

## Chapter 4

# The Roman period

### SETTING THE SCENE

Four to five thousand years ago, a low, featureless landscape of marshes, creeks and mudflats emerged within the area of DP World London Gateway. Such conditions were to prevail in the Thames Estuary until the late medieval period, when systematic reclamation of the coastline commenced. During the Roman period (AD 43–410), activity in this harsh, wet environment was limited to industry, particularly salt production, grazing, and the exploitation of other coastal resources such as fish and shellfish. Settlement was located on

higher ground to the north and west, for example at Mucking.

Investigations at Stanford Wharf Nature Reserve provided an opportunity to look in some detail into life during the Roman period at London Gateway. The period between *c* AD 43 and 100 saw the establishment of a saltern within the eastern end of the excavation area alongside a former channel or palaeochannel of the Thames (Stansbie *et al.* 2012). Evidence associated with this activity comprised ditches which trapped seawater during daily inundations at high tide, storage pits into which the brine was transferred in preparation



Figure 4.1 Reconstruction of the early Roman saltworks and boathouse at Stanford Wharf Nature Reserve as viewed from the Thames estuary (artwork by Peter Lorimer)

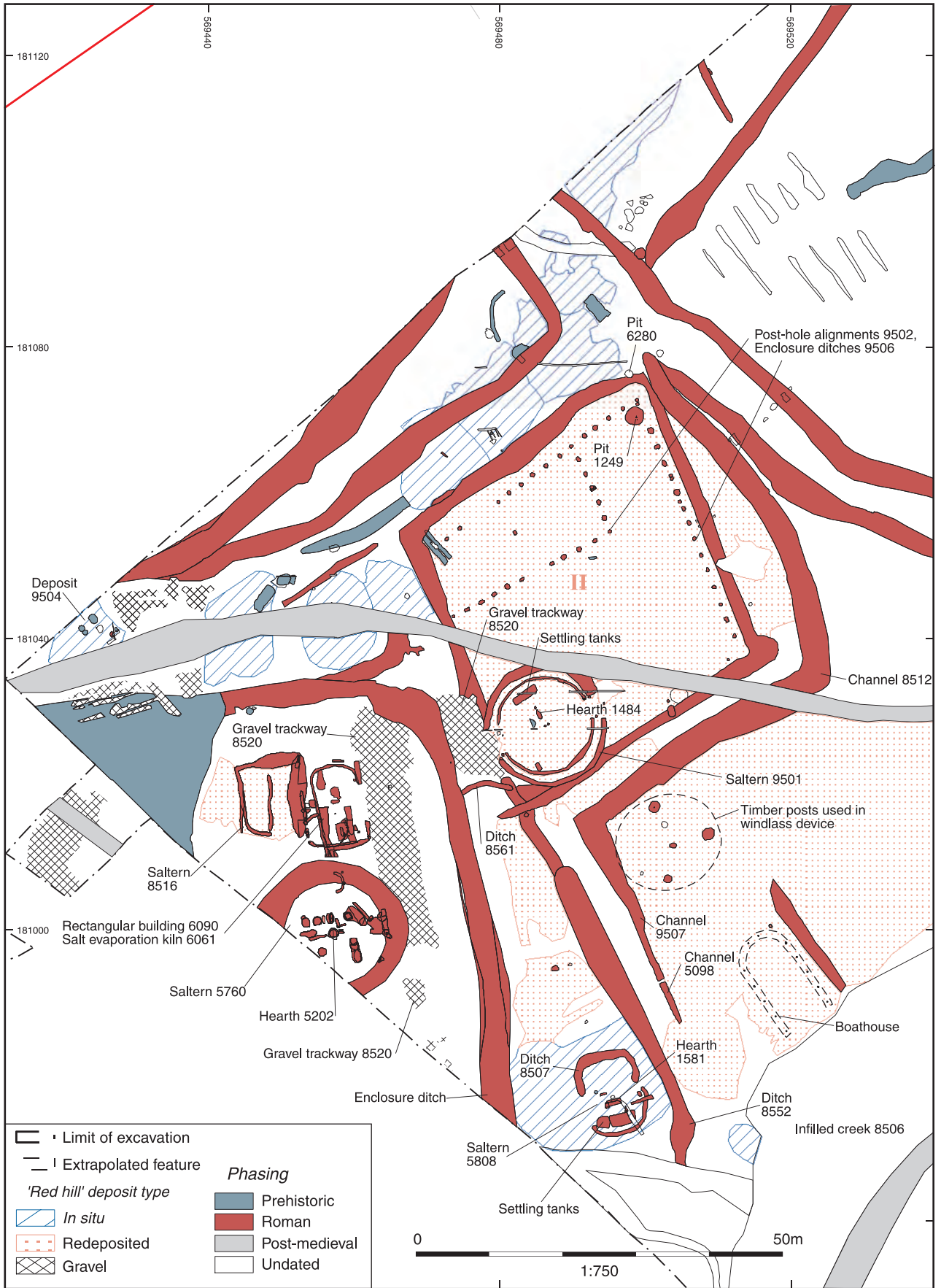


Figure 4.2 Phase plan of activity at Stanford Wharf Nature Reserve



for evaporation, hearths over which the brine was evaporated to extract the salt, a range of evaporation and storage vessels and hearth furniture made in briquetage, and postholes that hinted at structures such as shelters for salt workers. Elsewhere within the excavation area were surviving timber posts belonged to a 13m-long U-shaped structure built on the edge of the palaeochannel. The building may have been used as a boathouse which served as a base for trading or fishing vessels (Fig. 4.1). More timber in the form of two wattle panels had been inserted across a natural channel, the space between the panels being infilled with earth to create a causeway across the channel, allowing better access across the marsh. Analysis of charred plant remains recovered from features associated with the early Roman period demonstrated that the local salt marsh plants, such as sea lavender, sea plantain and sea rush, were being harvested for fuel (Hunter 2012). Oak timbers used for the boathouse are likely to have derived from woodland on the higher ground (Goodburn 2012).

The area of Stanford Wharf Nature Reserve appears to have been abandoned during the 2nd century AD, but

by the 3rd century people returned to the site to resume salt production and other coastal industries (Fig. 4.2). A trapezoidal enclosure defined an area used for salt production in the western part of the site. Among the more notable features was a cesspit (1249) dug into one corner. The waterlogged conditions within the pit had preserved a range of organic evidence, including a leather shoe, woodworking waste, fish remains, insects characteristic of foul matter, cereals, fruits and seeds, which reveal much about the lifestyle and diet of the people who worked there. Several salterns were established in and around the enclosure from the 3rd century onwards. One (5808) was defined by a hearth, settling tanks and two horseshoe-shaped ditches designed to trap seawater. Another saltern (9501), a circular structure with a clay mass external wall, was erected in the corner of the trapezoidal enclosure and contained a hearth and a three-celled brine or settling tank. A saltern with a tile-built hearth (6061) above which lead evaporation pans were placed was built nearby. A large circular building (5760), again with a mass clay outer wall and supported internally by four substantial wooden posts, was also used as a saltern. The eastern part of the site was

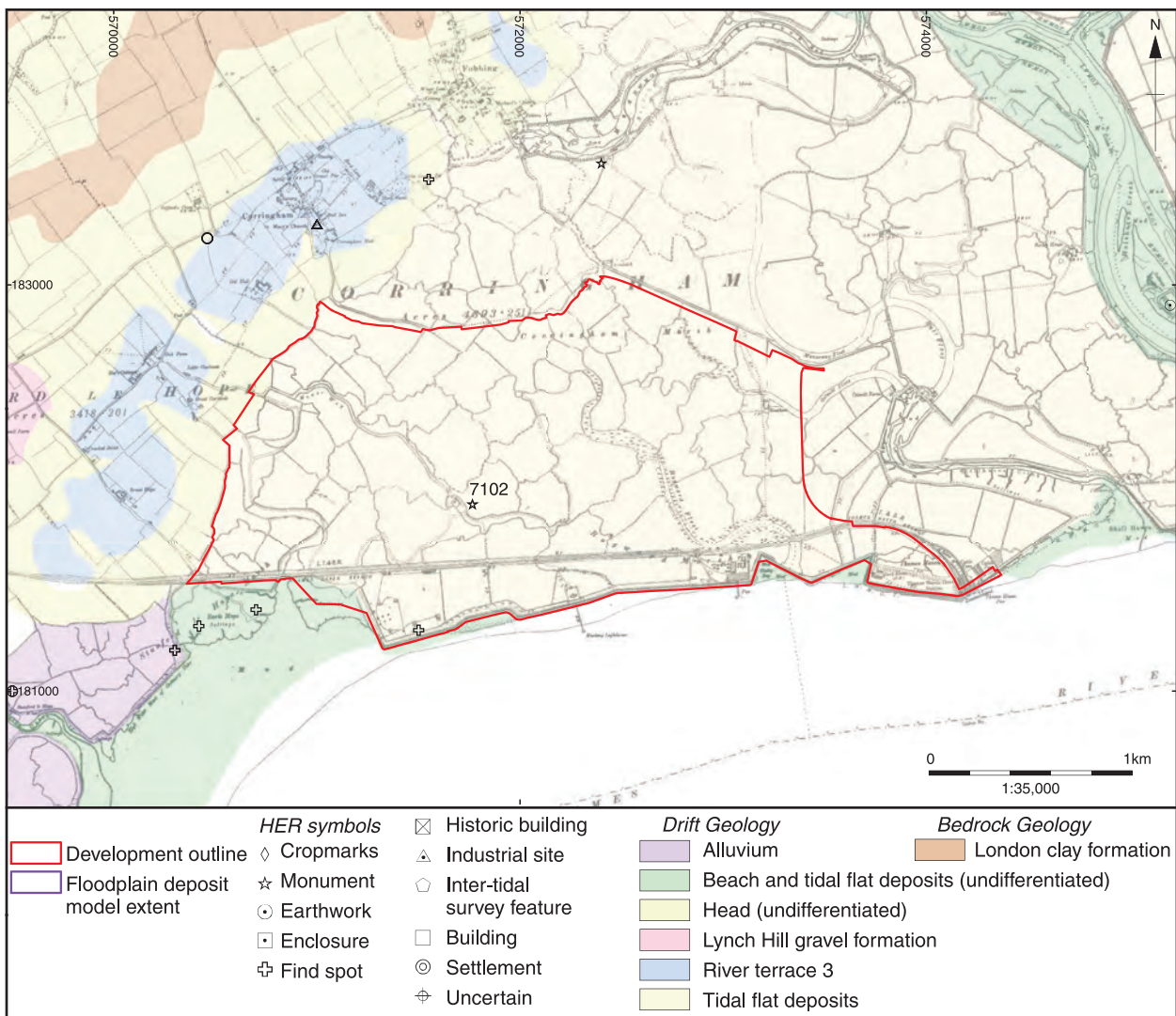


Figure 4.3 Location of Roman finds and sites, as recorded in baseline data, across DP World London Gateway

similarly reoccupied, with a saltern, complete with three-celled tanks, being established there.

