

Mixed Use Development, Grafton Way  
Ipswich, Suffolk  
IPS 707

**Archaeological Evaluation Report**

**SCCAS Report No. 2012/195**

**Client: Roscoe DM**

Author: M. Sommers

March 2013



# Mixed Use Development, Grafton Way Ipswich, Suffolk IPS 707

Archaeological Evaluation Report

SCCAS Report No. 2012/195

Author: M. Sommers

Contributions By: A. Fawcett & R. Goffin

Illustrator: M. Sommers

Editor: Dr R. Gardner

Report Date: March 2013



## HER Information

---

**Report Number:** 2012/195  
**Site Name:** Mixed use development, Grafton Way, Ipswich  
**Planning Application No:** IP/08/00953/FUL  
**Date of Fieldwork:** 19th to 28th November 2012  
**Grid Reference:** TM 1603 4395  
**Client/Funding Body:** Roscoe DM  
**Curatorial Officer:** Keith Wade  
**Project Officer:** M. Sommers  
**Oasis Reference:** suffolkc1-144550  
**Site Code:** IPS 707

Digital report submitted to Archaeological Data Service:  
<http://ads.ahds.ac.uk/catalogue/library/greylit>

### Disclaimer

Any opinions expressed in this report about the need for further archaeological work are those of the Field Projects Team alone. Ultimately the need for further work will be determined by the Local Planning Authority and its Archaeological Advisors when a planning application is registered. Suffolk County Council's archaeological contracting services cannot accept responsibility for inconvenience caused to the clients should the Planning Authority take a different view to that expressed in the report.

Prepared By: M. Sommers  
Date: 15th March 2013

Approved By: Dr. R. Gardner  
Position: Contracts Manager  
Date: 15th March 2013  
Signed:



# Contents

---

Summary

<b>1. Introduction</b>	<b>1</b>
<b>2. Geology and topography</b>	<b>1</b>
<b>3. Archaeology and historical background</b>	<b>3</b>
<b>4. Methodology</b>	<b>5</b>
<b>5. Results</b>	<b>7</b>
5.1 Introduction	7
5.2 Trench results	7
5.3 Archaeological features	12
5.4 Environmental sampling	12
<b>6. Finds and environmental evidence</b>	<b>14</b>
6.1 Introduction	14
6.2 The Pottery	14
6.3 Ceramic building material (CBM)	14
6.4 Mortar	14
6.5 Small finds	15
6.6 Faunal Remains	15
6.7 Iron Objects	15
6.8 Discussion of material evidence	15
<b>7. Discussion</b>	<b>16</b>
<b>8. Conclusions and recommendations for further work</b>	<b>18</b>
<b>9. Archive deposition</b>	<b>19</b>
<b>10. Acknowledgements</b>	<b>19</b>

<b>11. Bibliography</b>	<b>19</b>
<b>11. Plates</b>	<b>21</b>
<b>List of Figures</b>	
Figure 1. Location map	2
Figure 2. 2nd Edition Ordnance Survey map of 1904 (rescaled extract)	4
Figure 3. Trench location plan (section locations in red)	6
Figure 4. Trench 1, section 1	8
Figure 5. Trench 2, section 2 (north)	8
Figure 6. Trench 2, section 3 (south)	9
Figure 7. Trench 3, section 4	9
Figure 8. Trench 4, section 5 (north)	10
Figure 9. Trench 4, section 6 (south)	10
Figure 10. Trench 5, section 7	11
Figure 11. Archaeological features recorded in Trench 2	13
Figure 12. Archaeological features recorded in Trench 4	13
Figure 13. White's map of Ipswich, 1867 (un-scaled extract)	17
Figure 14. 2nd Edition Ordnance Survey with recorded wall lines superimposed	17
<b>List of Plates</b>	
Plate 1. Trench 1 stratigraphy (ref. HSV 70)	21
Plate 2. Trench 2, north, stratigraphy (ref. HSV 87)	21
Plate 3. Trench 2, south, stratigraphy (ref. HSV 88)	22
Plate 4. Trench 3 stratigraphy (ref. HSV 96)	22
Plate 5. Trench 4, north, stratigraphy (ref. HSW 11)	23
Plate 6. Trench 4, south, stratigraphy (ref. HSW 28)	23
Plate 7. Trench 5 stratigraphy (ref. HSW 38)	24
Plate 8. Trench 2 view facing north, Wall 0054 in foreground (ref. HSV 78)	24
Plate 9. Trench 4, Wall 0056, view facing west (ref. HSW 16)	25
Plate 10. Trench 4, railway wagon screw link coupling from layer 0005 (ref. HSW 48)	25
Plate 11. View looking southeast across Commercial Road (7/8/1960).	26
Plate 12. View west from Bridge Street (1/7/1962).	26
Plate 13. Aerial photograph of Ipswich, dated 1920	27



## **List of Appendices**

- Appendix 1. Brief and specification
- Appendix 2. OASIS data collection form
- Appendix 3. Context list
- Appendix 4. Palaeoenvironmental analysis



## **Summary**

An archaeological evaluation was carried out on a parcel of land to the south of Grafton Way, Ipswich, in advance of a mixed use development. A total of five trenches were excavated which revealed extensive marsh deposits beneath mid-19th century reclamation deposits. Remains of two 19th century structures relating to a former railway goods station were recorded but no earlier features were noted. A single leather shoe, possibly 15th century in date, was recovered from a peat layer c. 2m below present ground level. (Suffolk County Council Archaeological Service for Roscoe DM).



## **1. Introduction**

---

A mixed use development has been proposed for an area of land to the south of Grafton Way, Ipswich. Planning consent has been granted (IP/08/00953/FUL) but with an attached condition which stipulates that an agreed programme of archaeological work is in place prior to the commencement of any site work relating to the development.

The first stage of the programme of work, as specified in a Brief and Specification by Keith Wade of the Suffolk County Council Conservation Team (Appendix 1), was the undertaking of a trenched evaluation in order to ascertain what levels of archaeological evidence may be present within the development area and to inform any mitigation strategies that may then be deemed necessary.

Due to the site's location within the floodplain of the River Orwell, in addition to the trenched evaluation, the Brief and Specification also called for a Palaeo-environmental assessment. This was to consist of a series of hand augered holes excavated with the aim of obtaining samples for analysis from the deep deposits thought to exist on this site.

The National Grid Reference for the approximate centre of the site is TM 1603 4395. Figure 1 shows a location plan of the site.

The archaeological evaluation was undertaken by Suffolk County Council Archaeological Service's Field Team who were commissioned and funded by Roscoe DM, on behalf of their client. The Palaeo-environmental assessment was sub-contracted to qualified environmental specialists, Archaeology South-East.

## **2. Geology and topography**

---

The underlying solid geology of Ipswich is chalk covered by greensand and river terrace deposits of sand and gravel which are occasionally overlain by alluvial deposits, variably sandy silty clay.

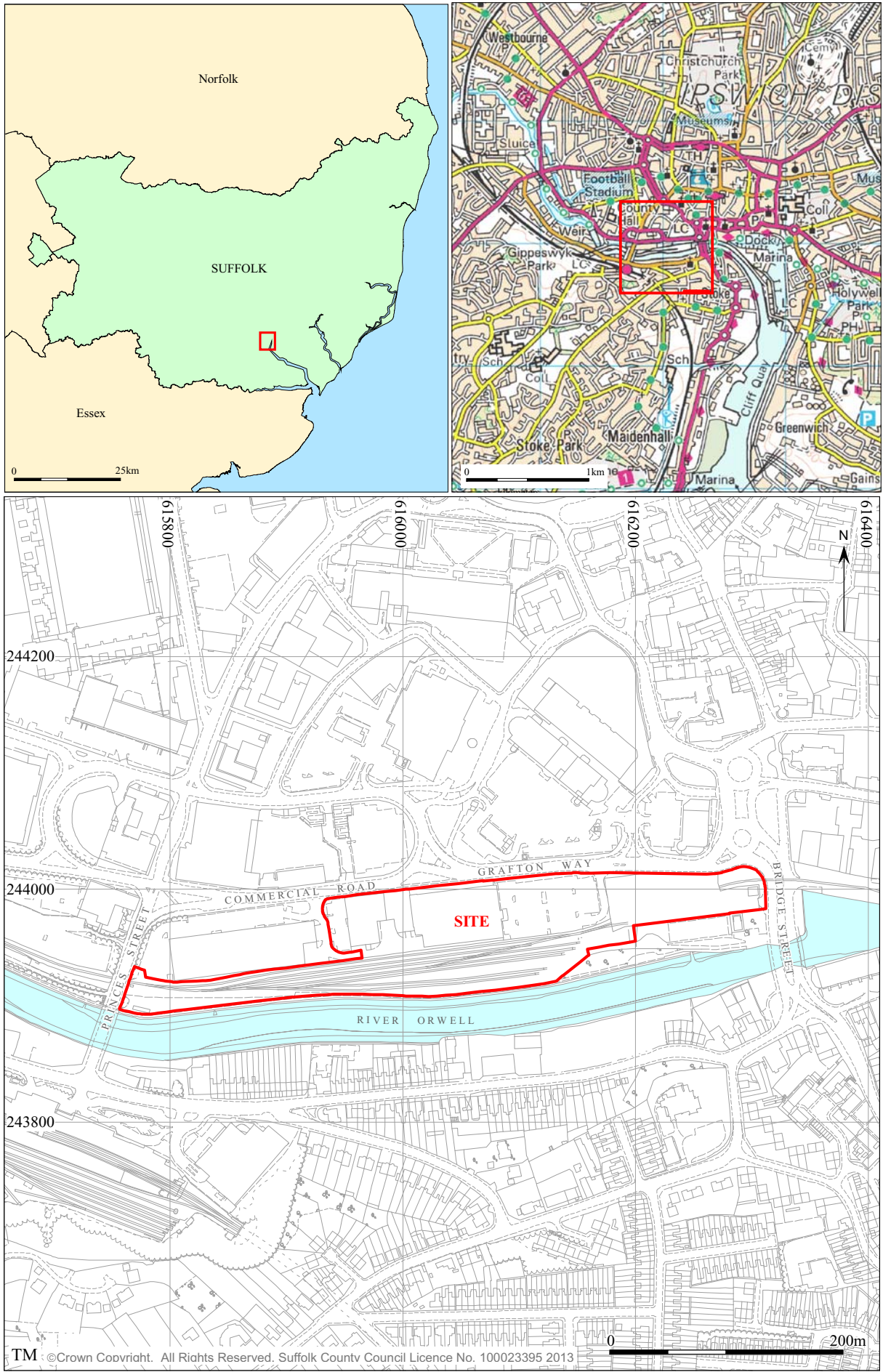


Figure 1. Location map

The site consists of an elongated irregularly shaped parcel of land to the south west of central core of the town of Ipswich. It is bounded by Grafton Way and Bridge Street to the north and east, and a skate park to the south-east. The River Orwell, a tidal estuary at this point, lies to the south and is separated from the site by a concrete and steel flood barrier. The north-west corner of the site backs onto the rear of a row of commercial properties housed in a single large building. The western end of the site is bounded by Princes Street which runs north-south on a raised embankment and a rail bridge which leads to a further bridge that passes over the river.

The site lies within the floodplain of the River Orwell at a height of c. 3m OD. The site is level from end to end with no obvious slope towards the river. On the northern side of the river the floodplain extends in a band approximately 500m wide whilst to the south the land rapidly rises up to 30m OD and up to 45m OD at the summit of Stoke Hill to the south-west.

### **3. Archaeology and historical background**

---

No archaeological sites or findspots are recorded on the County Historic Environment Record (HER) within the development area itself although it is on the edge of the area of the medieval Ipswich, as defined in the Local Plan, (HER ref. IPS 413). Prehistoric activity in the area is suggested by a Neolithic polished flint axe that was dredged from the river immediately adjacent the site (HER ref. IPS 021). Although the town of Ipswich was a large and highly significant Anglo-Saxon settlement that covered the whole of the central core of the modern town, no evidence for related activity has been identified within the development area.

Historically the site has been part of an area of low lying marshland within the floodplain of the River Orwell. Three post-medieval maps of Ipswich, Speed (1610), Ogilby (1674) and Pennington (1778) show the development area lying within a large marsh that is criss-crossed by occasional paths and minor water channels. It is not until the early 19th century that the land was systematically reclaimed. A plan of leasehold property, dated 1852, shows Commercial Road with the land to the north being occupied by various buildings. The land to the south of Commercial Road, i.e. the development site, is undeveloped but is crossed by a railway line that runs diagonally south-west to north-

east which would indicate that this area is no longer marshland but that it has been reclaimed. The area to the west of Princes Street (named Railway Station Road in 1852) appears to still be marshland. It should be noted that Grafton way is modern creation and that originally Commercial Road connected with Bridge Street.

The next available map, White's map of Ipswich dated 1867, marks the development area as the Great Eastern Railway Goods Station. Other than three separate buildings, no other detail is shown. The 1st, 2nd and 3rd edition, Ordnance Survey 1:2500 scale maps (published 1884, 1904 and 1927 respectively; see figure 2 for an extract of the 2nd edition map) all show the goods station to consist of the three buildings marked by White which are served by an extensive series of railway sidings. This arrangement remained throughout the majority of the 20th century although by the late 20th century only the southern railway yard area remained, the buildings relating to the goods station having been demolished and replaced by a series of large warehouse style retail outlets.

Two of these modern structures lay within the site. These had been demolished by the time of the evaluation.

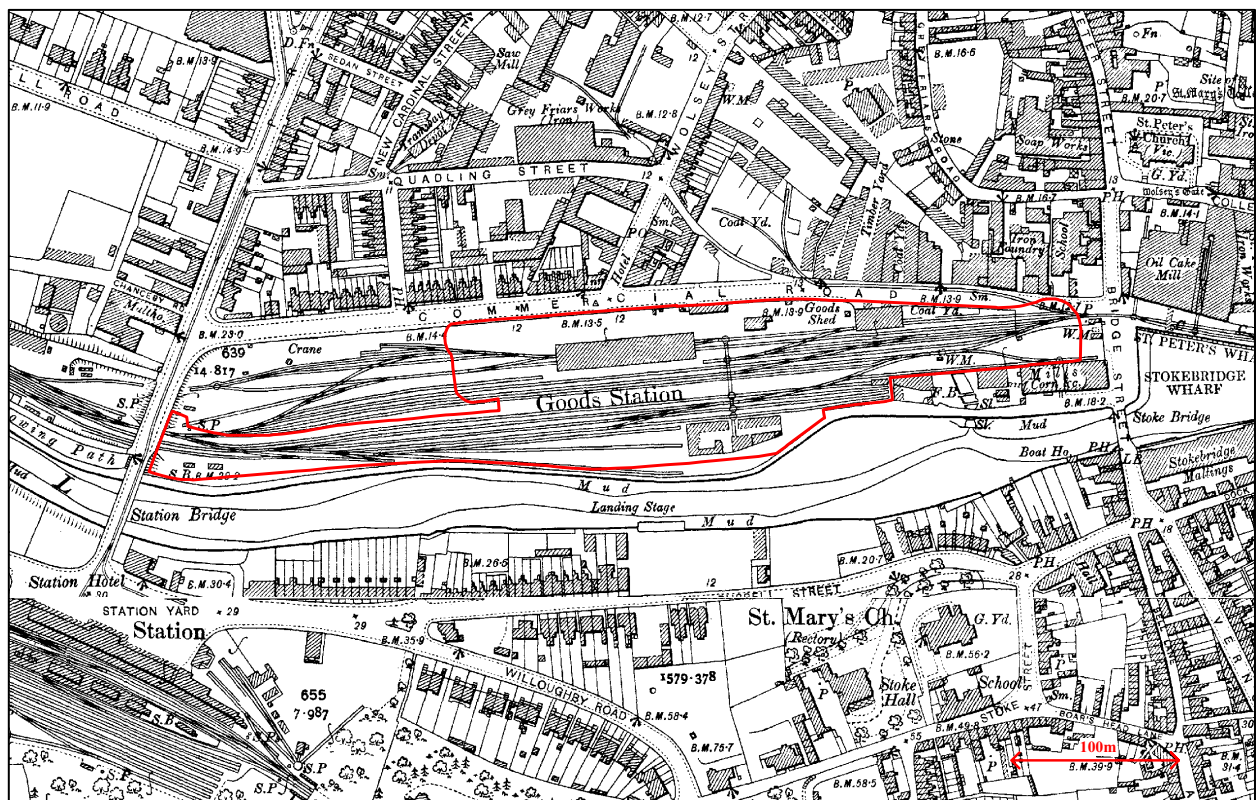


Figure 2. 2nd Edition Ordnance Survey map of 1904 (rescaled extract)



## 4. Methodology

---

The trial trenches were machine excavated down to the level of the natural subsoil using a tracked machine fitted with a toothless ditching bucket. The location of the trenches was broadly in accordance with a plan approved by the County Archaeological Service Conservation Team. It had been intended to excavate north-south trenches from the river wall to the northern edge of the site but due to the presence of a series of railway yard, which survived across the southern half of the site, many of the trenches were reduced in length. Although it would have possible to extend the trenches slightly further to the south it still would not have been possible to cut them to the full length due to the existence of a high-voltage cable and an Environment Agency restriction on works being carried out too close to the flood defences.

The trenches were located using basic measuring tapes, 30m in length, and through triangulation and/or alignment with mapped structures and features within the site.

The machining of the trenches was closely observed throughout in order to identify any archaeological features and deposits and to recover any artefacts that might be revealed. Excavation continued until undisturbed natural deposits were encountered. Due to the nature of site natural subsoils were encountered at depths exceeding 2.5m. No features were noted at the depth of the natural subsoil negating the need to enter the trenches. Had it been necessary to undertake work within the trenches substantial shoring and/or battering of the trenches would have been required. All recording of the stratigraphic sequences revealed in the trenches was undertaken from the ground surface and was carried out by photographing cross sections of the exposed stratigraphy using a 14 megapixel digital camera. Ranging rods divided into 0.5m sections were put in place prior to photographing in order to provide a scale and the resultant images were then used to construct section drawings of the deposits encountered to scale. The locations of these recorded sections were plotted on a scale plan of the site.

Upon completion of the recording, the trenches were backfilled.

