5.0 Regional Evaluation of the Study Area. Case Study I: Kent

5.1 Introduction

The previous two chapters (**3.0-4.0**) have provided a general overview of the archaeological evidence for salt-production within the study area. The following two chapters allow for a more detailed overview into two of the four 'key areas of activity': Kent and Somerset (Figure 10.3.1). Although Dorset and Hampshire are also key areas of activity, discussion is limited by a lack of well-preserved and recorded archaeological evidence attributable to salt-production. Therefore, these areas will be discussed in the wider context of the study area in **7.0.**

These more detailed regional evaluations rely upon different sources of data, which results in the regional evaluations being presented differently.

The overview for Kent (**5.0**) has been formulated exclusively from the *original research dataset*. The overview of Somerset (**6.0**) is based upon two sources of data: the *original research datas*et and the *new data generated from fieldwork* (main focus).

As outlined in **1.7.5**, Kent is particularly rich in Iron Age and Romano-British archaeology (Williams 2007). It has an impressive length of coastline ranging between the famous cliffs of Dover which dominate the central southern coast and the low-lying areas of Romney Marsh, the Medway Estuary and North Kent. These low-lying areas provided ideal environs for salt-production.

Kent by far, has the highest quality of archaeological remains for salt-production in the study area, with a high quantity of sites (89/276 sites: Figure 10.3.2).

This includes the best-preserved examples of Stages 1 and 2 of the salt-production process, including various distinctive ‘working areas’ containing sets of hearths and brine tanks, as well the uniquely preserved ‘whole’ water management system in Romney Marsh (Site 82).

The exceptional archaeological record for salt-production in Kent, is due in most part to a particularly passionate team of volunteer archaeological groups and professional archaeologists who have carefully recorded archaeology for decades. In particular, the extensive archaeological data (including salt-production sites) generated within the Medway Estuary, is nearly all due to a dedicated research group (Upchurch Archaeological Group) and the work carried out by Ian Jackson. The County HER is also dedicated to digitising archaeological data and making it available for researchers, resulting in many large landscape and site-specific projects.

This regional evaluation is designed to be read in conjunction with figures in **Appendix 10.4.** The **Site Gazetteer** (**Table 10.1.4: Volume Two: DVD**) can also be used to provide a convenient overview of each site discussed in the main text, if required.

Key themes discussed within this chapter are listed in Table 5.1.

Table 5.1 Key Themes in Chapter 5.0

Key Themes	Trends of site concentration
	Trends in chronological development of salt-production
	Contextual overview of key areas of production
	Evidence for the use of space
	Identifying working area formation indicative of individual technological choice
	Characterising salt-production in Kent
	Technological Innovation in Kent

5.1.1 Key Site Groups in Kent (Table 5.1 and Figures 10.3.3-10.3.8)

Kent has a distinctive distribution of sites that form three main concentrations. These have been separated into several smaller groups. These groups occur on across the North Kent Mainland (Group 1), the Medway Estuary (Group 2 a-c) and Romney Marsh (Groups 3-4), (Figures 10.3.3-10.3.8). There is also a small scatter of briquetage findspots between Dover and Rochester (Figure 10.3.2).

However, there is no evidence that any significant level of salt-production took place in these more exposed coastal areas.

Key sites discussed within the main text occurring within these groups are listed in Table 5.2. All sites are presented in a series of maps showing overall site and 'Site Type' distribution (Figures 10.3.2-10.3.16).

Table 5.2 Key Areas of Salt-Production Activity in Kent (sites discussed in main text only), (site names as originally recorded in literature/HER)

Site ID	Site Name	Site Type
Group 1: North Kent Mainland and Hoo Peninsula) (Figure 10.3.3)		
27	Possible Salt mound: Romano-British salt working site? High Halstow, Rochester Upon Medway	Mound Associated Briquetage
28	Romano-British salt making site, High Halstow, Rochester Upon Medway	Briquetage Findspot Only
29	Romano-British salt making site with briquetage, Little Middle Marsh, High Halstow, Rochester Upon Medway	Briquetage Findspot Only
30	Roman salt workings, Cooling, Rochester Upon Medway	Actual Site
66	Square enclosure. Possible salt works, Hoo St Werburgh, Rochester Upon Medway	Unknown
74	Salt workings, Allhallows, Rochester upon Medway	Unknown
250	Drainage work in Stoke marsh	Briquetage Findspot Only
289	Romano-British pottery and briquetage, Kingsnorth Power Station	Briquetage Findspot Only
316	Foreshore at Cliffe Creek, Cliffe	Actual Site
Group 2 (Groups 2a-2c) (Figure 10.3.4)		
Group 2a: Nor Marsh and Bishops Saltings (Medway Estuary) (Figure 10.3.5)		
17	Roman salt manufacturing site, South Yantling Creek, Bishop Saltings	Unknown
18	Roman salt works, Gillingham	Unknown
19	Roman intertidal salt/pottery site, south east of Darnet, Upchurch, Swale	Actual Site
20	Roman intertidal site, Gillingham Kent	Actual Site
43	Iron Age/Romano-British saltworking, Bishop Saltings, Gillingham	Briquetage Findspot Only
44	Possible Romano-British saltworks, Gillingham	Actual Site
45	Romano-British Saltmaking site, Bishop Saltings, Medway	Briquetage Findspot Only
47	Romano-British saltworking site, Bishop Saltings, Gillingham, Medway	Briquetage Findspot Only
48	Romano-British saltworking site, by South Yantlet Creek, Bishop Saltings, Medway	Briquetage Findspot Only
49	Possible Romano-British saltworking by Long Reach, Bishop Saltings, Gillingham	Briquetage Findspot Only

50	Continuation of Late Iron Age/Romano-British saltworking site on Burntwick Island	Briquetage Findspot Only
54	Area of burning, Nor Marsh, Gillingham, Medway	Briquetage Findspot Only
55	Peat deposits and pottery, possible salt works, Bishop Saltings, Gillingham, Medway	Unknown
56	Possible Romano-British saltworks, Bishop Saltings by South Yantleet Creek, Medway	Briquetage Findspot Only
84	Roman Salt Manufacturing Site, Gillingham	Unknown
312	Nor Marsh	Actual Site
314	Nor Marsh	Actual Site
Group 2b: Millfordhope Marsh, Slayhill Marsh, Sharfleet Marsh and Burntwick Island (Medway Estuary) (Figure 10.3.6)		
51	Possible area of salt workings, Sharfleet Saltings, Burntwick Island	Unknown
52	Romano-British Saltworks, by Sharfleet Creek, Upchurch, Swale	Briquetage Findspot Only
53	Possible Romano-British saltworks, Sharpness Saltings, Burntwick Island, Medway	Briquetage Findspot Only
57	Romano-British saltworks, Sharfleet Saltings, Burntwick Island, Upchurch, Swale	Actual Site
58	Romano-British finds, Sharfleet Saltings, Burntwick Island, Upchurch, Swale	Briquetage Findspot Only
59	1st century ditches and salt winning, Upchurch, Swale	Actual Site
60	Saltwinning debris and C1st pit remains, Upchurch, Swale	Briquetage Findspot Only
61	C1st salt winning area with brine pits, Upchurch, Swale	Actual Site
63	Mid-late 1st century salt winning debris and pottery, Millford Marsh, Upchurch, Swale	Briquetage Findspot Only
64	1st century salt winning debris, hearth, post-holes, Upchurch, Swale	Actual Site
299	Slayhills Saltings	Actual Site
301	Near Kethole Reach, Burntwick Island	Actual Site
308	Slayhills Marsh	Actual Site
309	Slayhills Saltings	Actual Site
310	Burntwick Island	Briquetage Findspot Only
311	Millfordhope Marsh	Actual Site
313	Millford Marsh	Briquetage Findspot Only
Group 2c: Upchurch and Lower Halstow (Mainland) (Figure 10.3.4)		
32	Romano-British saltworks, Funton Marsh, Iwade, Swale	Actual Site
34	Roman wooden building, probably a salt winning site (associated animal burial). Industrial site	Actual Site
35	Romano-British saltworks, Iwade, Swale	Actual Site
41	Roman saltworking site by Raspberry Hill, Bedlams Bottom	Briquetage Findspot Only
42	Iron Age/Roman saltworks, Halstow Creek,	Actual Site

	Lower Halstow, Swale	
62	Salt winning debris and pottery	Actual Site
90	Funton Creek, Iwade, Swale	Actual Site
Group 3: Romney Marsh Mainland (Figure 10.3.7)		
16	Roman Saltworking Site, Brenzett, Shepway	Briquetage Findspot Only
285	Site at Newchurch	
286	Site at Newchurch	
287	Site at Bilsington	
288	Snave	
Group 4: Romney Marsh Coastal (Figure 10.3.8)		
13	Early Romano-British Salt-Working site at Scotney Court	Actual Site
82	Brett's Lydd Quarry, parts 12-16, Lydd	

The nature of these groups will be outlined further shortly, following an overview of the spatial and chronological development of salt-production in Kent.

5.2 Development of Salt-Production in Kent

This section will provide an overview of the development of Iron Age and Romano-British salt-production in Kent.

5.2.1 Overview of Site Type (Table 10.1.3 and Figures 10.3.11-10.3.16)

A summary of 'Site Type' for Kent was provided in **3.2.2** (Figures 3.15-3.16 and Figure 10.1.3) and these are listed for all sites discussed in this chapter, in order of groups, in Table 5.2. The results in **3.2.2**, showed that, excluding the 'Unknown' Site Types, attributable to a series of elusive earthworks in North Kent and the Isle of Sheppey, 'Briquetage Findspots' and 'Actual Sites' dominated this region.

As outlined in **3.2.1,** it is difficult to determine whether 'Briquetage Findspots' represent the only visible remains of a specific salt-production site, extensions of another site/remains of waste deposition.
Given the mixture of 'Actual Sites' and 'Briquetage Findspots', especially within the Medway Estuary (Groups 2a-c) it is best to view these sites as intensive salt-

producing landscapes as a whole. In areas where space was limited, it is probable that areas were shared for debris deposition.

5.2.2 Overview of Chronology (Table 10.1.8)

Currently there is limited archaeological evidence for salt-production prior to the Roman period in Kent (Figures 3.10 and 5.1).