Salt-making, however, was not the only activity that was carried out at the site. Abundant fish bones collected from an enclosure ditch are likely to represent the remains of fish sauce production, while perforated cattle scapulae point to the suspension of meat, probably to allow it to be salted and preserved. Stanford Wharf Nature Reserve was, then, a place where a number of salt-related industries took place. The latest coins recovered indicate that the site was occupied into the second half of the 4th century, and this chronology is supported by pottery, which points to deposition after *c* AD 350.

Plant remains recovered from the ditches, tanks and hearths of the salterns were dominated by salt marsh species and indicate that the salt marsh landscape, which was criss-crossed by natural channels and deliberately dug drainage ditches, remained healthy. Evidence of past activity intruded on this environment as well, with middle Iron Age red hills, comprising dumped fuel ash and burnt salt marsh sediment and other waste of earlier salt-making (Macphail *et al.* 2012), forming low mounds of rusty earth which were utilised as convenient raised platforms for the later salterns. The late Roman period saw the increasing use of charcoal to fire the salt evaporation hearths, exploiting charcoal from coppiced oak and alder and shrubs such as gorse that grew on the elevated river terrace gravels (Druce 2012).

Away from Stanford Wharf Nature Reserve, very few Roman-period remains are known within the London Gateway area (Fig. 4.3). This does not, however, necessarily preclude the absence of Roman activity here, as the thick alluvium that covers the intertidal zone may well obscure any archaeological remains present. Indeed, fragments of Roman pottery collected over the years from the foreshore may have derived from eroded or deeply buried salterns. Recorded on the Essex Historic Environment Record (HER; <https://www.placeservices.co.uk/what-we-do/historic-environment/historic-environment-records/>), one possible Roman saltern (HER 7102) lies close to the Logistics Park Infrastructure site in the central part of the London Gateway development. The HER entry describes evidence for salt-making, finds of 3rd century date, and reports of a boat. There was, unfortunately, no information on the depth at which it was discovered, though if the reported Roman date is correct the finds are likely to have been buried by a significant thickness of alluvium. The reported location coincides with a post-medieval earthwork enclosure shown on the first edition Ordnance Survey map of 1863 and raises the possibility that the artefacts and timbers are in fact later, although it is not uncommon to find medieval and later marshland sites built on top of Iron Age and Roman saltern mounds, taking advantage of existing elevated ground within the marshes.

Remains of more certain Roman date have been recorded on the gravel terrace on the western part of London Gateway. These include pottery from a Roman

burial, comprising a flask, a bowl and a beaker dated to the 2nd century AD (HER 1891). The group was found in 1886 *c* 100m north of Mucking Church, close to the Rail Corridor (Broadhope Loop) site. It is possible that more burials once existed in the area, but much of the surface gravel deposits in the vicinity were quarried

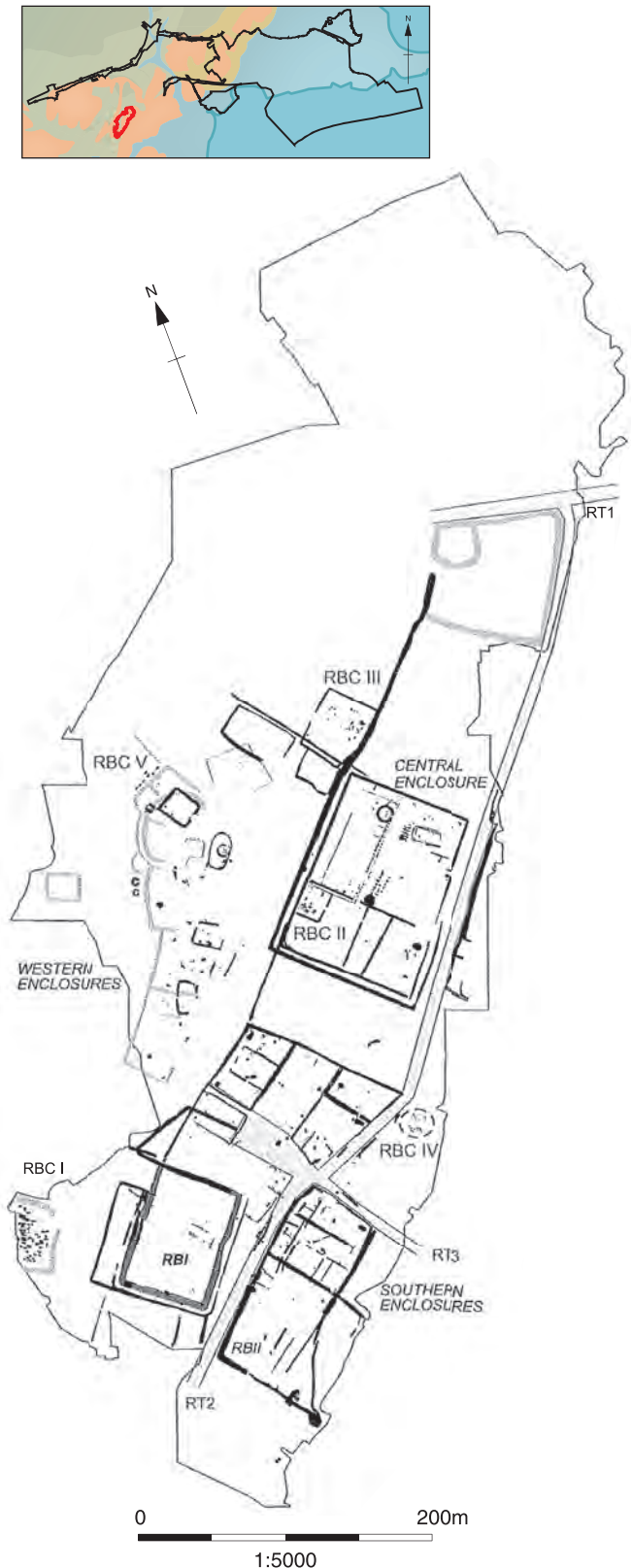


Figure 4.4 Plan of Roman Mucking (after Lucy and Evans 2016, fig. 1.7)



away during the 20th century and so any further remains have unfortunately disappeared without record. More graves, however, have been recorded further to the west *c* 300m east of the A13/A1014 road junction (HER 5184 and 5185). These were found during gravel quarrying in the 1950s, and again it is likely that the extensive quarrying has removed other burials. Other discoveries have been made within the road junction itself. Roman pottery and timbers were found in the early 1970s during the construction of the junction (HER 5257), while a possible Roman well and a mortarium fragment were recorded in the mid-1930s when the A13 Stanford-le-Hope bypass was originally constructed. Though sparse, the discoveries nevertheless suggest that a Roman settlement of some sort lay in the immediate vicinity.

Extensive excavations between 1965 and 1978 at Mucking, some 5km west of London Gateway, uncovered evidence for Roman-period settlement, industry and burial (Fig. 4.4; Lucy and Evans 2016). Continuing from the late Iron Age – a period that is largely absent at Stanford Wharf Nature Reserve – the early Roman period saw pottery production and domestic occupation within enclosures. Much expanded pottery production continued into the 2nd century AD, and new enclosures were laid out. There was abandonment of some areas of the site in the late 2nd century, although pottery continued to be produced, possibly into the 3rd century. Deposition of pottery and other artefacts attests to activity in the 3rd and 4th centuries, although the precise nature of this is uncertain. Indeed, the recovery of latest Roman pottery in association with Anglo-Saxon-style fabrics points to the continuity of settlement into the late 4th or early 5th century. The excavations also revealed a

number of cemeteries, the earliest dating to the 1st century AD and the latest to the mid-3rd century (although a later 4th-century burial was also recorded).

Beyond London Gateway and Mucking, archaeological discoveries attest to a rich landscape of Roman-period settlement (Fig. 4.5). At the Orsett ‘Cock’ site, west of London Gateway, excavation uncovered a late Iron Age triple-ditched rectangular enclosure and Roman settlement (Carter 1998). There was a Roman occupation site at the Williams Edwards School, Grays (Lavender 1998), while excavation at the Palmers School site, also at Grays, uncovered evidence for pottery production dated to the late 2nd–early 3rd century (Rodwell 1983). At Gun Hill, West Tilbury, late Iron Age and Roman settlement occupying a sharply defined gravel spur north of the Tilbury marshes comprised an enclosure, field system, structures and kilns (Drury and Rodwell 1973). Further west, a settlement at Ship Lane, Aveley, included large enclosures and structures dating to the 1st and early 2nd centuries, 2nd to 4th century gullies and a small late Roman enclosure containing a well and hearth (Foreman and Maynard 2002, 123–35), and a prehistoric settlement and early Roman inhumation burials were uncovered at High House, West Thurrock (Andrews 2009). Sites east of London Gateway include North Shoebury, near Southend, where evidence for late Iron Age burials and Roman-period field systems were uncovered (Wymer and Brown 1995), and Hadleigh, east of Canvey Island, where a rectangular ditched enclosure of suspected Roman date is known from aerial photography (Hull 1963, 135).