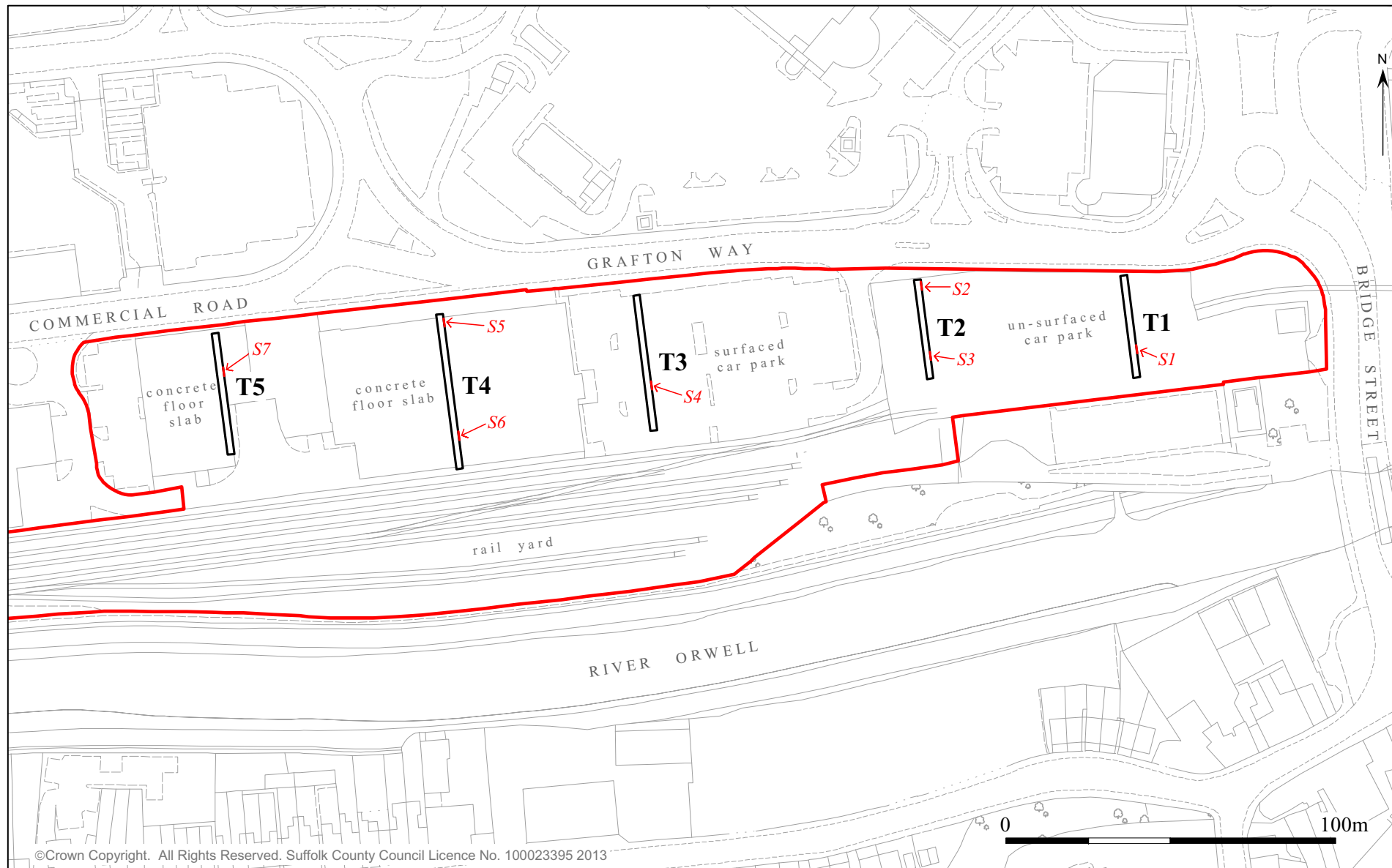


Figure 3. Trench location plan (section locations in red)

## 5. Results

---

### 5.1 Introduction

A total of five evaluation trenches were excavated, numbered T1 to T5, the locations of which are marked in figure 3. (fig. 3). All were broadly located in accordance to the approved trench plan although it had been intended to excavate trenches right up to the southern edge of the site but this was not possible at the time of the evaluation.

Two of the trenches (T1 & T2) were cut through an un-surfaced area of car parking, Trench 3 was cut through a surfaced car park which consisted of tarmac over concrete, and Trenches 4 and 5 were cut through reinforced concrete floor slabs associated with the recently demolished structures. The floor slabs had been broken through by the demolition contractors to enable the excavation of the evaluation trenches.

### 5.2 Trench results

The main finding of the evaluation was the stratigraphic make-up of the site as revealed in all five of the excavated trenches, which was recorded in a series of digitally photographed sections (plates 1 to 7). The layers encountered were laid horizontally with little variation within the trench or over the site as a whole and consequently only one or two sections per trench were recorded. See figure 3 for the section locations and figures 4 to 10 for scaled reconstructions of the exposed stratigraphy.

In summary the stratigraphy comprised a natural subsoil of sand and gravel or a layer of broken flint which occurred at depths of between 2.7m to 3m below the present ground level. This was overlain by natural silts and peat deposits which were in general 1.5m to 2m in thickness. This was in turn overlain by a c. 0.5m to 1m thick layer of clean yellow sand sealed with a thin layer of crushed chalk, which was overlain by layers of railway ballast, occasional tarmac surfaces and brick rubble. The upper layers comprised modern deposits of concrete or compacted hardcore.

Few artefacts were recovered during the evaluation; they consist of part of a leather shoe (SF1001) and small assemblage from a peat layer (0003) in Trench 5. The shoe was found in Trench 1 within a layer of dark silt at a depth of 2m. A railway wagon coupling link was also recovered from the railway ballast (0005) in Trench 4. See Section 6 for further details of the finds recovered.

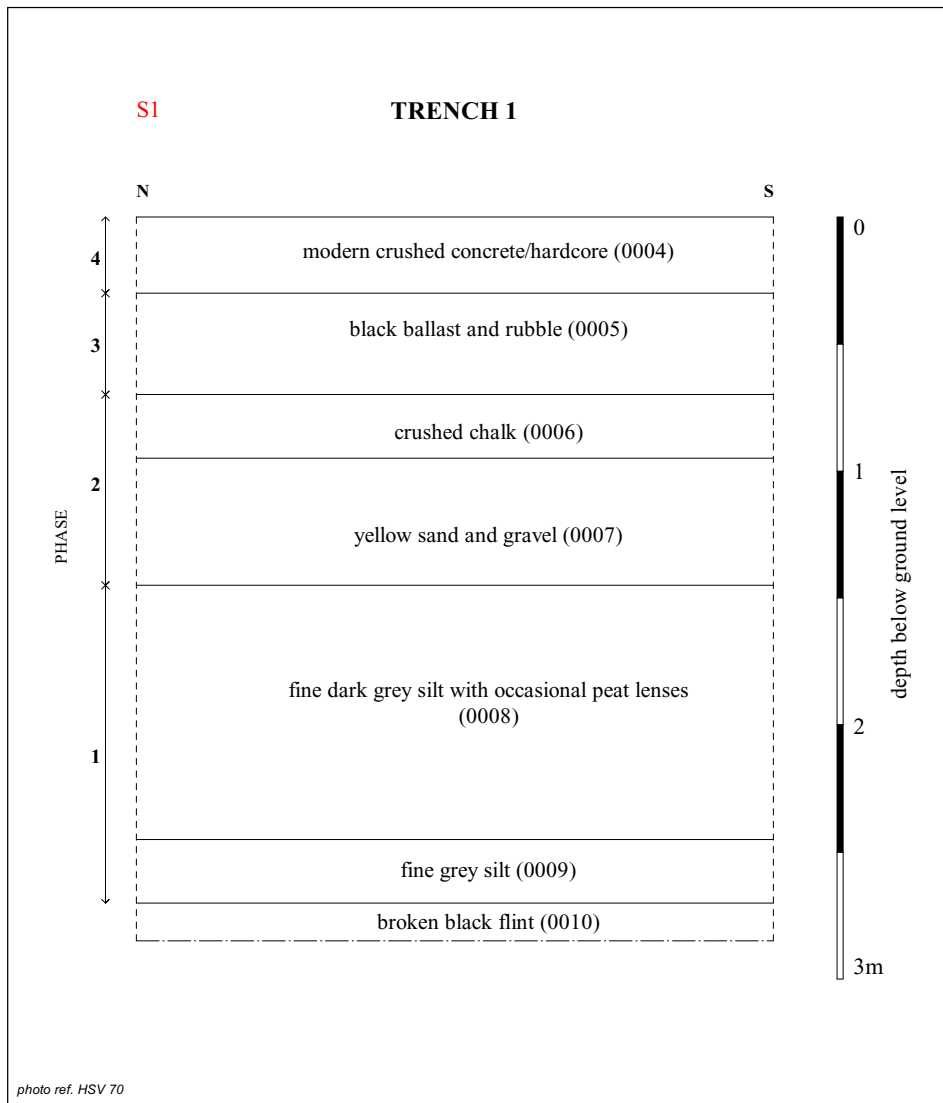


Figure 4. Trench 1, section 1

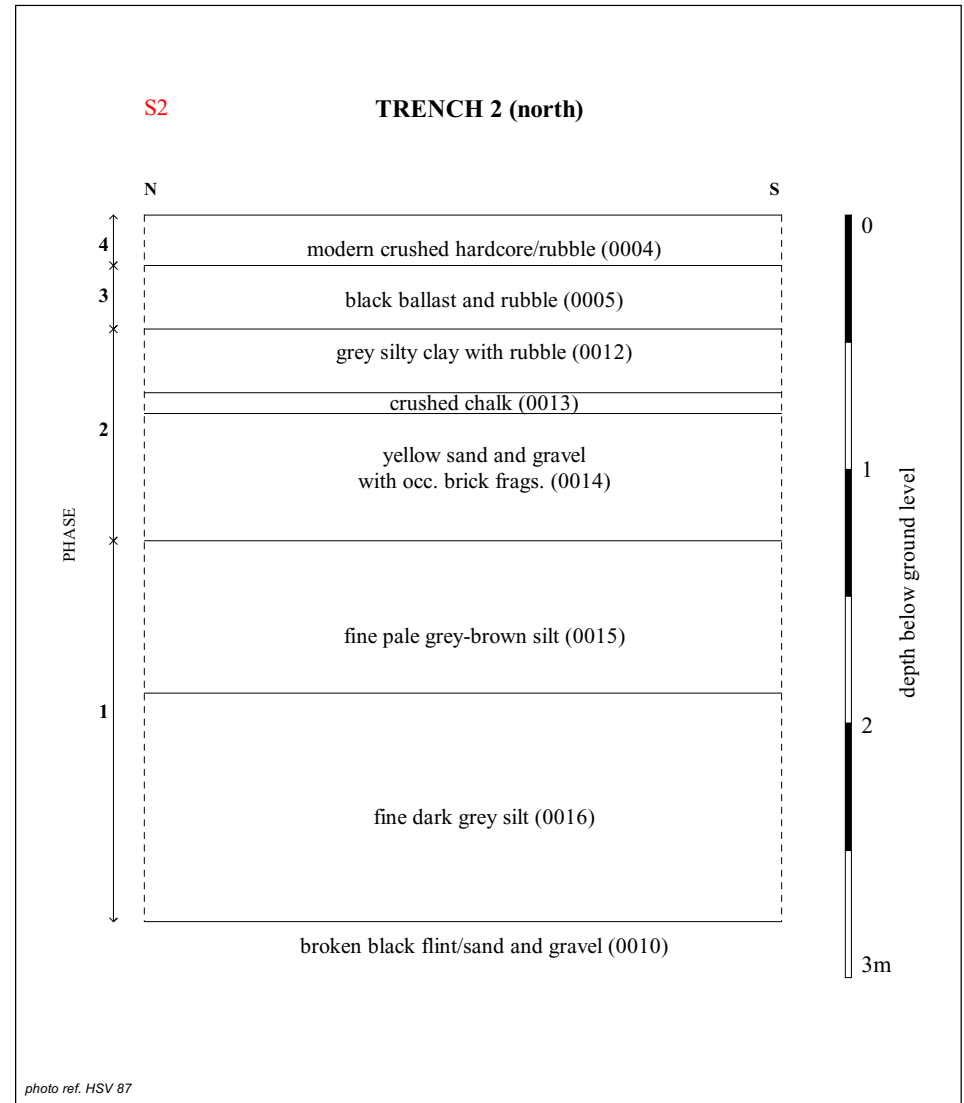


Figure 5. Trench 2, section 2 (north)

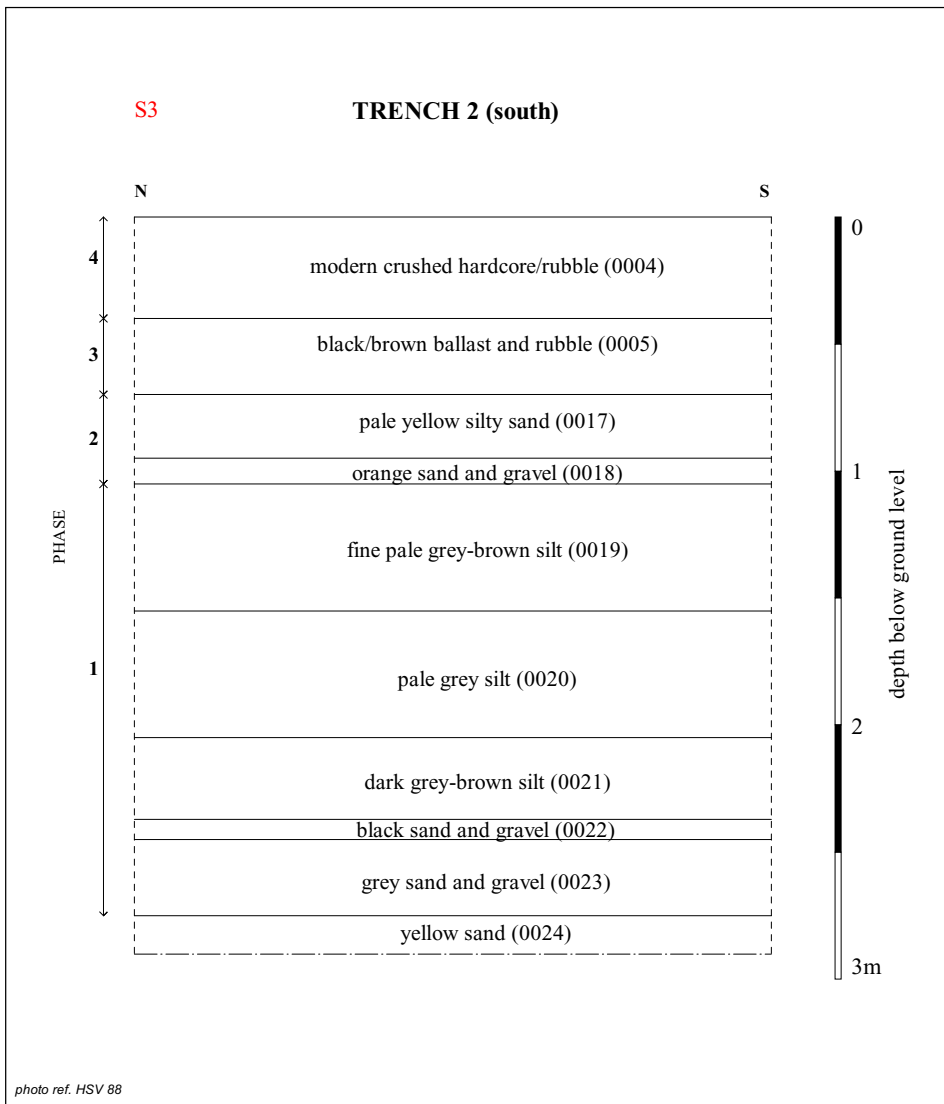


Figure 6. Trench 2, section 3 (south)

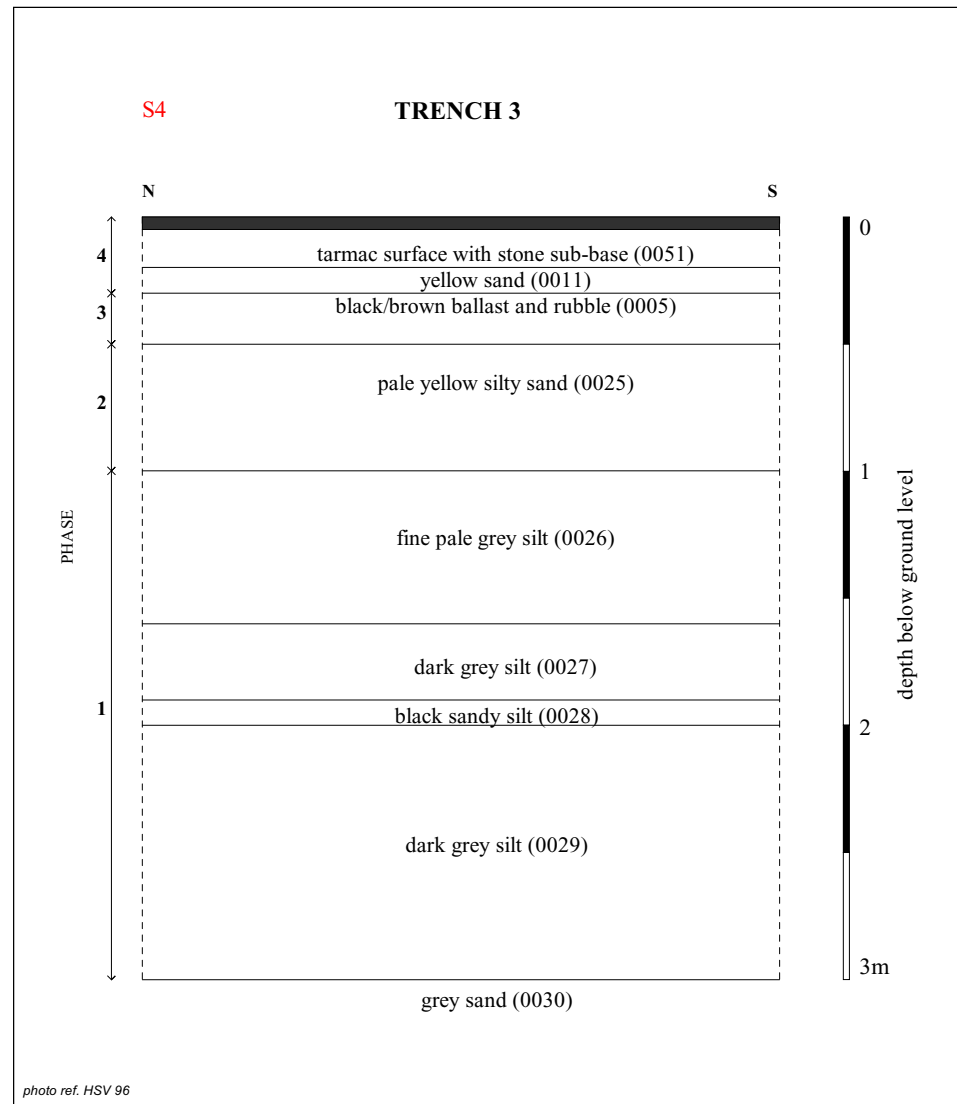


Figure 7. Trench 3, section 4

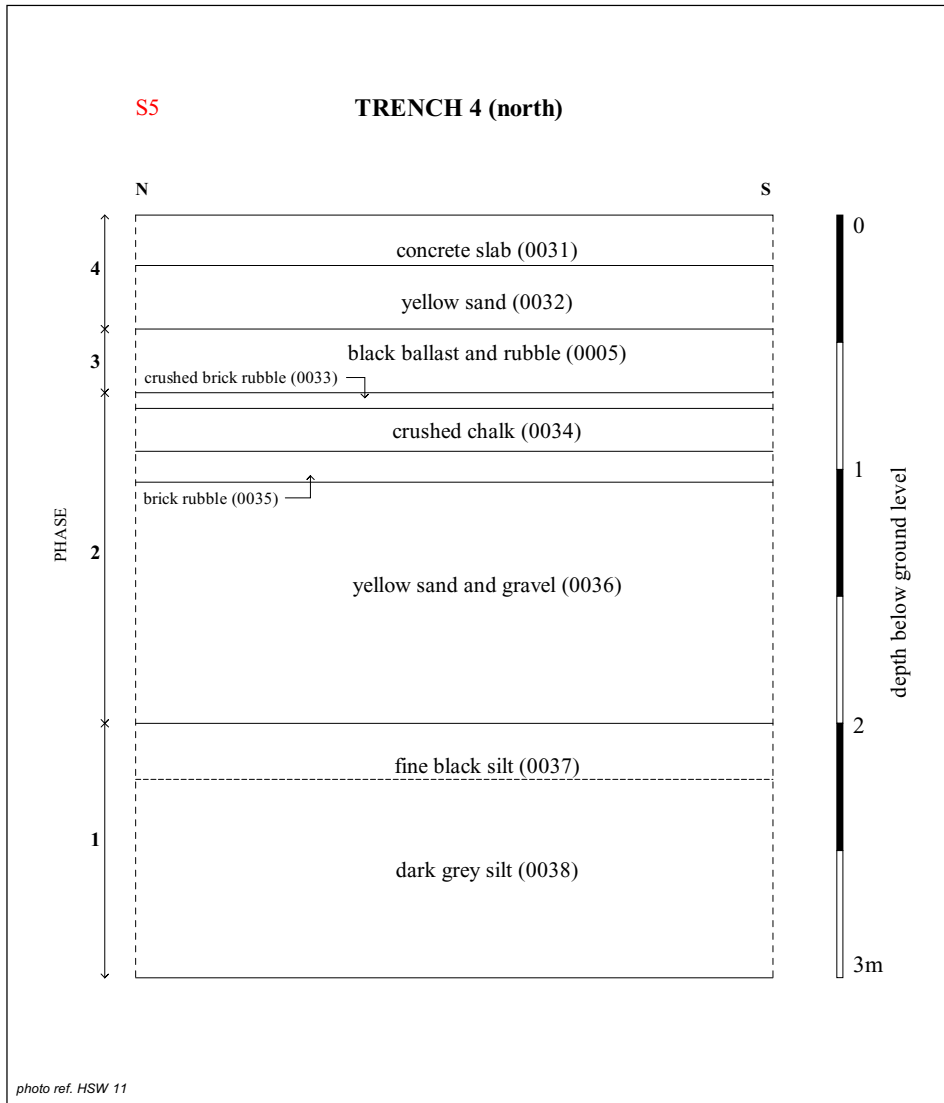


Figure 8. Trench 4, section 5 (north)

