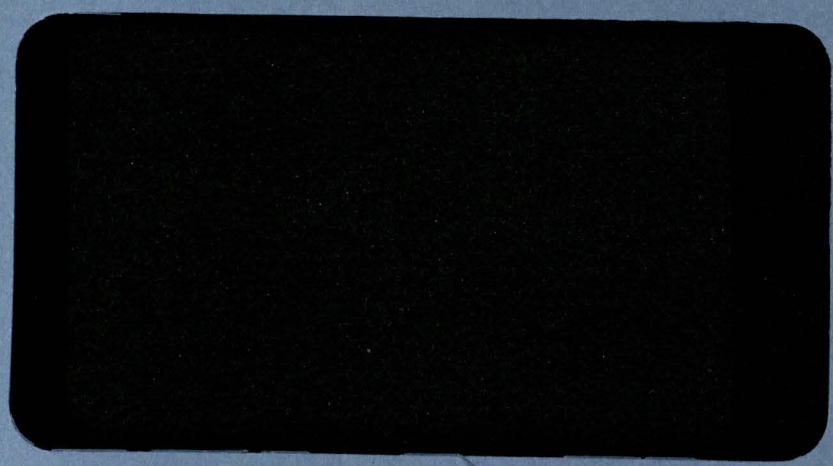
98/19

ARCHAEOLOGICAL FIELD EVALUATION
LAND NORTH OF ST. MICHAEL'S LANE,
WAINFLEET ST MARY, LINCOLNSHIRE.

Site Code:	MLW98
LCNCC:	210.98
NGR:	TF 4978 5773
Planning Ref:	S/195/1697/97



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Report prepared for Hugh Bourn Developments (Wragby) Ltd.,
by James Albone BSc PIFA.
with specialist reports by
J. Cowgill, J. Rackham and J. Young.

October 1998

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Summary

* *An archaeological field evaluation took place on land north-east of St Michael's Lane, Wainfleet St. Mary, Lincolnshire (Fig. 1).*

* *The site lies within an area of late medieval salt-making activity and waste mounds are known to have existed on the site until earlier this century.*

* *Seven trenches were excavated to establish the presence of any archaeological remains which may survive on the site.*

* *Four filtration units associated with the salt-making process were identified. One of these units contained thirteenth to fourteenth century pottery. No traces of the waste mounds were found and these are assumed to have been completely removed by ploughing.*

* *Three large ditches and a possible midden were also identified. These features produced thirteenth to seventeenth century pottery suggesting a long period of activity on the site.*

* *A rare fragment of a jawbone sledge runner was found in one of the ditch fills.*

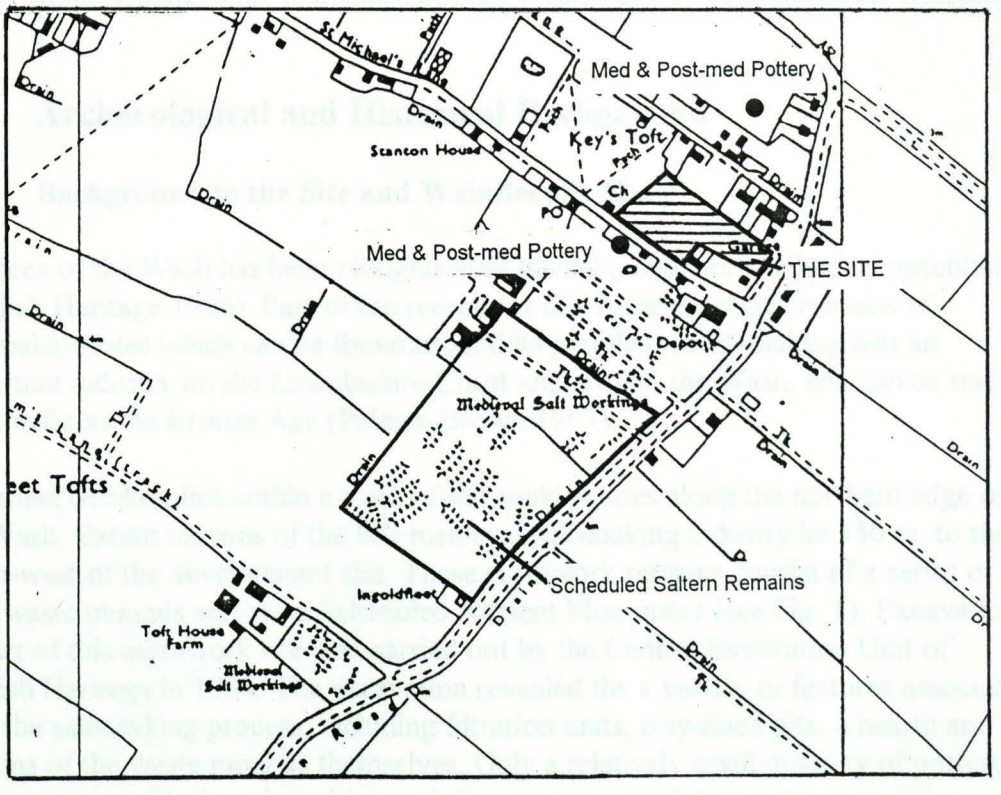

Fig. 1: Site location incorporating principal entries from the County Sites & Monuments Record (1:10000)
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1.0 Introduction

A five-day programme of archaeological trial excavation was carried out on a site north-east of St. Michael's Lane, Wainfleet St. Mary, Lincolnshire (Fig. 1). The work was commissioned by Hugh Bourn Developments (Wragby) Ltd. to fulfil a planning requirement issued by East Lindsey District Council (Ref. S/195/1697/97).

The results of this report will assist the clients and the local planning authority to assess the archaeological significance of the site, the potential impacts which may be imposed by a development, and the requirement or non-requirement for further archaeological intervention in advance of, or during, development.

A copy of this report will be deposited at the County SMR, and a short text will be submitted to the editor of the county journal, *Lincolnshire History and Archaeology*; effectively placing the information in the public domain. Reports will be deposited at the City and County Museum, Lincoln, accompanied with an ordered project archive.

2.0 Location and Description

Wainfleet St. Mary is situated in the administrative district of East Lindsey, approximately 9 km. south-west of Skegness and 22 km north-east of Boston. The site is centred on NGR TF 4978 5773, where the mean elevation above sea level is approximately 4 m.OD. The site lies on a broad, but low strip of land (Wainfleet Tofts) which separates the marshlands of the Wash from those of the River Steeping.

3.0 Archaeological and Historical Background

3.1 Background to the Site and Wainfleet St Mary

The area of the Wash has been recognised as having a high archaeological potential (English Heritage 1996). Part of the reason for this is the extensive remains of salt-making sites which can be found around its periphery. Salt-making was an important industry on the Lincolnshire Coast and around the Wash, and can be traced back as far as the Bronze Age (Palmer-Brown 1993).

Wainfleet St Mary lies within a band of salt-making sites along the northern edge of the Wash. Extant remains of the late medieval salt-making industry lie 350 m. to the south-west of the development site. These earthwork remains consist of a series of long waste mounds and are a Scheduled Ancient Monument (see Fig. 1). Excavation of part of this earthwork site was carried out by the Central Excavation Unit of English Heritage in 1984. The excavation revealed the a variety of features associated with the salt-making process, including filtration units, clay-lined pits, a hearth and the remains of the waste mounds themselves. Only a relatively small quantity of pottery contemporary with the salt-making activity was recovered during the excavation. Worked leather, including parts of boots and shoes, was recovered from some of the clay lined pits (McAvoy 1994).

The excavated site dated to the fifteenth to sixteenth centuries, a time when the Lincolnshire salt industry was in decline. The exact reason for the decline of the industry is uncertain, but it has been suggested that cheaper imported salt from the Tyne and Firth of Forth was to blame (Sturman 1984, 54). Evidence of earlier medieval salt-making activity at Wainfleet can be found in the Domesday Book. The survey of 1086 records eleven salterns in Wainfleet and twenty more associated with Wainfleet and other settlements (McAvoy 1994, 138). The importance of the Wainfleet salterns during the twelfth and thirteenth centuries is shown by the involvement of religious establishments such as the abbeys of Bardney, Revesby and Bury St Edmunds (Hallam 1960, 108-109).

The development site lies within an area of land known as Key's Toft where medieval and post-medieval pottery has been found (see Fig.1). Earthworks of fifteen waste mounds are shown on the 25" to the mile Ordnance Survey map of 1905 (Fig.2) providing clear evidence of salt-making activity on the site. All of these mounds had been destroyed by housing and arable farming by at least 1980.