Our understanding of the Roman use of the Cooling marshes on the opposite side of the Thames Estuary is

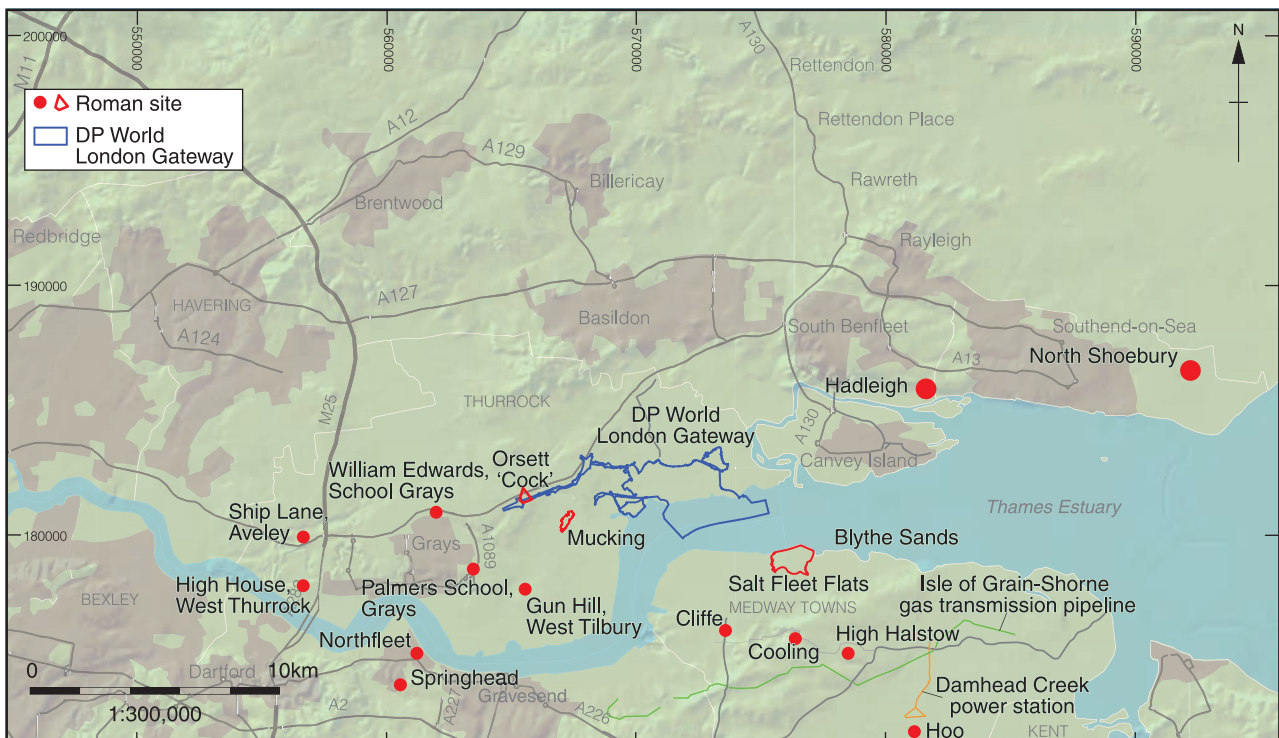


Figure 4.5 Selected Roman sites in the vicinity of DP World London Gateway

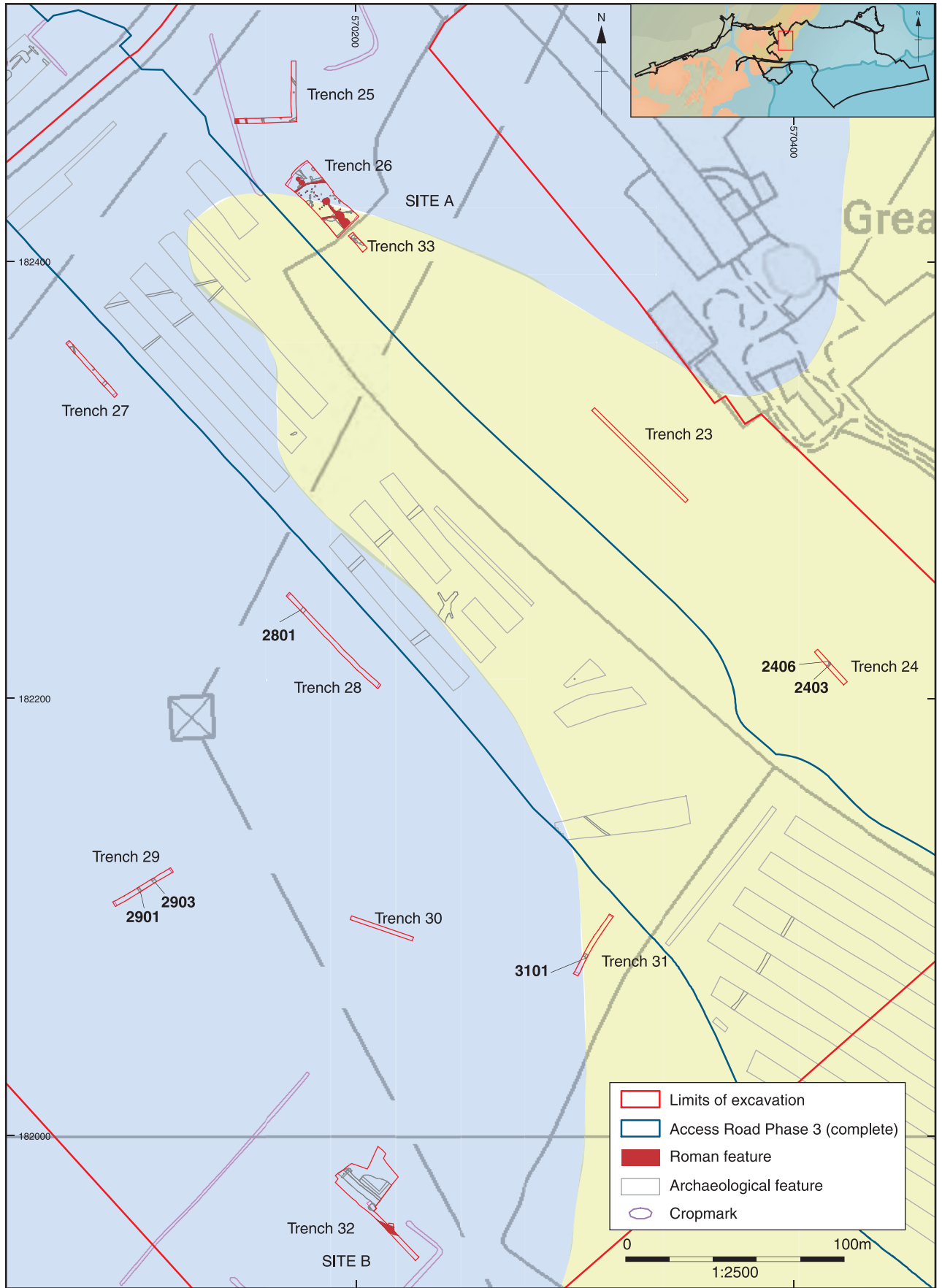


Figure 4.6 Roman features, Pipeline Diversion



restricted by the deep deposits of alluvium that have since built up and limited interventions that have penetrated these deposits to any depth. The work at Salt Fleet Flats provided a useful opportunity to examine this landscape, but with the impact level of development being above the Roman-period occupation levels, the window into the Roman landscape was inevitably narrow. Nevertheless, a picture of the Cooling marshes in the Roman period can be reconstructed to some extent from the archaeological work in the area.

An assessment of the north Kent coast by Wessex Archaeology (WA 2001) identified Roman pottery and animal bone on the foreshore in front of the sea wall on Blythe Sands, immediately to the north-west of the site boundary. The material may have derived from a Roman-period saltern or pottery kiln under active tidal erosion. Small-scale excavations have been carried out over the past 45 years within the wider area on the Hoo Peninsula. Much of the evidence recovered relates to salt production. Hearths cut into the alluvial clay at Cliffe Creek were tentatively dated to the Iron Age or 1st century AD on the basis of briquetage recovered from a layer sealing the structures (Miles 1968). Briquetage and pottery of late Iron Age and early Roman date has been collected from the peat deposits from John's Hope marshland at Cliffe (Hutchings 1987, 376). More substantial remains of salt production were recorded during excavations at Broomhey Farm in Cooling. The field-work uncovered a double hearth structure, settling tanks and structures defined by gullies and floors of crushed briquetage. The features were dated by pottery to the 1st century AD, but salt-making may well have continued at the site into the 3rd century, as suggested by a flanged bowl recovered from a rectangular settling tank, also associated with a hearth and structural remains (Miles 2004, 309–15). At High Halstow, south of Cooling, depressions or 'saucer-shaped pans' dug into the clay were presented as evidence for salt production (Thornhill and Payne 1980, 382). Excavations at Decoy Farm, High Halstow, uncovered deposits of fragmented briquetage – including evaporation vessels, containers and wedges – and a quantity of what was described as saltern debris (Ocock 1969, 257). More saltern debris – its precise composition is unknown – was collected along with Roman-period pottery at Hoo on the south-eastern edge of the Hoo Peninsula (Ocock 1965, 273).