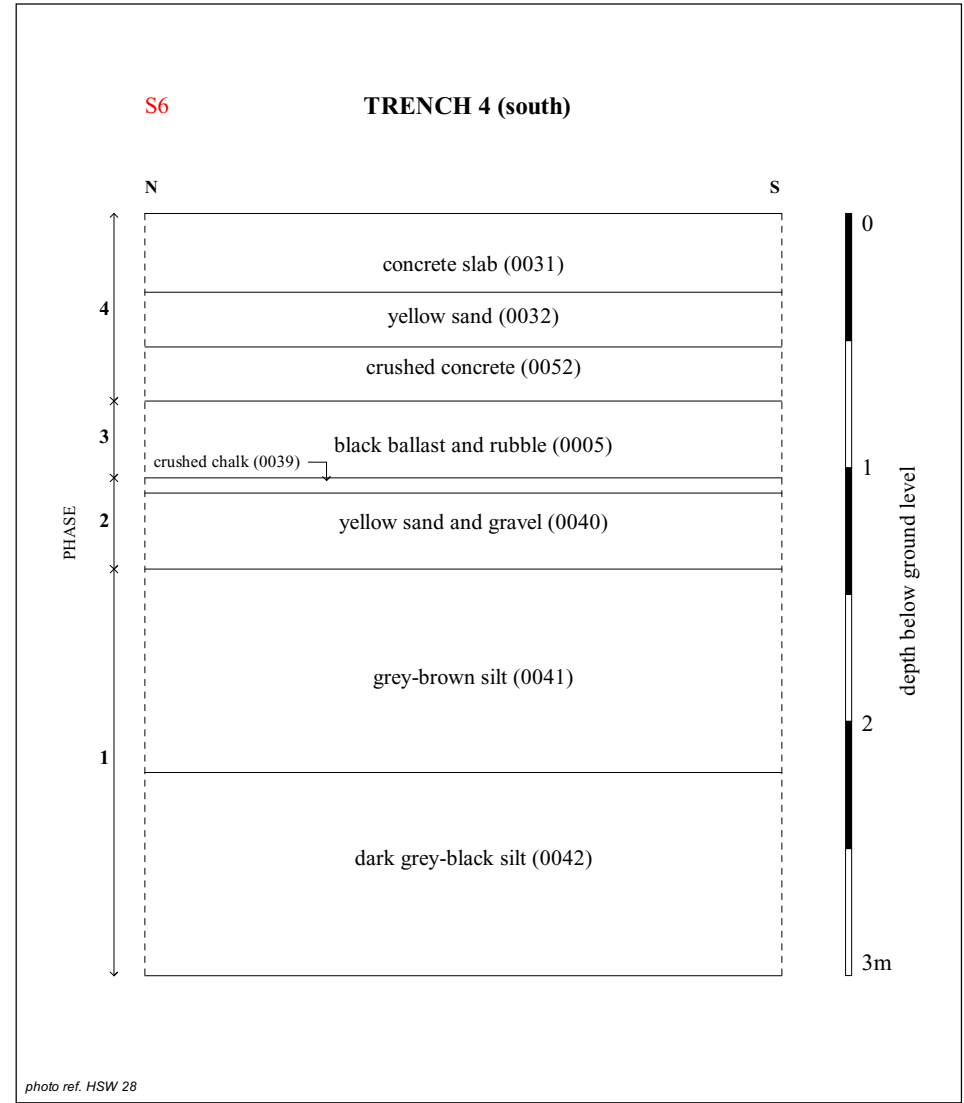


Figure 9. Trench 4, section 6 (south)

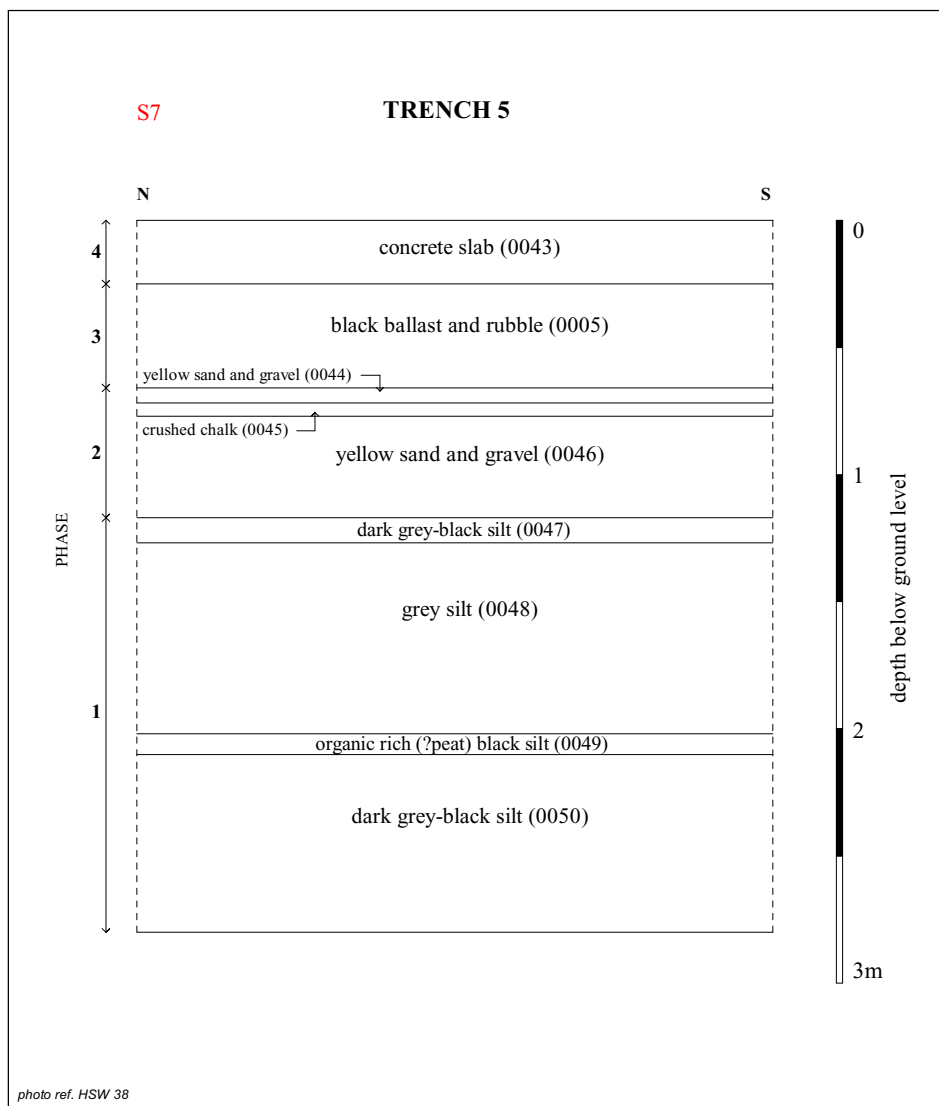


Figure 10. Trench 5, section 7

The deposits recorded in the evaluation trenches can be attributed to four specific phases. Which are as follows:

<b><u>Phase</u></b>	<b><u>Description of deposits</u></b>	<b><u>Date</u></b>
1:	The silts and peat which are naturally occurring deposits relating to the former marsh historically recorded in this area of Ipswich.	pre 19th century
2:	The layer of clean yellow sand sealed with crushed chalk which relates to reclamation of the marshland.	mid 19th century
3:	Railway ballast and occasional brick rubble deposits relating to area's use as a goods station	mid 19th to late 20th century
4:	Concrete, sand and hardcore deposits relating to the post-goods station, modern retail structures.	late 20th century

This phasing is indicated on the section drawings (figs. 4 to 10).

### 5.3 Archaeological features

Archaeological features were recorded in only two trenches, Trench 2 and Trench 4. They were dated to the 19th century and related to structures associated with the goods station; they are described as follows:

**Trench 2:** The remains of building were recorded in the northern end of the trench (fig. 11). They comprised a brick wall (0053) constructed of soft red bricks cemented with a lime mortar, a concrete floor slab (0055) in which two rails at standard rail gauge were set, and a further brick wall (0054) set perpendicular to wall 0053, which also marked the southern extent of the floor slab (plate 8).

Wall 0053 measured 0.29m wide and comprised six courses of brickwork. The bottom two courses stepped out to provide a foundation for this wall; the bottom course was 0.55m wide. Wall 0054 was 0.44m wide and comprised eight courses of brickwork. The bottom two courses of brickwork stepped out and the wall was also resting on a concrete strip foundation.

**Trench 4:** The remnants of a brick wall (0056) constructed of soft red bricks cemented with a lime mortar were located running on an east-west alignment. It measured c. 0.45m in width and was built on a concrete strip foundation (plate 9). A parallel wall (0057) was identified 15.5m to the south marked only by a concrete footing (fig. 12). Immediately north of Wall 0056 a possible tarmac surface roadway was present which extended to the northern end of the trench (?visible in plate 5).

A railway wagon screw coupling (plate 10) was recovered from the ballast layer (0005) in an area approximately 3m south of Wall 0056.

### 5.4 Environmental sampling

In Trench 5 a series of three boreholes were sunk in order to obtain samples for environmental analysis, the full results of which are presented as Appendix 4. In summary, the results indicated that the site formerly lay within an area of tidal influence resulting in sediment accumulation which led to the establishment of an area of saltmarsh. Radiocarbon dating of a basal sample suggested this process began in the late to early post-Roman period (419-543 Cal AD). Evidence for human activity was demonstrated in the coleopteran and pollen assemblages suggesting there may have been some instances of refuse deposition in the saltmarsh.



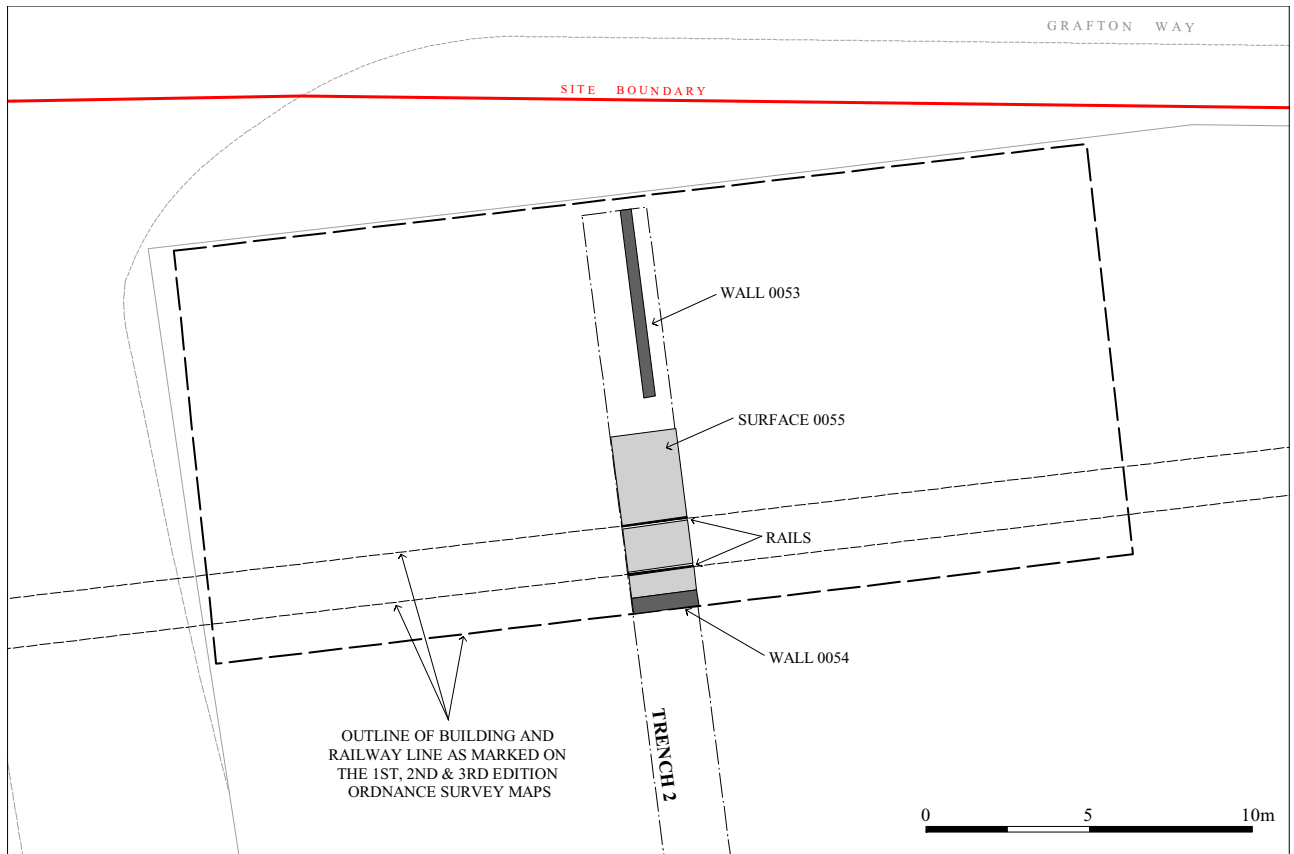


Figure 11. Archaeological features recorded in Trench 2

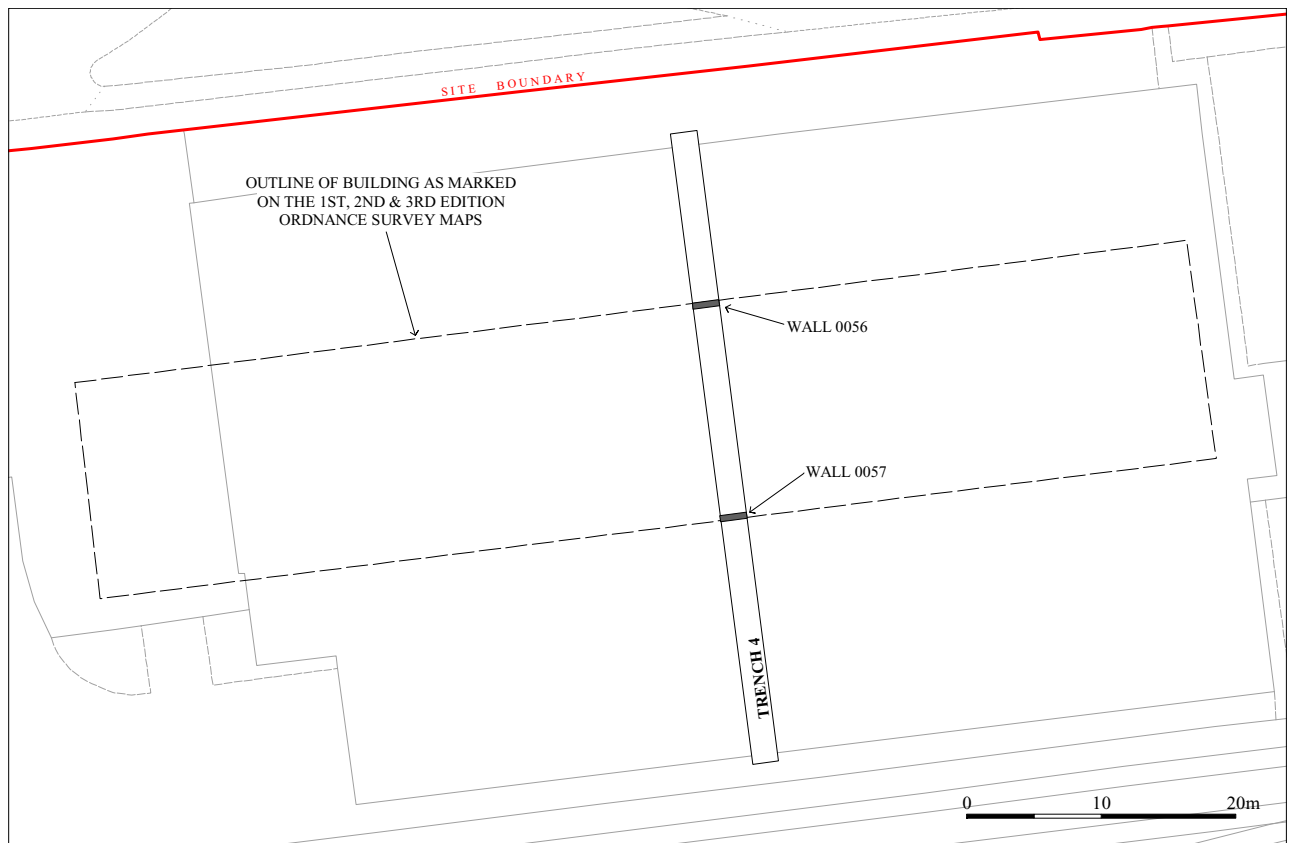


Figure 12. Archaeological features recorded in Trench 4

## 6. Finds and environmental evidence

---

Andy Fawcett

### 6.1 Introduction

A small quantity of finds was recovered from the layer 0003 (Tr.5). A full breakdown of these can be seen in Table 1. A single small find (SF1001) was recorded and this has been reported on separately.

Find type	No	Wgt/g
Pottery	3	25
CBM	9	103
Mortar	1	9
Animal bone	2	29
<b>Totals</b>	<b>15</b>	<b>166</b>

Table 1. Finds quantities from layer 0003

### 6.2 The Pottery

Saxon

A single abraded body sherd of Ipswich sandy ware (SIPS) was noted in layer 0003 (23g). The fabric is oxidised with grey surfaces and contains abundant fine ill-sorted sand. Of note on the surfaces (and less so in the break) are common irregular organic voids. The sherd is dated from AD 650-850.

Post-medieval

Also present within layer 0003 are two body sherds of refined white earthenware (REFW) dated from the late 18th to 20th century.

### 6.3 Ceramic building material (CBM)

The CBM assemblage consists entirely of roof tile fragments (RT). These are all hard and sandy in a fully oxidised fabric that is medium sandy with ferrous inclusions (msfe). This fabric is dated from the late medieval to post-medieval period, however, it is more typical of the post-medieval era.

### 6.4 Mortar

A single abraded fragment of lime based mortar, attached to natural chalk, was recorded in layer 0003.

## **6.5 Small finds**

Richenda Goffin

The remains of a leather shoe were recovered from layer 0008 (Tr.1). The sole measures 254mm in length and belonged to an adult. The shoe remains consist of part of the upper and several fragments of the sole. The vamp has the same rounded shape as a typical medieval turnshoe, but the shoe is actually made in a turned-welt construction, as there is evidence for a strip of leather (welt) sewn between the vamp and the insole, and the remains of a second thicker sole. The use of a wider piece of leather rather than a rand so that a second sole can be attached is a transitional feature which became common c.1400 (Carlson 2005). SF1001 (0002).

## **6.6 Faunal Remains**

Two pieces of animal bone were noted in layer 0003. The first is a shattered cow tooth and the other is an unidentifiable large mammal bone which has been burnt.