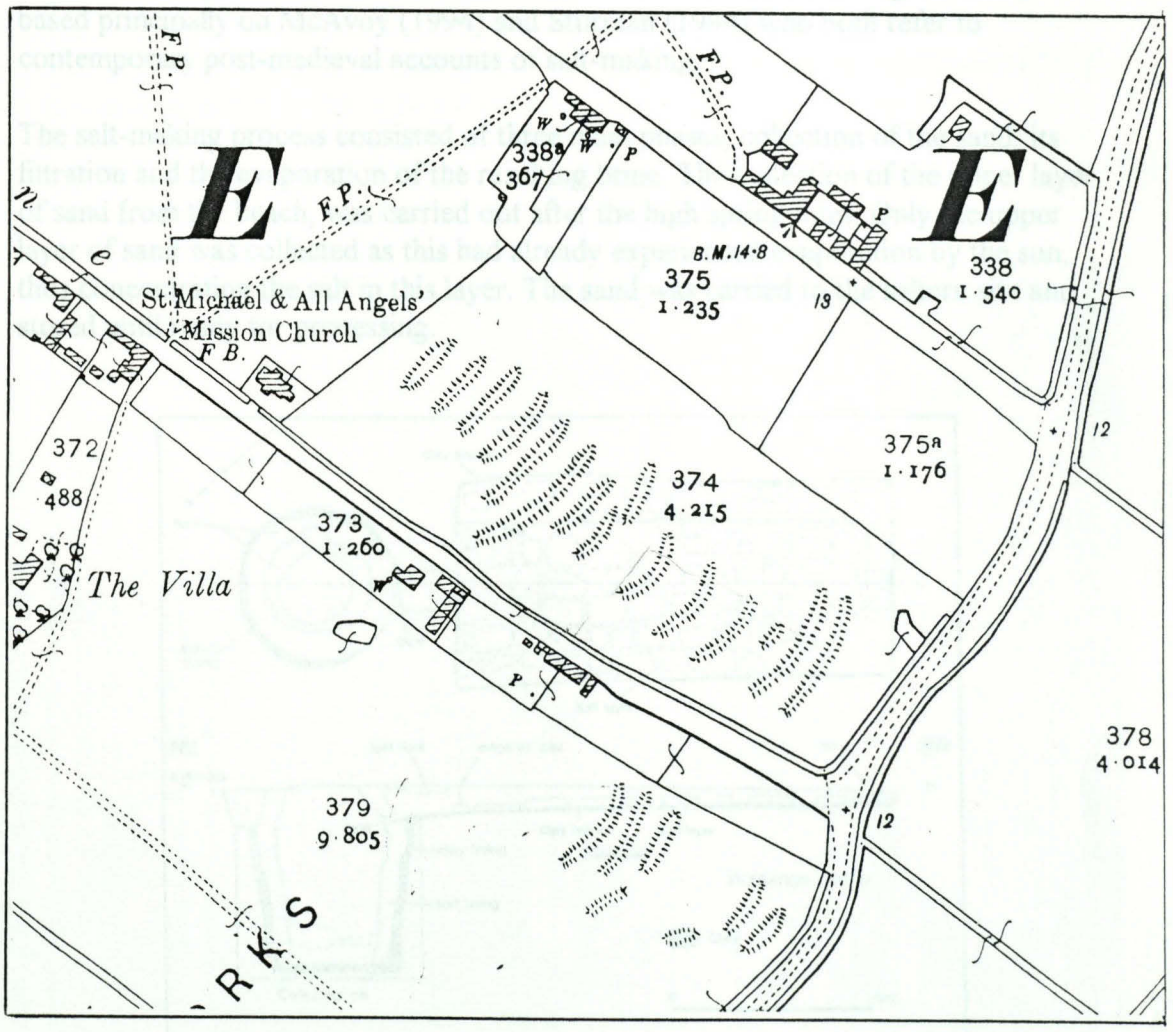


Fig. 2: Extract of the 2nd edition, 25" to the mile Ordnance Survey map of 1905, showing the site (field 374) and the extant waste mounds.

It has been suggested that Groose Lane and St Michael's Lane (formerly Mouse lane), to the north and south of the site, are both of medieval origin. These two lanes link the Key's Toft area to the former focus of the of settlement of Wainfleet St Mary, which lies 3 km. to the west-north-west. The medieval church of St Mary now stands in isolation surrounded by the earthworks of the village remains (Pevsner et al 1995, 778).

St Michael's Church, which lies immediately to the north-west of the site, is a small brick structure in the Gothic style. It was constructed in about 1880 as a mission church, consecrated in 1883 and was originally dedicated to St. Michael and All Angels (Massingberd-Mundy 1991, 52).

3.2 A Brief Summary of the Salt-Making Process

Although much has been written about the processes involved in salt-making in the medieval and early post-medieval periods, a brief summary is included here to allow for easier interpretation of the results of the evaluation. The following summary is based principally on McAvoy (1994) and Sturman (1984) who both refer to contemporary post-medieval accounts of salt-making.

The salt-making process consisted of three main phases; collection of the sand, its filtration and the evaporation of the resulting brine. The collection of the upper layer of sand from the beach, was carried out after the high spring tides. Only the upper layer of sand was collected as this had already experienced evaporation by the sun, thus concentrating the salt in this layer. The sand was carried to the saltern site and stored until ready for processing.

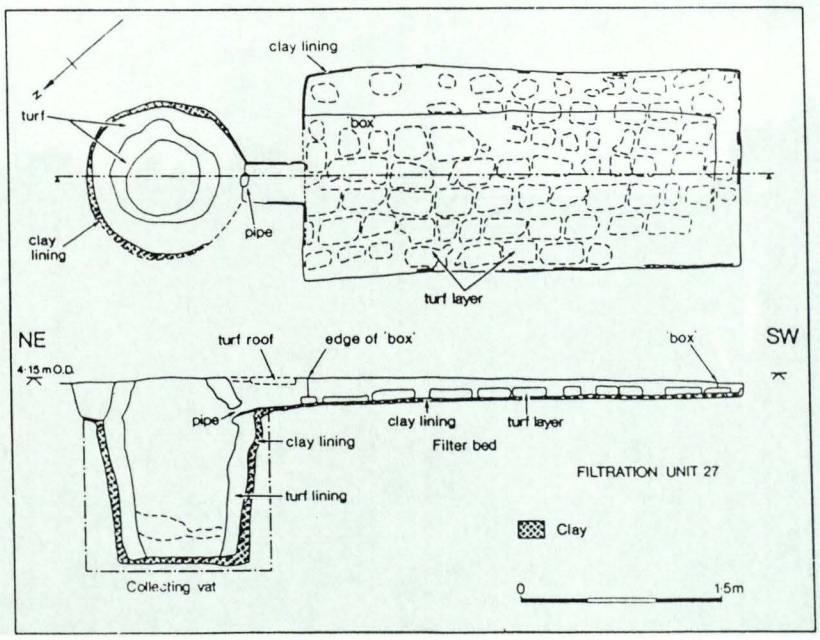


Fig. 3: A typical filtration unit found during the 1984 excavation (McAvoy 1994, 140).

The next stage was the filtration to effectively wash the salt out of the sand. The filtration units consisted of clay-lined rectangular filter beds which contained a layer of turves (to act as the filter). The sloping base of the filter bed led to a pipe which ran into a round clay and turf-lined collecting vat. The salt impregnated sand was placed in the filter bed and water was poured in which carried the salt with it through into the collecting vat. The filter beds had wooden frames around them to increase the volume of sand which could be processed and to prevent overflow directly into the collecting vat. Twenty four filtration units were identified during the 1984 excavation, although only two were completely excavated (A typical example is shown in Fig. 3 above).

The brine was taken from the collecting vats and boiled in large rectangular lead trays (approximately 1.2 m. x 0.9 m. and 0.1 m. deep). These pans were raised on bricks to allow a peat fuelled fire beneath them. Only one clay hearth area was identified during the 1984 excavation.

4.0 Methodology

A project specification was prepared by Pre-Construct Archaeology (Lincoln) in line with the Lincolnshire County Council Archaeology Section document, '*Standard Brief for Archaeological Projects in Lincolnshire*'.

Pl. 1: General view of the site looking north-west with trench one in the foreground.

Trial trenching was considered to be the most appropriate evaluation technique. Alternative approaches were considered, were rejected due to site constraints: extensive vegetation cover prevented fieldwalking, and geophysical survey was not undertaken due to the presence of overhead power cables (see Pl. 1 above).

Seven trenches (six of which were 15m. long and one at 30m.) were excavated by a mechanical excavator fitted with a toothless ditching bucket. The location of the trenches is shown in Fig. 4. The purpose of the trenching was to determine the nature of the archaeology (its character, date, depth, state of preservation, extent and significance). The overall objective of this phase of work, therefore, was to present the District Planning Authority and the client with a set of data from which reasoned decisions may be taken regarding future management of the archaeological resource.

Recording was undertaken using standard context record sheets (incorporating physical descriptions, interpretations, and stratigraphic relationships). Features were drawn to scale in plan and section, and photographic recording was also undertaken (some prints are reproduced in this report). The drawings, and the rest of the paper record, will form the basis for a long-term project archive.

A small quantity of finds, including pottery, fired clay, animal bone and iron artefacts were recovered during the excavation, and specialist reports on these are included in the appendices at the back of this report. Substantial deposits with a potential for the recovery of environmental remains were limited and only one sample was taken during the evaluation.

The evaluation was supervised by the writer assisted by three experienced field archaeologists between 28th September and 5th October 1998.