The north Kent marshes during the Roman period are also well-known as a centre of pottery production. Jason Monaghan's corpus of pottery types and discussion of pottery production remains the definitive study of the Roman 'Thameside' industry (Monaghan 1987), although further evidence of pottery production has emerged since the publication of that volume. For example, wasters recovered from recent excavations at Damhead Creek on the southern part of the Hoo Peninsula attest to production there (Lyne 2017, 167), while David Applegate (2015) has analysed two pottery

assemblages from Hoo to identify a previously unknown production site. In addition to industrial activity, there is evidence of Roman-period settlement suggested by, among other evidence, field systems, a building and a cemetery exposed along the Isle of Grain–Shorne Gas Transmission Pipeline (Dawkes 2017).

## THE DP WORLD LONDON GATEWAY SITES

### *Pipeline Diversion*

Roman-period evidence was relatively sparse across the development, the most substantial remains being concentrated within the Pipeline Diversion (Figs 2.9 and 4.6). The northernmost trench at that site, Trench 25, contained two ditches of possible Roman date (Fig. 4.7). Ditch 2516 was orientated NW–SE and had a V-shaped profile that measured 1.6m wide and 0.55m deep. It contained a single fill from which a fragment of Roman brick and a sherd from a dish (Drag. 31) in Central Gaulish samian ware were recovered, the pottery dating deposition to the later 2nd century or later. Another ditch (2504) was parallel and adjacent to ditch 2516 and, while containing no finds, may have been associated with it, the pair in combination possibly forming a trackway *c* 3m wide. Ditch 2504 was, however, smaller, at 0.8m wide and 0.25m deep.

### *Site A*

Further evidence of Roman or possible Roman date was uncovered in Site A (Trench 26; Figs 4.6 and 4.8). Ditch 2613 was orientated ENE–WSW and measured 0.8m wide and 0.37m deep. It contained no finds but was cut by late Roman pit 2640 (see below). The ditch was *c* 15.5m south of another ditch (2667) which was parallel to 2613, at least in part, and together they may have defined an enclosure or field. An entrance is suggested by a gap between the east end of 2613 and an unexcavated linear feature on the same alignment further east. Ditch 2667 measured 0.6m wide and 0.15m deep and contained a single fill from which three fragments of Roman brick and tile were recovered. The existence of a fence or structure between the pair of ditches is suggested by three rows of postholes; the longest alignment comprised seven or eight postholes and extended NW–SE for some 10m, with the shorter rows forming returns at either end that extended toward south-west. Three postholes in the main alignment were excavated and one in the north-eastern return, resulting in the recovery of a fragment of Roman tile from posthole 2610. More ceramic building material of Roman date was collected from two pits or natural features situated immediately to the north of ditch 2667. Feature 2649 has an irregular profile and measured 1.6m wide and 0.6m deep; 2651 was similarly irregular and measured 2.6m wide and 0.45m deep (Fig. 4.9).

*Salt-evaporating hearth*

The most prominent aspect of Site A was a complex of features comprising a large, elongated pit (2640), a linear structure constructed from re-used Roman roof tiles (2630/2631) and a pit (2617) at the north end of the structure. The group of features may represent a salt-evaporating hearth.

In plan, pit 2640 had an hourglass shape and was 4.4m wide and at least 8m long. It is possible that the feature was originally formed from two or more conjoined or intercutting pits, although there was no clear indication of multiple pits in section and the cut seems to have been infilled as a single event. The sides were moderately shallow, the base was irregular, and the total surviving depth was 1.20m (Fig. 4.10, section 128). During excavation the base filled with water which rose from the natural sand into which the feature had been cut. The primary fill (2641) of the pit consisted of alluvial clay with gravel bands from which no artefacts were recovered. Tile structure 2630/2631

was laid on the surface of fill 2641 at the pit's north-west end (Fig. 4.11), indicating that the pit was earlier than the putative hearth and had been dug originally for a different purpose, probably as a waterhole. In time, after the tile structure had been laid, the clay and gravel fill had settled, causing the structure to slump. Support for the notion that pit 2640 was originally formed from multiple features comes from pit 2635, which was situated to the north-east of pit 2640. Its full plan could not be discerned. Like that in 2640, the bottom fill of 2635 comprised clay and gravel, and as in 2640, part of structure 2630/2631 has been laid across the pit after it had partly infilled (Fig. 4.10, section 127).

Feature 2632, the foundation slot for the tile structure that connected pits 2640 and 2617, measured *c* 8m long and 0.88–1.25m wide and ranged in depth from 0.2m at its north-west end to 0.33m at the south-east. The feature had dirty natural gravel across its base, probably having been disturbed and trampled during

