of vetches. It may be that the Thorney Borrow Pits site lies closer to the regional woodlands in which the deer, aurochs and pine marten could be found. However, the radiocarbon dates from the Borrow Pits site suggest that the studied samples predate those at Pode Hole, which could account for the differences between the results from the two investigations.