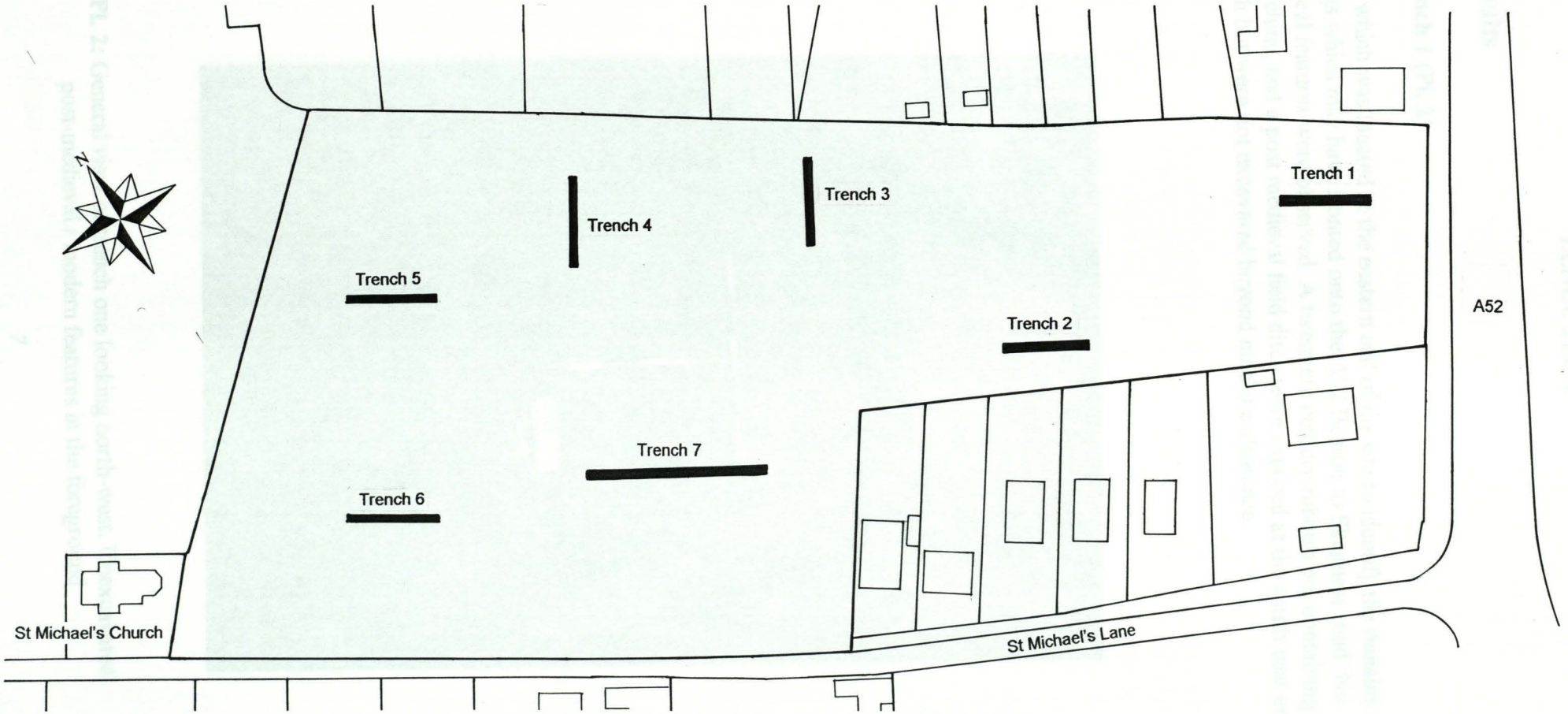


Fig. 4: Site plan showing the location of the trenches (1:1000).

5.0 Results

5.1 Trench 1 (Pl. 2)

This trench which was located at the eastern end of the site to identify the remains of any buildings which may have fronted onto the A52 Boston to Skegness road. No archaeological features were observed. A twentieth century rubbish pit, containing bottles and china, and a post medieval field ditch were exposed at the south-east end of the trench but were not excavated beyond machine clearance.

Pl. 2: General view of trench one looking north-west. Unexcavated post-medieval / modern features in the foreground.

5.2 Trench 2 (Fig. 5)

This trench was located on the south-west side of the site, parallel to the boundary. It was orientated north-west to south-east and was excavated to a depth of c.1.3 m.. Below the ploughsoil were layers of greyish brown sandy silt (201 & 202) which appeared to dip to the south-east (i.e. towards the Wash). A sondage excavated on the north-east side of the trench showed that these layers had a maximum thickness of 1.1 m.. Beneath these deposits was a layer of blue grey sandy clay silt (227) which represented a salt marsh deposit (see Appendix 8.2).

The filter beds of two (or possibly three) filtration units were observed in the sections of the trench. The fill of these features was very similar to the sandy silt deposits into which they were cut and consequently the were not noticed in plan during machining.

5.2.1 Filtration Units 216 and 221 (Figs. 6 & 7, Pls. 3 & 4)

The filter bed of unit 216 appeared to be present in both sections of the trench and its orientation was north-north-east to south-south-west. It must be noted that as the continuation of the filter bed was not observed in plan, the two sections could be parts of two separate filtration units. For the purposes of this report they will be treated as one. Unit 221 lay to the north-west of 216 and its filter bed was only observed in the south-west section of the trench. It was sealed by a layer of mottled white and grey-brown silty sand. This layer was cut by unit 216, showing that this was the later of the two units in this trench. The 1984 excavation showed that the processing activity advanced towards the Wash (McAvoy 1994, 144). The sequence of the two filtration units in this trench seems to suggest that a shift in activity also occurred on this site.

The structure of the filter beds was broadly similar to those excavated in 1984 (see Fig. 3). Each was lined with a thin layer of mid blue grey clay which contained mid brownish grey silty sand remains of turves which acted as the filter. Overlying the turves was a light orange brown silty sand, presumably the from the last use of the filter bed. Silty sand deposits at the sides of the filter bed 221 were possibly the remains of a wooden frame. Both filter beds were sealed by a layer of light brown to brown-grey sandy silt-clay. This material presumably represented some part of the structure, although no direct parallel can be found in the example shown in Fig. 3. The filter bed of unit 216 was sealed by mottled white and orange-brown sand.

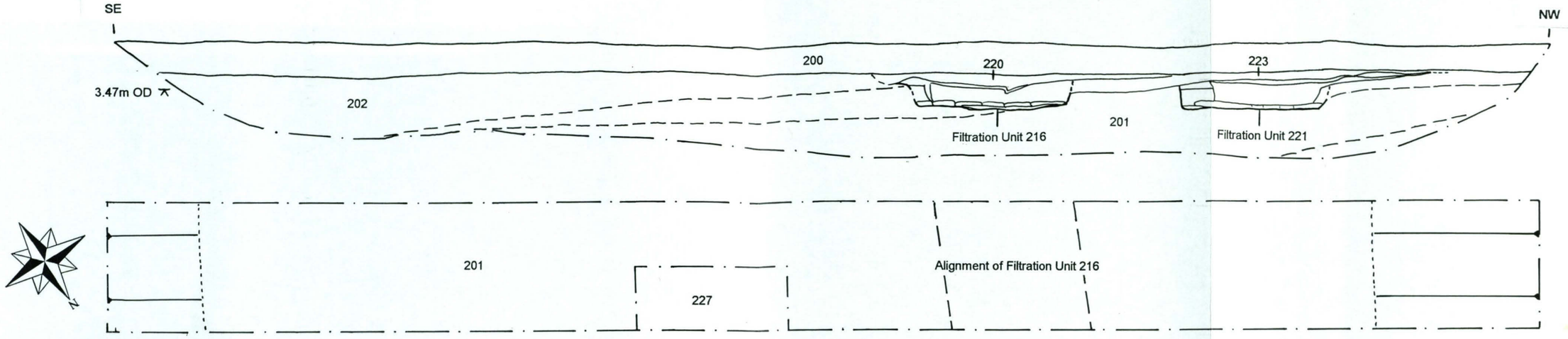


Fig. 5: Plan and section of trench two (1:50).

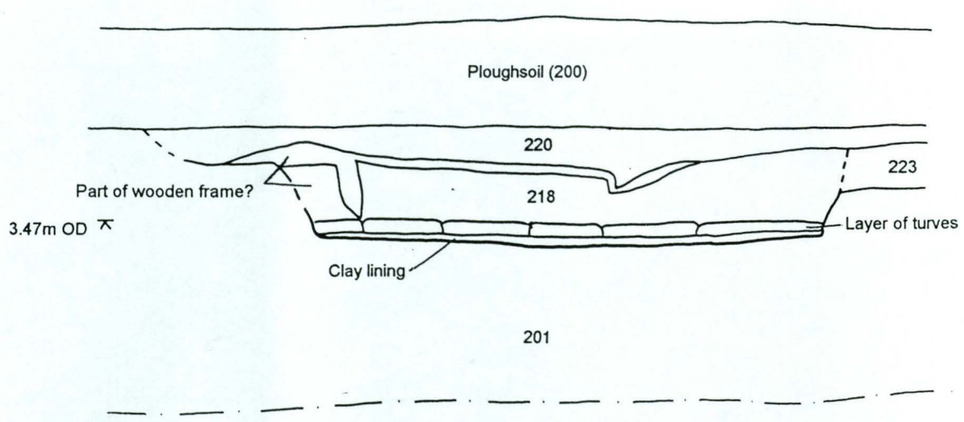


Fig. 6: Section of filtration unit 216 (1:20).