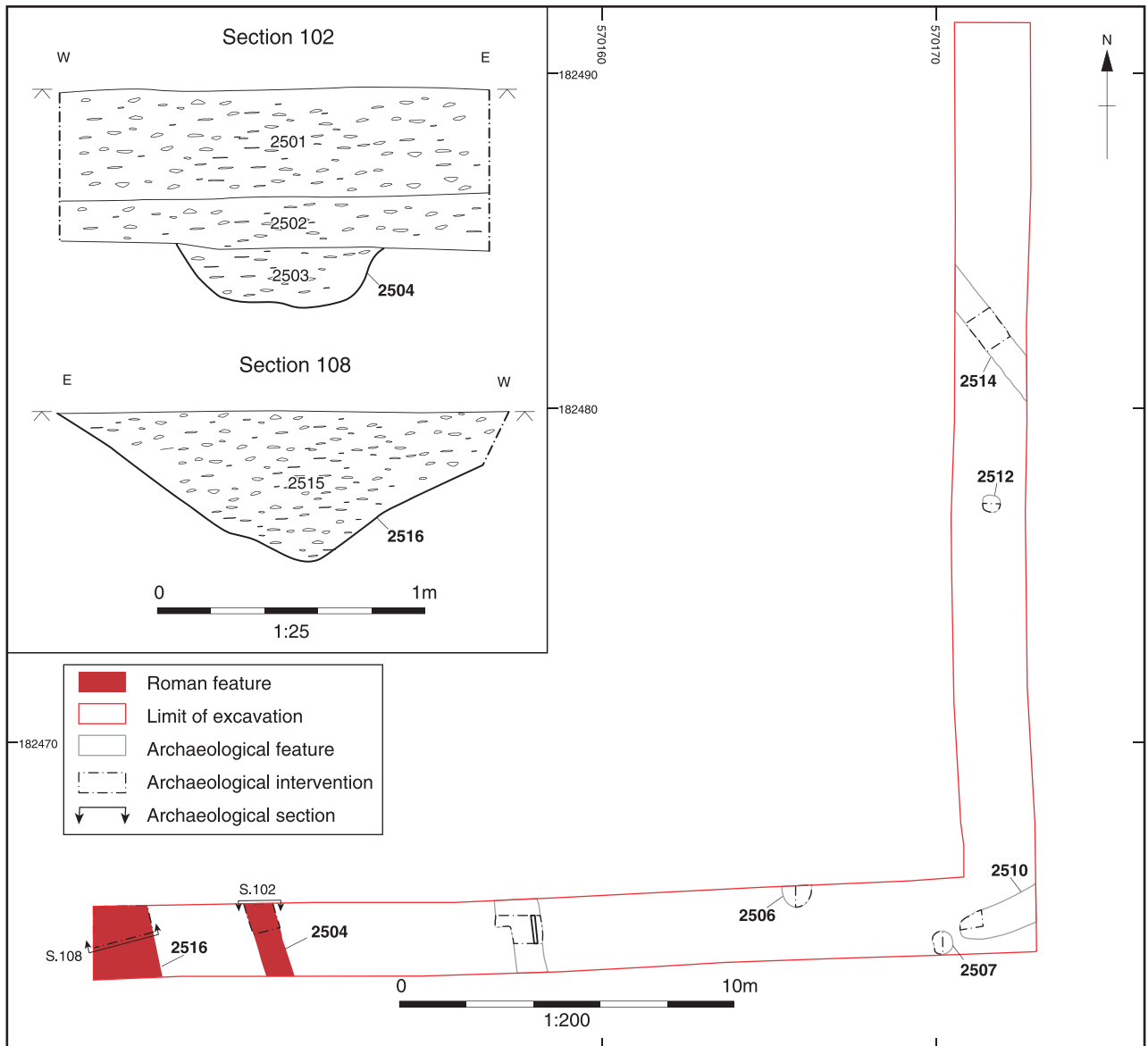


Figure 4.7 Plan of Trench 25, Pipeline Diversion



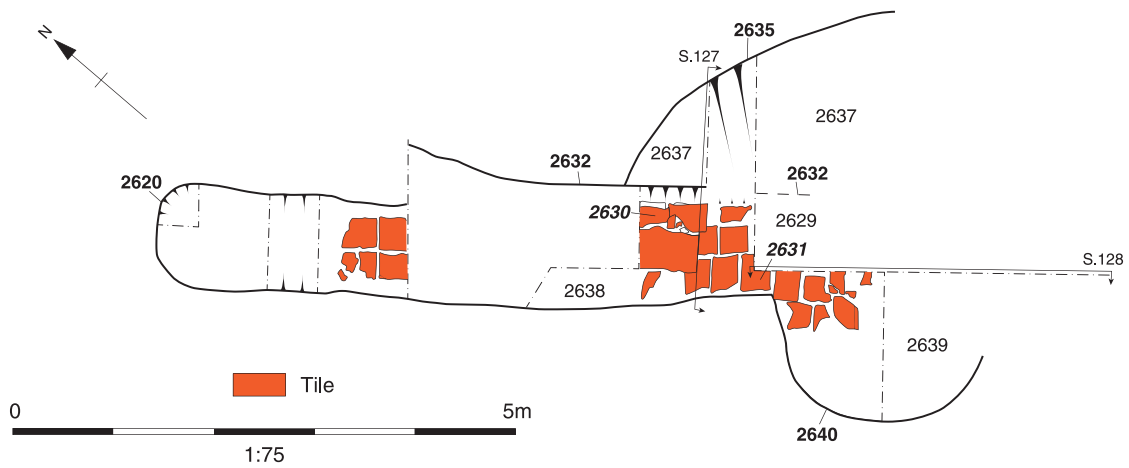
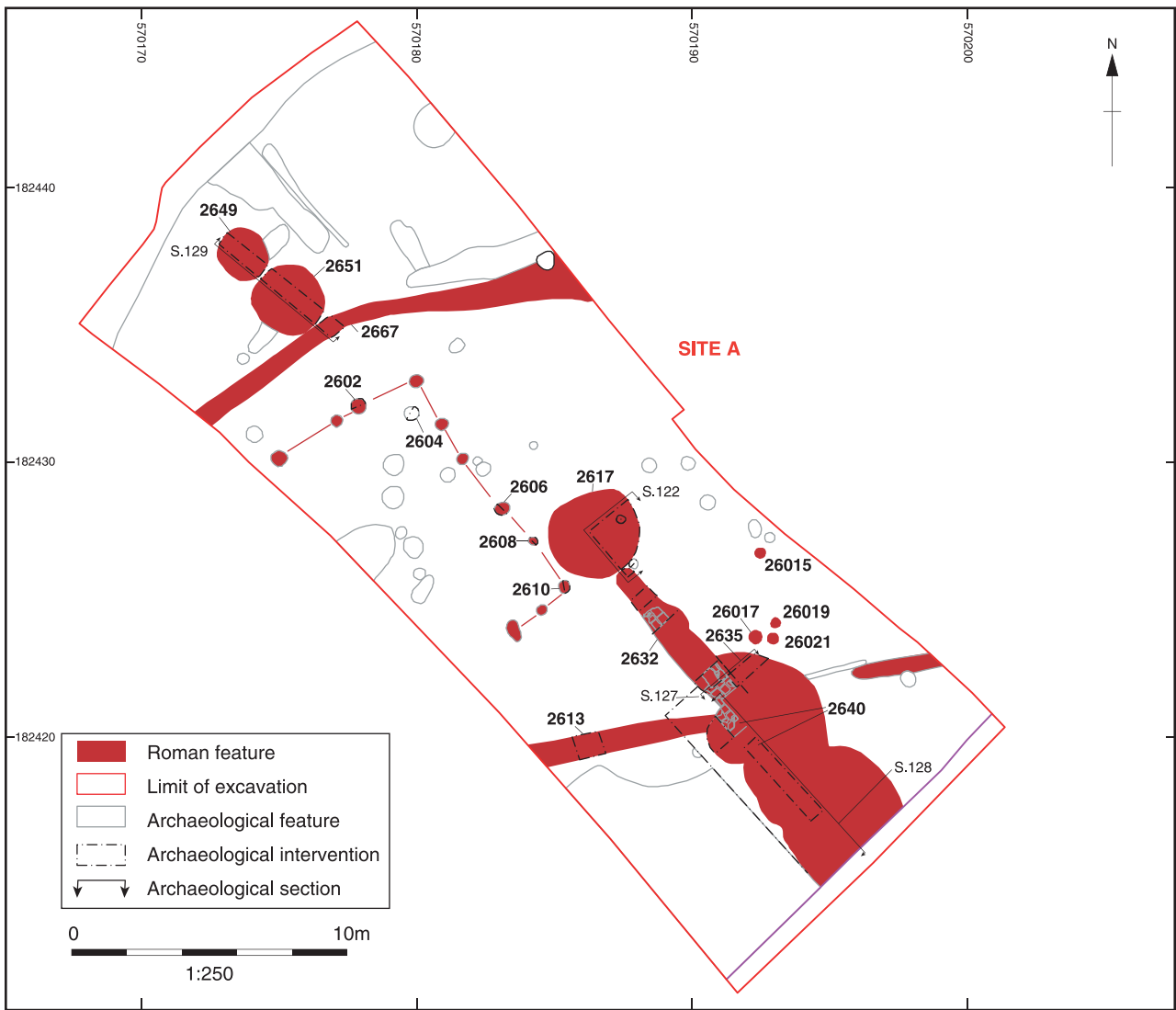


Figure 4.8 Plan of Roman features at Site A, Trench 26, Pipeline Diversion

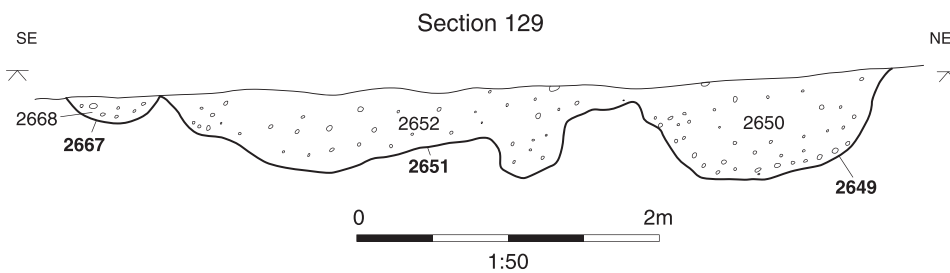


Figure 4.9 North-east-facing section through pits 2649 and 2651 and ditch 2667, Pipeline Diversion

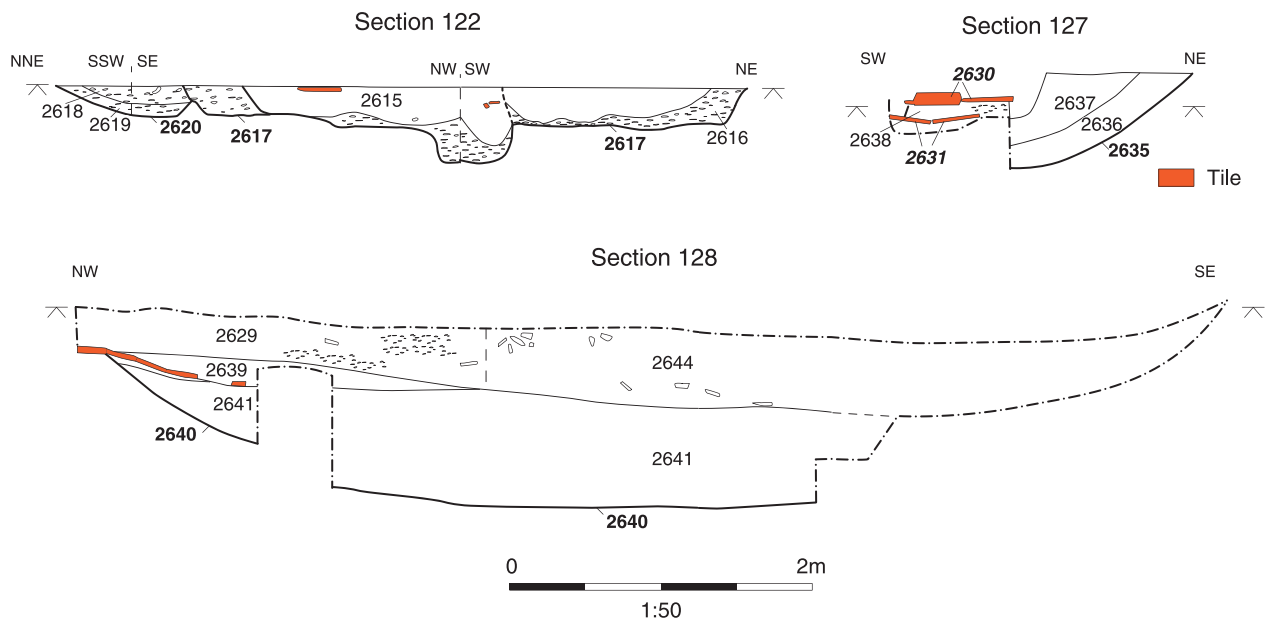


Figure 4.10 Sections through salt-processing hearth, Trench 26, Pipeline Diversion



Figure 4.11 South-west edge of structure 2630/2631, with imprints of robbed tiles visible in the underlying bedding layer, Trench 26, Pipeline Diversion



the original digging of the feature. A layer of sandy silt or clay overlay the gravel layer. This deposit formed a bedding layer on which courses of tiles were laid (2630/2631). The tiles disappeared at the north-west end of the foundation feature, probably having been robbed out, but survived from the central section to the south-east end. The tile surface consists of two rows of tiles, identified as tegulae and lydion bricks, laid side by side. Some tegulae had been deliberately deflanged, while others retained the flange, which had been set alongside the edge of the structure to form a kerb (Fig. 4.12). The tiles had been laid both upright and face down with the sanded base uppermost. At the south-east end, where it subsided into pit 2640, the structure appears to have comprised a single course of tiles, four tiles wide, though the full width was not exposed. In the central section, the lower course of tiles was overlain by a thin layer (2638) that can be divided into a lower horizon of grey ashy sandy clay containing charcoal and an upper horizon of compact lightly burnt yellow and red clay that appears to have a worn surface. It is unclear whether this represents a resurfacing of the paving or a collapsed block of superstructure.

The north-west terminal (2620) of foundation slot 2632 joined the large, shallow circular pit 2617, which

measured 3.5m in diameter and up to 0.25m deep (Fig. 4.10, section 122). The pit was deepest in the centre, perhaps representing a posthole-like feature. The pit contained two deposits, the upper of which (2615) contained a large quantity of tile (over 6kg) comprising tegulae, flat tile, brick and flue tile, as well as large pieces of carbonised timber, pieces of which measured up to 300 x 100mm. There was a shallow lip between pit 2617 and the terminal of the foundation slot and the two features appear to have respected each other in plan, although there was some suggestion in section that the pit may have cut the ditch. It is likely that both were essentially contemporary, but because of heavy robbing it is now impossible to be certain that the pit formed an integral element of the tiled structure rather than a contemporary but separate feature. At its south-east end, the foundation slot was cut into the top of pits 2635 and 2640, with the tile structure laid on top of the pits' clay and gravel fills.