However, there are some key sites emerging in the Late Iron Age as well as one possible Early Iron Age site in the Thanet area. This site (**Site 40**) was recorded within a cliff section and consisted of a series of pits (according to HER records). A possible 'stone trough' was recorded and 'daub' could have been briquetage, both of which could have been associated with salt-production. This site, however, could not be confidently dated and therefore its origin remains elusive.

Chronologically, salt-production in Kent becomes most *archaeologically visible* from the Early Romano-British period, continuing on a smaller scale, or at least on much fewer sites, into the Middle Romano-British period (Figure 5.1). Most of the undated sites consist of earthwork mounds, which could be of a later medieval date.

North Kent (Group 1) and the inner environs of the Medway Estuary (Groups 2a-b) contain the most sites with origins in the Late Iron Age. Five of the nine sites are located within Group 2a (Sites 43, 45, 48, 50 and 56) and there is one potential Late Iron Age site within the North Kent Mainland on the Hoo Peninsula (Group 1: Site 315).

All five sites in Group 2a continued into the Early Romano-British period; and two of them continued into the Middle Romano-British period (Sites 43 and 45) and two into the Late Romano-British period (Sites 48 and 50). This indicates clearly that this had a long history of salt-production.

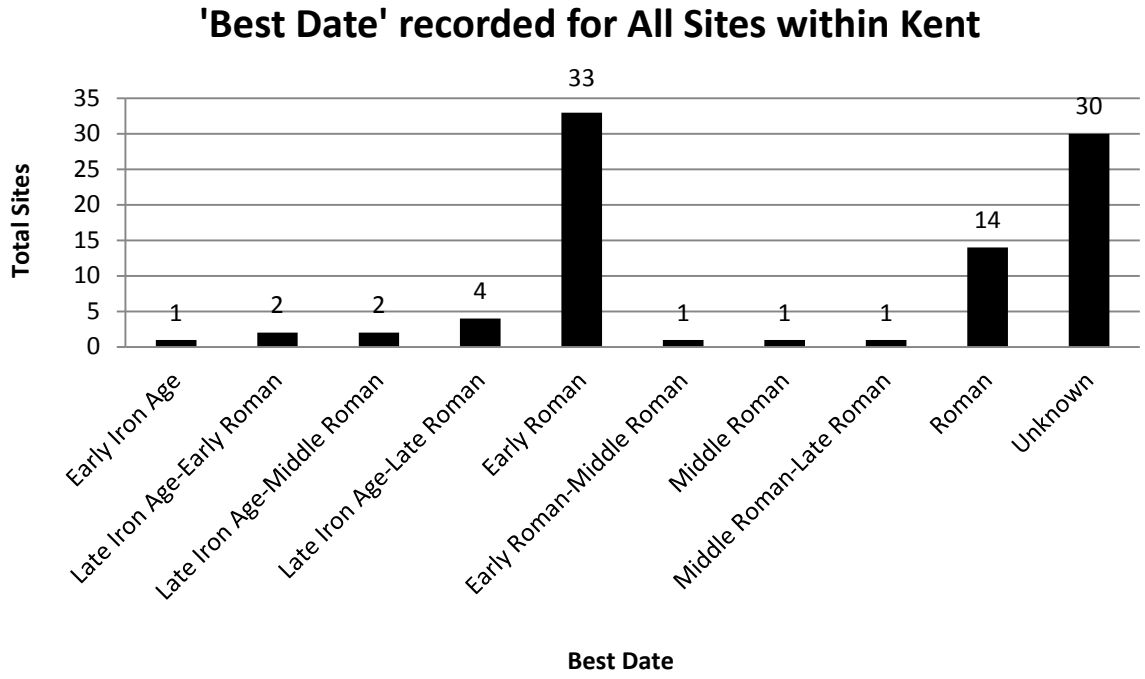


Figure 5.1 Graph showing the Best Dates for all salt-production sites in Kent

The salt-production complex at Lydd, Romney Marsh (Site 82, and also probably Site 13), (Group 4) also has Late Iron Age origins, although defining the scale of salt-production at this time is difficult as site phasing is still on-going. However, it appears that the majority of salt-production occurred in the Early Romano-British period.

North Kent and Romney Marsh, as well as some scattered coastal sites across south-east Kent, experienced a significant increase in the production of salt within the 1st -2nd century AD (Figure 5.1). A total of 34 new sites *started* within the Early Romano-British period (Figure 5.1), many within the Medway Estuary. It is highly probable that the 14 salt-production sites just recorded as 'Roman' (Figure 5.1) also had their origins within the Early Romano-British period.

The inner environs of the Medway Estuary contains multiple, discreet, salt-producing working areas that could have been potentially linked, forming a single large, complex. There are subtle chronological shifts within this area. Group 2a sites appear to have been active longer than Group 2b. Group 2b was the first area focused upon for salt-production with c.19 sites, dating to between the 1st century BC and 1st century AD. Group 2a, also containing c.19 sites, was mainly active between the 1st century AD and the 2nd century AD.

The 1st and 2nd centuries AD were particularly important for salt-production in Kent. In addition to the sites in Group 2a, at least three new salt-production sites (Sites 27, 28 and 29) appeared within the Hoo Peninsula (Group 1). During the same period at least three sites appeared on the coastline on the edge of the Medway Estuary in the Funton Marsh area (Group 2c), (Sites 41, 42 and 62). Similarly at least five sites in Group 3, Romney Marsh can also be dated to the 1st-2nd centuries AD.

Most sites in the main Kent groups appear to have ceased between the Late 1st century to 2nd century AD. with only a small number of sites continuing further. However, at least four sites continue into the 3rd century AD. Two of these sites are in Group 1 (Sites 28 and 30); the former continuing until the 3rd century AD, and the latter until c.300 AD. The other two are in Group 4 (Site 82: potentially has later phases of this date, but this is not certain) and Group 2 (Site 62).

One site is unique (Group 2, Site 90) in that it appears to have *started* producing salt in the 3rd century AD, possibly even continuing into the 4th century AD. In total therefore, five sites appear to continue into the 3rd and 4th centuries AD in Kent.

It is possible, that the general decline in the number of sites involved in salt-production within Kent during the 2nd-4th centuries AD, was due to more focus being placed upon large site 'complexes' which would have provided intense competition. If it could be proved that Site 82 was still producing salt on a significant scale during the Middle-Late Romano-British period, then this could have been the main complex for salt produced in Kent. However, early indications do appear to show that most of the salt-production at Site 82 occurred in the *c*.1st century AD (Priestley-Bell 2006). Therefore, it is probable, that only small-scale salt-production was taking place in the Late Romano-British period in Kent.

The recent discovery of a large, multi-phased salt-production complex at Stanford Wharf (Biddulph *et al.* 2012), with the last phase dating to between the 3rd and 4th centuries AD, just on the other side of the Thames Estuary (discussed further in **5.3.2**), could also be a reason for the decline in Kentish salt-production at this time.

5.2.3 Overview of Briquetage

As shown in **3.4.3**, briquetage containers and supports were common across most sites in Kent. Like most other regions of the study area, briquetage data from Kent has been relatively poorly identified and recorded; therefore it is difficult to make any observations about trends further than stating that briquetage containers and supports were commonly part of salt-production.

Briquetage containers were present on at least 24 of the 52 sites in Kent with briquetage assemblages. Of these sites, only ten had recorded container form and therefore discussion of container trends is limited. However, a limited chronological profile is presented in Figure 5.3. Seven sites contained Type 1 containers, four sites contained Type 2 and only three contained Type 3 (four sites contained more than one form). Evidence for Type 1 containers, is particularly prevalent in the Medway Estuary and Higham areas (Figure 5.2: left), where unstratified large fragments are often found (Ian Jackson *pers comm*.).

Figure 5.2 Left: Example of a c.1st century AD. flat-based briquetage container found on the foreshore at Higham, Kent (Type 1) Right: Remains of a Type 1 briquetage container from Site 30, Cooling, Kent (Author: 2008)

Direct evidence for the use of lead containers remains limited to Site 32 (Group 2c), (Table 3.6), therefore it should be noted that the timeline for this type in Figure 5.3 is only based upon this one site. There is currently no evidence that this form was commonly employed in Kent.