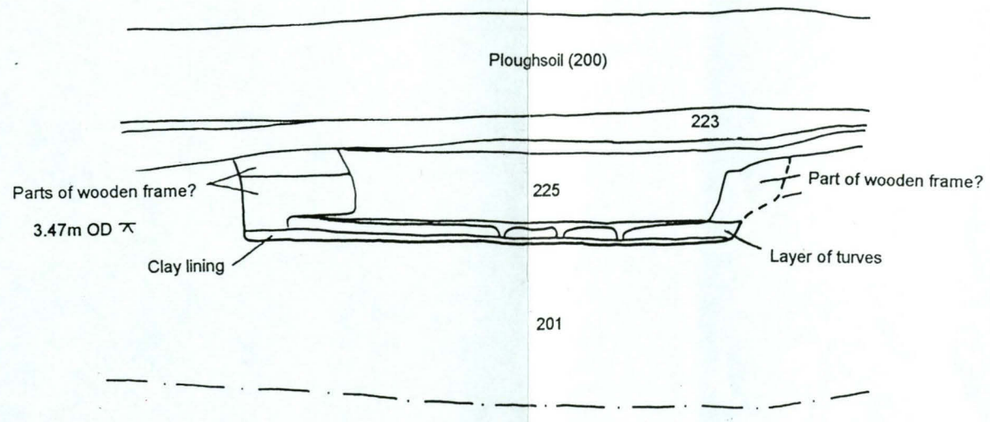
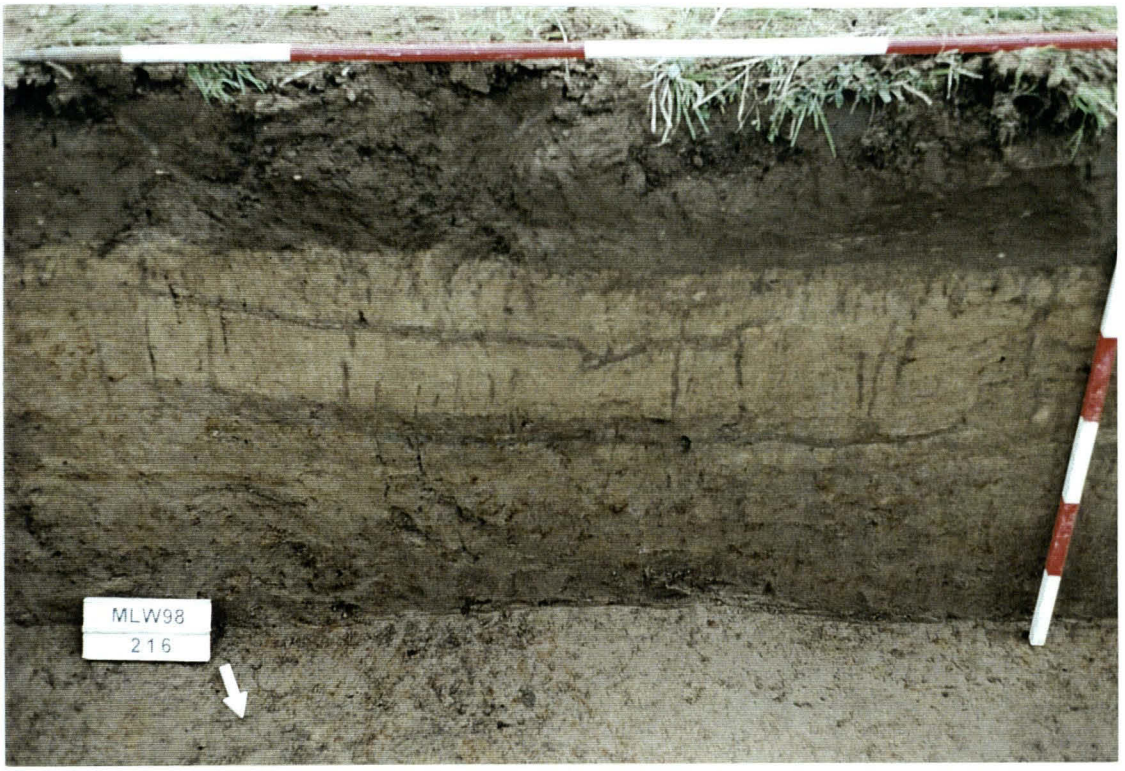


Fig. 7: Section of filtration unit 221 (1:20).



Pl. 3: Section of filtration unit 216, looking south-west.

Pl. 4: Section of filtration unit 221, looking south-west.

5.3 Trench 3 (Pl. 5)

This trench was orientated north-east to south-west along the north-east side of the site. It was excavated to a depth of c.0.60m. No archaeological features were observed, although modern land drains were identified. Sealed below the ploughsoil (300) was a layer of brownish grey silty sand subsoil (301) above the natural silty sand (302).

5.4 Trench 4 (Fig. 8, Pl. 6)

Trench 4 was orientated north-east to south-west, parallel to trench 3. Sealed below the ploughsoil were a sequence of deposits which may have related to a levelled midden, although the small area exposed did not permit a full interpretation.

The upper layer of these deposits (401) produced pottery and brick dated to the fifteenth to seventeenth centuries, animal bone and a large quantity of shell (cockle, mussel and oyster). Also from this layer were two iron artefacts; a ring of unidentified function and fragments of a curry comb.

Cutting the silt layer was a linear clay feature (403) which may have been part of a structure, although it was not possible to see what this related to. Below this and the clayey silt were bands of fine light yellow silty sand (405 & 407) and grey-brown clay silt (406 & 408). These layers contained a large quantity of shell and some thirteenth to fourteenth century pottery. Underlying these deposits was a fine yellow silty sand which was probably a natural deposit (409).

5.5 Trench 5

Trench five was located at the north-western end of the site. It contained the only filtration unit to be exposed in plan during the evaluation. As the nature of this feature could be positively identified it was not excavated.

5.5.1 Filtration Unit 503 (Fig. 9, Pl. 7)

Filtration unit 503 was orientated north-east to south-west and was exposed in a sondage within the trench. The collecting vat was located at the south-west end of the unit and consisted of a reddish brown clay structure which narrowed towards the top. The vat was filled with a light yellowish brown sand (505) which contained two sherds of thirteenth to fourteenth century pottery. Only part of the filter bed was exposed. This contained a light yellowish brown silty sand which was very difficult to distinguish from the natural sand. The unit was sealed below a mid greyish brown silty sand (501) which contained animal bone and an iron nail.

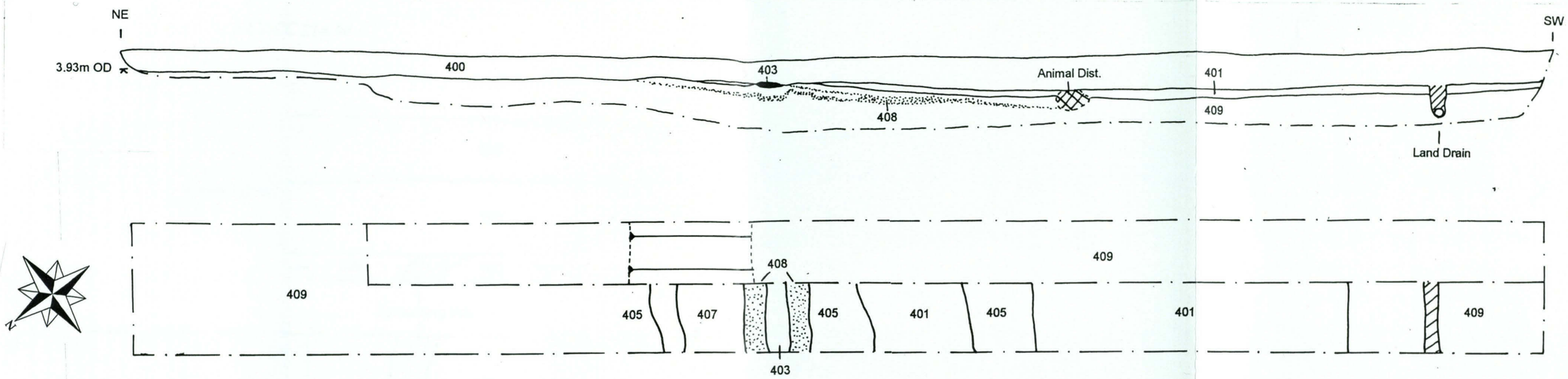


Fig. 8: Plan and section of trench four (1:50).

Pl. 5: General view of trench three, looking north-east.

Pl. 6: General view of trench four, looking north-east.

Pl. 7: Filtration unit 503, looking south-east.