A charcoal-rich layer (2639), 0.17m thick and *c* 2.2m across at its widest extent, accumulated within a hollow in the top of pit 2640 and covered the south-eastern end of the tile structure (Fig. 4.10, section 127, and Fig. 4.13). The layer was roughly circular and contained charcoal and fuel ash, as well as fragments of



Figure 4.12 Tiles set along the edge of structure 2630/2631 to form a kerb, Trench 26, Pipeline Diversion





Figure 4.13 Charcoal-rich layer 2639 within a hollow in pit 2640, Trench 26, Pipeline Diversion

fired clay, the latter being identified as oven wall lining; some fragments had pink, lavender and white surfaces typical of salt discolouration. The charcoal layer had the appearance of the accumulated waste from a stoking hollow or raked-out debris from the flue of an oven or kiln-type structure.

Along the south-west edge of the tile structure, imprints of robbed tiles were apparent in the underlying bedding layer (2631) (Fig. 4.11) and suggest that the structure had been very deliberately robbed out. Following demolition of the structure, it was covered by a layer of sandy clay (2629/2637/2644) containing tips of gravel, frequent tile fragments, fired clay, charcoal, slag, animal bone and in one area residual late Bronze Age–early Iron Age pottery. This deposit was thickest across the south-east half over the hollow formed by the earlier pits. The fired clay within this layer comprised structural fragments with wattle impressions, and oven wall lining, some with the cerise colouring commonly associated with salt discolouration, as well as a tiny vitrified fragment.

In view of the substantial robbing and the incomplete excavation of the feature, the proposed interpretation is inevitably tentative. Overall, it can be suggested that the features formed an oven- or hearth-type structure of enclosed or semi-enclosed construction. Pit 2617 may have formed the oven or hearth, with the flue

represented by structure 2630/2631, which in turn connected to the stoking chamber in the hollow formed over pit 2640. However, this would form a very long feature for an oven or kiln and it is possible that instead pit 2617 was the base of an associated structure rather than an integral part of any oven. The posthole-like feature in the centre of pit 2617 may have held a central supporting structure, which had been pulled out, allowing deposit 2615 to fall into the void. This could have been a pedestal for a suspended floor, and indeed, the presence of tile and carbonised pieces of wood support the idea of an internal structure within the pit. Whilst no evidence for the flue walls survives, it is probable these and any other superstructure were constructed of tile bedded in clay. It is difficult to judge whether the upper layer of tile (2630) represents the vault of the flue or a later rebuild or re-flooring. The presence of fired clay with wattle impressions from the layers sealing the tile structure may indicate that the flue and firing chamber were covered with a surface constructed of clay supported on a framework of interwoven wattles.

The limited intrinsic dating evidence of the tile suggests that the material was obtained from buildings originally constructed in the 3rd, or possibly 4th century. The structure must represent some form of oven or kiln, though the precise function cannot be





Figure 4.14 Cluster of putative Roman cremation burials, Site A, Pipeline Diversion

proven beyond doubt. Certain categories may be, however, eliminated. The absence of carbonised grain suggests that this was not a crop-processing structure, while the dearth of pottery on the site and the form of the structure exclude pottery manufacture. Smithing hearth bottom slag was found on site and it could be argued some form of metalworking was undertaken, but it is unlikely that so elaborate a structure would have been used for this purpose. The use of tile to construct the oven suggests that it needed to be sufficiently robust, which combined with its location close to the salt marshes alongside the Thames Estuary and its late Roman date points to its use for salt evaporation. The use of lead pans would account for the absence of briquetage, contrasting with earlier periods when ceramic containers were used for evaporation.

#### *Possible cremation burials*

Another notable group of features lay immediately to the west of pit 2640. Four small pits (26015, 26017, 26019 and 26021) were identified as possible cremation graves since fragments of charcoal and burnt bone were observed on the surfaces of the features (Figs 4.8 and 4.14). The features were not excavated and so their interpretation and dating cannot be confirmed. However, a few fragments of cremated bone found

within pit 2640, probably redeposited from one of the putative graves or another one in the surrounding area, were identified as human, specifically an adult or older juvenile (McIntyre, Specialist Report 12).

#### **Site B**

A boundary ditch (3203) containing Roman pottery was recorded in the south-eastern extension of Site B (Trench 32), some distance south of Site A (Figs 4.6 and 4.15). The ditch (3203) was aligned NW–SE and measured 2.48m wide and 0.53m deep. It was filled by two deposits, both of which containing shell-tempered pottery dating to the 1st century AD.

#### *Intertidal Survey*

While no features were discovered during the intertidal survey along the southern extent of London Gateway, artefacts, including 12 sherds of Roman pottery, were collected at various locations. The pottery, though redeposited and highly worn from coastal and agricultural processes, may well have derived from an eroded saltern site. The few sherds that could be dated reasonably closely are early Roman (*c* AD 43–100) in date.



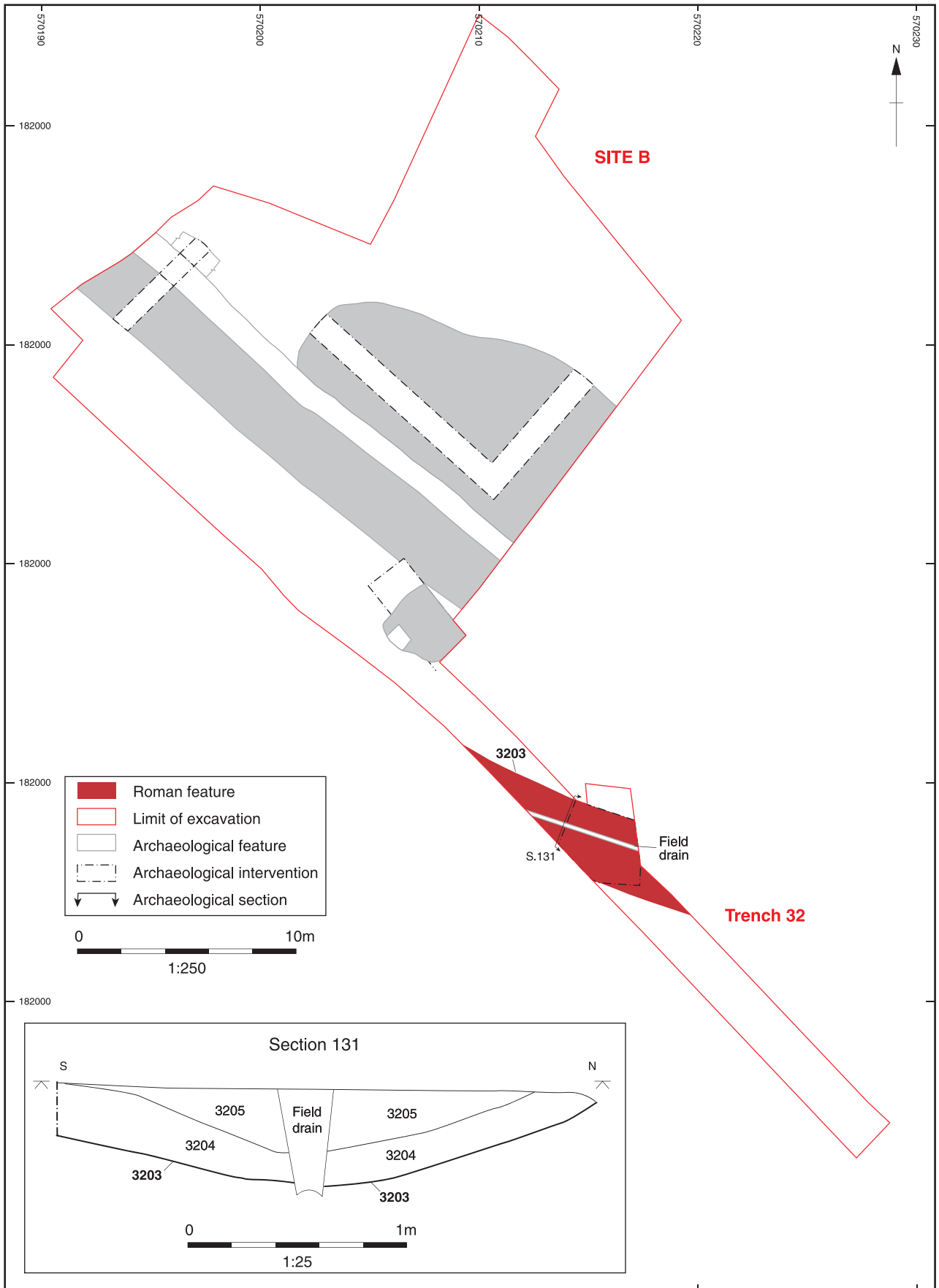


Figure 4.15 Plan of Roman feature in Site B, Trench 32, Pipeline Diversion

### Logistics Park Infrastructure

The reputed site of a Roman saltern close to the Logistics Park Infrastructure site was targeted by trenching during the evaluation. A test pit was dug within Trench 5 to a depth of 7.7m but encountered only alluvium. Since in this part of the site the alluvium is typically *c* 12m thick, the deposits recorded are likely to form part of the upper alluvium. No evidence of briquetage, worked wood or other artefacts was seen during excavation and fragments of ceramic material recovered from two soil samples taken from the trench are likely to be modern. If a saltern does exist here, it must lie at a significant depth below the alluvium.