## **6.7 Iron Objects**

Mark Sommers

A railway wagon coupling link was recovered from the railway ballast in Trench 4 (plate 10). It comprised two shackles connected by a length of bar with opposing screw threads on each end. It is known as a screw coupling. In the middle of the threaded bar a smaller bar ran through a central hole. One end of the bar had a wider head whilst the opposite end had a pear shaped weight fixed. In operation, the two shackles would be placed over the hooks of adjacent wagons in a train and the threaded bar rotated. This would tighten or loosen the link so that the correct tension could be obtained. The weight on the centre bar would always fall to a low point and stop the threaded bar from rotating during a journey. Dates from late 19th or early 20th century and clearly relates to the site's former use as a goods station.

## **6.8 Discussion of material evidence**

All of the bulk finds were retrieved from layer 0003 in Trench 1. These are generally in a poor state of preservation, being small and often abraded. The finds are of a mixed date, the earliest being a single sherd of Saxon pottery and the latest being dated to the late post-medieval period. The area under examination was not fully developed until the early 19th century and these finds, although of a mixed date represent some of the first to have been retrieved from the area. The presence of the Saxon pottery sherd is not a surprise given the site's close proximity to the historic centre of Ipswich.

## 7. Discussion

---

Layers of silts with occasional peat lenses, which are undoubtedly marsh deposits, were encountered at the base of the sequence. This was confirmed by the environmental analysis which indicated a saltmarsh environment in the range of a tidal influence. The River Orwell is tidal in the area of the site although it is now constrained between flood defences. These deposits were encountered in all the excavated trenches indicating that the marsh extended across the whole site, as illustrated in the early map evidence. Radiocarbon dating suggests that these marsh deposits started to accrue in the late Roman period. This may be as a result of natural processes or could possibly indicate the introduction of some form of control of the waterways in this area. It has been speculated that a separate channel to the north of the River Orwell, known as Alderman Canal, may have been Roman origins.

Other than the single abraded sherd of Anglo-Saxon pottery, which is likely to be a stray residual find, no evidence for any activity related to this period was identified on this site, despite the proximity of the known settlement. This would indicate that the area either unused, possibly being too wet too access, or that it was in use as pasture only.

The earliest activity identified is the discard, accidental or otherwise, of the late medieval leather shoe that was recovered from what was presumably, at the time of its loss, an area of boggy marsh. Other than this one artefact, the marsh deposits are remarkably clean despite being adjacent a large and busy settlement. This would suggest that the dumping of waste is discouraged and that the marsh is in some form of use, probably as pasture.

The area of the site remained marsh until it was reclaimed by dumping a large volume of clean yellow sand, which was presumably imported, and the construction of the Goods Station. The reclamation appears to be directly related to the construction of a railway to the nearby Wet Dock, which appears on a map of 1852, and the creation of the Goods Station, which was in existence from at least 1867, and it is highly probable that the material used for the reclamation was transported by rail. There was a significant amount railway construction underway in Ipswich during the mid to late 1840s with the construction of a line from Colchester, the driving of a tunnel through Stoke Hill and a connection through to Bury St Edmunds. It is therefore

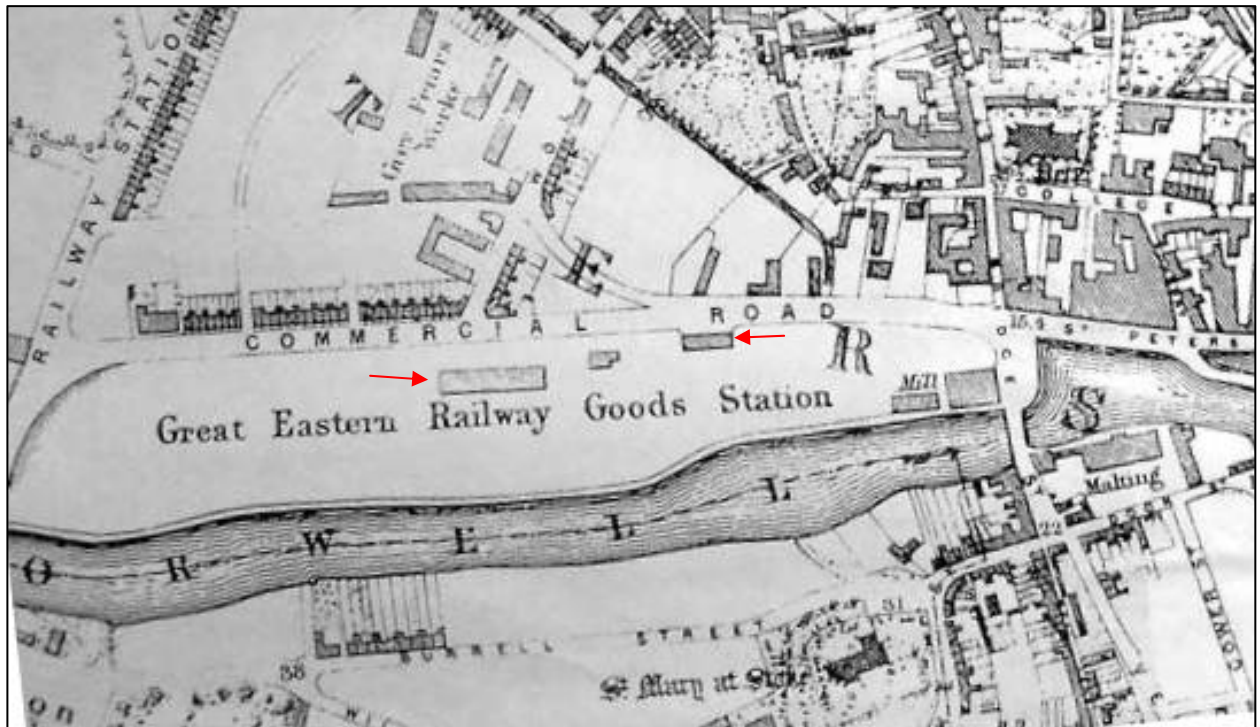


Figure 13. White's map of Ipswich, 1867 (un-scaled extract)

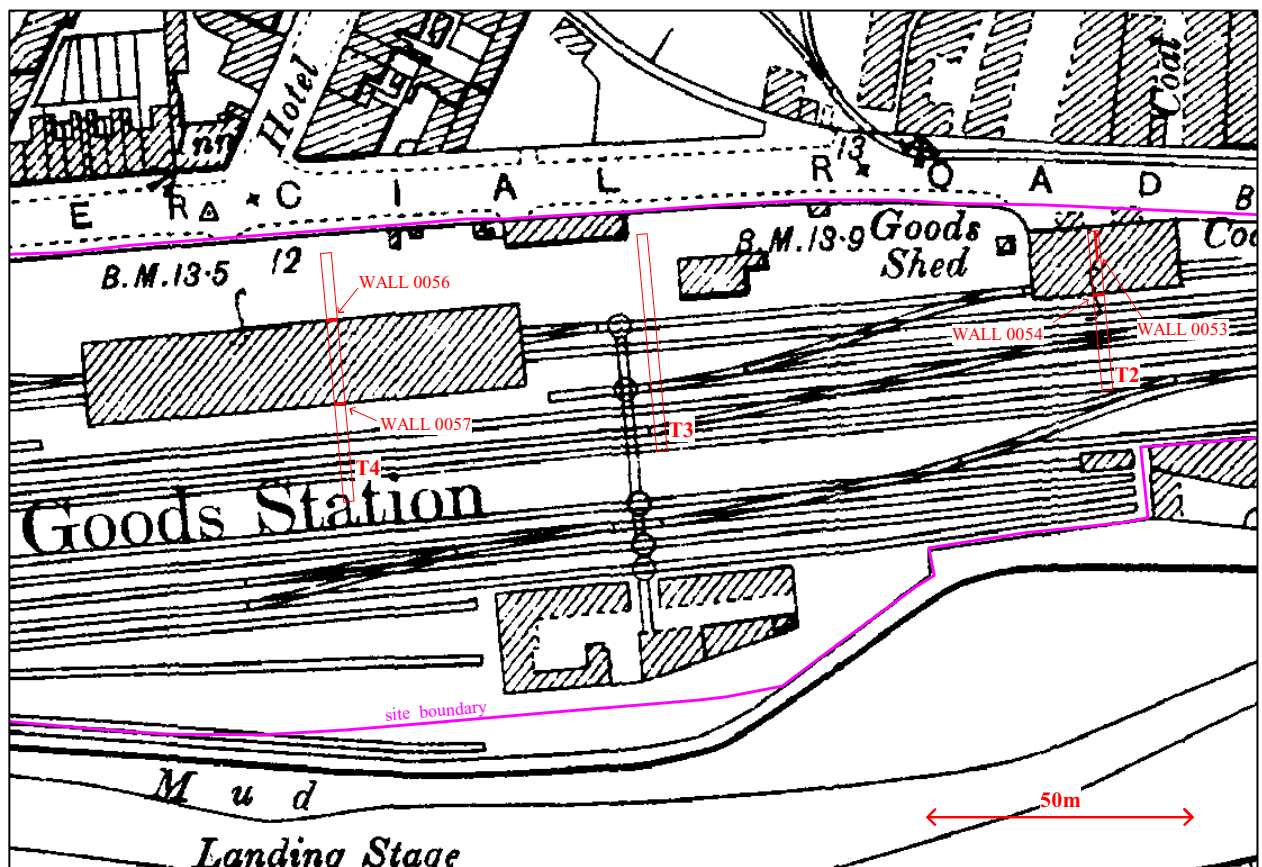


Figure 14. 2nd Edition Ordnance Survey with recorded wall lines superimposed

possible that that the material used for reclamation on this site originated as spoil from these works. The creation of a railway line and goods station at this site would have been highly desirable as it would enable a valuable rail link with the Ipswich Wet Dock that lies immediately to the west.

Two structures were identified during the evaluation, both of which are related to the former Goods Station that appear to have been in present throughout its entire period of use. The walls recorded in Trenches 2 and 4 are coincidental with structures marked on White's map of Ipswich, published in 1867 (arrowed in fig. 13), and the 1st, 2nd and 3rd editions of the Ordnance Survey, 1:2500 scale sheets. Figure 14 is a reproduction of the 2nd edition Ordnance Survey map with the features recorded in Trenches 2 and 4 superimposed confirming their identification. These two structures can be partially seen in views of the area recorded in the 1960s (plates 11 and 12) which shows them to be single storey structures with an apex roof running longitudinally. These two structures can also be seen in an aerial photograph taken in 1920 (plate 13).

The existence of these walls indicates that the Goods Station structures were only cleared to ground level and that below ground remains were not grubbed out prior to the construction of the modern retail buildings. The stratigraphy revealed in the trenches suggests that the area of the Goods Station was simply buried under imported sand and hardcore prior to the area's redevelopment and that further remains of buildings and roadways are likely to exist within the site.

## **8. Conclusions and recommendations for further work**

---

No archaeological evidence for any significant activity on this site, prior to the coming of the Goods Station in the 1850s/60s, has been identified. This would indicate that the area was simply open marsh. The lack of any significant quantities of early artefacts indicates that it was not used as dump for refuse from the town which would suggest that it was probably used as pasture.

It is likely that further remains of the Goods Station are present within the site although they are of only limited significance and are fairly well documented. If any substantial remains, such as pits for turntables or weighbridges, etc, are encountered during

groundwork for the proposed development these may be worthy of recording for purposes of local history and railway studies.

It should be remembered that only the northern half of the site has been evaluated due to the restrictions present in the southern area and that it is possible that riverside structures relating to management of the marsh and use of the river could potentially exist. It may therefore be prudent to archaeologically monitor groundwork undertaken in this area of the site.

## **9. Archive deposition**

---

Historic Environment Record reference under which the archive is held: IPS 707.

The digital archive will be stored on the SCC secure servers at the location:

*R:\Environmental Protection\Conservation\Archaeology\Archive\Ipswich\IPS707 Evaluation (Grafton Way)*

Digital photographs are held under the references: HSV66 to HSW51

A summary of this project has been entered into OASIS, the online database, under the reference: suffolkc1-144550

## **10. Acknowledgements**

---

The evaluation was carried out by Tim Browne and Mark Sommers from Suffolk County Council Archaeological Service, Field Team.

The project was directed by Mark Sommers and managed by Dr R. Gardner, who also provided advice during the production of the report.

## **11. Bibliography**

---

Carlson M, 2005, Footwear of the Middle Ages - a glossary of footwear terminology





## 11. Plates

---

*(featured scale is 1m or 2m in length with 0.5m divisions)*



Plate 1. Trench 1 stratigraphy (ref. HSV 70)



Plate 2. Trench 2, north, stratigraphy (ref. HSV 87)



Plate 3. Trench 2, south, stratigraphy (ref. HSV 88)



Plate 4. Trench 3 stratigraphy (ref. HSV 96)



Plate 5. Trench 4, north, stratigraphy (ref. HSW 11)



Plate 6. Trench 4, south, stratigraphy (ref. HSW 28)



Plate 7. Trench 5 stratigraphy (ref. HSW 38)



Plate 8. Trench 2 view facing north, Wall 0054 in foreground (ref. HSV 78)

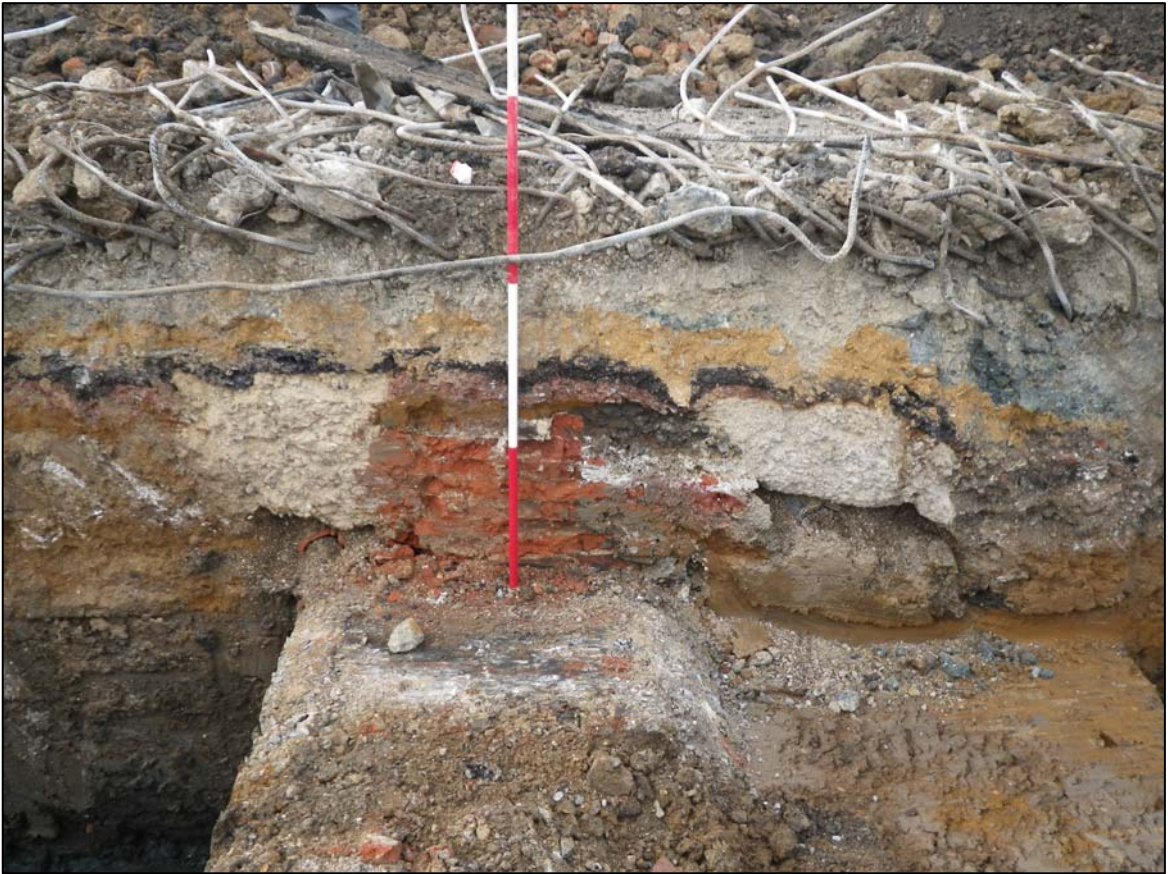


Plate 9. Trench 4, Wall 0056, view facing west (ref. HSW 16)



Plate 10. Trench 4, railway wagon screw link coupling from layer 0005 (ref. HSW 48)



Reproduced with kind permission of Suffolk Record Office, Ipswich branch (document ref. K490/67/1)

Plate 11. View looking southeast across Commercial Road (7/8/1960).  
The building recorded in Trench 2 is visible in the distance (arrowed)



Reproduced with kind permission of Suffolk Record Office, Ipswich branch (document ref. K490/67/3)

Plate 12. View west from Bridge Street (1/7/1962).  
The building recorded in Trench 2 is visible in the centre right (red arrow),  
the building recorded in Trench 4 is visible in the distance (blue arrow)

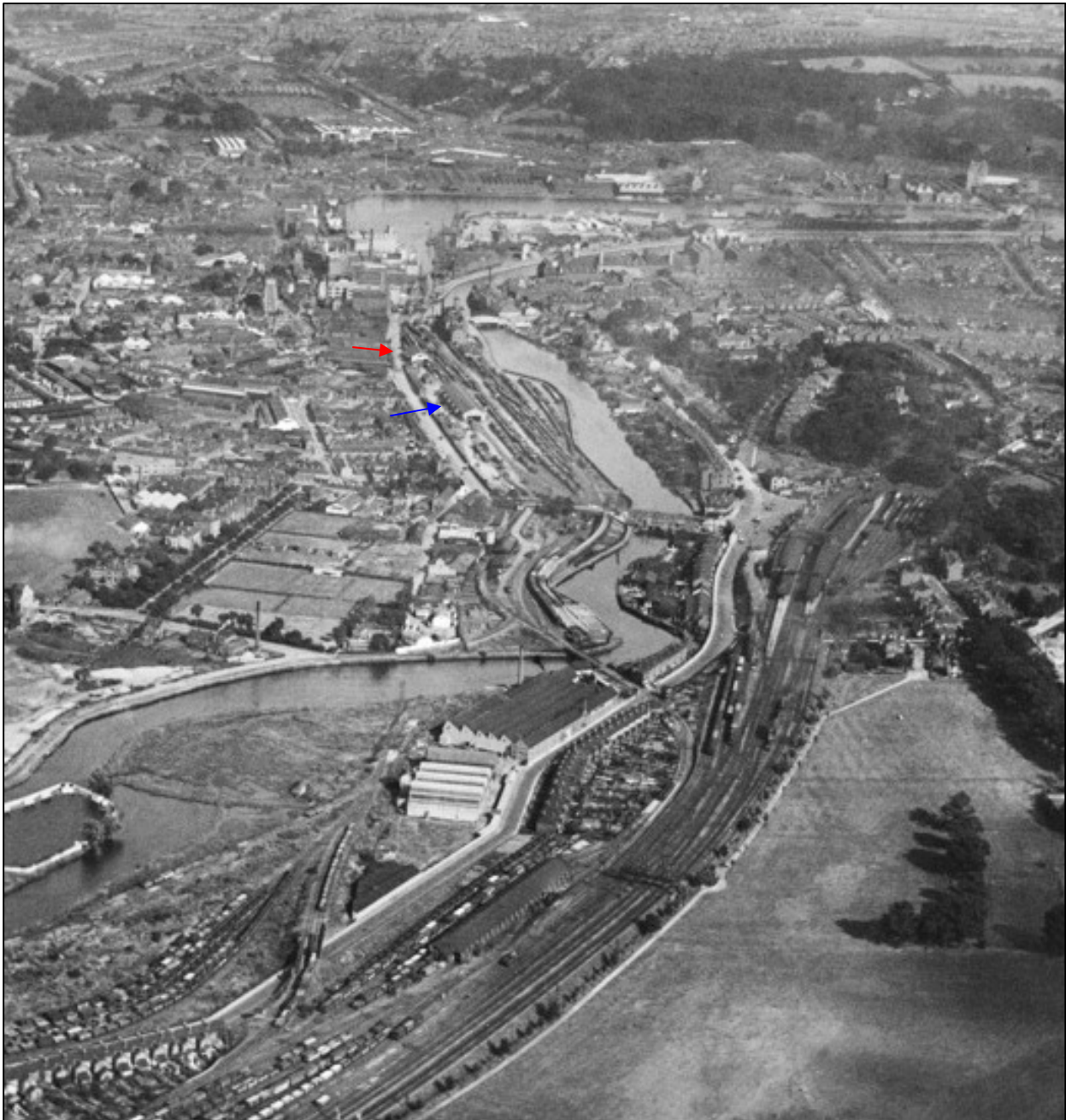


Plate 13. Aerial photograph of Ipswich, dated 1920 with the Goods Station visible in the distant centre.  
Red arrow = building recorded in Trench 2; Blue arrow = building recorded in Trench 4





# Appendix 1. Brief and specification

---

## Brief and Specification for Evaluation by trenching and Palaeo-environmental Assessment

### MIXED USE DEVELOPMENT, GRAFTON WAY, IPSWICH

#### 1. Background

- 1.1 Planning permission has been granted for a mixed use development at Grafton Way, Ipswich (IP/08/00953/FUL).
- 1.2 The Consent is conditional on the applicant securing the implementation of a programme of archaeological work prior to commencement of the development.
- 1.3 The area of the proposed development is about 3 ha in size and is located on the reclaimed floodplain of the River Orwell on the south margin of what was the Town Marsh during the medieval period and immediately south-west of the Area of Archaeological Importance defined for the Anglo-Saxon and Medieval town in the *Ipswich Local Plan*. It also lies just upstream of Stoke Bridge (the crossing point of the River Orwell from at least the 10<sup>th</sup> century), which has probably been the site of water mills until the 19<sup>th</sup> century..
- 1.4 In order to establish the full archaeological implications of the proposed development, an archaeological evaluation is required of the site. **The evaluation is the first part of the programme of archaeological work and decisions on the need for, and scope of, any further work will be based upon the results of the evaluation and will be the subject of additional briefs.**
- 1.5 Borehole data shows approximately one metre of made ground overlying deep alluvial deposits including sands, gravels and peat. Such deposits have great potential for:
- palaeo-environmental and geo-archaeological deposits
  - former land surfaces buried by later sedimentation
  - preserved wooden structures
  - water management features, including mill leets
- 1.6 In order to inform the archaeological mitigation strategy a trenched evaluation of the development area will be required followed by palaeo-environmental assessment of the deposits.
- 1.7 The assessment will provide information to construct an archaeological conservation strategy, dealing with preservation, the recording of palaeo-environmental and geoarchaeological deposits, working practices, timetables and orders of cost. Further mitigation may be required as a direct result of this assessment should unusual palaeo-environmental deposits be recovered. This will be at the discretion of SCCAS/C
- 1.8 In addition, the upper levels of the site contain the foundations of the Ipswich Goods Station, the ground plan of which should be exposed and recorded.