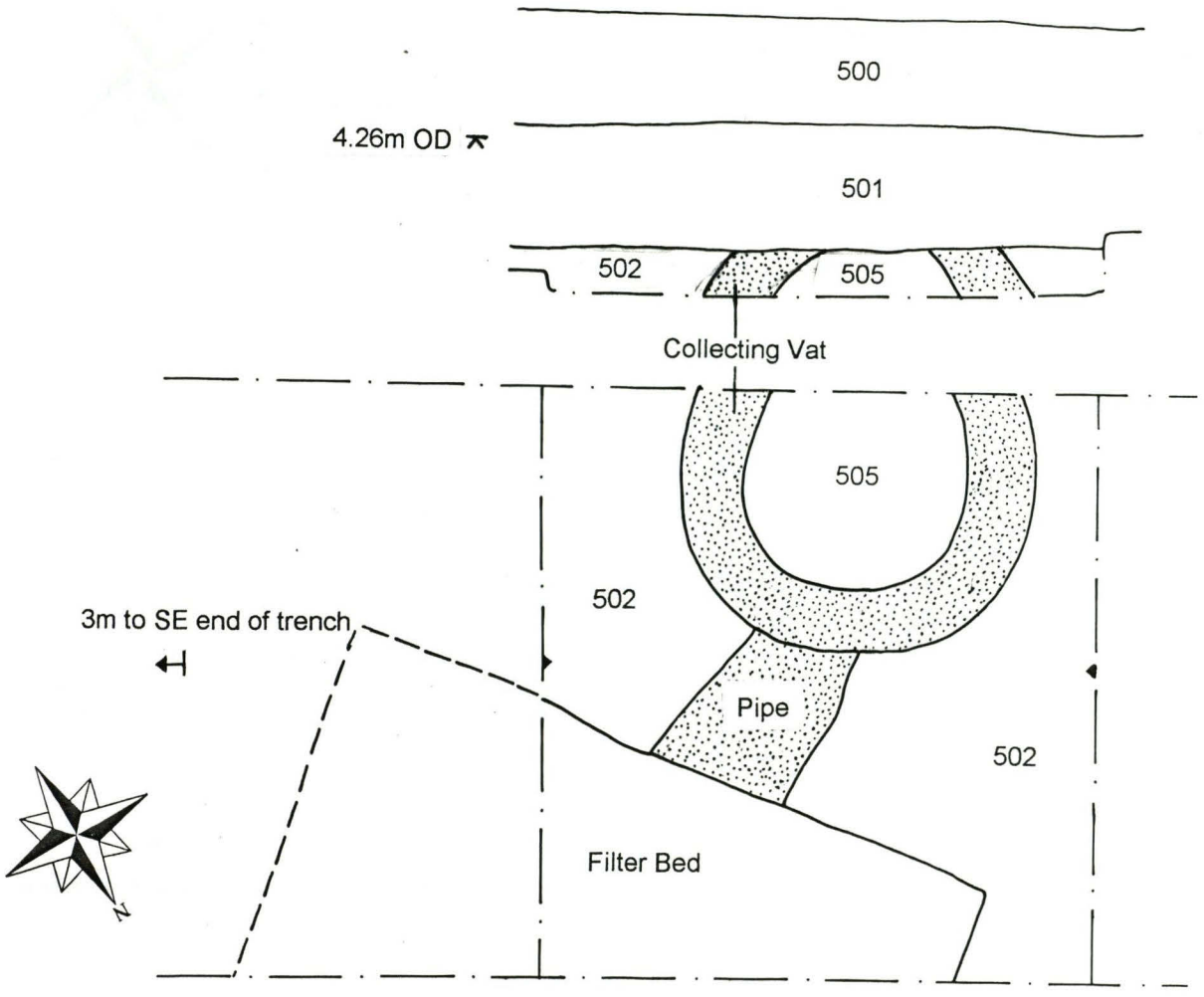


Fig. 9: Plan and section of filtration unit 503 (1:20).

5.6 Trench 6 (Pl. 8)

Trench six was located parallel to, and to the south-west of, Trench five. Beneath the ploughsoil (600) was a mid orangey brown silty sand subsoil (601) and natural sand (602). No archaeological features were observed.

5.7 Trench 7 (Fig. 10)

Trench seven was 33m.long and was located across three of the mounds shown on the 1905 map (Fig. 2). No traces of the three waste mounds were identified in this trench. Three large ditches, orientated north-east to south-west, and part of a possible filtration unit were exposed.

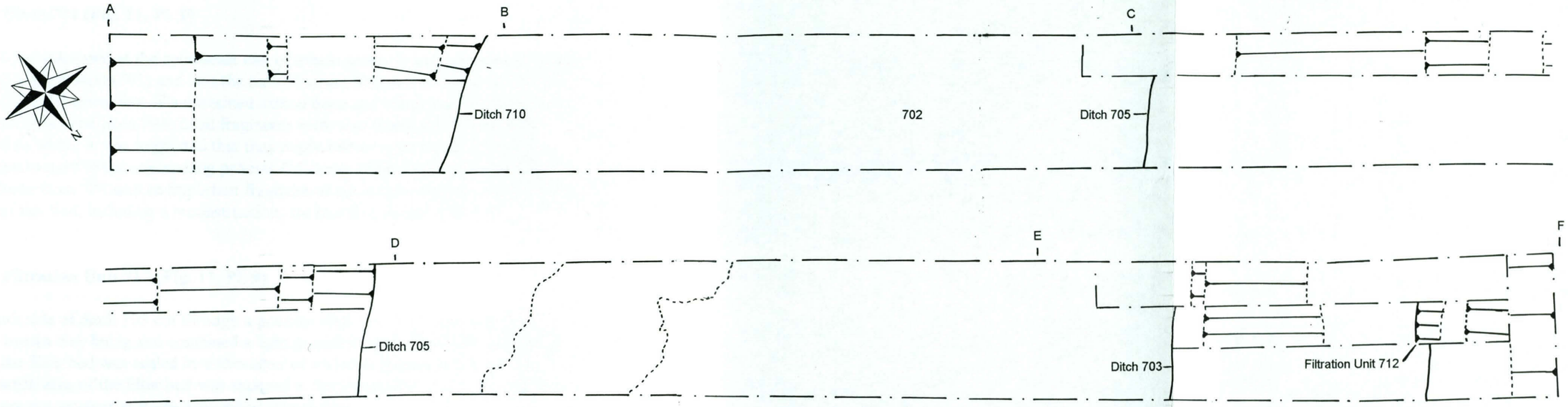


Fig. 10: Plan of trench seven (1:50).

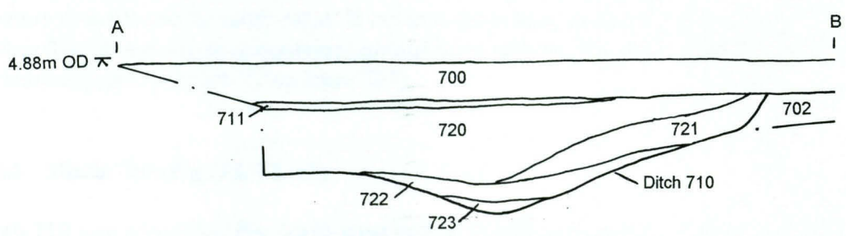


Fig. 11: Section of ditch 710 (1:40).

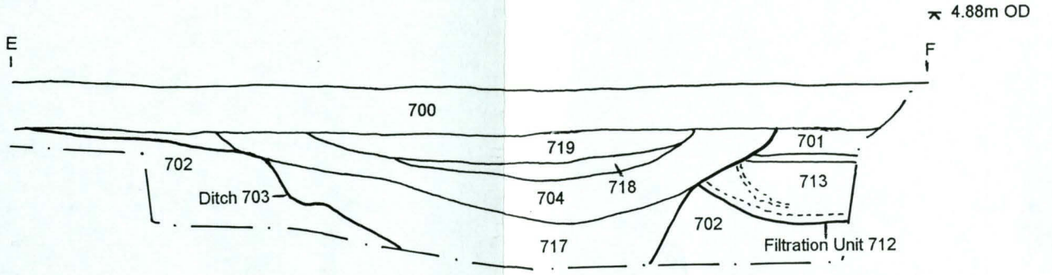


Fig. 13: Section of ditch 703 and filtration unit 712 (1:40).

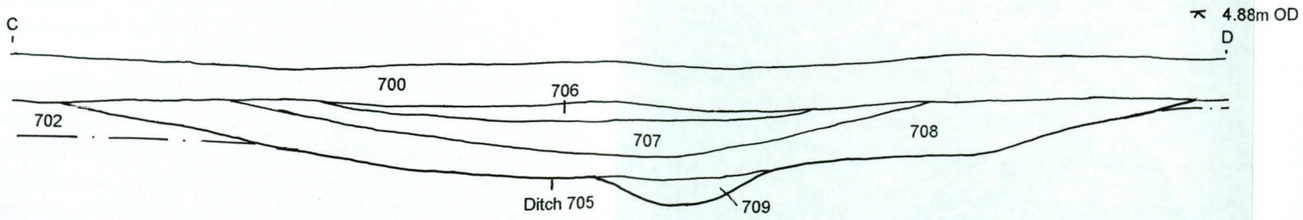


Fig. 12: Section of ditch 705 (1:40).

5.7.1 Ditch 703 (Fig. 11, Pl. 9)

Ditch 703 was located at the south-east end of trench seven. It was cut through a mid orange-brown subsoil (701) and into the natural sand (702), and it contained a series of four fills. The lower two fills contained animal bone and a few small fragments of lead were recovered from 704. Lead fragments were also found during the 1984 excavation, where it was suggested that they might relate to the repair of the large boiling tanks used in the salt-making process (McAvoy 1994, 142). Amongst the animal bone from 704 was an important fragment of a jaw bone sledge runner. Further details of this find, including a reconstruction, are included in Appendix 8.2.