### Salt Fleet Flats, Cooling Marshes, Kent

The prospect of discovering *in situ* Roman remains at Salt Fleet Flats in the Cooling Marshes was limited by the depth of the investigation, which was restricted to 1m; any Roman archaeology is likely to be buried at greater depth. No trenches could be excavated in the intertidal zone to the north of the sea defences, where Iron Age and Roman finds have previously been recovered, and at Salt Fleet Flats the only Roman material recovered was a small number of residual artefacts found in medieval contexts at Site 1. These included a sherd of pottery of early Roman date and two sherds of pottery of middle Roman date (*c* AD 120–250/300). Considered together, the finds suggest the presence of a Roman site in the process of erosion or extensively disturbed during construction of the sea wall and associated drains.

## FINDS AND ENVIRONMENTAL EVIDENCE

A small assemblage of Roman pottery – 28 sherds in total, weighing 220g – was recovered from the DP World London Gateway fieldwork (Biddulph, Specialist Report 2). The assemblage has an emphasis on the early and middle Roman periods (*c* AD 43–250) and on local manufacturers. Pottery from Salt Fleet Flats included two dishes made in north Kent, one of them coming from the Cooling marshes (Fig. 4.16, nos 1 and 2). Pottery from the Pipeline Diversion and the intertidal survey included sherds in fabrics manufactured nearby

at Mucking. Some pottery, however, arrived from further afield. A bead-rimmed lid in a fine oxidised fabric (Fig. 4.16, no. 4), recovered from the Pipeline Diversion, is a Hadham product from Hertfordshire and dates to the 3rd or 4th century. A plainware form in South Gaulish samian ware reached Salt Fleet Flats during the second half of the 1st century AD. Another piece of samian, in this case a dish (Drag. 31) which arrived from Central Gaul during the second half of the 2nd century, was recorded in the Pipeline Diversion assemblage (Fig. 4.16, no. 3). The condition of the assemblage was poor. The mean sherd weight (weight divided by sherd count) was 8g, which attests to a high level of fragmentation. Much of the pottery is very worn, too. The dish from Salt Fleet Flats had smoothed surfaces and rounded edges, as did the entire group from the intertidal survey. Such characteristics are typical of long-term exposure and movement of the material in the deposits from which it was recovered, through agricultural practices and the action of the tide.

Ceramic building material dating to the Roman period was recovered exclusively from the Pipeline Diversion (Poole, Specialist Report 4). The assemblage was concentrated in Site A and consisted of 125 fragments, weighing 26,655g. Brick, tegula and indeterminate flat tile dominated, though smaller quantities of flue tile and imbrex were also present (Fig. 4.17). The assemblage was fairly well preserved, with a high mean fragment weight of 215g and with no or a low level of abrasion, although no complete tiles were present. In addition to the loose tile within feature fills, a tile structure (2630/2631), suggested above to have formed part of a salt evaporation hearth, is likely to be the source of tile on the site.

Three fragments of lava (76g) were recovered from an early Roman ditch from the Pipeline Diversion (Shaffrey, Specialist Report 7). The fragments are almost certain to be from rotary querns because this is the only known use for lava in England. They are unlikely to be pre-conquest in date (Fitzpatrick 2017).

Environmental remains were limited to charcoal recovered from the north-western end of pit 2640 (Meen *et al.*, Specialist Report 16). Of the taxa identified, oak (*Quercus* sp.) was most common, followed by hawthorn-type (Maloideae) and less frequent occurrences of birch (*Betula* sp.), hazel (*Corylus avellana*), field maple (*Acer campestre*), willow/poplar (*Salix/Populus*) and ash (*Fraxinus excelsior*). The wood had been

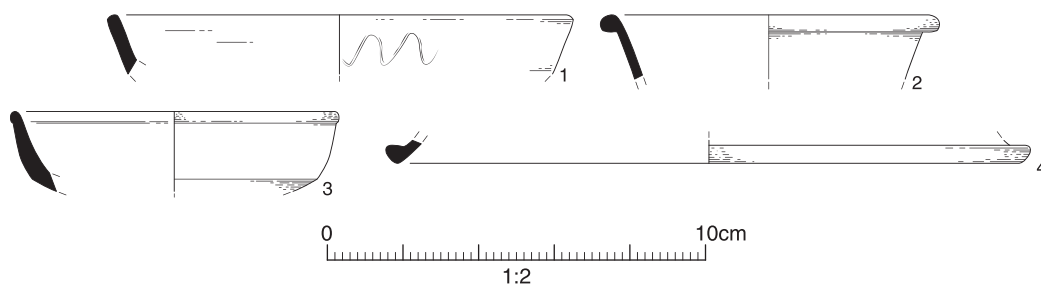


Figure 4.16 Roman pottery from DP World London Gateway



Figure 4.17 Roman ceramic building material from Site A, Pipeline Diversion



gathered from local deciduous woodland and had been used as fuel in the site's putative salt evaporation hearth.

salt evaporation hearth, which was located on the river gravel deposits in Pipeline Diversion Area A.

## DISCUSSION

The Roman evidence, though of limited character, nevertheless goes a little way to filling a gap in our knowledge of the exploitation of the coastal environment during the Roman period. Before the investigations at DP World London Gateway, the distribution of findspots and sites in the vicinity, as recorded on the Historic Environment Record for Essex, was sparse, owing largely to the thick layer of alluvium on the tidal flats. The impact of development has generally not been of sufficient depth to reach the Roman levels in the intertidal zone; a test pit within Trench 5 in the Logistics Park Infrastructure site indicated that any such remains lay at a depth of more than 7.7m below ground level. However, pottery from the intertidal zone suggests that archaeological remains dating to the Roman period, probably relating to salt production, exist there, possibly on a similar scale to that at Stanford Wharf Nature Reserve. Evidence for settlement, as suggested by cropmarks, burials and a timber-lined well, is known in more elevated positions, as is the most significant discovery at London Gateway, the possible

### *Salt evaporation hearth*

The interpretation of the possible salt evaporation hearth is far from certain and alternative functions, such as a crop-processing oven or a pottery kiln, can be suggested; however, given the paucity of crop remains or kiln furniture and waste from this or surrounding features, neither of these alternative interpretations is entirely convincing. The elevated position of the hearth, if salt-related, presents something of a conundrum: why was it located outside the intertidal zone, unlike the salterns at Stanford Wharf Nature Reserve, which were situated within it? It is possible that brine was carried to the hearth from settling tanks or ditches located within the tidal flats. An advantage of the hearth's elevated position may have been that operations were removed from the threat of tidal inundation. Another possibility is that the hearth was used for the secondary processing of salt, freshly harvested salt, still wet, being brought from salterns in the intertidal zone to the hearth for drying. The hearth may have been designed for such a purpose, comprising as it did a hollow within the partly infilled pit 2640 that served as a stoking hole, a long,



Figure 4.18 Tile-built hearth within saltern 6090 (looking west, scale 1m), Stanford Wharf Nature Reserve

tile-built flue (probably originally covered) and, at the end of the flue, a firing chamber or oven (2617), which may have been open (Poole, Specialist Report 4). At Stanford Wharf Nature Reserve, brine within evaporation pans were placed above hearths and subject to heat emanating from a fire beneath or from a fire separated from the hearth by a short flue, which brought the brine rapidly to the boil. The hearth on the Pipeline Diversion, however, would have functioned differently. The oven in this case was separated from the fire by a longer flue, reducing the temperature inside the hearth. This made the structure more suitable for the gentle drying of salt, rather than the boiling of the brine.

The absence of briquetage suggests that salters were using containers made of materials other than clay. The hearth, probably dating to the later 3rd or 4th century, was contemporary with salterns 5760, 6090 and 9501 at Stanford Wharf Nature Reserve (Biddulph and Stansbie 2012a, 121–35). Micromorphological analysis identified high concentrations of lead and tin within the floor deposits of saltern 6090 and a lead-enriched hearth liner within saltern 9501. The traces in both salterns are consistent with the use of lead evaporation vessels, which, given that briquetage was also recovered from the salterns, may have been used alongside clay vessels. Since no scientific analysis was undertaken of the deposits associated with the hearth in the Pipeline Diversion, the use of lead vessels cannot be confirmed but remains a possibility. Like the structure on the Pipeline Diversion, the hearth within saltern 6090 at Stanford Wharf Nature Reserve was tile-built, but its design was different. Lead pans were placed over a tile base, which incorporated a short flue that drew heat from a stoking pit at the end (Fig. 4.18). Another connection with the Stanford Wharf Nature Reserve salterns is the choice of fuel, analysis of the environmental remains from pit 2640 indicating that the hearth was heated by wood charcoal, predominantly oak and to a lesser extent hawthorn, birch, hazel, field maple, willow/poplar and ash. Charcoal was also recorded in salterns 5760 and 6090 (Biddulph and Stansbie 2012a, 127, 129; Druce 2012), oak, alder and hazel being the species identified, although it should be noted that charcoal was just one of the fuel types used, other fuels including salt marsh plants and crop-processing waste. The introduction of lead vessels and charcoal to Stanford Wharf Nature Reserve coincided with the intensification of salt production at the site in the late Roman period, bringing with it increased demand for fuel and a need for greater efficiency (Biddulph and Stansbie 2012a, 163). The hearth at the Pipeline Diversion, where briquetage and salt marsh plant-based fuel was absent, is consistent with this narrative and, by providing the means for secondary processing, may represent part of the same industrial zone. Alternatively, it may represent a later development in salt production, when the use of briquetage and salt marsh plants, declining by the time late Roman salterns at Stanford Wharf Nature Reserve were functioning, had been abandoned entirely.