#### 2.0 General

- 2.1 In accordance with the standards and guidance produced by the Institute of Field Archaeologists, this brief should not be considered sufficient to enable the total execution of the project. A Written Scheme of Investigation (WSI) based upon this brief and the accompanying outline specification

of minimum requirements, is an essential requirement. This must be submitted by the developers, or their agent, to the Conservation Team of the Archaeological Service of Suffolk County Council (Shire Hall, Bury St Edmunds IP33 2AR; telephone/fax: 01284 352443) for approval. The work must not commence until this office has approved both the archaeological contractors as suitable to undertake the work, and the WSI as satisfactory. The WSI will *provide the basis for measurable standards* and will be used to establish whether the requirements of the planning condition will be adequately met.

- 2.2 Before commencing work the project manager must carry out a risk assessment and liaise with the site owner, client and SCCAS/CT in ensuring that all potential risks are minimised. A copy of this must be given to SCCAS/CT before the commencement of works. It is the responsibility of the developer to provide the archaeological contractor with either the contaminated land report for the site or a written statement that there is no contamination.
- 2.3 The responsibility for identifying any restraints on field-work (e.g. Scheduled Monument status, Listed Building status, public utilities or other services, tree preservation orders, SSSIs, wildlife sites etc) rests with the commissioning body and its archaeological contractor. The existence and content of the archaeological brief does not over-ride such restraints or imply that the target area is freely available.
- 2.4 Any changes to the specification that the project manager may wish to make after approval by this office should be communicated directly to SCCAS/CT for approval.
- 2.5 The involvement of SCCAS/CT should be acknowledged in any report or publication generated by this project.
- 2.6 An outline specification, which defines certain minimum criteria, is set out below.

### **3. Brief for Evaluation and Auger Survey**

- 3.1 Seven trenches will be machine dug across the site at right angles to the river (see map). Trenches are to be a minimum of 1.8m wide unless special circumstances can be demonstrated. Any variation to the attached trench design must be approved by the Conservation Team of the Archaeological Service before field work begins.
- 3.2 The topsoil may be mechanically removed using an appropriate machine fitted with toothless bucket and other equipment. All machine excavation is to be under the direct control and supervision of an archaeologist. The topsoil should be examined for archaeological material.
- 3.3 The top of the first alluvial deposit may be cleared by machine, but must then be cleaned off by hand. There is a presumption that excavation of all archaeological deposits will be done by hand unless it can be shown there will not be a loss of evidence by using a machine. The decision as to the proper method of further excavation will be made by the senior project archaeologist with regard to the nature of the deposit.
- 3.4 Plans of any archaeological features on the site are to be drawn at 1:20 or 1:50, depending on the complexity of the data to be recorded. Sections should be drawn at 1:10 or 1:20 again depending on the complexity to be recorded. Any variations from this must be agreed with the Conservation Team.
- 3.5 Where appropriate, a digital vector plan showing all the areas examined should be included with the report. This must be compatible with MapInfo GIS software, for integration into the County HER. AutoCAD files should be also exported and saved into a format that can be imported into MapInfo (for example, as a Drawing Interchange File or .dxf) or already transferred to .TAB files.
- 3.6 A photographic record of the work is to be made, consisting of both monochrome and colour photographs.
- 3.7 The auger survey will have the following objectives:

- The characterisation of the sequence and the patterns of accumulation of palaeo-environmental/geoarchaeological deposits across the development area, including the depth and lateral extent of any major stratigraphic units, and the character of any potential land surfaces/buried soils within or pre-dating these sediments.
  - The identification of significant variations in the deposition sequences indicative of localised features, particularly in relation to topographic variation and the presence of features such as palaeo-channels.
  - Identify the location and extent of any waterlogged organic deposits and where appropriate and practical, to retrieve suitable samples in order to assess the potential for the preservation of environmental remains and material for scientific dating.
  - Clarify the relationship between sediment sequences and other deposit types, including periods of 'soil', peat growth, and archaeological remains.
  - To provide for the absolute dating of critical contacts.
  - To focus academically upon the potential for this site to produce palaeo-environmental evidence, together with its potential to inform our understanding of past environments, palaeo-climates, sea-level changes and human interaction.
  - To make the results of the investigation available through suitable reporting.
- 3.8 The survey will comprise of two linear transects across the site. The location of these transects will depend on local conditions on the site, the amount of overburden and the ability to access below ground deposits. This will be at the discretion of the specialist contractor.
- 3.9 Each location will be recorded in three dimensions, either with a GPS or by total station surveying.
- 3.10 The equipment used can be one of the following, or a combination of both:
- A standard hand-operated soil auger, with a selection of different auger heads in order to deal with the variety of sediment types that may be encountered (Bucket, Stoney soil, Gouge, and Screw auger)
  - Mechanically operated coring rig, under the supervision of a suitably qualified person, specified in the WSI.
- 3.11 Each location will be augured to a depth of 5.00m or until the underlying glacial tills/boulder clay have been proven, whichever is reached first and providing no obstructions are encountered. Should deeper sequences be encountered then provision should be made to explore these sequences, but any changes to the specification should be communicated directly to SCCAS/CT for approval.
- 3.12 The profile will be recorded on a summary proforma sheet and significant layers identified. Relative depths will be noted and a description of the deposits using standard Quaternary (Late Devensian and Holocene) terminology (colour texture, compaction and inclusions). This will follow the English Heritage Centre for Archaeology Guidelines, *Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post-excavation* (2002).
- 3.13 If suitable deposits are identified a number of cores will be taken and retained for assessment.

#### **4. Brief for Environmental assessment**

- 4.1 Deposits will be sampled and assessed for their potential for palaeo-environmental analysis. It may be necessary for a representative of the SCCAS/CT to discuss the sampling strategy on site, depending on the deposits, and advice may be requested from English Heritage's Regional Science Advisor if required.
- 4.2 An assessment of the environmental potential of the site will be undertaken through the examination of suitable deposits by the contractors preferred palaeo-environmental specialist (see Section 4.4), who will examine the potential for further analysis. This will be undertaken in accordance with English Heritage Guidelines (2002).

- 4.3 The cores/sections will be assessed for pollen and plant macrofossils. In addition, the samples may be assessed for diatoms, foraminifera, insect, and molluscs. It will also consider the potential for the dating of suitable deposits and requirements for any AMS and OSL dating and samples may be submitted to the contractors preferred dating laboratory.
- 4.4 The assessment must be undertaken by an environmental archaeologist of recognised competence, fully experienced in work of this character and formally acknowledged by the SCCAS/CT. Details, including the name, qualifications and experience, of the site director and all other key project personnel (including specialist staff) will be communicated to SCCAS/CT as part of a specification of works that conforms to the guidelines contained in English Heritage's MAP 2 publication (Management of Archaeological Projects, specifically, Appendix 2).

## **5. General Arrangements for the Evaluation/Palaeo-environmental Assessment**

- 5.1 To carry out the evaluation, the developer must appoint an archaeological contractor and that contractor must be approved by SCCAS/CT as competent.
- 5.2 The archaeological contractor will give SCCAS/CT not less than five working days notice of the commencement of the evaluation and palaeo-environmental assessment work , in order that the works may be monitored if required.
- 5.3 All arrangements for the field evaluation of the site, the timing of the work, access to the site, the definition of the precise area of landholding and area for proposed development are to be defined and negotiated with the commissioning body.
- 5.4 SCCAS/CT should be kept regularly informed about progress both during the site works and subsequent post-excavation work.
- 5.5 Allowance must be made to cover costs of the assessment by the contracted specialist. The size of the contingency should be estimated by the approved contractor, based upon the outline works in the Brief and Specification and the contractor's programme of works and timetable.
- 5.6 It is the archaeological contractor's responsibility to ensure that adequate resources are available to fulfil the Brief.
- 5.7 If unexpected remains are encountered SCCAS/CT must be informed immediately. Amendments to this specification may be made to ensure adequate provision for archaeological recording.
- 5.8 The developer shall afford access at all reasonable times to SCCAS/CT archaeologist the archaeological contractor and specialists to allow work to be undertaken.

## **6. Report Requirements**

- 6.1 An archive of all records and finds is to be prepared consistent with the principles of *Management of Archaeological Projects (MAP 2)*. This must be deposited with the County Historic Environment Record (HER) within three months of the completion of work. It will then become publicly accessible.
- 6.2 A report on the fieldwork and archive, consistent with the principles of *MAP 2*, particularly Appendix 4, must be provided.
- 6.3 The report should reflect the aims of the WSI.
- 6.4 A copy of the Specification should be included as an appendix to the report.
- 6.5 The methodology should be set out carefully, and explained as appropriate. It must include non-technical summaries to make the report intelligible to both specialists and non-specialists.
- 6.6 There must be an analytical report, integral to the survey, with description and interpretation of the results. The objective record of the evidence for both surveys must be clearly distinguished from its interpretation.

- 6.7 The report must include a clear statement of the archaeological potential of the site, and the significance of that potential in the context of the Regional Research Framework (*East Anglian Archaeology*, Occasional Papers 3 & 8, 1997 and 2000).
- 6.8 An opinion as to the necessity for further evaluation and its scope may be given. No further site work should be embarked upon until the primary fieldwork results are assessed and the need for further work is established.
- 6.9 To assist with the curation of the project's archive, the project manager must contact the Suffolk Historic Environment Record officer (Dr Colin Pendleton) to obtain a HER number. This number will be used as a unique identifier linking all physical and digital components of the archive. The unique number must be clearly indicated on any specification received for this project and on any ensuing reports.
- 6.10 The site archive is to be deposited with the Suffolk HER within three months of the completion of fieldwork. It will then become publicly accessible.
- 6.11 The project manager should consult the SCCAS Archive Guidelines 2008 and also the Suffolk HER Officer regarding the requirements for the deposition of the archive (conservation, ordering, organisation, labelling, marking and storage) of excavated material and the archive.
- 6.12 Where positive conclusions are drawn from a project (whether it be evaluation or excavation) a summary report, in the established format, suitable for inclusion in the annual 'Archaeology in Suffolk' section of the *Proceedings of the Suffolk Institute for Archaeology and History*, must be prepared. It should be included in the project report, or submitted to SCCAS/CT, by the end of the calendar year in which the evaluation work takes place, whichever is the sooner.
- 6.13 Suffolk HER sheets must be completed, as per the Suffolk HER manual, for all sites where archaeological finds and/or features are located.
- 6.14 Where appropriate, a digital vector trench plan should be included with the report, which must be compatible with MapInfo GIS software, for integration in the Suffolk HER. AutoCAD files should be also exported and saved into a format that can be imported into MapInfo (for example, as a Drawing Interchange File or .dxf) or already transferred to .TAB files.
- 6.15 At the start of work (immediately before fieldwork commences) an OASIS online record <http://ads.ahds.ac.uk/project/oasis/> must be initiated and key fields completed on Details, Location and Creators forms.
- 6.15 All parts of the OASIS online form must be completed for submission to the Suffolk HER. This should include an uploaded .pdf version of the entire report (a paper copy should also be included with the archive).

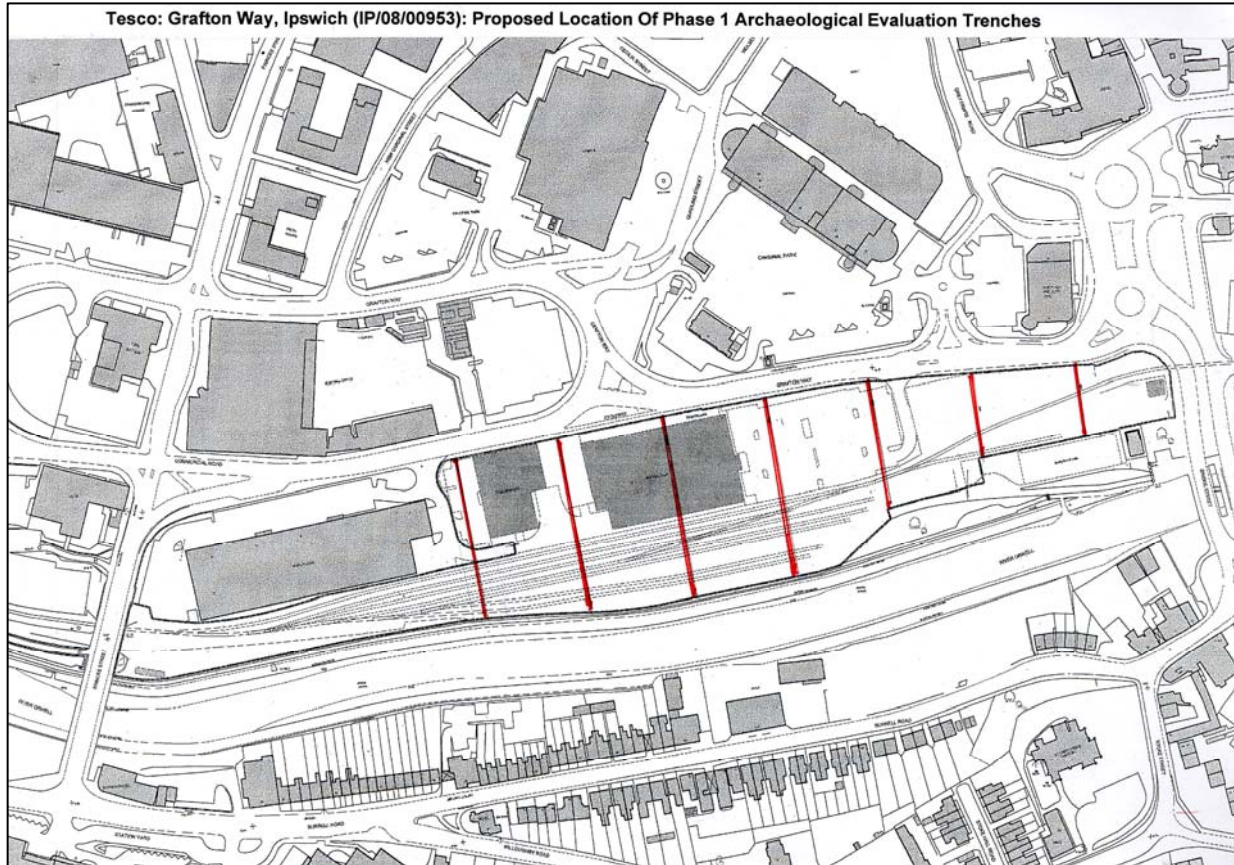
Specification by: Keith Wade

Suffolk County Council  
Archaeological Service Conservation Team  
Environment and Transport Service Delivery  
9-10 The Churchyard, Shire Hall  
Bury St Edmunds  
Suffolk IP33 2AR

Tel: 01284 352440  
Email: keith.wade@suffolk.gov.uk  
Date: 11<sup>th</sup> November 2010

Reference: Specgeo(KW)\_Grafton Way, Ipswich

**This brief and specification remains valid for six months from the above date. If work is not carried out in full within that time this document will lapse; the authority should be notified and a revised brief and specification may be issued.**



## Appendix 2. OASIS data collection form

<b>OASIS ID: suffolkc1-144550</b>	
<b>Project details</b>	
Project name	IPS707 - Mixed use development, Grafton Way, Ipswich
Short description of the project	A trenched evaluation in advance of development revealed extensive marsh deposits beneath mid-19th century reclamation deposits. Remains of two 19th century structures relating to a former railway goods yard were recorded but no earlier features noted. A single leather shoe, possibly 15th century in date, was recovered from a peat layer c.2m below present ground level.
Project dates	Start: 19-11-2012
Previous/future work	No / No
Any associated project reference codes	IPS707 - HER event no.
Any associated project reference codes	IP/08/00953/FUL - Planning Application No.
Type of project	Field evaluation
Current Land use	Vacant Land 1 - Vacant land previously developed
Monument type	BUILDING Post Medieval
Significant Finds	LEATHER SHOE Medieval
Methods & techniques	"Sample Trenches"
Development type	Urban commercial (e.g. offices, shops, banks, etc.)
Prompt	Direction from Local Planning Authority - PPS
Position in the planning process	After full determination (eg. As a condition)
<b>Project location</b>	
Country	England
Site location	SUFFOLK IPSWICH IPSWICH IPS707 - Grafton Way

Study area	3.00 Hectares
Site coordinates	TM 1603 4395 52 1 52 03 04 N 001 09 03 E Point
<b>Project creators</b>	
Name of Organisation	Suffolk County Council Archaeological Service
Project brief originator	Local Authority Archaeologist and/or Planning Authority/advisory body
Project design originator	Suffolk County Council Archaeological Service, Field Team
Project director/manager	Rhodri Gardner
Project supervisor	Mark Sommers
Type of sponsor/funding body	Developer
Entered by	MS (mark.sommers@suffolk.gov.uk)
Entered on	25 February 2013