5.7.2 Filtration Unit 712 (Fig. 11, Pl. 9)

The south side of ditch 703 cut through a possible filter bed. This filter bed had a mid greyish brown clay lining and contained a light greyish brown silty sand. The upper part of the filter bed was sealed by a thin layer of mid to dark greyish brown silty sand. Only a small area of the filter bed was exposed in the trench and its various component parts were not as clear as those exposed in Trench two.

5.7.3 Ditch 705 (Fig. 12, Pl. 10)

Ditch 705 was a broad, shallow feature located in the middle of trench seven and was orientated north-east to south-west. It cut into the natural sand and contained a series of four fills. These deposits contained animal bone and two fragments of fifteenth to seventeenth century brick (from layer 707).

5.7.4 Ditch 710 (Fig. 13, Pl. 11)

Ditch 710 was situated at the north-west end of Trench seven and contained a series of five fills. Animal bone was recovered from some of the lower fills and fragments of fired clay were found in layer 722.

6.0 Discussion and Conclusion

The evaluation was broadly successful in establishing the presence of archaeological remains on the site. Archaeological features associated with medieval to post-medieval salt-making were identified in four of the seven trenches excavated (but see below).

Four filtration units (216, 221, 503 & 712) were identified during the evaluation. The alignment and location of these features correspond well with the position of the mounds shown on the 1905 map. Only one of the filtration units produced any direct dating evidence. This was the thirteenth to fourteenth century pottery from the fill of the collecting vat of unit 503. If this is truly representative of the date of the unit, this

Pl. 10: Ditch 705, looking north.

Pl. 11: Ditch 710, looking north.

Pl. 8: General view of trench six, looking south.

Pl. 9: Ditch 703, looking north.

indicates that salt-making was taking place on this site much earlier than was identified in the area of the 1984 excavation.

The deposits which can not be directly related to the salt-making activity raise some interesting questions about the site. Finds from the three large ditches in trench seven suggest a fifteenth to seventeenth century date, but the function of these features remains uncertain. The brick fragments may relate to structures, and/or settlement activity, on or close to the site, which were not identified during the evaluation. The bone sledge runner from ditch 703 is a particularly significant find as this is a rare find and these small sledges are normally associated with children (see Appendix 8.2). This find may add to the argument for settlement in this vicinity.

The possible midden deposit in trench four is interesting as it contains pottery from the thirteenth to seventeenth centuries, perhaps suggesting a long period of activity on the site.

No traces of the waste mounds, which are known to have existed on the site, were identified. It appears that these have been completely destroyed by ploughing although a broad north-west to south-east ridge remains across the site where they would have been.

The way in which the processing activity had advanced across the site presented problems with the identification of some of the associated features. The process is described by McAvoy (1994, 144) and summarised here. The initial waste from one row of filtration units was cast seawards to form a platform. The next row of filtration units were then cut into this platform with the initial waste being cast forward to form the next platform. Further waste from the second row of filtration units was then cast back to form the mound, burying the previous row of units. This method of working means that many of the filtration units are cut into, filled by and buried beneath what is essentially the same silty sand waste material from the processing.

This similarity in the deposits made the filtration units very difficult to identify (as is well illustrated in Pl. 7). With this in mind, it is possible that some archaeological features were not overlooked, and the apparently negative results in trenches one, three and six must be treated with caution. This problem was also experienced during the 1984 excavation, where it was noted that features were cut from a variety of different levels (ibid).

The environmental potential of the site appears to be high (see Appendix 8.2). The potential for organic finds, such as the worked leather from the 1984 excavation, must also be considered. The animal bone was well preserved and a larger assemblage could be expected to answer questions about the diet and pastoral economy of the salt-makers (Appendix 8.2) especially if there was domestic activity on or close to the site.

The dating of the salt-making activity on the site is one of the most important questions that remains outstanding. There appears to be some activity on the site from the thirteenth to seventeenth centuries. Whether or not this represents continuous salt-making, or some other activity, is impossible to say. If the salt-making on the site

dates to the seventeenth century, it represents the final phase of this industry in Lincolnshire. The site may hold important evidence regarding the exact date of and reason for the decline and envronment at the time of the industry's cessation.

7.0 Acknowledgements

Pre-Construct Archaeology (Lincoln) express sincere thanks; both to Hugh Bourn Developments (Wragby) Ltd. for this commission. Thanks are expressed also to Mark Bennett and Sarah Grundy (County SMR), to the specialist who have contributed to this report; Jane Cowgill, James Rackham and Jane Young, and to the site team; Sue Farr, Jeremy Mordue and Tobin Rayner.

8.0 Appendices:

8.1 Post-Roman pottery analysis and archive by J. Young

By Jane Young

Context	Ware	Sherds	Form	Comments
300	TB	1	BOWL?	BASE; INT GLZE
Date: MH8-PMH6; 14th to 17th centuries				
401	TOY	1	JUG?	BS; X2
Date: MH5-MH10; 13th to 15th centuries				
505	TOY	2	JUG	BS
Date: MH5-MH7; 13th to 14th centuries				
407	TOY	3	JUG	BS; BURNT GLZE
Date: MH5-MH7; 13th to 14th centuries				
708	TOY	1	JUG	BS; 13TH/14TH
	LMLOC	1	BOWL?	HEAVY BASE; PROB TOYNTON/BOLINGBROKE
Date: MH10-PMH6; 15th to 17th centuries				
400	TOY	5	JUG/JAR	BS; NO GLZE
	TOY	1	JUG	BS; APP DEC
	TOY	1	JUG	BS; X3
	TOY	1	JUG/JAR	BS; NO GLZE; X2
	TOY	1	JUG	GLZE BURNT
	TB	1	JUG/JAR	PROB MED; X4
	TB	1	JUG/JAR	PROB MED; BURNT GLZE
	TB	1	JUG/CISTERN	LMED/PMED
	TB	1	BOWL	INT GLZE; LMED/PMED
	TB	1	JUG/JAR?	INT GLZE; NOT A BOWL; PROB LMED/PMED; X2
Date: MH10-PMH6; 15th to 17th centuries				
401	BRK	1	BRICK	SMALL FRAG ?TUDOR; X4
Date: PMH1-PMH6; 16th to 17th centuries				
720	LERTH	2	?	19TH/20TH
400	BRK	2	BRICK	16TH/17TH?
707	BRK	1	BRICK	HANDMADE; TUDOR?; X2; 5-6CM THICK
	BRK	1	BRICK	TINY FRAG TUDOR?
	MISC	1	?	POSS LERTH OR LATE TILE
Date: 19/20th and 16/17th centuries				

A small group of medieval and post-medieval pottery that appears to be almost entirely made up of Toynton-type wares. Most vessels are jugs or jars. There are no diagnostic sherds present, but the manufacture and glaze types indicate the presence of both medieval and late medieval/post-medieval vessels. There are 2 fragments of an unglazed early modern earthenware vessel of unknown type in (720). The bricks appear to be all handmade, probably all of the Tudor type belonging to the 16th or 17th century.

8.2 Environmental and animal bone analysis by J. Rackham

St Michael's Lane, Wainfleet St Mary - MLW98

Environmental Archaeology Assessment

Introduction

One soil sample and thirty seven animal bones were submitted for assessment from excavations of a medieval/post-medieval saltern at Wainfleet St Mary.

The sample

The soil sample, context 227, was weighed and its volume recorded. The sediment comprised a mottled very dark grey (Munsell N3/) and dark bluish grey (Munsell 5B 4/1) very fine sandy, slightly clayey, silt which oxidised rapidly to brown (Munsell 10YR 5/3) in air. A sub-sample of 2 kg was taken and washed over a 0.5mm mesh sieve and floated onto a 0.25mm seive. Both residue and float were dried. The dry volume of the flot was measured, and the volume and weight of the residue recorded.

The sample was found to have preserved organic remains including matted lumps of organic matter, peat, small twigs and rootlets. Juvenile shells, foraminifera, plant seeds and beetles were among the remains identified. The sediment appears characteristic of Shennan's Zone 9, saltmarsh (Shennan1986), in which silts dominate with some fine sand and progressively more clays with altitude, and some organic matter including rootlets and detritus is normally present. There was little evidence that the sediment was laminated in the submitted sample. The peat elements in context 227 indicate the silt was being deposited at the same time as peats were being eroded elsewhere on the foreshore.

The Animal Bone

The small collection of animal bone submitted varies in preservation condition, while some of the bone fragments are well preserved some have undergone surface erosion and pitting. This has not been sufficient to prevent identification of the collected material but it is possible that a proportion of bones from a larger sample would be unidentifiable due to poor condition. Five of the bones exhibit evidence of being gnawed by dogs.

Only horse (5 fragments), cattle (8), cattle size (8), sheep (10) and pig (5) were identified. A number of the bones were butchered. Four of the butchered bones were sawn, a butchery method normally associated with post-mediaeval material, and the large size of a few of the cattle and sheep bones perhaps also suggests material of this date.

There are a few bones from immature animals. One of these, a femur from context 706, is from a foal, but of what age cannot be established.