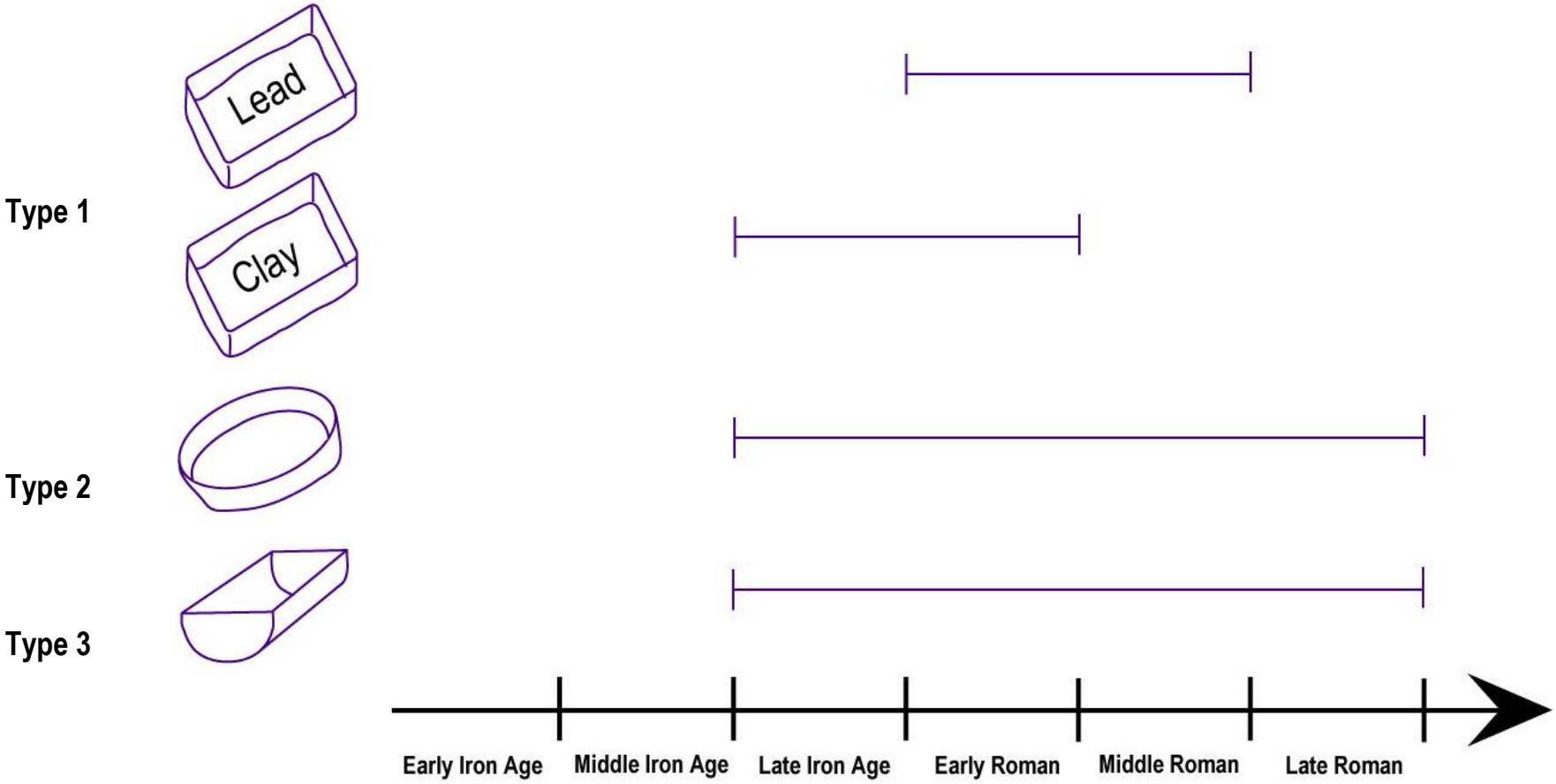


Figure 5.3 Basic Typology and Chronology of containers used for salt-production in Kent (coloured forms present only)

Briquetage supports were recorded on at least 21 out of 52 sites with briquetage assemblages in Kent, although, as with containers, form evidence is limited. Despite this, there is evidence that all the three main briquetage support forms were used (pedestal, bar and slab), (Figures 5.4 and 5.5).

Pedestals were identified from at least five sites (Sites 13, 30, 39, 82 and 299), (Table 10.1.31). Of those sites, four contained rounded pedestals: Types 1 and 5 (Table 10.1.28 and Figure 5.3), varying in thickness and height across the region. They appear to have been employed from at least the Late Iron Age until the start of the Middle Romano-British period (Figure 5.4).

Most information gained about rounded pedestals in Kent, has been obtained from a single site: Site 82 at Lydd Quarry (Group 4), which contained an exceptionally large, well-preserved and varied briquetage assemblage. In fact, the site contained the full briquetage 'toolkit', including containers, pedestals and ad-hoc support material (Figures 5.5-5.6).

A sample of pedestals was observed during a visit to the archive whilst they were still being processed (during post-excavation), and they were all identified as Rounded Pedestals: Types 1 (including 1a) and 5. Although the forms remained similar, there was a lot of variation in thickness and height (Figure 4.63 and Figures 5.5-5.6).

One pedestal was at least c.20cm tall (Figure 5.5: right) which is unusually tall for a Type 1 pedestal in the study area. The closest comparison, is in Essex, at 'Osea Road', (Red Hill site) where one similar near complete Type 1 pedestal was *c*.30cm in height (Fawn 1986). It is difficult to imagine these taller slender pedestals being stable when supporting containers, and therefore they would have at least needed to have been fixed within a hearth base or clay surface.

As considered in **4.0**, variations in pedestal dimensions are mostly determined by the size and depth of the hearth they were used within (and vice-versa), which could provide insight into the preferences of individual producers.

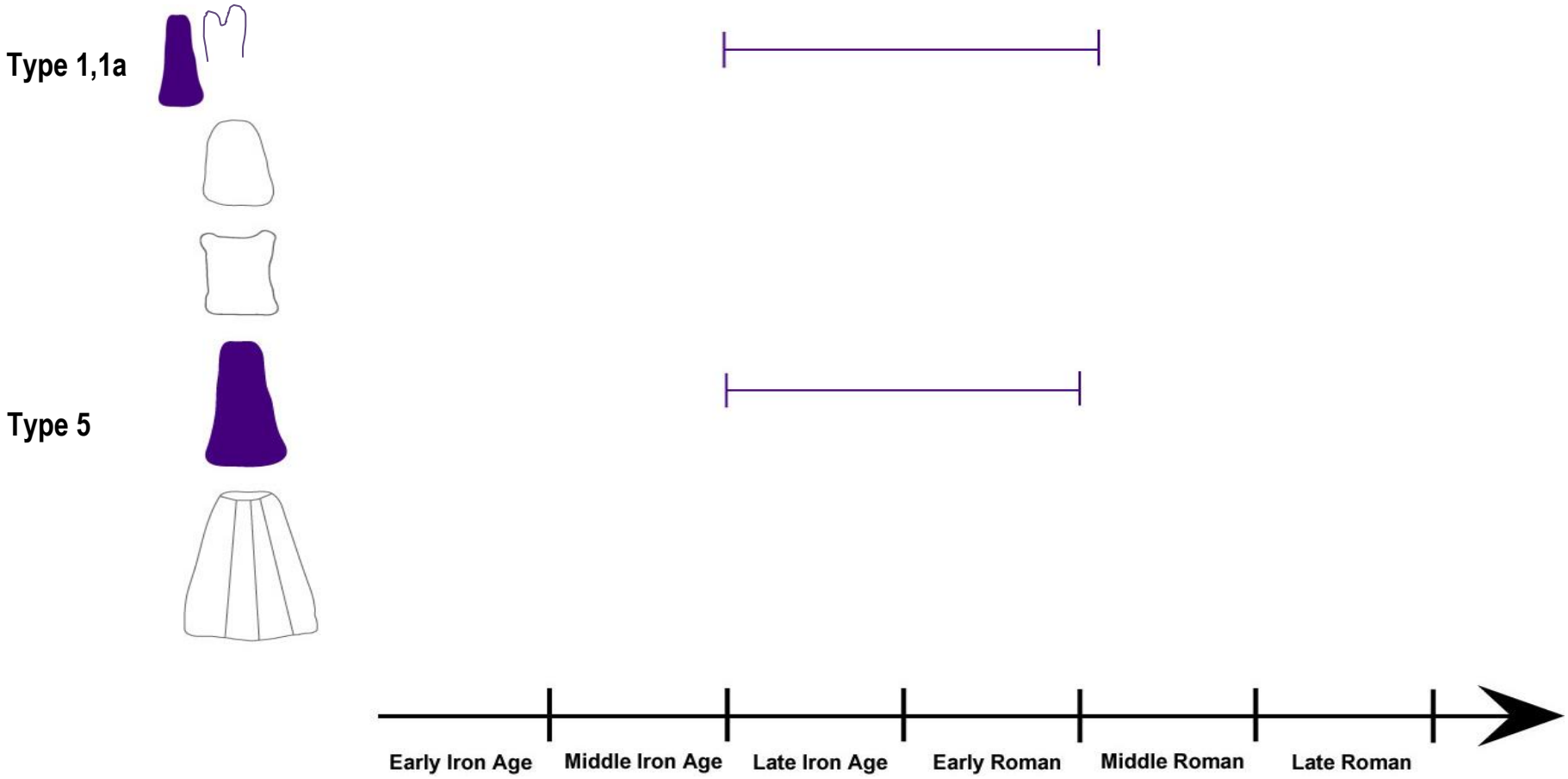


Figure 5.4 Basic Typology and Chronology of pedestals in Kent (coloured forms present only)

Figure 5.5 Selection of Type 1 and 5 Rounded Pedestals from Site 82 (Author: 2008)

Figure 5.6 Selection of briquetage supports from Site 82. Left: Eroded Type 1a Rounded Pedestal; Centre: Rods (Stabiliser Type 4); Right: Ad-hoc Stabilsiers (Author: 2008)

This assemblage could also potentially shed light on the briquetage used on other sites in Kent. The rods shown in Figure 5.6: centre, could have been crude pedestals that were created quickly to replace broken pedestals.

Briquetage support bars and wedges (Figures 5.8-5.9) were used on at least eight sites (Sites 25, 30, 32, 41, 42, 299 and 312 and 316) in North Kent (Tables 10.1.22 and 10.1.35). No evidence for the use of bars in southern Kent has been found, although this is most probably due to a lack of sites other than Site 82. Sites 30 and 299 employed both pedestals and bars; it is currently impossible to prove that they were used together, but it seems probable. Kent also had the greatest variety of bar form within the study area (Figures 5.7-5.8).

Bars appear to have been a 1st century AD introduction (Figure 5.7). A square bar (Type 1) was found in association with Site 25 in Queenborough, Swale. This site consists of a 'salt mound' and was assumed to have belonged to a later period. However, the square bar could indicate that this site was Roman and this supports the need for further work on these particular mound sites.

Of the six sites that had bars, four were recorded as triangular (Type 4) and outside of Kent, these forms are only seen in Essex (Figure 5.8). The wedge (Type 6) is possibly a variant of the triangular bar, and occurs on three sites in North Kent (Sites 30, 41 and 316). These forms appear to have been short-lived, and used predominantly within the Early Romano-British period.

Similarly, the use of the ‘Slotted Lumps’ and separate slabs (Figures 4.47) in North Kent also appear to be mainly restricted to the Early Romano-British period, suggesting that this period was a time of more experimentation in the creation of equipment to produce salt. This could also simply be due to there being more sites and therefore more forms during this period. These lumps of concreted clay containing embedded slabs, are discussed further in **5.3.2.3**.

The use of wedges, bars and slabs in North Kent could be due to the proximity of sites to pottery production sites which also used similar forms. Site 30 was a combined salt and pottery production site (Miles 2004).