## Appendix 3. Context list

Context Number	Category	Trench	Description	Interpretation
0001	Other		unstratified finds	
0002	Other	1	Leather shoe. Recovered from layer 0008 at a depth of c. 2m below present ground surface (since allocated a Small Find Number, SF1001)	
0003	Layer	5	Peat. Number issued to finds recovered during bulk sampling of peat deposit in trench 5 (see ASE report for detail)	Marsh/pond deposit, finds are post-med
0004	Layer	1,2	modern crushed concrete and hardcore	rudimentary surface of overflow car park
0005	Layer	1,2,3,4,5	stone ballast, stained black with crushed coke and soot. Contains occasional small brick frags.	railway yard deposit
0006	Layer	1	crushed chalk	reclamation deposit
0007	Layer	1	yellow sand and gravel	reclamation deposit
0008	Layer	1	Fine dark grey silt with occasional peat lenses	marsh deposit
0009	Layer	1	fine grey silt	marsh deposit
0010	Layer	1	broken flint, black	a natural deposit. Overlies natural yellow sand
0011	Layer	3	yellow sand	post-railway yard sub-base for car park
0012	Layer	2	grey silty clay with occasional rubble	reclamation deposit
0013	Layer	2	crushed chalk	reclamation deposit
0014	Layer	2	yellow sand and gravel with occasional brick fragments	reclamation deposit
0015	Layer	2	fine pale grey-brown silt	marsh deposit
0016	Layer	2	fine dark grey silt	marsh deposit
0017	Layer	2	pale yellow silty sand	reclamation deposit
0018	Layer	2	orange sand and gravel	reclamation deposit
0019	Layer	2	fine pale grey-brown silt	marsh deposit
0020	Layer	2	pale grey silt	marsh deposit
0021	Layer	2	dark grey-brown silt	marsh deposit
0022	Layer	2	black sand and gravel	marsh deposit

<b>Context Number</b>	<b>Category</b>	<b>Trench</b>	<b>Description</b>	<b>Interpretation</b>
0023	Layer	2	grey sand and gravel	marsh deposit
0024	Layer	2	yellow sand, probably the top of the natural subsoil	natural subsoil
0025	Layer	3	pale yellow silty sand	reclamation deposit
0026	Layer	3	fine pale grey silt	marsh deposit
0027	Layer	3	dark grey silt	marsh deposit
0028	Layer	3	black sandy silt	marsh deposit
0029	Layer	3	dark grey silt	marsh deposit
0030	Layer	3	grey sand	probably a natural subsoil
0031	Layer	4	Concrete slab	floor of former retail warehouse
0032	Layer	4	yellow sand	sub-base for the concrete slab 0031
0033	Layer	4	crushed red brick rubble	reclamation deposit
0034	Layer	4	crushed chalk	reclamation deposit
0035	Layer	4	red brick rubble with sand	reclamation deposit
0036	Layer	4	yellow sand and gravel	marsh deposit
0037	Layer	4	fine black silt	marsh deposit
0038	Layer	4	dark grey silt	marsh deposit
0039	Layer	4	crushed chalk	reclamation deposit
0040	Layer	4	yellow sand and gravel	reclamation deposit
0041	Layer	4	grey-brown silt	marsh deposit
0042	Layer	4	dark grey-black silt	marsh deposit
0043	Layer	5	concrete slab	floor of former retail warehouse
0044	Layer	5	yellow sand and gravel	reclamation deposit
0045	Layer	5	crushed chalk	reclamation deposit
0046	Layer	5	yellow sand and gravel	reclamation deposit
0047	Layer	5	dark grey-black silt	marsh deposit
0048	Layer	5	grey silt	marsh deposit
0049	Layer	5	organic rich (peaty) black silt	marsh deposit
0050	Layer	5	dark grey-black silt	marsh deposit

Context Number	Category	Trench	Description	Interpretation
0051	Layer	3	tarmac over concrete	car park surface associated with former retail building
0052	Layer	4	Crushed concrete	post railway yard levelling
0053	Wall	2	Brick wall built of soft reds cemented with a lime mortar	railway yard structure
0054	Wall	2	Brick wall built of soft reds cemented with a lime mortar on concrete footing	railway yard structure
0055	Surface	2	Concrete slab into which are set two rails at standard gauge	railway yard structure
0056	Wall	4	Concrete slab into which are set two rails at standard gauge	railway yard structure
0057	Wall	4	Wall line marked by surviving concrete footing	railway yard structure



## Appendix 4. Palaeoenvironmental analysis

---



**A Palaeoenvironmental Evaluation  
at Grafton Way, Ipswich.**

**NGR: 615977 243973  
(TM 15977 43973)**



**Project No: 5817  
Site Code: IGW12**

**ASE Report No. 2013062**

**Kristina Krawiec  
With contributions by  
Karine le Hégarat, Emma Hopla, David Smith and John Whittaker**

**March 2013**

**A Palaeoenvironmental Evaluation  
at Grafton Way, Ipswich.**

**NGR: 615977 243973  
(TM 15977 43973)**

**Project No: 5817  
Site Code: IGW12**

**ASE Report No. 2013062**

**Kristina Krawiec  
With contributions by  
Karine le Hégarat, Emma Hopla, David Smith and John Whittaker**

**March 2013**

**Archaeology South-East  
Units 1 & 2  
2 Chapel Place  
Portslade  
East Sussex  
BN41 1DR**

**Tel: 01273 426830  
Fax: 01273 420866  
Email: [fau@ucl.ac.uk](mailto:fau@ucl.ac.uk)**



## **Abstract**

*In November 2012 Archaeology South-East (ASE) was commissioned by Suffolk County Council Archaeological Service (SCAAS) to undertake a palaeoenvironmental investigation at Grafton Way, Ipswich (NGR 615977 243973) prior to the redevelopment of the site. The site had undergone trial trenching (carried out by SCAAS) which revealed the basal sands and gravels to be c.3m below current ground surface. The borehole survey was intended to recover sediment suitable for palaeoenvironmental analysis and radiocarbon dating.*

*The sediment recovered was assessed for the preservation of environmental proxies including ostracods/forams, pollen, plant macrofossils and coleoptera. The results indicated the presence of sediments from a saltmarsh environment indicating this area to be within the range of tidal influence during sediment accumulation. The radiocarbon dating did not provide a reliable chronological framework due to the reworked nature of the upper deposits. A basal date however may be more reliable when considered in light of the ostracod remains and therefore the accumulation began in the late to early post-Roman period (419-543 Cal AD). Evidence for human activity was demonstrated in the coleopteran and pollen assemblages suggesting there may have been some instances of refuse deposition in the saltmarsh. Although no further work is recommended at the site the results demonstrate the potential for deposits associated with the River Orwell to elucidate the nature of the river in the historic period.*

## CONTENTS

- 1.0 Introduction
- 2.0 Background
- 3.0 Methodology
- 4.0 Results
- 5.0 Discussion and Conclusions

Bibliography  
Acknowledgements

## HER Summary Sheet

### TABLES

- Table 1: Organic remains
- Table 2: Brackish Foraminifera
- Table 3: Brackish Ostracods
- Table 4: Insect fauna recovered from Grafton Way, Ipswich
- Table 5: Summary of the nature of the insect faunas from Grafton Way, Ipswich
- Table 6: Results for samples <2> and <3> associated with Core 1
- Table 7: Radiocarbon dates

### FIGURES

- Figure 1: Site location
- Figure 2: Borehole location
- Figure 3: Pollen percentage diagram
- Figure 4: East facing section of trench

Cover: River Orwell looking west

### APPENDICES

Appendix 1: The detailed ecological preferences and geographical distribution of the microfossil species.

## **1.0 INTRODUCTION**

### **1.1 Site Background**

1.1.1 In November 2012 Archaeology South-East (ASE), part of the Centre for Applied Archaeology, University College London, were commissioned by Suffolk County Council Archaeological Service to undertake a palaeoenvironmental investigation at Grafton Way, Ipswich (NGR: 615977 243973) prior to the redevelopment of the site.

1.1.2 The site had previously undergone trial trenching which revealed basal sands and gravels to be c.3m below current ground surface. The borehole survey was intended to recover sediment suitable for palaeoenvironmental analysis and dating.

### **1.2 Geology and Topography**

1.2.1 The site is located on the reclaimed floodplain of the River Orwell on river terrace gravels which overlie the Newhaven Chalk formation. During the reclamation the terrace deposits were levelled up and the river canalised and embanked to prevent flooding.

### **1.3 Planning Background**

1.3.1 The site is to be redeveloped for a new Tesco superstore using pile construction. Formerly the site was occupied by a goods station and latterly a B&Q warehouse which used and maintained the railtracks from the goods station until the late 1980's.

### **1.4 Aims and Objectives**

1.4.1 The aims of this project are to characterise the nature of the sediments and recover suitable material for palaeoenvironmental analysis. More specific objectives are:

- To characterise the sequence of deposits in terms of accumulation and extent
- To identify significant variations in the depositional sequence
- To inform understanding about the nature of the environment and any changes over time.

### **1.5 Scope of Report**

1.5.1 This report details the results of the borehole survey and the palaeoenvironmental analysis of the sediment recovered. It also includes recommendations for further work.

## **2.0 BACKGROUND**

- 2.1 The site was subject to an archaeological evaluation in 2012 by Suffolk County Council Archaeological Service which revealed an absence of archaeological features and demonstrated the homogenous nature of the overlying sediments across the site. The lack of dated environmental sequences from Ipswich meant that this site was considered to have deposits that were likely to have significant palaeoenvironmental potential.

### **3.0 METHODOLOGY**

#### **3.1 Fieldwork Methodology**

3.1.1 The site was intended to be subject to a borehole survey comprising two transects using a windowless percussive sampling rig. However, this was not possible because was still under demolition. In order to penetrate the made ground at the site the overlying material was removed using a machine fitted with a ditching bucket to a depth of c.1.0. The sediment was then removed in 1m sleeved cores (Cores 1-3, Figure 2) which were opened and recorded on site. The sediment was recorded using the Troels-Smith (1955) system and was accompanied by digital photographs. Bulk samples were taken from the machine bucket as the base of the trench was too deep to allow safe access.

#### **3.2 Post-Excavation Methodology**

3.2.1 The cores are stored at ASE offices and were subsampled in the laboratory for pollen and ostracods/forams at a 16cm resolution with accompanying radiocarbon dating samples.

3.2.2 A total of 8 sub-samples were taken for pollen assessment (7 from Core 2 and 1 from Core 1). Pollen preparation followed standard techniques including potassium hydroxide (KOH) digestion, hydrofluoric acid (HF) treatment and acetylation (Moore et al., 1991). A count of at least 125 total land pollen grains (TLP) excluding aquatics and spores were attempted for each sample. Two of the samples at 2.4m depth from Core 1 and 3.10m depth from Core 2 produced very low pollen concentrations and assessment counts were not possible for these samples.

3.2.3 The ostracod/foram samples were broken into very small pieces by hand and placed in ceramic bowls and dried in an oven. Hot water was poured over them, a little sodium carbonate added (to help remove the clay) and they were then left soaking overnight. Washing was through a 75 micron sieve with hand-hot water, the resulting residue being decanted back into the bowl for final drying. In a few cases this process had to be repeated to achieve a full breakdown. After drying in the oven the residues were stored in labelled plastic bags. Examination was under a binocular microscope each residue being put, first, through a nest of sieves (>500, >250, >150 microns and collecting pan). A little of each grade was sprinkled on a picking tray and a representative fauna of foraminifera and ostracods picked out and placed in a 3x1" faunal slide for archive purposes. The foraminiferal and ostracod species were logged semi-quantitatively by experience and by eye and recorded on an Excel chart (Tables 1-3) and colour-coded to show ecological preferences. Other useful "organic remains" were also logged on a presence/absence basis and noted on Table 1.

3.2.4 The beetle samples were processed using the standard method of paraffin flotation as outlined in Kenward et al. (1980). The system for 'scanning' faunas as outlined by Kenward et al. (1985) was followed in this assessment.

When discussing the faunas recovered (Tables 4 and 5), the following considerations should be taken into account:

- 1) Identifications of the insects present are provisional. In addition,

many of the taxa present could be identified down to species level during a full analysis, producing more detailed information.

- 2) The various proportions of insects suggested are very notional and subjective. As a result, these faunas should be regarded as incomplete and possibly biased.

3.2.5 For the recovery of plant macrofossil remains, two litre sub-samples taken from both bulk samples which were then wet sieved through a stack of graded geological sieves measuring 4mm, 2mm, 1mm, 500µm and 250µm and each fraction was retained in water. Sub-samples from each fraction were scanned using a stereozoom microscope at x7-45 magnification. Table 6 presents an overview of their contents. Preliminary identifications were made for the macrobotanical remains by comparing them with specimens documented in reference manuals (Cappers *et al.* 2006, NIAB 2004, Mauquoy and van Geel 2007). Nomenclature used follows Stace (1997). Abundance and preservation of the environmental remains have been recorded to establish their potential for further analysis.

## 4.0 THE RESULTS

### 4.1 Stratigraphic recording

4.1.1 The site was still undergoing clearance at the time of the fieldwork and as such the original methodology of two transects perpendicular to the river was unsuitable. Due to restricted nature of the area available a single 30m trench was excavated in order to remove the concrete and made ground sealing the lower silt deposits (Figures 2 and 3). This allowed the recovery of three cores and 3 bulk samples. The bulk samples were recovered from the machine bucket as the trench was over 3m deep and therefore inaccessible. The full core logs are available in Appendix 1.

4.1.2 The basal gravels were encountered c.3.48m below current ground level and were stained black by the overlying silts. The gravels were overlain by a smooth grey brown occasionally mottled silt clay (Unit 1) c.0.27-0.35m thick. This contained occasional organic remains including woody fragments and reed remains. Unit 1 trended into a grey sandy silt (Unit 2) 0.15-0.30m thick which was not seen in Core 1. This was overlain by an oxidised alluvial clay in Core 2 (Unit 4) 0.54m thick. This deposit represents the last naturally laid down sediment in the sequence with a series of made ground layers overlying Unit 4 and Unit 2 in Cores 2 and 3. This made ground comprised a layer of buff sand 0.48m thick followed by layer of contaminated clinker 0.50m thick and 0.50m of hardcore.

4.1.3 In Core 1, Unit 1 was overlain by a thin layer of well-humified silty peat 0.39m thick (Unit 3). At the base of this deposit several fragments of post-medieval tile, animal bone and white glazed pottery were recovered indicating a post-medieval date for the onset of peat accumulation. This peat layer was observed in the section of the trench once the borehole survey was completed and was found to thin out to the south. This was then overlain by grey brown gritty silt clay 0.71m thick which contained crushed molluscan remains and gravel (Unit 5). Again, this deposit was confined to the northern end of the trial trench as there was a greater degree of post-medieval disturbance and made ground to the south.

4.1.4 A single core (2) was selected for sub-sampling due to the homogenous nature of the sediment. Three 20L bulk samples were recovered from the site, one from Unit 5 <1>, one from Unit 3 <2> and one from Unit 1 <3>. Samples <2> and <3> were assessed for the presence of plant macrofossils and beetle remains. The core was subsampled for pollen and ostracod analysis at 16cm intervals. Two samples of bulk sediment were submitted for radiocarbon dating from the top and base of the silt unit (Unit 1).

### 4.2 Pollen by Emma Hopla

4.2.1 Concentration and preservation of palynomorphs varied throughout the samples. Assessment counts were obtained for all samples apart from 2.4m (Core 1) and 3.10m (Core 2) where concentrations were extremely low. The results are presented in the form of a pollen diagram (Figure. 3), produced using TILIA and TILIA\*GRAPH (Grimm 1991). All percentages are Total Land Pollen (TLP) unless otherwise stated.

4.2.2 The sequence is dominated by herbaceous pollen throughout (up to 70%)

with Poaceae (wild grasses) accounting for up to 40% and Cyperaceae (sedges) which increases up to 20% in the upper section of the diagram. Other herbs present up to 10% and below include Apiaceae (carrot family), Chenopodiaceae (goosefoots), Lactuceae (dandelions), *Plantago lanceolata* (ribwort plantain) and *Rumex*-type (docks). *Artemisia* (mugwort), *Aster*-type, Brassicaceae (cabbage family), Cereal-type, *Centaurea cyanus* (cornflower), *Cirsium*-type (thistles), *Filipendula ulmaria* (meadowsweet), *Helleborus*-type (hellebore), Ranunculaceae (buttercup family) and Rosaceae (rose family) are all present at trace values along with single grains of *Secale* (rye) and *Urtica* (nettle).

- 4.2.3 Tree and shrub pollen accounts for up to 40% which largely consists of *Quercus* (oak) up to 20% with *Corylus avellana*-type (most likely hazel) and *Alnus glutinosa* (alder) up to 10%. Other trees and shrubs include *Pinus sylvestris* (scots pine), *Betula* (birch), *Tilia* (lime), *Ulmus* (elm), *Salix* (willow), Ericacace (heath family) and *Hedera helix* (ivy). *Fraxinus* (ash) also appears at 5% in sample 3.26m. Aquatics and spores are present in the form of *Sparganium* indet. (bur-reed), *Myriophyllum spicatum* (spiked water milfoil), Sphagnum (peat moss) and *Polypodium vulgare* (common polypody) at trace values. *Pteridium aquilinum* (bracken) and Pteropsida (monolete) indet, (ferns) reach values up to 5% TLP+spores.

### 4.3 Ostracods/Forams by John Whittaker

- 4.3.1 Core 2 covers a 1.14m interval from 2.28m in the core down to 3.42m. The purpose of the present analysis was to assess the usefulness of the microfauna (foraminifera and ostracods) in reconstructing the environment of deposition through time.

Sample (depth in core)	Weight processed
2.28m	15g
2.44m	20g
2.86m	20g
2.94m	15g
3.10m	15g
3.26m	20g
3.42m	20g

- 4.3.2 Examination was under a binocular microscope. Each residue being put, first, through a nest of sieves (>500, >250, >150 microns and collecting pan). A little of each grade was sprinkled on a picking tray and a representative fauna of foraminifera and ostracods picked out and placed in a 3x1" faunal slide for archive purposes. The foraminiferal and ostracod species were logged semi-quantitatively by experience and by eye and recorded on an Excel chart (Table 1) and colour-coded to show ecological preferences. Other useful organic remains were also logged on a presence/absence basis and noted in Table 1.



**Table 1:** Organic remains

Depth in core	2.28m	2.44m	2.86m	2.94m	3.10m	3.26m	3.42m
plant debris + seeds	x	x	x	x	x	x	x
?charcoal	x		x				
brackish foraminifera	x	x	x	x	x	x	x
insects		x		x	x	x	
brick/tile			x				
brackish ostracods					x	x	x
brackish molluscs							x

<i>Ecology</i>	<i>Mid-high saltmarsh</i>	<i>Tidal flats and brackish creeks; fringing saltmarsh developing</i>
----------------	---------------------------	---

- 4.3.3 In spite of the samples being very small (only 15-20g each) they proved to be very fossiliferous and this has enabled an accurate palaeoenvironmental reconstruction of Core 2 to be achieved. The results are shown graphically in Tables 2 and 3, below.

**Table 2:** Brackish Foraminifera

Depth in core	2.28m	2.44m	2.86m	2.94m	3.10m	3.26m	3.42m
<i>Jadammina macrescens</i>	x	xx	xxx	xxx	x	x	
<i>Trochammina inflata</i>		x	x	x			
<i>Miliammina fusca</i>		x	x	x	x	xx	
<i>Balticammina pseudomacrescens</i>		x	x	xx	xx	x	x
<i>Tiphotrocha comprimata</i>				x	x		
<i>Ammonia</i> sp. (brackish)					xx	xx	
<i>Elphidium williamsoni</i>					x		x

**Table 3:** Brackish Ostracods

Depth in core	2.28m	2.44m	2.86m	2.94m	3.10m	3.26m	3.42m
<i>Cyprideis torosa</i>					xx	xx	xxx
<i>Loxoconcha elliptica</i>					xx	xx	xx
<i>Leptocythere porcellanea</i>					xx	xx	xx
<i>Cytherura gibba</i>					x	x	x

Organic remains are recorded on a presence (x)/absence basis.