One find is of some interest. This is the posterior ventral portion, the angle of the jaw, of the horizontal ramus of a horse mandible. The ventral surface has been worn away smooth and polished, and despite only a small fragment surviving is consistent with the jaw having been used as a sledge runner. MacGregor (1985) illustrates a reconstructed jaw bone sledge in the Pitt Rivers Museum, and although this is made from cattle mandibles a similar construction was used with horse mandibles. Although illustrated in contemporary engravings and paintings MacGregor records only two examples of this type of sledge runner from archaeological

contexts, a fourteenth or fifteenth century context in Dordrecht and a mediaeval example from York. Although probably used on ice there are eye-witness accounts of such sledges being used for toboganning.

Conclusions

The survival of organics and foraminifera in the sample suggests that it would be possible to carry out a detailed study of the sedimentary sequence at the site and identify the mudflat, saltmarsh and upper saltmarsh environments. It may even be possible to separate the sediments collected from the foreshore for salt extraction from those natural to the site of the saltern. A study of the foraminifera would be an essential element of this work.

The animal bones are in sufficiently good condition that a larger sample can be expected to give a reasonable view of the food and pastoral economy associated with the saltern. The presence of young horses and the frequency of horse bones suggests that these may be an essential element, as draught animals, of the salterns work and larger bone samples may allow us to consider the type of horse, and therefore its functional use at the site.

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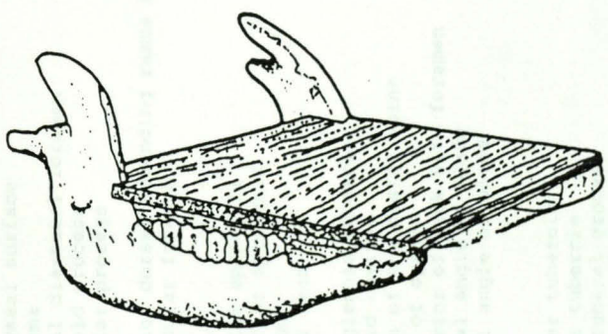

Fig. 14: Reconstruction of the jawbone sledge (after Balfour in MacGregor. 1985, Fig. 76).

ZONES - codes used to define zones on each bone

SKULL -
1. paraoccipital process
2. occipal condyle
3. intercornual protuberance
4. external acoustic meatus
5. frontal sinus
6. ectorbitale
7. entorbitale
8. temporal articular facet
9. facial tuber
0. infraorbital foramen

MANDIBLE
1. Symphyseal surface
2. diastema
3. lateral diastemal foramen
4. coronoid process
5. condylar process
6. angle
7. anterior dorsal acsending ramus posterior M3
8. mandibular foramen

VERTEBRA
1. spine
2. anterior epiphysis
3. posterior epiphysis
4. centrum
5. neural arch

SCAPULA
1. supraglenoid tubercle
2. glenoid cavity
3. origin of the distal spine
4. tuber of spine
5. posterior of neck with foramen
6. cranial angle of blade
7. caudal angle of blade

HUMERUS
1. head
2. greater tubercle
3. lesser tubercle
4. intertuberal groove
5. deltoid tuberosity
6. dorsal angle of olecranon fossa
7. capitulum
8. trochlea

RADIUS
1. medial half of proximal epiphysis
2. lateral half of proximal epiphysis
3. posterior proximal ulna scar and foramen
4. medial half of distal epiphysis
5. lateral half of distal epiphysis
6. distal shaft immediately above distal epiphysis

ULNA
1. olecranon tuberosity
2. trochlear notch- semilunaris
3. lateral coronoid process
4. distal epiphysis

METACARPUS -
1. medial facet of proximal artciulation, MC3
2. lateral facet of proximal articulation, MC4
3. medial distal condyle, MC3
4. lateral distal condyle, MC4
5. anterior distal groove and foramen
6. medial or lateral distal condyle

FIRST PHALANX
1. proximal epiphysis
2. distal articular facet

INNOMINATE
1. tuber coxae
2. tuber sacrale + scar
3. body of illium with dorso-medial foramen
4. iliopubic eminence
5. acetabular fossa
6. symphyseal branch of pubis
7. body of ischium
8. ischial tuberosity
9. depression for medial tendon of rectus femoris

FEMUR
1. head
2. trochanter major
3. trochanter minor
4. supracondyloid fossa
5. distal medial condyle
6. lateral distal condyle
7. distal trochlea
8. trochanter tertius

TIBIA
1. proximal medial condyle
2. proximal lateral condyle
3. intercondylar eminence
4. proximal posterior nutrient foramen
5. medial malleolus
6. lateral aspect of distal articulation
7. distal pre-epiphyseal portion of the diaphysis

CALCANEUM
1. calcaneal tuber
2. sustentaculum tali
3. processus anterior

METATARSUS
1. medial facet of proximal artciulation, MT3.
2. lateral facet of proximal articulation, MT4
3. medial distal condyle, MT3
4. lateral distal condyle, MT4
5. anterior distal groove and foramen
6. medial or lateral distal condyle

THE ENVIRONMENTAL ARCHAEOLOGY CONSULTANCY

Key to codes used in the cataloguing of animal bones

SPECIES

BOS	cattle
CSZ	cattle size
SUS	pig
OVCA	sheep or goat
OVI	sheep
SSZ	sheep size
EQU	horse
CER	red deer
CAN	dog
MAN	human
UNI	unknown
CHIK	chicken
GOOS	goose, dom
LEP	hare
UNB	indet bird
MALL	duck, dom.
GULL	gull sp.
FISH	fish
UNIB	bird indet
UNIF	fish indet
GSZE	goose size
BEAV	beaver
CORV	crow or rook

BONE

SKL	skull
TEMP	temporal
FRNT	frontal
PET	petrous
PAR	parietal
OCIP	occipital
ZYG	zygomatic
MAN	mandible
MAX	maxilla
ATL	atlas
AXI	axis
CEV	cervical vertebra
TRV	thoracic vertebra
LMV	lumbar vertebra
SAC	sacrum
CDV	caudal vertebra
SCP	scapula
HUM	humerus
RAD	radius
MTC	metacarpus
MC1-4	metacarpus 1-4
INN	innominate
ILM	ilium
PUB	pubis
ISH	ischium
FEM	femur
TIB	tibia
AST	astragalus
CAL	calcaneum
MTT	metatarsus
MT1-4	metatarsus 1-4
PH1	1st phalanx
PH2	2nd phalanx
PH3	3rd phalanx
LM1-LM3	Lower molar 1 - molar 3
UM1-UM3	upper molar 1 - molar 3
LPM1-LPM4	lower premolar 1-4
UPM1-UPM4	upper premolar 1-4
DLPM1-4	deciduous lower premolar 1-4
DUPM1-4	deciduous upper premolar 1-4
MNT	mandibular tooth
MXT	maxillary tooth
LBF	long bone
UNI	unidentified
STN	sternum
INC	incisor
TTH	indet. tooth
CMP	carpo-metacarpus

SIDE

W - whole
L - left side
R - right side
F - fragment

FUSION

Records the fused/unfused condition of the epiphyses
P - proximal; D - distal; E - acetabulum;
N - unfused; F - fused; C - cranial; A - posterior

TOOTH WEAR

Codes are those used in Grant, A. 1982 The use of tooth wear as a guide to the age of domestic animals, in B.Wilson, C.Grigson and S.Payne (eds) *Ageing and sexing animal bones from Archaeological sites, 91-108.*

Teeth are labelled as follows in the tooth wear column:

h ldpm4/dupm4	f ldpm2/dupm2
H lpm4/upm4	g ldpm3/dupm3
I lm1/um1	
J lm2/um2	
K lm3/um3	

ZONES

zones record the part of the bone present.
The key to each zone on each bone is on page 2

MEASUREMENTS

Any measurements are those listed in A.Von den Driesch (1976) *A Guide to the Measurement of Animal Bones from Archaeological Sites*, Peabody Museum Bulletin 1, Peabody Museum, Harvard, USA

PRESERVATION

1 - enamel only surviving
2 - bone very severely pitted and thinned, tending to break up teeth with surface erosion and loss of cementum and dentine
3 - surface pitting and erosion of bone, some loss of cementum and dentine on teeth
4 - surface of bone intact, loss of organic component, material chalky, calcined or burnt
5 - bone in good condition, probably with some organic component