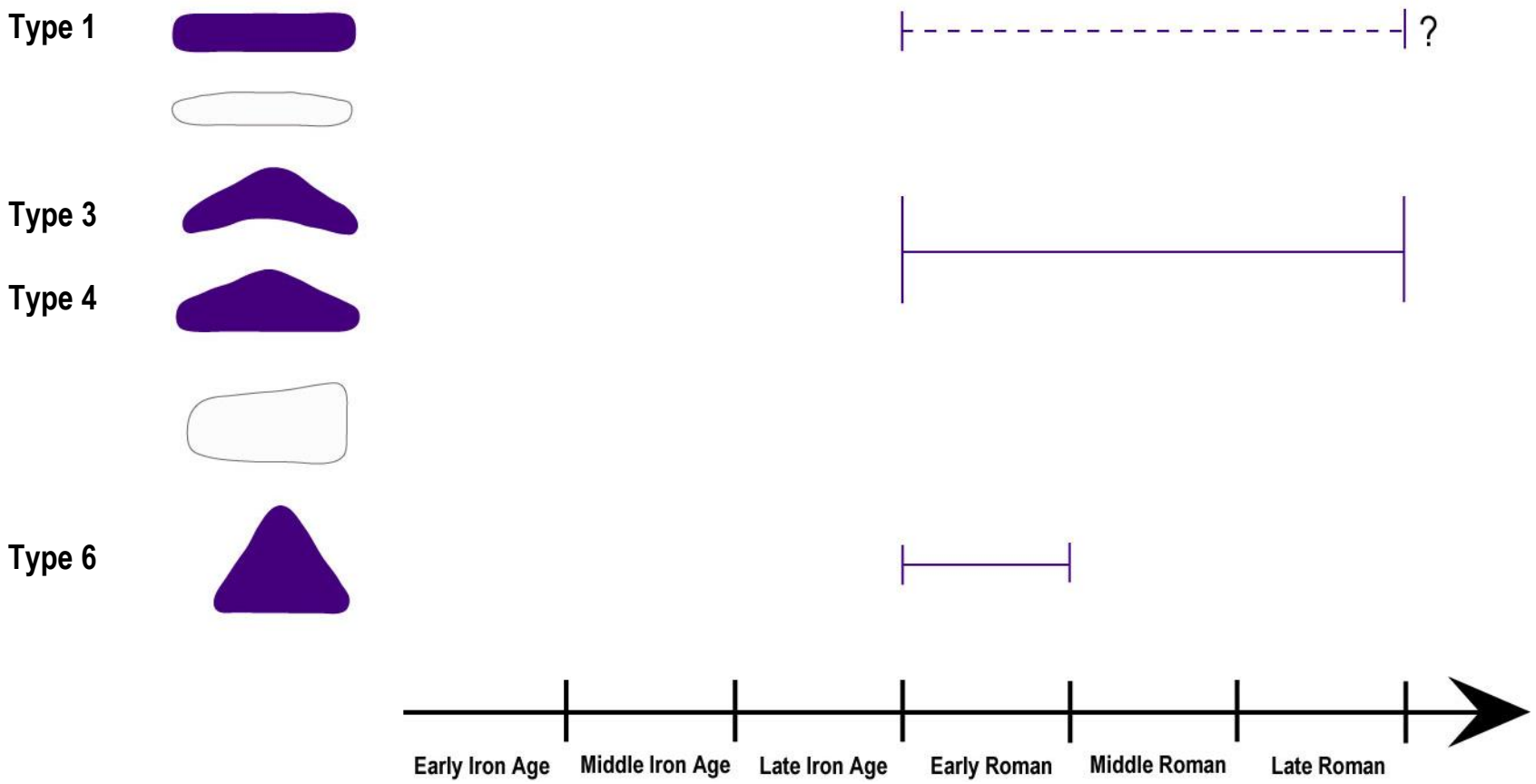


Figure 5.7 Basic Typology and Chronology of bars in Kent (coloured forms present only)

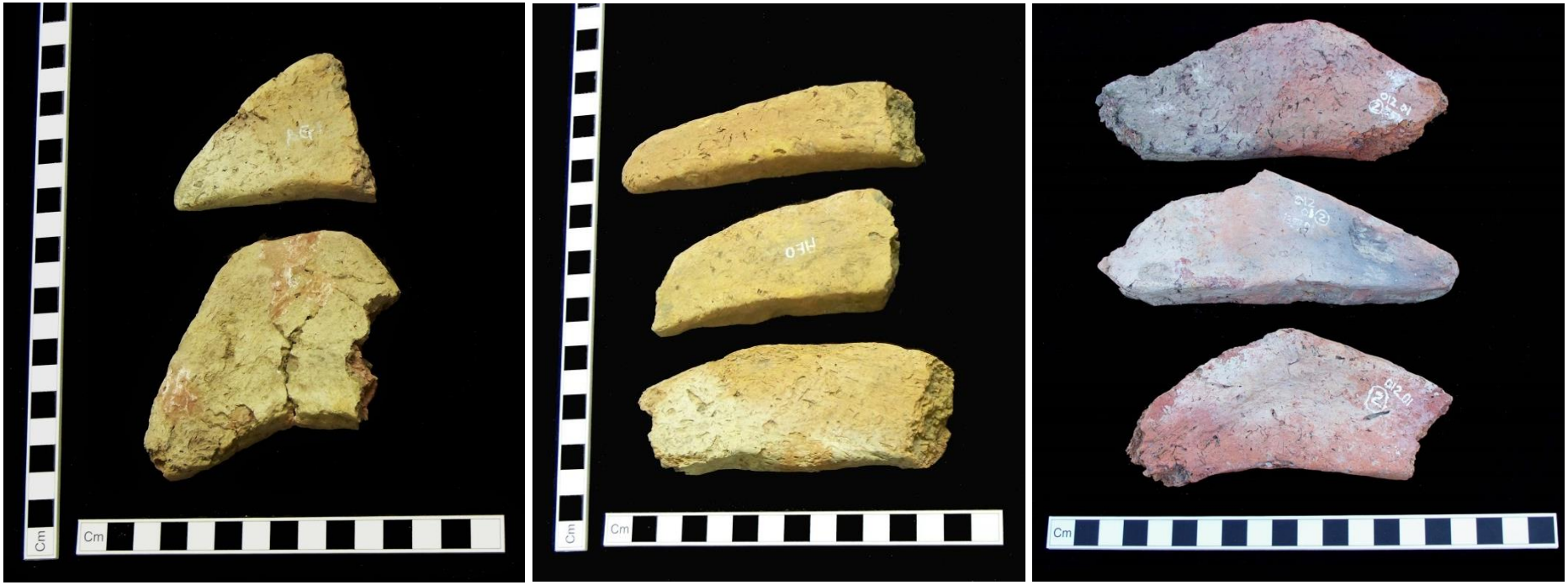


Figure 5.8 Left: Rare 'Arrow'-shaped wedge (form of Type 6) from Site 30, Cooling Centre: Triangular/Boomerang Type Bars (Types 3/4) from Site 30, Cooling Right: Triangular Bars (Type 4) from Site 42, Upchurch Marshes, Medway Estuary (Author: 2008-2009)

Given the problems identifying ‘meaningful’ chronological trends in the briquetage, it is possible that trends could be more evidenced in the exceptionally well-preserved working areas. This will be explored further in **5.3.1**.

5.2.4 Overview of Site Spatial Distribution

5.2.4.1 Group 1: North Kent Mainland (Table 5.1, Figures 10.3.3 and 10.3.11)

This area contains a scatter of sites exploiting the coast on the fringes of the River Thames to the north and the Medway Estuary to the north-east and south. Of greater significance, are those sites exploiting the extensive marshes containing saltwater inlets in the Cooling and Hoo areas (Figures 10.3.3 and 10.3.11).

Four sites are located on the coastal fringe (from east to west: Sites 316, 72, 74 and 289) and seven are further inland (Sites 69, 85 30, 29, 28, 27 and 66).

There is a significant cluster of sites exploiting the marsh area near Cooling. These sites exploited a series of small inlets and creeks, many of which are still visible today. **Site 85** is associated with a small branch of the 'Cliff Fleet' running through the Cliffe Marshes. Sites 27-29 all exploit an old tidal inlet leading from Egypt Bay into the Halstow Marshes. Site 30 covers a large area (Figure 10.3.11: shaded **orange**). This substantial ‘production zone’ generated large amounts of material and must have exploited the inland reach of either the Cliff Feet or the Decoy Fleet. Site 316 also covers a large coastal area either side of Cliffe Fort.

This area contains a rare example of a multi-phased substantial salt and pottery production site (specialising in Black Burnished Ware production), (**Site 30**), (Miles 2004). Although pottery production working areas are not shown in the site plan in Figure 5.9, pottery kilns in the site environs have been revealed during much earlier excavations at this site (Figure 5.10: left) and large quantities of pottery have been retained in the archive of Maidstone Museum (Figure 5.10: right).

The plan in Figure 5.9 does however, reveal at least four working areas (highlighted), with at least two confirmed as certainly being used in salt-production (**darker blue** highlighted areas).