Foraminifera and ostracods are recorded: x – present (several specimens); xx – common; xxx – abundant/superabundant

- 4.3.4 Table 1 shows the organic remains encountered in the residues. All 7 samples contained plant debris (and seeds) and brackish foraminifera. Four samples contained insects/insect remains, three contained brackish ostracods, but only one contained brackish molluscs. Two other items are listed in this table – the presence of charcoal and brick/tile fragments. These occurred in the upper part of the core between 2.28 and 2.88m and seem to indicate human activity. The sample from 2.88m, which contained the brick/tile fragments, also contained many shard-like pieces of flint.
- 4.3.5 Tables 2 and 3 show the occurrence of the foraminifera and ostracods in the samples, respectively, and they form the main subject of this report. It can be immediately seen that the sequence is brackish throughout, so if the modern limit of tidal penetration is Stoke Bridge, then tidal penetration must have been further to the west at the time of deposition of all of these sediments. It may even have been much further to the west, as not a single indication of freshwater (through the presence of non-marine ostracods, or anything else) was found.
- 4.3.6 The foraminiferal and ostracod species in Tables 2 and 3 are colour-coded to indicate their ecological preference. Moreover, more detailed information concerning their ecology and general distribution is provided in an Appendix to this report (below). The five species colour-coded turquoise are all specialised agglutinated foraminifera. They have a shell of mineral grains assembled by the organism itself and cemented with organic cement on an organic template and will survive in the most inhospitable and reducing of environments. In the total absence of anything else, the uppermost four samplers covering the interval 2.28 down to 2.94 can confidently be ascribed to mid-high saltmarsh. The lowermost three samples of Borehole 2 (interval 3.10-3.42m) contain agglutinating foraminifera, but in diminishing numbers, with now, in addition, two species of calcareous foraminifera (colour-coded grey) of low-mid saltmarsh and tidal flats, and four species of brackish ostracods (colour-coded lime-green), three of them in large to very large numbers, indicative of tidal flats and creeks. Particularly in the lowest sample examined (at 3.42m) the ostracods (especially *Cyprideis torosa*) are almost all preserved as carapaces and with a full suite of juveniles, which indicate an *in situ* population probably of a sheltered creek, with virtually no transport. None of the shells of *Cyprideis torosa* is noded which indicates that the salinity was never below c. 5‰ at any time.
- 4.3.7 Therefore, a clear picture can be formed of a former brackish tidal river at the Grafton Way site, initially one of mudflats and sheltered creeks, with fringing saltmarsh. The saltmarsh then develops through time as it grows out over the mudflats, or as the mudflats diminish with rising sea-levels or a more restricted tidal flow. The age of this sequence can only be guessed at the moment, but it would seem that the later part (certainly 2.86m and above) was associated with human occupation, whether this be Roman, Anglo-Saxon, or medieval is unclear.
- 4.4 Insects by David Smith**
- 4.4.1 The insect taxa recovered are listed in Table 4. The taxonomy follows that of Lucht (1987) for the Coleoptera (beetles).

**Table 4:** Insect fauna recovered from Grafton Way, Ipswich

<b>Unit number</b>	<b>3</b>	<b>1</b>
<b>Sample number</b>	<b>2</b>	<b>3</b>
<b>Sample weight kg</b>	<b>3.8</b>	<b>3.6</b>
<b>Sample volume l</b>	<b>3</b>	<b>3</b>
<b>COLEOPTERA</b>		
<b>Carabidae</b>		
<i>Bembidion</i> spp.		++
<i>Pterostichus</i> spp.		
<b>Haliplidae</b>		
<i>Halipus</i> spp.		
<b>Dytiscidae</b>		
<i>Hygrotus</i> spp.	+	
Hydraenidae		
<i>Ochthebius</i> spp.		+
<b>Hydraena spp.</b>		
<i>Helophorus</i> spp.		++
<b>Hydrophilidae</b>		
<i>Laccobius</i> spp.		+
<i>Megasternum boletophagum</i> Marsh.		+++
<b>Staphylinidae</b>		
<i>Olophrum</i> spp.		
<i>Omalius</i> spp.		
<i>Oxytelus</i> spp.	+	++
<i>Trogophloeus</i> spp.		+
<i>Xantholinus</i> spp.	++	+
<i>Stenus</i> spp.		
<i>Philonthus</i> spp.	+	+
<i>Tachinus</i> spp.		
<b>Elateridae</b>		
<i>Agriotes</i> spp.		
<b>Cantharidae</b>		
<i>Cantharis</i> spp.		
<b>Dryopidae</b>		
<i>Dryops</i> spp.	+	
<b>Dermestidae</b>		
<i>Dermestes</i> spp.		+
<b>Cucujidae</b>		
<i>Monotoma</i> spp.		+
<i>Oryzaephilus surinamensis</i> (L.)		+
<b>Lathridiidae</b>		
<i>Lathridius minutus</i> (Group)		++
<i>Corticaria</i> spp.		
<b>Anobiidae</b>		
<i>Anobium punctatum</i> (Geer)		+
<b>Scarabaeidae</b>		
<i>Aphodius</i> spp.	+	
<b>Scolytidae</b>		
<i>Leperisinus varius</i> (F.)		+
<b>Curculionidae</b>		
<i>Apion</i> spp.		++
<i>Sitona</i> spp.		+

4.4.2 The numbers of individuals present for each taxa is estimated using the following scale: + = 1-2 individuals, ++ = 2-5 individuals, +++ = 5-10 individuals, ++++ = 10-20 individuals, +++++ = 100s of individuals. The nature of the preservation and the potential for archaeological interpretation is outlined in Table 5.

**Table 5:** Summary of the nature of the insect faunas from Grafton Way, Ipswich

Sample number	Degree of preservation	Comparative size of faunas	Water conditions	Landscape	Overall interpretative potential of sample
2	poor	small	<i>Hygrotus</i> and <i>Dryops</i> may suggest still water.	Small group of 'rove beetles' may indicate decaying plant materials, animal dung or settlement waste	Very limited
3	poor	small	<i>Ochthebius</i> and <i>Laccobius</i> may indicate slow flowing water.	<i>Oxytelus</i> , <i>Lathridius</i> , <i>Dermestes</i> , <i>Monotoma</i> and <i>Anobium punctatum</i> may suggest settlement waste. <i>Oryzaeophilus surinamensis</i> is usually a pest of stored grain. <i>Apion</i> and <i>Sitona</i> may indicate grassland or hay.	limited

4.4.3 The majority of the insect fauna recovered were Coleoptera (beetles). The faunas examined were all poorly preserved, highly fragmented and quite small in size.

4.4.6 Unit 3/ Sample <2> produced a very small insect fauna which is difficult to interpret. A number of staphylinids 'rove beetles' such as the *Oxytelus spp.*, *Xantholinus spp.* and *Philonthus spp.* are common in rotting materials in settlement deposits and in more natural circumstances as is the hydrophilid *Megasternum boletophagum*. The *Hygrotus* and *Dryops spp.* recovered may indicate the presence of slow-flowing waters.

4.4.7 Unit 1/ Sample <3> also produced a small sized insect fauna which is clearly from human settlement. Many of the species of beetle recovered are common inhabitants of a range of wastes associated with human settlement in the archaeological record (i.e. Kenward and Hall 1995). This includes the *Oxytelus spp.*, *Xantholinus spp.*, *Monotoma spp.* and *Lathridius minutus* species. A single individual of *Dermestes*; a species normally associated with hides, hair or birds' nests in human housing (Koch 1992), was also recovered. Unit 1/ Sample <3> also included a single *Oryzaeophilus surinamensis*, the 'saw-toothed grain beetle' which is normally a pest of stored grain. The scolytid 'bark beetle' *Leperisinus varius* is normally found under the bark of ash (*Fraxinus excelsior L.*) and the *Apion* and *Sitona* weevils often are associated with rough grassland, or in settlements, with hay (i.e. Kenward and Hall 1997). The 'water beetles' *Ochthebius* and *Laccobius spp.* recovered may suggest that this material was dumped into an area of slow-flowing water.

#### 4.5 Plant macrofossils by Karine le Hégarat

4.5.1 Table 6 presents an overview of the contents of the bulk samples.

**Table 6:** Results for samples <2> and <3> associated with Core 1; Wet sieved samples quantification (\* = 1-10, \*\* = 11-50, \*\*\* = 51-250, \*\*\*\* = >250) and preservation (+ = poor, ++ = moderate, +++ = good), Presence (denoted as 'P') of remains where recorded but not yet weighed or quantified.

Sample Number	Extracted	Depth (cm)	Deposit	Sample size (Litres)	Volume processed (Litre)	Flot and Residue Volume (ml)	Sub-sample scanned (ml)	Macrobotanical Remains	Identification and preservation notes	Wood	Faunal remains	Notes on faunal remains	Others
2	Near to Core 1 Unit 3	240-248	Black sandy well humified silty peat, overlays post-medieval CBM and pottery	10	0.2	510	50	P	Uncharred: <i>Ranunculus acris/sardous</i> (**, ++), <i>Chenopodium</i> sp. (**, ++) - unid. seed (*, +) - unid. frags of stems, roots, rhizomes (**, +)	-	-		CBM (1 pc > 12mm in size; ** small fragments fire clay <4mm)
3	From Core 1, at the base of Unit 1	345-358	Basal silts, Mottled grey black organic silt, occasional woody fragments and pale rootlets, reed remains at base (unit 1)	10	0.2	760	50	P	Uncharred: <i>Ranunculus acris/sardous</i> (*, ++); cf. <i>Zannichellia palustris</i> (**, ++); cf. <i>Seriphidium maritimum</i> (1, ++); <i>Chenopodium</i> sp. (*, +) - unid. frags of stems, roots, rhizomes (**, +) to 5mm in diameter	-	P	Snail shells (**, ++ to +++); Small bivalves (**, ++ to +++ in 500µm to 1mm fraction	-

- 4.5.2 Sample <2> extracted near to Core 1 (Unit 3, 2.40-2.48m) contained a moderate amount of archaeobotanical remains preserved through waterlogging. The assemblage was dominated by fine fragments of stems including several lower stem bases as well as probable roots and/or rhizomes, none of which were identifiable. The sample contained a moderate amount of uncharred seeds, although a limited range of taxa was present. The assemblage comprised seeds of meadow / hairy buttercup (*Ranunculus acris* / *sardous*) and goosefoot (*Chenopodium* sp.) as well as some unidentified seeds. No wood was evident in the sample, and no other biological remains were recorded. A single very small piece of ceramic building material and a small amount of amorphous fragments of fired clay mainly <4mm in size were present.
- 4.5.3 Sample <3> recovered from Unit 1 (345-358cm) contained a moderate concentration of unidentified small plant fragments, some of which could be stems, roots and/or rhizomes. Similarly to the previous sample, no wood was present. A moderate assemblage of uncharred seeds was recorded including a similar range of taxa to the ones recorded in Sample <2> with seeds of meadow / hairy buttercup (*Ranunculus acris* / *sardous*) and goosefoot (*Chenopodium* sp.). However, Sample <3> differed from the previous one by the presence of possible horned pondweed (cf. *Zannichellia palustris*) and a single possible sea wormwood (cf. *Seriphidium maritimum*). A small amount of snail shells was recovered from the deposit and a moderate quantity of very small bivalves were present in the 500µm to 1mm fraction. No other biological remains or artefacts were recovered.
- 4.5.4 The botanical material recovered from the sub-samples was preserved through waterlogging, and there was no evidence of preservation by charring. Waterlogged plant remains were recorded in both Samples <2 and 3> including weed seeds and small plant fragments such as stems but also potential roots and/or rhizomes. The assemblage of waterlogged plant remains is not particularly rich in term of frequency and diversity. Nonetheless, the weed seeds were fairly well preserved.
- 4.5.5 The small assemblage of waterlogged plant remains suggests that overtime the conditions remained generally very wet. The presence of horned pondweed in Sample <3> (Unit 1) provides a strong indication for wetland environment. This true aquatic rhizomatous plant thrives in fresh or brackish water. It indicates fairly deep, slow flowing water. Sea wormwood also found in Sample <3> grows on dry parts of saltmarshes, sea walls and rough grounds by the sea (Stace 1997, 728). Evidence for wet conditions is not as strong in Sample <2> (Unit 3) which contained less remains. Nonetheless, meadow / hairy buttercup also recorded in Sample <3> is generally associated with wet grassland. Goosefoot can be related with disturbed nitrogen-rich soils, but they can also be associated with estuarine conditions. Botanical remains such as charcoal, cereal grains or chaff were absent, and these small assemblages of plant remains can't provide evidence for anthropogenic activities such as deposition of domestic or industrial waste.

## 4.6 Radiocarbon dating

- 4.6.1 Bulk sediment was recovered for dating. The problem of using bulk sediment can be seen in the inverted dates returned. This phenomenon has been

observed in the Suffolk region previously (Gearey *et al.*, 2009). This may be due to the upper sediments being reworked incorporating older material. The presence of pre-Quaternary spores in the pollen assemblage also indicates a certain amount of reworking. The basal date may be reliable but further dating, perhaps from the ostracod or plant macrofossil assemblage would be needed in order to confirm this.

<b>Lab number</b>	<b>Material</b>	<b>Sample number</b>	<b>Method</b>	<b>Radiocarbon age (BP)</b>	<b>C13</b>	<b>2 sigma Calibrated date 95% confidence</b>
SUERC-43893	Bulk sediment	2.26-2.30m	AMS	2816 $\pm$ 30	-25.7%	1055-896 Cal BC
SUERC-43894	Bulk sediment	3.40-3.42m	AMS	1582 $\pm$ 27	-26.2%	419-543 Cal AD

Table 7: Radiocarbon dating



## 5.0 DISCUSSION AND CONCLUSIONS

### 5.1 Stratigraphic analysis

5.1.1 The borehole survey at Grafton Way, Ipswich revealed part of the sedimentary sequence that makes up the floodplain of the river Orwell. In combination with trial trenching (SCCAS 2012) it has been demonstrated that the northern half of the site has a relatively uniform sequence. The basal gravels show relatively no topographic change across the site and are fairly level. As a consequence no sub-surface features such as palaeochannels were identified. The trenching and borehole survey were limited due to the presence of a high voltage power cable, disused railway line and Environment Agency flood defences. This prevented investigation of sediments closest to the present course of the river which may contain evidence of former channels of the Orwell.

5.1.2 The basal gravels were overlain by a mottled grey brown smooth silt indicative of low energy fluvial regime and most likely represent mudflat deposits. The lack of any highly organic deposits indicates that the area was subject to regular probably tidal inundation leading to minerogenic sediment accumulation. There is a slight change in regime within Unit 2 which contains a coarser sand fraction indicating higher energy flooding events.

5.1.3 At the northern end of the site a thin peat layer (Unit 3) was encountered which was found to contain post-medieval tile, animal bone and pottery. This appears to represent a short-lived sequence of accumulation probably dating to around the time the area was reclaimed for the construction of the railway goods yard. It demonstrates that this part of the site was no longer subject to regular flooding but was probably still waterlogged with peat forming in a stagnant pool. To the southern end of the site the smooth silts were overlain by an oxidised alluvial clay representing the last of the naturally occurring sedimentation at the site. This deposit was oxidised indicating a change in water levels at the site, possible due to canalisation of the river. The introduction of oxygen into the sediment indicates periods of desiccation where the alluvial clays dried out and cracked causing oxidation.

### 5.2 Analysis of samples by Kristina Krawiec, Karine le Hégarat, Emma Hopla, David Smith and John Whittaker

5.2.1 The material recovered from Core 2 was assessed for multiple proxies in order to establish the nature of the surrounding landscape and any on-site activities. There is little change in the pollen diagram throughout the sequence examined. The spectra indicate that the immediate sampling site was dominated by wild grasses and sedges. It is likely that some of the grasses were associated with the damp soils colonised by the sedges and would have included species such as *Phragmites australis* (common reed). Tall herb vegetation such as meadowsweet and members of the carrot and pink families are also typical of these wet environments. Similarly, alder would have been growing nearby if not on the sampling site. Areas of still or slow flowing water are suggested by the presence of aquatic species such as bur-reed and spiked water milfoil and this is further confirmed by the presence of *Ochthebius* and *Laccobius* spp. in the beetle record.

5.2.2 The presence of horned pondweed in the plant macrofossil record is

indicative of deep, slow-flowing brackish water. The forams/ostracods also demonstrate a former brackish tidal river was active at this site with a fringing saltmarsh. This is further supported by instances of goosefoots in the pollen and plant macrofossil records.

5.2.3 Mixed woodland of oak and hazel with stands of birch and pine along with the occasional lime, elm and ash would have existed on the drier soils in the wider landscape, but the extent and precise character and extent of this vegetation is unclear, in part due to the 'swamping effect' from the local pollen signal. It is also evident from the record of docks, ribwort plantain, bracken and cereals that there were some areas of open, disturbed/pasture ground and perhaps arable cultivation (Behre, 1981). The presence of human activity at the site is further confirmed by the small insect assemblage recovered from Sample <3> which includes *Oxytelus* spp., *Xantholinus* spp., *Monotoma* spp. and *Lathridius minutus* species which are associated with human settlement (i.e. Kenward and Hall 1995). There were no anthropogenic indicator species present in the plant macrofossil record which is unusual given the presence of these insects and the suggestion that they derived from waste dumps. The presence of occasional grains of pre-Quaternary spores could also indicate some reworking of the sediment at the site. Indeed the problems with the upper radiocarbon date are possibly due to these processes incorporating older material into younger sediments.

5.2.4 The sample taken from Core 1 (2.44m) had very low pollen concentrations which produced single grains of *Pinus sylvestris*, *Alnus glutinosa*, Cyperaceae and *Pteridium aquilinum* along with 3 unidentified grains. The bulk sample <2> contained a moderate amount of uncharred seeds, although a limited range of taxa was present. The assemblage comprised seeds of meadow / hairy buttercup (*Ranunculus acris / sardous*) and goosefoot (*Chenopodium* sp.) as well as some unidentified seeds. This is indicative of wet grassland although rather than saltmarsh which suggests the site was beginning to dry out by this time, possibly due to the canalisation of the river.

### 5.3 Conclusions

5.3.1 The material recovered from Grafton Way, Ipswich presents an interesting assemblage indicating the area was within the range of tidal influence prior to being reclaimed. The sediment recorded in the trenches and boreholes most likely represents accumulation under estuarine conditions during tidal inundation. The lack of any palaeochannel features within the area investigated also supports this hypothesis. Very little is known about the fluvial development of the River Orwell despite several recent excavations in close proximity to the river (i.e. Albion's Wharf. Hill 2006).

5.3.2 There are no other dated palaeoenvironmental sequences recovered from Holocene deposits in Ipswich making comparison difficult. The inverted radiocarbon dates as well as the pollen suggest that a certain amount of reworking occurred at the site also making the dataset problematic. The small quantities of coleopteran and plant macrofossil remains, apart from indicating the presence of settlement rubbish, produce little information. It is therefore suggested that no further work is undertaken on the insect or plant remains from these cores, although should future work make more sediment available this should be assessed for these proxies. The ostracods/forams and pollen, however, were well preserved with the ostracods/forams indicating *in situ*

communities. This may be seen to be at odds with the pollen which indicates a certain amount of reworking. Clearly the fluvial processes acting at the site are complex and are unlikely to be resolved with further study of this sequence. Instead this analysis should be seen as a baseline data for further work in the area more generally so that should further deposits be encountered the analysis can be more targeted.