### Roman burials at DP World London Gateway

The human bone recovered from pit 2640 and the putative cremation burials close by add to our knowledge of Roman burial practice in the area. The features are undated but plausibly belong to the 1st to early 3rd century AD, to which most of the cremation burials at Mucking are dated – some 74 in total (Lucy and Evans 2016, table 4.1). The Pipeline Diversion burials form a group of four and in this respect differ from the solitary cremation burial, dated to *c* AD 1–70, at Stanford Wharf Nature Reserve (Stansbie *et al.* 2012, 90–4). The isolated character of that burial may relate to its location within the intertidal zone and away from settlement. In contrast, the Pipeline Diversion burial group is located on higher ground and may represent part of a larger cemetery or a family plot. Three areas of burial are now known within the London Gateway development (excluding the isolated burial at Stanford Wharf Nature Reserve). In addition to the Pipeline Diversion group, an area of burial represented by a furnished cremation grave (HER 1891) lies close to the Rail Corridor site. A third area of graves (HER 5184 and 5185) has been recorded near the A13/A1014 road junction (Fig. 4.3). These areas of burial may once have been more extensive, gravel quarrying and development at Stanford-le-Hope having disturbed much of the landscape around them. It can be tentatively suggested that the pattern at London Gateway, though ephemeral, resembles the pattern of discrete cemeteries seen at Mucking, where it was suggested that each cemetery served separate parts of the settlement complex, which were differentiated spatially and by function and status (Lucy and Evans 2016, 430). Similarly, the burial groups at London Gateway may relate to a single settlement, presumably below the southern end of the modern town of Stanford-le-Hope (possibly focused around Mucking Creek), or else multiple areas of farming settlements peripheral to Mucking, which lay little more than 2km south-west.

### The wider landscape

Something of the use of the wider landscape is suggested by ditches exposed during the Pipeline Diversion investigation. Ditches 2504 and 2516 in Trench 25, orientated NW–SE and 3m apart, may represent the flanking ditches of a trackway; pottery suggests that ditch 2516 was infilled in the later 2nd century or later. The ditches match the alignment of an adjacent linear cropmark reasonably well (Fig. 4.6), and it is likely that both represent the same landscape feature. If so, then the trackway extends for at least 80m. It is notable that the orientation of the trackway is at odds with the prevailing orientation of the medieval coaxial field pattern, supporting the possibility that the trackway is earlier in date. Another set of parallel ditches (2613 and 2667), which were revealed in Site A and must pre-date the late Roman period, appear to be too



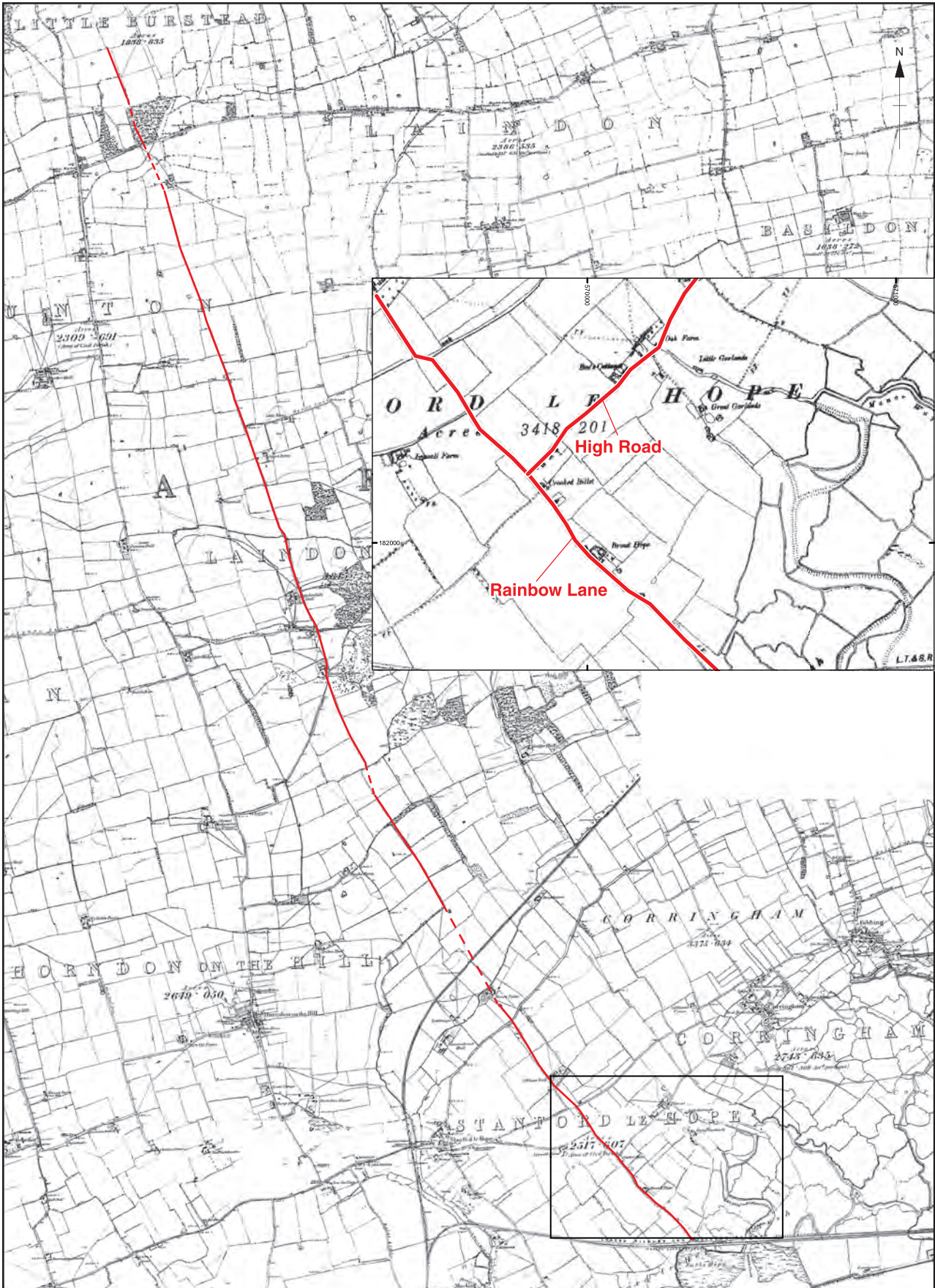


Figure 4.19 Route of possible Roman road from Little Burstead to DP World London Gateway, as identified by Rippon *et al.* (2015, 154). Inset: detail showing Rainbow Lane and High Road, Stanford-le-Hope (mapping reproduced courtesy of Groundsure)



widely spaced to be a trackway but may instead form part of an enclosure in which a post-built structure or the small cremation cemetery were located. The wide ditch 3203 in Site B may be a boundary ditch; pottery from the feature suggests that it was in use during the 1st century AD.

A locally important landscape feature, a putative Roman road that extends through the development area, has been traced by Rippon *et al.* (2015, 154, fig. 4.10), based on an extended alignment of field boundaries, from Stanford-le-Hope – in fact just beyond the north-east tip of Stanford Wharf Nature Reserve – to Little Burstead some 12km to the north-west (Fig. 4.19). At its southern end, the alignment extends through the sites of the medieval or early post-medieval farms of Broad Hope (possibly shown as cropmarks just outside the southern extent of the Pipeline Diversion site) and Crooked Billet and on modern mapping is preserved as Rainbow Lane. The investigations at London Gateway cannot help clarify the dating of this alignment, except that if the Roman-period archaeology at the Pipeline Diversion forms part of a more extensive (roadside) settlement, then the road is likely to have been laid out before the late Roman period. It is worth noting, too, that High Road, which extends approximately NE–SW through the London Gateway Access Road site and is adjacent to the Pipeline Diversion site, terminates at Rainbow Lane, which it meets at right angles, suggesting that High Road was laid out with reference to the lane. High Road was certainly present on its present alignment during the medieval period (see Chapter 5) and it is possible that its origin is earlier still. That said, none of the Roman ditches in the Pipeline Diversion matches the orientations either of High Road or Rainbow Lane.

### *Trade and communications*

The supply of pottery from Mucking to London Gateway implies that the locations were connected in the Roman period by trackways, roads or other means of communication. These may have included coastal

and riverine routes traversed by shallow-draught boats or barges, perhaps on the lines of the Barland's Farm boat uncovered in the Severn Estuary (Nayling and McGrail 2004), and implied by the boathouse at Stanford Wharf Nature Reserve, which would have travelled along the coast and inland via the myriad creeks. The existence of roads and trackways may also be presumed, though tracing any such routes is difficult. No routes were uncovered at Stanford Wharf Nature Reserve, and the trackway recorded in Trench 25 at the Pipeline Diversion was orientated NW–SE and thus away from Mucking. Three routeways were identified at Mucking (Fig. 4.4; Lucy and Evans 2016, fig. 2.1). One of these (RT2) extends NE–SW for a distance of some 600m along the eastern side of the area of excavation before appearing to terminate at a T-junction with RT1, which was aligned approximately E–W. There is no suggestion that RT2 continued north, and it should be noted that the routeways appear to have fallen out of use after the early Roman period, but if some form of continuation existed, then it may have connected, skirting around the intertidal zone on the elevated river terraces, to areas of settlement implied by burials and a well within the London Gateway development or to a projected alignment of High Road.

Trade between the north and south sides of the Thames, probably using the same shallow-draught boats, is indicated by the presence on the Rail Corridor of an oxidised, fine ware flagon from north Kent and is supported by the recovery of north Kent pottery at Stanford Wharf Nature Reserve (Biddulph and Stansbie 2012b) and the presence of lid-seated, shelly-ware jars, a mainstay of Mucking's early Roman pottery industry (Jefferies and Lucy 2016, fig. 3.16, type AB06), at Springhead in Kent a little further west along the Thames (Seager Smith *et al.* 2011, fig. 27, no. 296). The amount of such pottery at these sites, though, was small; at Stanford Wharf Nature Reserve, pottery from north Kent was just 0.6% by sherd count. This suggests that the scale of trade between the two regions, both of which had successful ceramic and salt industries (which may have used jars like those at Springhead for transportation), was limited.