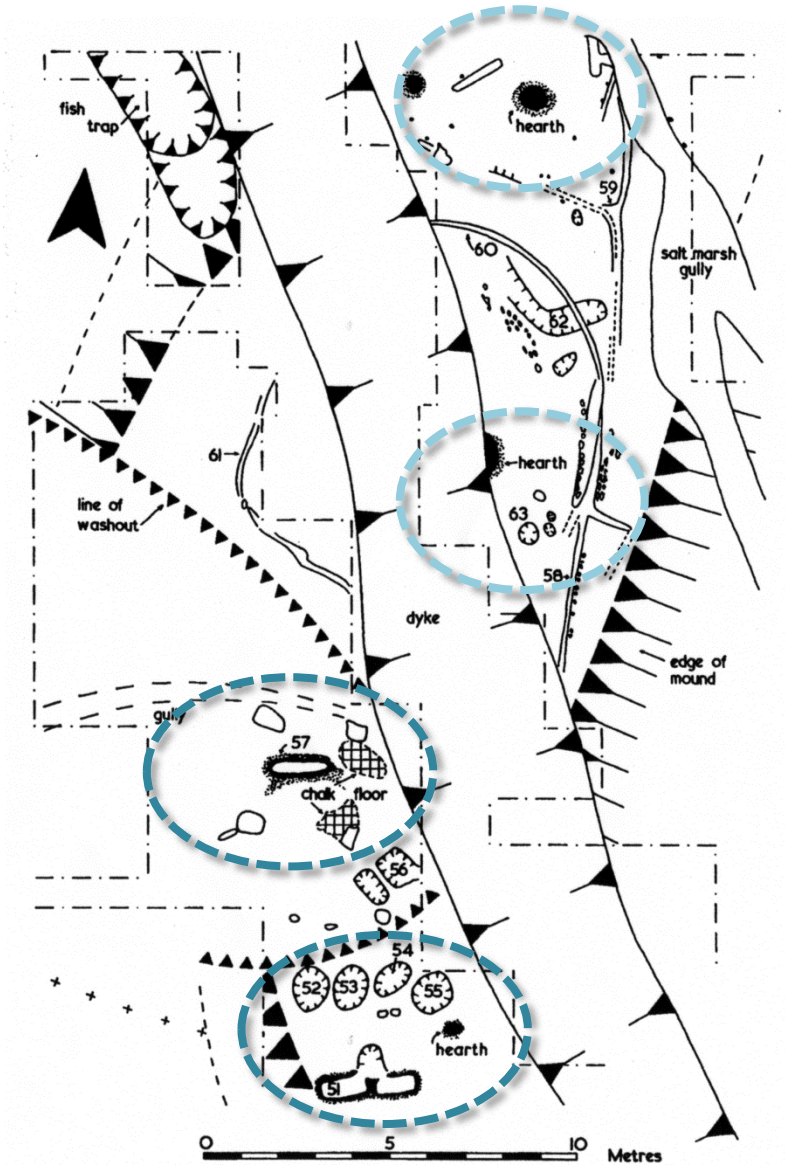


Figure 5.9 Rare multi-phased area of salt-production at Cooling (Site 30): Working Areas highlighted in blue (Adapted from Miles 2004: 319)

Only the lower two working areas were subject to more detailed investigation during excavation, which revealed they were not contemporary (**5.3.1**). The upper two working areas appear to resemble working areas for salt-production as opposed to pottery, but without more information, their association remains speculative. Site 30 appears disconnected in the modern landscape, but originally exploited the saltwater inlet branches in Cooling Marsh.

As stated earlier**,** Sites 27-29 (Ocock 1967; Miles 1975) are close to a saltwater inlet (Decoy Fleet) which fed the marsh (Figure 10.3.11: shaded grey). Sites 28-29 represent scattered briquetage findspots, whilst Site 27 represents a briquetage debris mound).

Figure 5.10 Top: Earlier excavations of a well-preserved Romano-British pottery kiln at Site 30 (photograph within site archives in Maidstone Museum) Bottom: Large quantities of pottery from Site 30 in storage (inset: BBW) (Author: 2009)

If this marsh area was originally managed and exploited as a *whole*, it is possible that the debris deposition sites are related to the main working areas in the area covered by Site 30. Sites 27-29 are all located on the edge of the Cooling Marsh at a point where topographically, the lowland marsh gives way to gradually higher ground (Figure 10.3.11).

Therefore, it is possible that this area on the eastern perimeter of the Cooling Marsh was used for briquetage deposition (Figure 10.3.11: shaded in **grey**) in order to keep the main working areas in the within the large environs of Site 30

(Figure 10.3.11: shaded in **orange**) clear of debris. However, these sites are also located closely to the saltwater inlet of Decoy Fleet, and if this inlet has not drastically changed route, then this could strongly suggest Sites 27-29 exploited this inlet for salt.

Sites 27-29 all contained briquetage and pottery indicative of local domestic occupation. Sites 27 and 29 also contained building material from a nearby settlement or a single Roman building, not commonly associated with briquetage debris deposition areas. Site 27 appears to have been a discreet, damaged, mound area whilst Sites 28 and 29 represent larger spreads of debris (Site 28 covered an area at least 50 m²). It is very plausible that these sites form part of a *larger managed area of debris deposition* from nearly occupation sites and salt-production (no settlements have yet been found and the nearest 'Actual Site' is Site 30). Chronologically, Sites 27 and 28 appear to have origins in the 1st century AD whilst Site 29, the 2nd century AD. Site 28 is the largest 'snapshot' into this large deposition area and was continuously used for some 300 years (1st century-4th century AD). It could be speculated that Site 27 represented the first foray of debris deposition in this area as a mound, and then as more debris was generated, the mounds merged and developed into substantial debris spreads.

The mixed contents of the debris spreads in the area covered by Sites 27-29 suggests a *holistic debris management* and organisation system that was consistently used over a significant amount of time. This suggests a real attempt to manage this busy industrial and domestic area in order to structure and define the use of space consistently. The presence of building material in the contents of the debris could be potentially significant as there is often little evidence of occupation or 'domestic activity' at salt-production sites. At least one other salt-production site in Kent (Dawkes 2011) also had potential evidence for building material within debris (this Sittingbourne site was discovered after data collection so has no Site ID, but is discussed further in **5.3.1**). It is possible that they infer the presence of nearby settlements, but given the building material appears to represent material from more high status buildings with elaborate tiled roofs, then the possibility of a villa being nearby is very plausible. Clearly, this raises the question as to whether this site was part of land owned by a villa owner, and this will be considered in **5.2.5**.

Therefore, in this salt-producing landscape, the central area of Cooling Marsh was used for salt-production (Site 30) whilst the eastern area was used for debris deposition (Sites 27-29). There is no evidence that Sites 27-29 represent a stage of salt-production other than Stage 4, but it is always possible that the nearby creek was used in a later stage of the process, perhaps to cleanse and dry salt, or that these represent separate salt-production sites. Site 30 was used for salt and pottery production from the 1st to early 3rd century AD, which is consistent with the dating of Site 27-29 (although Site 28 appears to continue later).

Site 316 (Miles 1975), (Figure 10.3.11: highlighted in **purple**) is another 'Actual Site', located in an area which was probably part of a larger zone of salt-production at Cliffe. **Site 72** was probably a salt-production site now lost to the sea (Wessex Archaeology 2006). Site 316 could date to as early as the 1st century BC, continuing into the 1st century AD (although the eroded and damaged nature of the site limited archaeological investigations so dating and stratigraphy were uncertain). This site appeared to have been situated within an artificial mound, similar to those at Site 27 and Site 30. It was uncommon to use mounds on other salt-production sites in Kent. **Site 316** probably started before the extensive salt-production in the Cooling Marsh to the east. **Site 69** (Figure 10.3.11) was recorded in the HER as a 'salt works' with no other details and could perhaps represent an area of debris deposition from salt produced in and around Site 316.

Site 250 (Figure 10.3.11) to the east in Stoke Marsh currently sits alone as an area of Romano-British pottery and briquetage debris (Miles 1975). It is similar to the debris deposition sites of Sites 27-29. The site is located within another area of marsh that would have been ideal for salt-production. It is very likely that more sites will be found in Stoke Marsh should further archaeological investigations be carried out.

There is another briquetage and pottery findspot to the south of the saltings in Stoke Marsh (Site 289) (Wessex Archaeology 2005). **Sites 289** and **250** could represent debris deposition areas surrounding working areas located within the area of salt marsh between the two sites (Figure 10.3.11). This area is known as ‘Stoke Saltings’ and would have been an ideal area to produce salt during the Romano-British period. This marsh area is also relatively close to the area of

intensive predominantly 1st century AD salt-production in the Medway Estuary to the east, and could have been exploited during this period also.

Site 66 (Figure 10.3.11: highlighted in **light blue**) has long been thought to represent an area used for salt-production and consists of a square earthwork enclosure (HER). However, it is unclear why this site was thought to be associated with salt-production other than its coastal location and it seems more probable that it is associated with medieval salt-production (earthwork enclosures are not rarely associated with Iron Age and Romano-British salt-production). Further archaelogical investigationis required in order to establish the data of the enclosure.

Finally, **Site 315** (a new 'site' identified by author in the Maidstone Museum Archives) represents a very different briquetage findspot. Although there was no grid reference, it was probably from the area (Figure 10.3.11: highlighted in **green**) close to Sites 289 and 66 (highlighted in **light blue**). This unique find consists of a single briquetage container (Figure 3.37) which was buried containing cremated bones and fragments of a very large jar and pedestal urn base, all in the same light orange, well-fired fabric with little temper. It is probable that the fabric consisted of natural untempered clay from the area within which it was deposited (the area was extensively exploited for high quality brick clay in the last century).

The briquetage container was probably complete when deposited. It was constructed very carefully and was superior to any other briquetage container fragments found on Iron Age and Romano-British salt-production sites. It is therefore considered that this container could have been created specifically to be buried as a symbolic deposition within a landscape heavily associated with salt and pottery production. This also indicates that the good quality clays were originally exploited far earlier in Romano-British period. Symbolic behaviours assoicated with salt production are further discussed in **7.6.1**.

5.2.4.2 Group 2 (2a-c): Medway Estuary (Table 5.1, Figures 10.3.4-10.3.6 and 10.3.12-10.3.14)

The River Medway was a busy trade route during the Romano-British period and the Bishops Saltings sites are well placed for exploiting this route. The Medway

Estuary was by far the most concentrated area of salt-production and has been separated into three sub-groups (Medway Estuary Groups 2a-2c; Figures 10.3.4-10.3.6 and 10.3.12-10.3.14). This area again divided into sites based on the coastal fringes of the mainland, and sites located in the more complex areas of small islands and mudflats within the estuary.

Detailed discussion of site location within the Medway Estuary is somewhat restricted by the subtle changes in the coastal landscape and waterscape. For example, some creeks become substantially wider at certain high tides. Also, without detailed analysis of deposits in and around these sites it is difficult to relate the modern waterscape to the waterscape of 2000 years ago. Therefore, site clusters and locations will be discussed according to their modern context with some speculation about their ancient waterscape context.

Working within these unstable island areas of restricted ground surface, would have provided logistical issues for salt-production. It is likely that these current disjointed mudflats formed larger masses of higher ground in the Iron Age and Romano-British period. Gaining access to these islands (if they were indeed disconnected from the mainland) may have been achieved via sandbanks exposed during low tide or by boat.