## BIBLIOGRAPHY

- Athersuch, J., Horne, D.J. & Whittaker, J.E. 1989. Marine and brackish water ostracods. In: Kermack, D.M. and Barnes, R.S.K. (eds), *Synopsis of the British Fauna (New Series), no. 43*. E.J. Brill, Leiden (for the Linnean Society of London and The Estuarine and Brackish-water Sciences Association). 343pp.
- Behre, K.-E.(1981). The interpretation of anthropogenic indicators in pollen diagrams. *Pollen et Spores* 23, 225-245.
- Cappers, R.T.J., Bekker R.M. & Jans J.E.A. 2006. *Digital Seed Atlas of the Netherlands*. Groningen Archaeological Series 4. Barkhuis, Netherlands.
- English Heritage 2002. *Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation and Geoarchaeology: Using earth sciences to understand the archaeological record*
- Gearey, B.R, Hill, T.C.B, Fletcher, W, Marshall, P .2009. Fluvial sediments, correlations and palaeoenvironmental reconstruction: The development of robust radiocarbon chronologies. *Journal of Archaeological Science*
- Grimm, E.C. 1991. TILIA and TILIA\*GRAPH. Illinois State Museum.
- Hill, T.C.B. 2006. *Albion's Wharf, Ipswich: Summary of site visit and proposals for further work*. Birmingham Archaeo-Environmental report no 1557.Unpublished.
- Kenward H.K., Engleman C., Robertson A. and Large F. 1985. Rapid scanning of urban archaeological deposits for insect remains. *Circaea* 3, 163–72
- Kenward H. K. , Hall A.R., and Jones A.K.G .1980. A tested set of techniques for the extraction of plant and animal macrofossils from waterlogged archaeological deposits. *Scientific Archaeology* 22, 3–15.
- Kenward H. K. and Hall A.R. 1995. *Biological Evidence from Anglo-Scandinavian Deposits at 16-22 Coppergate (The Archaeology of York 14/7)*. London: Council for British Archaeology.
- Kenward, H.K. and Hall, A.R. 1997. Enhancing bio-archaeological interpretation using Indicator groups: stable manure as a paradigm. *Journal of Archaeological Science* 24. 663-673.
- Koch, K. 1992. *Die Käfer Mitteleuropas (Ökologie Band 3)*. Krefeld: Goecke and Evers.
- Lucht, W.H. 1987. *Die Käfer Mitteleuropas. Katalog*. Krefeld: Goecke and Evers.
- Mauquoy, D. and van Geel, B. 2007. Mire and Peat Macros. In Elias S. A. (ed.) *Encyclopedia of Quaternary Science, Volume 3*. Elsevier, Amsterdam, 2315-2336.
- Moore, P. D., Webb, J. A. & Collinson, M. E. 1991. *Pollen Analysis, 2nd Edition*. Blackwell Scientific Publications, Oxford.
- Murray, J.W. 2006. *Ecology and Applications of Benthic Foraminifera*. Cambridge

University Press, Cambridge, etc. xi+426pp.

NIAB. 2004. *Seed Identification Handbook: Agricultural, Horticulture and Weeds*. 2<sup>nd</sup> ed. NIAB, Cambridge.

Stace, C. 1997. *New Flora of the British Isles*. Cambridge University Press, Cambridge.

Troels-Smith, J. 1955. Characterisation of unconsolidated sediments. *Danm. Geol. Unders. Ser. IV, 3(10)*

## **ACKNOWLEDGEMENTS**

ASE would like to thank Suffolk County Council Archaeological Service for commissioning the work and for their assistance throughout the project, and Keith Wade County Archaeologist Suffolk County Council for his guidance and monitoring. The author would like to thank Antonio Reis who produced the figures for this report; Jon Sygrave who project managed the excavations and Jim Stevenson who project managed the post-excavation process.

## Appendix 1

The detailed ecological preferences and geographical distribution of the microfossil species found at the Grafton Way site, listed below and in Tables 1-3 1, are taken from Murray (2006) for the foraminifera, and Athersuch, Horne & Whittaker (1989) for the ostracods.

### Agglutinating foraminifera

***Jadammina macrescens*** - epifaunal (often on decaying vegetation), infaunal down to 60cm; a herbivore and detritivore; widespread on high to mid saltmarsh; mid-high latitudes almost worldwide.

***Trochammina inflata*** - epifaunal and infaunal down to 60cm; a herbivore and a detritivore; mid to high saltmarsh; worldwide.

***Miliammina fusca*** - epifaunal in marsh, shallow lagoons and estuaries; infaunal down to 50cm in marshes; a detritivore; widespread distribution.

***Balticammina pseudomacrescens*** - epifaunal, sometimes clinging to algal filaments; characteristic of low-salinity brackish high marsh closest to land; common in Europe, and elsewhere.

***Tiphotrecha comprimata*** - epifaunal, often clinging to algae, or infaunal down to c.40cm; a herbivore and detritivore; originally found in N America, but quite common on saltmarsh in Europe.

### Calcareous foraminifera

***Ammonia* spp.** - Infaunal and herbivores. The small, flat unornamented forms, as found here, are difficult to name specifically (several species may be present) but they usually indicate low brackish conditions, as in estuarine tidal mudflats and low-mid saltmarsh.

***Elphidium williamsoni*** - Infaunal and an herbivore; mid-low saltmarsh, intertidal to subtidal.

### Ostracods

***Leptocythere porcellanea*** - estuarine taxon living on tidal mudflats, particularly in sheltered creeks.

***Cyprideis torosa*** - a mud-crawler characteristic of protected estuarine creeks, usually associated with *Leptocythere porcellanea*. Can tolerate a wide range of brackish salinities, the shell developing nodes below c.5‰. All valves are smooth here.

***Loxoconcha elliptica*** - a fast swimmer on the mud/water interface. Found in estuarine mudflats all over Europe.

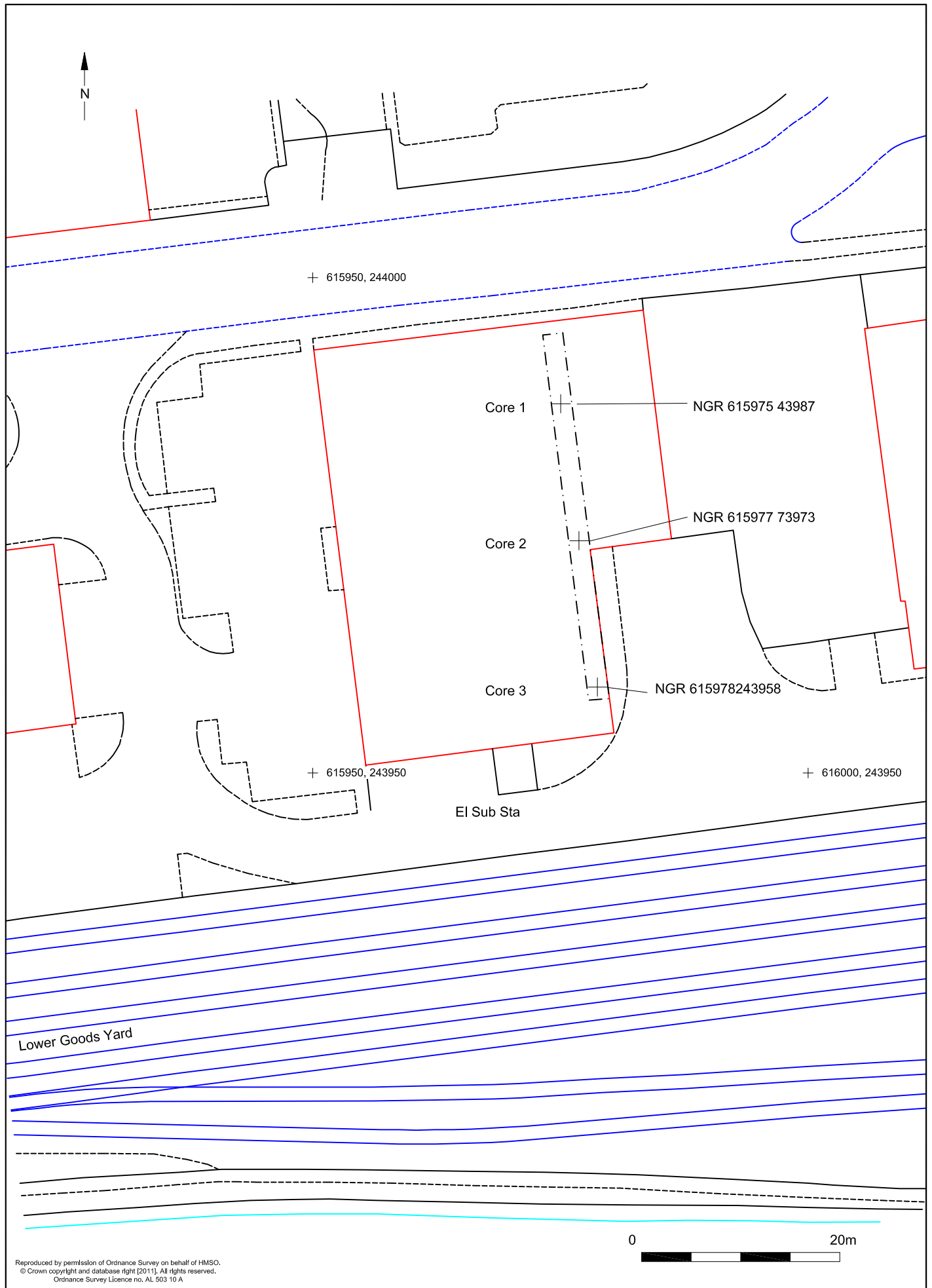
***Cytherura gibba*** - the only cytherurid restricted to brackish sites (estuarine creeks).

**HER Summary Form**

Site Code	IGW12					
Identification Name and Address	Grafton Way, Ipswich					
County, District &/or Borough	Suffolk County Council					
OS Grid Refs.	NGR: 615977 243973 (TM 15977 43973)					
Geology	River terrace gravels					
Arch. South-East Project Number	5817					
Type of Fieldwork	Eval.	Excav.	Watching Brief	Standing Structure	Survey	<b>Other</b>
Type of Site	Green Field	Shallow Urban	<b>Deep Urban</b>	Other		
Dates of Fieldwork	Eval.	Excav.	WB.	Other Nov 2012		
Sponsor/Client	Suffolk County Council Archaeological Service					
Project Manager	Jon Sygrave/Kristina Krawiec					
Project Supervisor	Kristina Krawiec					
Period Summary	Palaeo.	Meso.	Neo.	BA	IA	<b>RB</b>
	AS	MED	<b>PM</b>	Other Modern		

*In November 2012 Archaeology South-East (ASE) was commissioned by Suffolk County Council Archaeological Service (SCAAS) to undertake a palaeoenvironmental investigation at Grafton Way, Ipswich (NGR 615977 243973) prior to the redevelopment of the site. The site had undergone trail trenching (carried out by SCAAS) which revealed the basal sands and gravels to be c.3m below current ground surface. The borehole survey was intended to recover sediment suitable for palaeoenvironmental analysis and radiocarbon dating.*

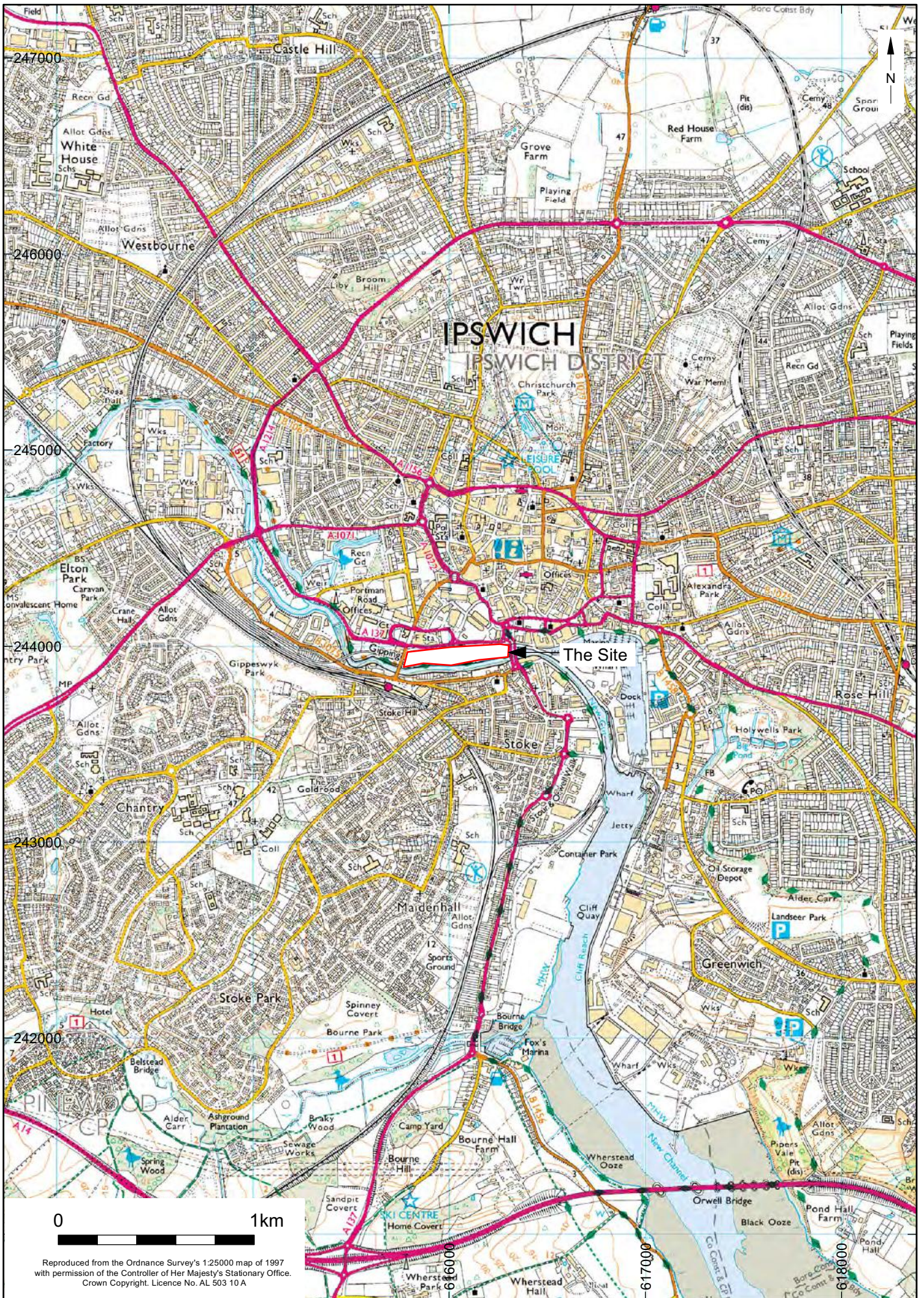
*The sediment recovered was assessed for the preservation of environmental proxies including ostracods/forams, pollen, plant macrofossils and coleoptera. The results indicated the presence of sediments from a saltmarsh environment indicating this area to be within the range of tidal influence during sediment accumulation. The radiocarbon dating did not provide a reliable chronological framework due to the reworked nature of the upper deposits. A basal date however may be more reliable when considered in light of the ostracod remains and therefore the accumulation began in the late to early post-Roman period (419-543 Cal AD). Evidence for human activity was demonstrated in the coleopteran and pollen assemblages suggesting there may have been some instances of refuse deposition in the saltmarsh. Although no further work is recommended at the site the results demonstrate the potential for deposits associated with the River Orwell to elucidate the nature of the river in the historic period.*



Reproduced by permission of Ordnance Survey on behalf of HMSO.  
 © Crown copyright and database right [2011]. All rights reserved.  
 Ordnance Survey Licence no. AL 503 10 A

© Archaeology South-East		Grafton Way	Fig.2
Project Ref: 5817	March2013	Borehole location	
Report Ref:	Drawn by: AR		



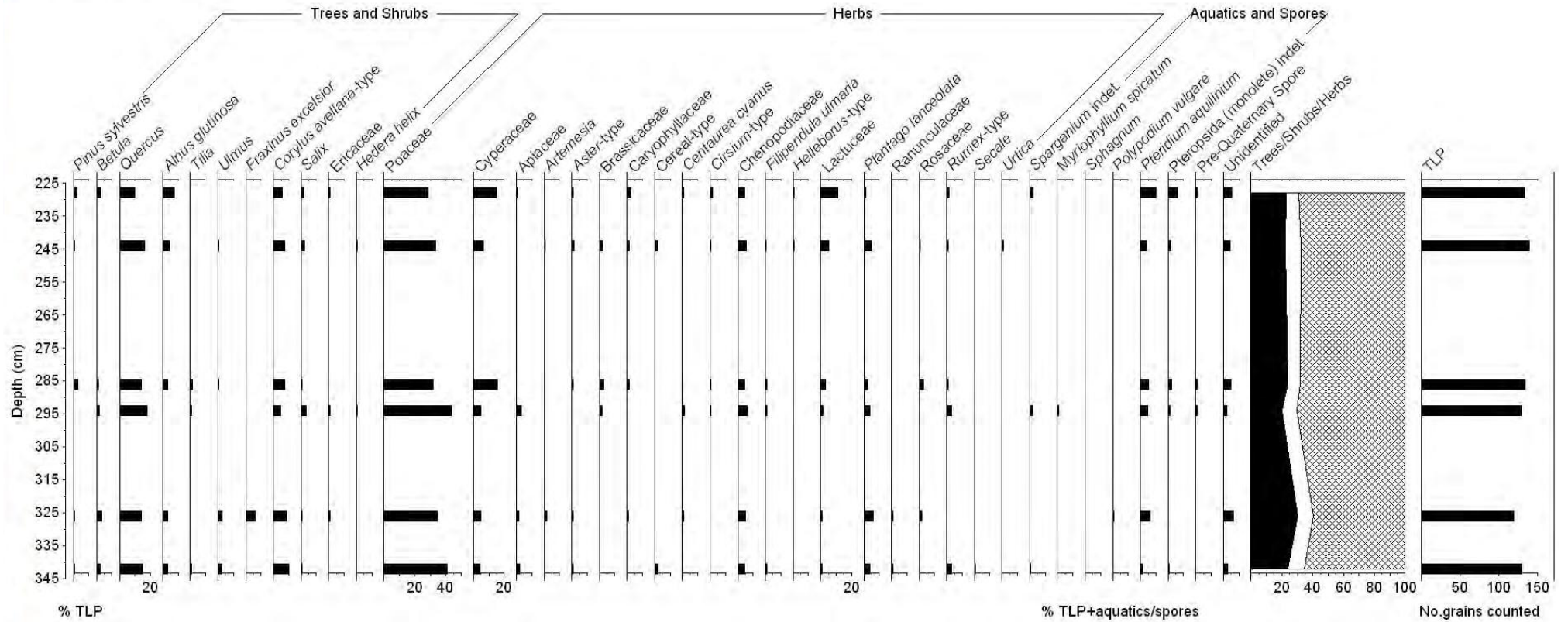


© Archaeology South-East		Grafton Way	Fig. 1
Project Ref: 5817	March 2013	Site location	
Report Ref:	Drawn by: AR		



© Archaeology South-East		Grafton Way	Fig. 4
Project Ref: 5817	March 2012	East facing Section of Trench	
Report Ref:	Drawn by: AR		

### Grafton Way Pollen Percentage Diagram



© Archaeology South-East		Grafton Way	Fig. 3
Project Ref: 5817	March 2012	Pollen percentage diagram	
Report Ref:	Drawn by: AR		

Head Office  
Units 1 & 2  
2 Chapel Place  
Portslade  
East Sussex BN41 1DR  
Tel: +44(0)1273 426830 Fax: +44(0)1273 420866  
email: [fau@ucl.ac.uk](mailto:fau@ucl.ac.uk)  
Web: [www.archaeologyse.co.uk](http://www.archaeologyse.co.uk)



London Office  
Centre for Applied Archaeology  
Institute of Archaeology  
University College London  
31-34 Gordon Square, London, WC1 0PY  
Tel: +44(0)20 7679 4778  
Fax: +44(0)20 7383 2572  
Web: [www.ucl.ac.uk/caa](http://www.ucl.ac.uk/caa)

The contracts division of the Centre for Applied Archaeology, University College London 

©Archaeology South-East



# Archaeological services Field Projects Team

**Delivering a full range of archaeological services**

- Desk-based assessments and advice
- Site investigation
- Outreach and educational resources
- Historic Building Recording
- Environmental processing
- Finds analysis and photography
- Graphics design and illustration

**Contact:**

**Rhodri Gardner**

**Tel: 01473 581743 Fax: 01473 288221**

**rhodri.gardner@suffolk.gov.uk**

**[www.suffolk.gov.uk/Environment/Archaeology/](http://www.suffolk.gov.uk/Environment/Archaeology/)**