Archive catalogue of animal bone from MLW98

site	context	species	bone	no.	side	fusion	zone	butchery	gnawing	toothwear	measurement	comment	preserv-ation
MLW98	227	BOS	SKL	1	L		2					OCCIPITAL CONDYLE-SL POROUS	4
MLW98	400	BOS	TIB	1	F			SW				DISTAL SHAFT-PROX END SAWN THROUGH- VERY LARGE	4
MLW98	400	CSZ	RIB	1	F							SHAFT FRAG	4
MLW98	400	CSZ	SKL	1	F							FRAG CRANIAL VAULT-? HORSE	4
MLW98	400	EQU	PAT	1	F		1					DAMAGED AND ERODED	3
MLW98	400	OVCA	SCP	1	R			SW				PART CAUDAL MARGIN-BOTH ENDS SAWN THROUGH	3
MLW98	400	SUS	LM2	1	W					J7		COMPLETE	5
MLW98	401	CSZ	RIB	1	L			KN				PROXIMAL SHAFT-SHAFT CUT	4
MLW98	401	OVCA	INN	1	L	EF	39					ILIAL SHAFT AND PART ACETABULUM	4
MLW98	401	SUS	AXI	1	F	AN	45		DG			CENTRUM AND ARCH-SPINE CHEWED OFF	4
MLW98	407	CSZ	LMV	1	L			CH				TRANSVERSE PROCESS-CHOPPED ALONG LEADING EDGE	4
MLW98	501	CSZ	RIB	1	L							PROXIMAL SHAFT	4
MLW98	704	BOS	CEV	1	F	CNAN	145					CENTRUM AND ARCH-SL POROUS-SMALL	4
MLW98	704	BOS	MTT	1	L				DG			PROXIMAL HALF SHAFT-POROUS-IMM-PROX END CHEWED OFF	4
MLW98	704	EQU	INN	1	R	EF						ACETABULAR FRAGMENT	4
MLW98	704	EQU	MAN	1	R		6					ANGLE-VENTRAL EDGE WORN AND POLISHED SMOOTH-POSSIBLE SLEDGE!	4
MLW98	704	OVCA	RAD	1	L		3					PROXIMAL SHAFT	4
MLW98	704	OVCA	TIB	1	L		4					MIDSHAFT	4
MLW98	704	OVCA	TIB	1	F							DISTAL SHAFT FRAGMENT	4
MLW98	706	EQU	FEM	1	R	DN	48					DISTAL SHAFT- 2 PIECES-SMALL-JUVENILE-FOAL	4
MLW98	707	BOS	MTC	1	L		12				Bp-65.4 Dp-40.6	PROX HALF-LARGE AND ROBUST	3
MLW98	707	BOS	TRV	1	L	CNAN		CH				CENTRUM AND TRANS PROCESS-CHOPPED THRU MIDDLE	3
MLW98	707	OVCA	HUM	1	L	DF	689	SW				DISTAL HALF-LARGE-ROBUST-SAWN THROUGH MIDSHAFT	4
MLW98	707	SUS	HUM	1	L	DJ	6789					DISTAL HALF	4
MLW98	708	OVCA	CAL	1	R	PF	123				GL-60.8	COMPLETE	4
MLW98	708	OVCA	RAD	1	L		3					PROX MIDSHAFT	4
MLW98	708	SSZ	VER	1	L	CN		CH				LEFT SIDE-CHOPPED DOWN MIDDLE	4
MLW98	708	SUS	INN	1	L	EN	7		DG			ISCHIAL SHAFT-POST CHEWED	4
MLW98	717	EQU	PAT	1	F		1		DG			DAMAGED-CHEWED	4
MLW98	720	BOS	RAD	1	R		6		DG			DISTAL SHAFT-DIST CHEWED OFF	3
MLW98	720	SUS	TIB	1	R		4	SW				PROX SHAFT-MIDSHAFT SAWN THRU-LARGE	3
MLW98	721	OVCA	SCP	1	R		235	B				GLENOID-NECK AND PART BLADE-BLADE CHARRED	3
MLW98	722	BOS	HUM	1	R	DF	6789	CH			BT-74.3 HT-42.4	DISTAL END- 2 PIECES-HEATED-CHOPPED ACROSS CONDYLE AND THRU DIST SHAFT	4
MLW98	722	CSZ	RIB	1	L			CH				PROX SHAFT-DISTAL END CHOPPED	4
MLW98	722	CSZ	RIB	1	F							SHAFT FRAG	4
MLW98	722	CSZ	TRV	1	F	CNAN	45					LAST THORACIC VERT-V SMALL-POROUS-CALF?	4
MLW98	722	OVCA	SCP	1	L		235					GLENOID NECK AND MOST OF BLADE	4

8.3 **Small finds analysis** by J. Cowgill

THE BULK AND REGISTERED FINDS FROM THE SALTERN ON SAINT MICHAEL'S LANE, WAINFLEET ST MARY (MCW98: LCCM210.98)

A very small assemblage of finds was recovered during the evaluation at this site. These finds are catalogued below.

Registered finds.

Context 704; RF 1. Lead waste comprising of five small droplets weighing 9g.

Context 501; RF 2. Iron nail shank? Length 8mm.

Context 401; RF 3. Iron circular object of uncertain function - associated with transport?? Maximum external diameter 52mm.

Context 401; RF 4. Iron currycomb. Incomplete and in four pieces.

Bulk Finds.

Context 720. 1 piece of fired clay weighing 26g.Unwedged clay fired in oxidising conditions. The organic temper could be natural. No surfaces.

Context 722. 1 piece of fired clay weighing 26g. Unwedged clay fired in reducing conditions. Possibly burnt natural?

Context 722. 3 pieces of fired clay weighing 121g. Clay that has been crudely wedged with organic temper. Two rough sides are evident and on the largest piece irregular holes, *c.* 4 – 15mm across, perforate through the fabric from the broadest surface. These appear to have been made by reeds or brushwood and may have been structural (there is no sign of drag indicating that they had been created by pushing a twig or reed through the fabric). The majority of the surfaces are oxidised while the core is reduced fired. The pieces may be from a roughly made raised hearth or a crude brick like object.

Jane Cowgill©
October 1998

8.4 List of archaeological contexts

Trench 1

100 Dark greyish brown silty sand ploughsoil

101 Mid orangey brown silty sand subsoil

102 Modern rubbish pit

103 Post-medieval ditch

104 Mid greyish brown natural sand

Trench 2

200 Dark brown clay loam ploughsoil

201 Light greyish orangey brown sandy silt natural

202 Mid light greyish brown sandy silt subsoil

203/216 Filtration unit

204/217 Mid bluish grey clay lining of 203/216

205/218 Mixed whitish orange brown silty sand fill of 203/216

206/219 clay Mixed whitish brown silty sand & structure around/ above 203/216

207/220 Mixed whitish orange brown sand layer above 206/219

208 Mixed greyish brown orange silty sand. Upper part of box/frame in 221

209 Mid greyish brown silty sand. Lower part of box/frame in 221

210 Mid greyish brown silty sand. ? Box/frame in 221

211 Mixed whitish orange brown silty sand layer.

212 Mid greyish brown silty sand layer.

213/226 Mid brownish grey silty sand. Layer of turves in base of 203/216.

214 Mid bluish grey clay lining of 221.

215 Mid brownish grey silty sand. Layer of turves in base of 221.

221 Filtration unit

222 Mid brownish grey silty sand & clay sealing 221

223 Mixed whitish grey brown silty sand layer above 222.

224 Mid greyish brown silty sand around 215. ? remains of last load in filter bed.

225 Mixed orangey / whitish brown silty sand fill of 221.

227 Mid blue/ black sandy clay silt. ? Natural salt marsh deposit.

Trench 3

300 Dark greyish brown silty sand ploughsoil.

301 Mid - light brownish grey silty sand subsoil.

302 natural Mixed yellowish orange brown silty sand.

Trench 4

400 Dark greyish brown sandy silt ploughsoil.

401 Very dark greyish brown clayey silt. ? midden.

402 Dark brown sandy silty fill of land drain.

403/404 Mid brown clay structure and cut.

405 Light yellow fine silty sand.

406 Mid grey brown clay silt.

407 Light yellow fine silty sand.

408 Mid grey brown clay silt.

409 Mixed whitish yellow orange natural fine silty sand.

Trench 5

500 Dark brownish grey silty sand ploughsoil.

501 Mid greyish brown silty sand subsoil.

502 Light - mid brownish orange natural sand.

503 Filtration unit.

504 Mid reddish brown clay lining of collecting vat 510.

505 Light yellowish brown fill of collecting vat 510.

506 Pipe in filtration unit 503.

507 Mid reddish brown packing of pipe 506.

508 Filter bed of 503.

509 Light yellowish brown fill of filter bed 508.

510 Collecting vat of 503.

Trench 6

600 Dark greyish black silty sand ploughsoil.

601 Mid orangey brown silty sand subsoil.

602 Mid - light orangey brown natural sand.

Trench 7

700 Dark brown clay loam ploughsoil.

701 Mid orangey brown silty sand subsoil.

702 Mid - light greyish yellow natural sand.

703 Ditch.

704 Dark greyish brown sandy silt secondary fill of 703.

705 Broad shallow ditch.

706 Light yellow sandy silt upper fill of ditch 705.

707 Mid yellow brown sandy silt tertiary fill of 705.

708 Mid greyish brown sandy silt secondary fill of 705.

709 Mid grey clay primary fill of 705.

710 Ditch.

711 Light yellowish brown sandy silt upper fill of 710.

712 Filtration unit.

713 Light greyish yellow silty sand fill of 712.

714 Mid greyish brown clay lining of 712.

715 Mid greyish brown clay lens within 713.

716 Mid -dark greyish brown sandy silt layer sealing 713.

717 Light yellowish grey silty sand primary fill of 703.

718 Mid greyish brown clay silt tertiary fill of 703.

719 Dark greyish brown clay silt upper fill of 703.

720 Dark brown sandy silt quaternary fill of ditch 710.

721 Mid brown sandy silt tertiary fill of 710.

722 Mid - dark brown sandy silt secondary fill of 710.

723 Grey clay primary fill of 710.

8.5 Site archive

Primary records are currently with PCA (Lincoln). An ordered archive of both paper and object elements is in preparation and will be deposited at the City and County Museum, Lincoln, within six months.

8.6 References (main text)

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