Group 2a (Figures 10.3.5 and 10.3.13)

Group 2a in the Medway Estuary contains at least 17 sites, including two main concentrations (South and North). Group 2a consists of a series of small raised areas of ground in the mudflats of Bishop Saltings and includes (from west to east) Sites: 19, 48, 50 and 18, 47, 84, 17, 49, 44, 56, 55, 43. This area is flanked to the north by a large channel (Pinup Reach and Long Reach) and to the south by a much smaller creek (South Yantlet Creek). **Site 45** is now located within mudflats detached from the higher ground (near Bishop Ness) as a result of subsequent sea level rise.

Darnet Ness/Bishop Saltings (Figure 10.3.5 and 10.3.13: purple)

Site 19 was a possible working area (Actual Site) as there was an associated ditch but detail was vague to poor preservation (Jackson 1992; Upchurch Archaeological Research Group 1999). All three sites contained briquetage and pottery, similarly to most other briquetage findspots across Kent. **Sites 48** and **50**

contained local coarsewares and finewares. Both sites also contained animal bone, which could have resulted from either domestic activity, or was associated with the salting meat. Site 48 also contained Samian Ware, which is not commonly found on salt-production sites in Britain (*ibid*).

Briquetage from Site 48 was very abraded, although it is difficult to ascertain whether this is due the way the material was deposited originally (exposed and trampled) or due to more recent coastal erosion. There was also evidence for 'slotted lump material' at Site 19 (Figure 5.11), as seen in many sites in this group (discussed further in **5.3.2.3**).

Site 19 was also associated with archaeological features including the ditch and postholes. Upon first observation, this site was a contender to have been the main working area in this zone, whilst Sites 48 and 50 could represent debris generated from Site 19, although this would have covered a large area of over 100m.

Figure 5.11 Slotted Lump from Site 19 (Author: 2009)

However the dates to do not support this relationship, as Site 19 appears to have been of a 1st-2nd century AD date, whilst Sites 48 and 50 could date to between the 1st century BC-1st century AD. This suggests that Sites 48 and 50 represent the damaged remains of a separate salt-production working area.

However, dating these sites remains tentative, as the pottery assemblages have yet to be formally assessed.

Bishop Saltings/Bishop Ness (Figure 10.3.5 and 10.3.13: orange)

Sites 47, 43, 56 and **45** are all similar in nature and represent scatters of briquetage, pottery and animal bone. Sites 43, 56 and 45 all appear to date to between the 1st century BC-1st century AD whilst Site 47 is recorded as Romano-British (Wessex Archaeology 2005).

Site 17 is recorded as 'Unknown' due to there being no direct evidence for salt-production. However, the site covers a large area, covered in the remains of probable wooden structures. Potentially, this represents the remains of a jetty contemporary with the main period of salt-production in this area (1st century AD pottery was found scattered around the site). If the nature and date of this site can be confirmed, it would indicate an important site for the transport of salt (Jackson 1992; Upchurch Archaeological Research Group 1999; Wessex Archaeology 2005).

Although no briquetage was found in **Sites 18, 84** and **55,** they are contemporary with salt-production in this zone (*ibid*).

The 'Actual Site' and main working area at **Site 44** is contemporary with these Briquetage Findspots and consisted of two distinct 'firing areas' and areas of burning with 'light structures' which appear to have been hearth areas with some covered areas, perhaps wind-breaks. 'Slotted lump material' was again noted at this site. Given that this site cluster and working zone is larger than the area directly to the west it seems likely that some of the Briquetage Findspots in this area are associated with further working hearth areas.

Most of the sites in the Bishops Saltings area appear to respect small channels currently running through the area suggesting the waterscape has changed little over the last 2000 years.

Nor Marsh (Figure 10.3.5 and 10.3.13: green)

To the south of the main concentration of sites there are three 'Actual Sites' and working areas (Sites 20, 314 and 312) with one 'Briquetage Findspot' to the east in

mudflats at Site 54 in an area known as Nor Marsh. Nor Marsh is flanked to the north by Yantlet Creek and to the south by Bartlett Creek.

Assuming the current courses of the water branches are similar to their course in the Roman period, the small branch of the Bartlett Creek leading north, clearly fed Sites 314 and 312 with saltwater. **Sites 312, 314** and **20** appear to all have been of a similar 1st century AD date and all had evidence for salt-production in the form of briquetage and possible feeder channels (Jackson 1992; Upchurch Archaeological Research Group 1999).

Site 312 also contained a hearth as well as a particularly varied briquetage assemblage, which included perforated slabs, wedges and deep rounded briquetage container fragments (Figure 5.12). There was also a probable brine transfer vessel, in the form of a pedestal pot that had been broken across the middle (Figure 5.12).

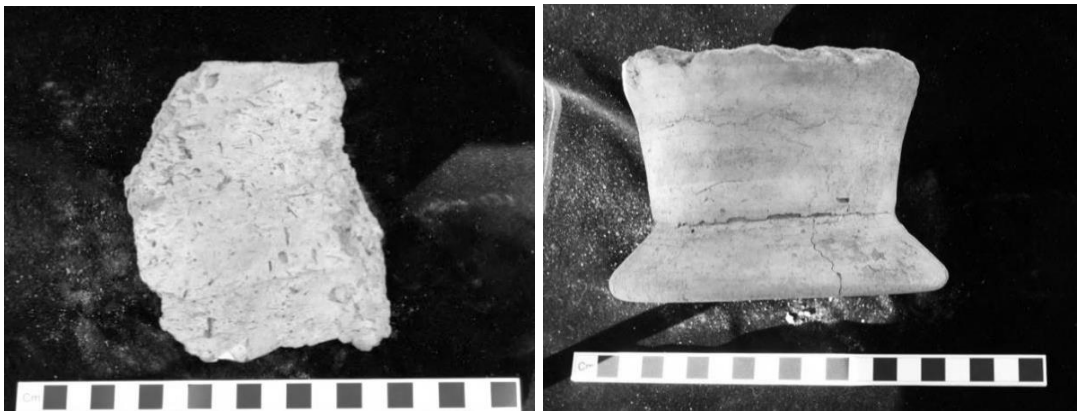


Figure 5.12 Left: Large fragment of a flat-sided briquetage container with a wiped exterior from Site 312 Right: Probable brine transfer vessel from Site 312 (Author: 2009)

Nor Marsh would have been continually inundated with saltwater. Similar marshes were heavily exploited in Essex and still are at the Maldon Saltworks. Therefore, although only one site has been identified here (**Site 20**), it is likely that a series of small working areas would have existed.

To date no sites have been discovered on the south side of Nor Marsh (facing South Yantlet Creek). This could suggest that either this area was not suitable for salt-production or more probably, that this area could have been joined to Bishops Saltings (possibly with the creek slightly dissecting it).

This particular salt-producing waterscape and distribution appears to represent salt-production activity spanning potentially between the 1st century BC-2nd century AD, however most activity appears to date to the 1st century AD.

Group 2b (Figures 10.3.6 and 10.3.14)

Group 2b sites are located to the east of those in 2a, across the large channel of Kethole Reach (which forms the entrance to the River Medway) and the smaller branch at Bartlett Creek. Group 2b covers a much larger area containing at least 19 sites split between three main 'islands', marshes and mudflats. It is flanked to the west by Kethole Reach and Bartlett Creek, and to the east by Stangate Creek, Sharfleet Creek and Milfordhope Creek.

Sharfleet Marsh (Figures 10.3.6 and 10.3.14: purple)

The first site concentration is located to the south of Burntwick Island (Figure 10.3.6), flanked by the Sharfleet Creek to the south and includes (from west to east) Sites 301 and 53, 52, 51, 57, 58, 59, 310. All these sites exploited the course of the Sharfleet Creek for saltwater.

These sites were again fragmented and truncated by seawater inundation and erosion. **Site 301** was at some distance away from the main group of sites in this concentration in mudflats. Similarly to some sites in Group 2a, Early Romano-British 'Slotted Lump' material was recorded within Site 301, along with butchery waste and a ditch (Upchurch Archaeological Research Group 1999). Two distinct 'tipping' deposits were identified within the ditch, both containing slotted lumps. This probably represents two episodes of dumping the remains of hearths that were either abandoned or reconstructed.

Site 53 also contained Romano-British pottery, animal bone and briquetage (*ibid*). Sites 57, 58 and 59 have been speculated to represent one large single Early Romano-British salt-production site (Upchurch Archaeological Research Group 1999; Wessex Archaeology 2005). **Site 57** again, contained slotted lump material as well as finewares. The slotted lumps were found in two 'rectangular formations' approximately 600mm in width and varying in length from 900mm to 1500mm (Ian Jackson *pers comm*.).

The presence of fineware on a salt-production site is perhaps surprising. Whether this is evidence of trade, pottery production, or domestic activity is currently unknown.

Site 58 contained similar briquetage, pottery and also butchery waste. Site 59 contained a 'double ditch' feature containing briquetage and peat (perhaps the remains of the fuel used for salt-production?). Two hearths were also observed (details unknown). **Site 59** contained a creek, that was modified for the supply of saltwater, which contained extensive briquetage, pottery and butchery waste. The remains of butchering waste is of interest as the area was probably not used as a settlement. Further assessment of the asssemblage is required, but it could represent evidence for the salting of meat in this area.

Site 310 appears to be of a later date and contained burnt debris (briquetage?) and pottery dated to between the Middle-Late 2nd century AD (Upchurch Archaeological Research Group 1999).

Slayhill Marsh (Figures 10.3.6 and 10.3.14: orange)

The second concentration of sites is located in the Slayhills Marsh, flanked to the north and north-west by Sharfleet Creek, to the west by Stangate Creek and to the south by Milfordhope Creek. Site distribution is currently restricted to the western side of Slayhills Marsh. This area includes Site 64 at the northern end and Sites 299, 309 and 308 at the southern end where the furthest reach of the Sharfleet Creek has been exploited. This particular creek provides the focus for most sites in this area perhaps because it had particularly high salinity levels.

Site 64 is similar to most other 1st century AD. 'Actual Sites' in the Medway Estuary, producing briquetage, and a hearth (Upchurch Archaeological Research Group 1999). However this site also has the addition of a cremation burial. This is discussed further in **7.0**.

Sites 308 and 309 appear to be closely linked and were either contemporary separate sites (*ibid*), or part of the same site. Although unfortunately no plans or details were available, both sites appear to have contained particularly well-preserved features. **Site 308,** dating to c.1st-2nd century AD, was described as containing a working area of two hearths and three brine tanks as well as an

enclosure ditch and possible 'timber drains' (Upchurch Archaeological Research Group 1999). It is possible that this represents evidence for a wooden sluice gate. More evidence for water management features and brine tanks were recorded at **Site 309** (*ibid*), and it is possible that the water management features fed more than one working area.

Unusually, no briquetage was identified on either sites, suggesting that perhaps portable 'slotted lump' material was used here also. It could also suggest that debris was well-managed, perhaps dumped in spreads outside the main working area of the site.

Site 299 was also well-preserved, and was probably a combined pottery and salt-production site. Within the site, features described as 'three sunken kilns' and three 'sunken permanent furnaces' were recorded (*ibid*). It is unclear how these features differed from each other, but it is plausible, that the features were all related to salt-production.

However, the presence of material described as 'pottery wasters' does suggest that small-scale pottery production was also carried out here. The finds require further assessment as well as an accessment of plans or site photographs to confirm this. Although this area is perhaps not suitable for a permanent pottery-production site, due to its unstable location, it was perhaps the site of temporary production alongside seasonal salt-production.

Further evidence for the use of these liminal areas for the deposition of human remains was revealed in Site 299. There were two 1st century AD child inhumations and a further cremation burial (*ibid*), supporting the use of this waterscape for both industrial and more symbolic purposes.

Millfordhope Marsh (Figures 10.3.6 and 10.3.14: green)

The third site concentration was at Millfordhope Marsh, which is flanked by Millfordhope Creek to the north, and Twinney Creek to the east. There are site concentrations to the north (Sites 63, 60 and 311), and to the south (Sites 61 and 313). Sites 63 and 60 contained Middle-Late 1st century AD briquetage and pottery, including two debris pits at Site 63 (Upchurch Archaeological Research Group 1999). Site 63 was also the third site in the Medway Estuary, to contain

contemporary (or possibly slightly later, into the 2nd century AD) burials. Three cremation burials were found, *respecting* two areas of briquetage (*ibid*). Given the close proximity of these two sites, and the similarities of the evidence, it is likely they are part of a single site, perhaps an area of debris deposition linked to a nearby undiscovered working area.

Site 311, was contemporary with most other surrounding sites (1st century AD) and contained a hard clay floor that appear to have been used for hearth bases, as well as hardstanding (*ibid*). Larger quantities of 'slotted lumps' were seen in this site, which could easily have been used to create portable hearths on the clay surface. It was also suggested that there was evidence for pottery-production at this site, however the evidence for this was not stated, therefore this remains unconfirmed.

Site 61 (Figure 4.18), to the south-west, represents a substantial 1st century AD salt-producing area. This site appears to incorporate at least four identical working areas, each of which consist of a single oval enclosed hearth and a set of three brine tanks, all lined and joined together with local clay. These are very distinct working areas and it is assumed that they were contemporary. Therefore it would appear that they were all created by the same individuals. This is the only site to have an oval hearth associated with slotted lumps (Figure 4.28). However, whether the lumps were used within this hearth, or simply dumped into the hearth after use, is unclear.

Site 61 provided evidence for a more complex salt-production site in the Medway Estuary. Given that this site is contemporary with most other salt-production sites in the vicinity (1st century AD), it may suggest that many other sites in this area were linked together in this way. To investigate this further however, more detailed archives such as plans, photographs and finds would need assessment.

Site 313 was also of a similar 1st century AD date and consisted of a spread of briquetage and pottery debris, typical on sites in this area.

Group 2c (Figure 10.3.4 and 10.3.12)

Group 2c consists of several sites distributed across the mainland coastal fringe of the Medway Estuary, in the Upchurch, Lower Halstow and Bedlams Bottom areas.

Upchurch Peninsula (Figure 10.3.4: red)

The first two sites (Sites 62 and 34) are located on the Upchurch Peninsula, facing north onto the mudflats of Hamgreen Saltings and the Ham Ooze. There is also a single site to the west of Lower Halstow (Site 42) and three sites in the Bedlams Bottom area (Sites 33, 90 and 32). Finally there is also a single site at Chetney Hill in Iwade (Site 35). All these areas exploited high tides that inundated the marshes and mudflats with saltwater. No sites have been identified to the west of Upchurch. The concentration of sites within the Upchurch area was probably influenced by the location of a contemporary pottery industry.

Site 62 is a particularly good example of a well-excavated and recorded salt-production site that is located in this dynamic coastal zone (Figure 4.31: bottom). It consisted originally of two brine tanks and a hearth, and was later converted to three hearths. This site produced fine, white slip decorated ceramic bowls/plates (Figure 5.13), (the assemblage is yet to be assessed). This site produced substantial quantities of butchered cattle bones (Ian Jackson *pers comm*.).

Figure 5.13 White slip decorated red ware plate from Site 62 (Author: 2009)

Although not assessed in detail, the bones appeared to nearly all be cattle skulls, long bones and pierced scapulae, indicating that shoulder joints of meat were hung (Figure 5.14). The assemblage, would appear to be too large for it all to

have been consumed by workers and this suggests that potentially, beef was salted at this site.

Figure 5.14 Small selection of the many cattle bones with evidence for butchery from Site 62 (Author: 2008)

Site 34 was later in date (2nd-3rd century AD) and produced evidence for a timber structure closely associated with at least three salt-production hearths (Upchurch Archaeological Research Group 1999; Wessex Archaeology 2002b). Similar to sites within Groups 2a and 2b there was another contemporary burial. Although in this case, it was a pot containing the remains of a single puppy (just outside the entrance corridor to the building). Although details were not available, the site was described as containing 'substantial debris' associated with salt-production.

The exact nature of the building is unknown. However, its location and association with salt-production hearths could suggest it was used for the storage of salt (or salted meat), but could also have been a home.

Site 42 is at some distance from Groups 2a and 2b, but it shares the same characteristics of sites in those areas. As at Site 311, Site 42 contained a hard clay floor associated with slotted lump material. Evidence for 'firing locations' (presumable hearths) and 'extensive briquetage' was recorded, as well as a circular ditch (also observed on several sites in 2a and 2b) and a natural inlet supplying saltwater to the site. This site also contained associated human

remains. They dated to the 2nd century AD in date were cremations, cut into 1st century salt-production debris. This could suggest that after the site had been abandoned, it was still perceived as significant enough to be used for burials. It would have been presumably more difficult to dig into a debris layer to deposit the cremations, than into natural, softer ground.

Site 33 is represented by truncated briquetage debris but appears to date to the 1st century AD. However, Sites 90 and 32 were well-preserved and distinctive in nature. As highlighted in **4.5.2**, **Site 90** (Figure 4.19) contained four highly fired features, including a set of three grouped tanks and an oval hearth, a particularly favoured hearth form in Kent. However, the state of the features was different, as all four had highly fired clay linings, including the 'tanks'. Although the three grouped features mirrored tank formations seen on other sites, they had clear evidence for being used as hearths in the form of vitrified linings. As discussed in **4.8** this demonstrates variability in techniques used to produce salt.

Site 32 (Figure 4.79), employed a linear hearth, similar to other sites within the Medway Estuary environs, and a possible larger open hearth area, represented by a large area of ash spread on the ground (Miles, 1965). Although heavily eroded by the sea, this site contained a large spread of well-preserved briquetage, including containers and bars.

Significantly, globules of lead were also discovered within the debris indicating that lead containers were probably used on this site. These are possibly the remains of a container that had over-heated and melted during use. Given that briquetage containers were also present, either briquetage containers were used originally, and then replaced by lead, or both forms of container were used contemporarily. It is possible that clay containers were used within the open hearth for drying salt, and that lead was used for evaporating brine within the hearth.

Although a more certain date for this site was not ascertained, the briquetage supports and especially the evidence for lead containers, would date the site to c.1st century AD.

5.2.4.3 Groups 3-4: Romney Marsh (Table 5.1 and Figures 10.3.7-10.3.8 and 10.3.15-16)

Sites in Romney Marsh have been divided into two groups: those exploiting the inner marshland areas (Romney Marsh: Group 3; Figure 10.3.7 and 10.3.15) and those exploiting the coastal inlets created in gravel within the Lydd area (Romney Marsh: Group 4; Figures 10.3.8 and 10.3.16).

Group 3 represent a limited, predominantly Early Romano-British scatters of briquetage and domestic debris (at least five sites: **Sites 16, 185-188**). These were discovered during systematic fieldwalking (Reeves 1992). These scatters represent damaged occupation and salt-producing areas and probably only represent a small proportion of sites. This area has been subject to drainage over the last 2000 years and the waterscape would have been much better suited to salt-production in the Iron Age and Romano-British periods. It is possible that this site was extensively exploited for salt during the Early Romano-British period, contemporary with the most intense period of production elsewhere in Kent.

Group 4 is only represented by two sites in the database (Sites 13 and 82), (Figure 10.3.16). However, these sites represent a single very large complex of salt-production working areas revealed during gravel quarrying. This site probably dates to between c.150 BC-AD 300 (Priestley-Bell 2006), (Figure 5.15). Although it is probable that the most intense phase was in the 1st century AD.

As highlighted throughout **4.0**, **Site 82** contains the best-preserved large salt-production 'complex' formed of multiple working areas (Figure 5.15: green dashed highlights) with sophisticated water management. It is possible to identify several compact working areas across the site, and discreet areas of debris deposition (Figure 5.15).

Some of the working area formations within Site 82 are also found in other areas of Kent, and this is explored further in **5.3.1**.

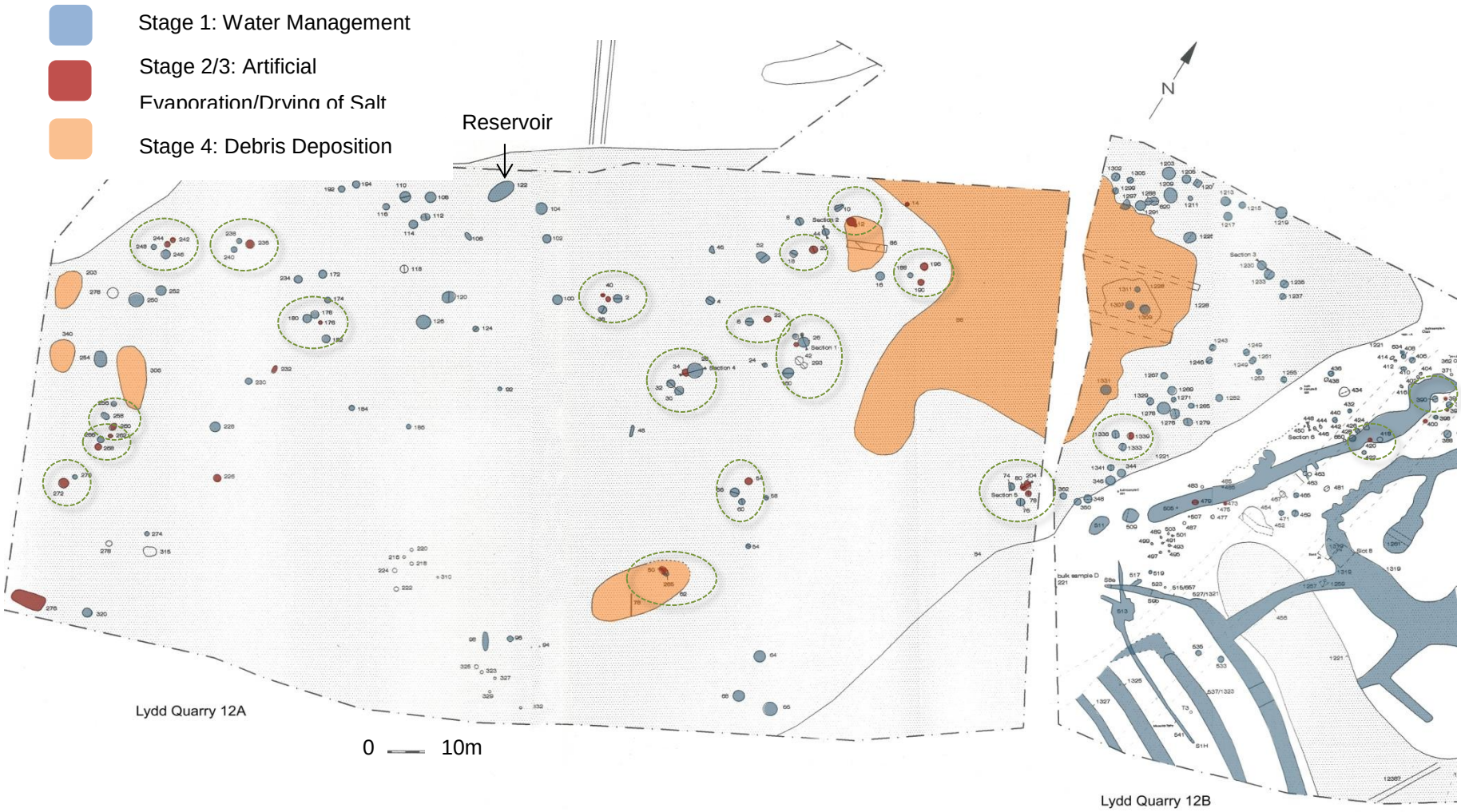


Figure 5.15 Plan of excavations at Site 82, Lydd Quarry (Phases 12A and 12B), (Adapted from: Archaeology South-East Site Archives: 2008: colour added by author to emphasis different feature types)

As discussed earlier (**5.2.3**), the briquetage assemblage from this site is exceptional, and the pedestals in particular could offer insights into the creation of briquetage. The variety in support size is probably is linked to the hearth dimensions and vice-versa, and hearths and supports could be created according to personal preference. The variety is therefore closely linked to individual choice, suggesting that there was no central briquetage manufacturing area or consist form dimensions.

Phasing for the different working areas, tanks and debris spreads was not available. However, the similarity between some of the working areas suggests that some of them were contemporary.

This site offers a rare opportunity to explore the use of space for salt-production in more detail ,and it is interesting that most of the briquetage was distributed in one large spread, suggesting there was controlled management of waste.

5.2.5 'Villa Estates' in North Kent?

Peacock (1982), included the mode 'Estate Production' in his modes of pottery production predominantly in Roman Britain). These were centred on villas whose owners used their land for industry, as well as agriculture.

Although not explored here in detail, there is possibility that some of the salt and pottery production sites in North Kent especially, were part of 'Villa Estates'. There are many Roman villas in North Kent, specifically within the area of the Medway Estuary and land to the west and the south (Figure 5.16).

However, this remains speculative, and there is currently little archaeological evidence to support the link, especially since the sites are so diverse and most sites were probably earlier than most villas in this area. One possible link however, is the presence of building debris on some salt-production sites (as highlighted in **5.2.4**) including well-made roofing tiles, but that is restricted to the building material associated with the new site at Sittingbourne (Dawkes 2011). Otherwise, there is no direct evidence for the inclusion of salt-production sites in a 'villa estate'. The sites are all sufficiently different to suggest they were 'separate

enterprises', with the only similar trends in technology being the use of the 'slotted lumps', presumably as portable hearths (**5.3.2.3**).

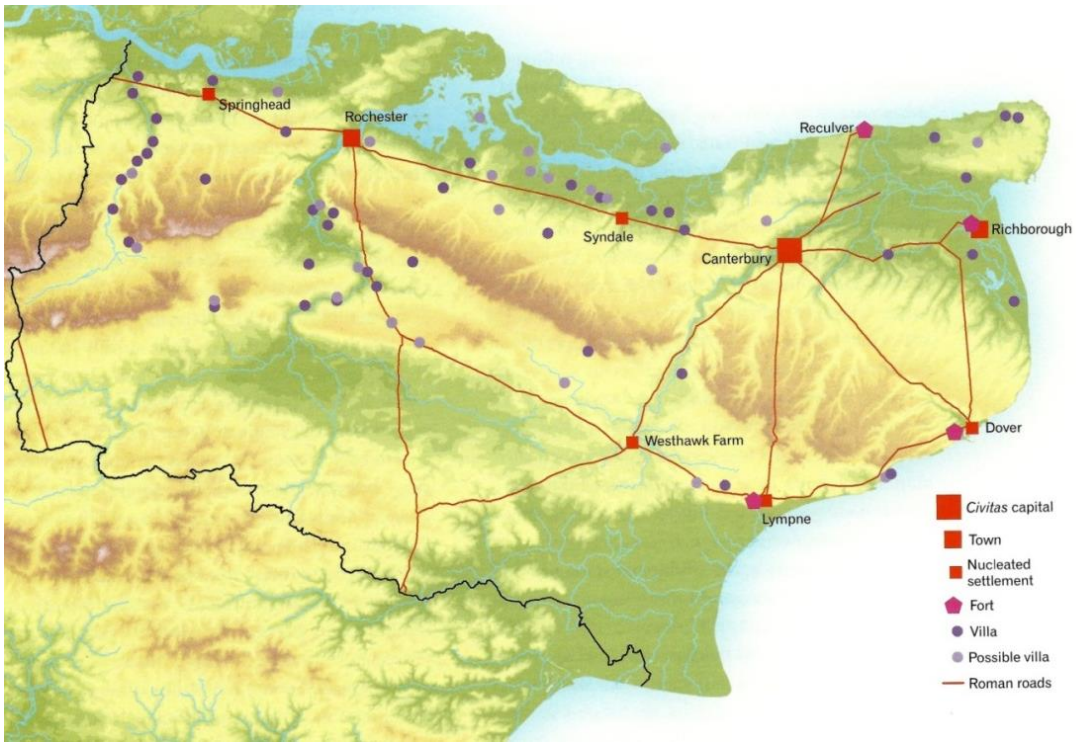


Figure 5.16 Map of key Romano-British roads, villas and towns in Kent (Millett 2007: 149)

Also the identification of lands associated with this is difficult, as highlighted by Millett:

> …we have absolutely no way of identifying the lands attached to any particular archaeological site, so the widely used term villa-estate has no archaeologically useful function. (Millett 1990: 92)

He further emphasises this again in (Millett 2007), when specifically discussing Roman Kent. Millett describes popular concepts of the 'villa estate' as flawed and the subject of 'key misapprehensions', due to not understanding the difference between wealth that was being expended, and wealth that was being obtained.

Also, as suggested above, there are comparatively few villa sites in Kent that were contemporary with the most intense time of 1st century AD salt-production (c.11) (Millett 2007). In fact, with the exception of the Eccles and Thurnham Villas, the most active period of building activity, including the creation of roadside

settlements, including Springhead, appears to have been in the 2nd century AD (Millett 2007), when salt-production was decreasing, or perhaps, centralising.

5.2.6 Distribution of Pottery-Production sites in relationship to Salt-Production Sites in North Kent

The spatial and chronological distribution of salt-production sites in North Kent and the Medway Estuary is so closely linked to the distribution and pottery-production, that it suggests a close relationship between the two (Figure 5.17).

Site 30 at Cooling is a particularly good example of a combined salt and pottery production site (Black Burnished Ware), only paralleled in scale at Poole Harbour, Dorset. The long lasting period of activity on this site created substantial waste debris across a large area.

There was so much debris, there was even evidence that some of the saltwater inlets feeding this site were blocked and filled up with broken pottery, pottery wasters and briquetage. This must have had a profound effect on the waterscape, with large quantities of debris clogging up saltwater inlets that eventually resulted in the site becoming no longer viable for industry.

Salt and pottery production would have naturally integrated very well, given that they both require similar raw materials (clay), salt and freshwater, fuel and combustion structures, a point highlighted by De Roche for Iron Age production processes (De Roche 1997). It is also possible the same producers made pottery and salt, in different seasons (further considered in **7.5.5.4**).

The presence of salt-production within the Medway Estuary islands and mudflats is not surprising given the ideal environment this area provided. However the presence of pottery production is more surprising.

The evidence remains relatively speculative in this area. Although there are large spreads of pottery and briquetage, including possible wasters, definite kilns have been harder to identify, not helped by coastal erosion. It is also possible that pottery kilns and salt-production hearths could be difficult to differentiate, when assessing eroded, truncated remains.

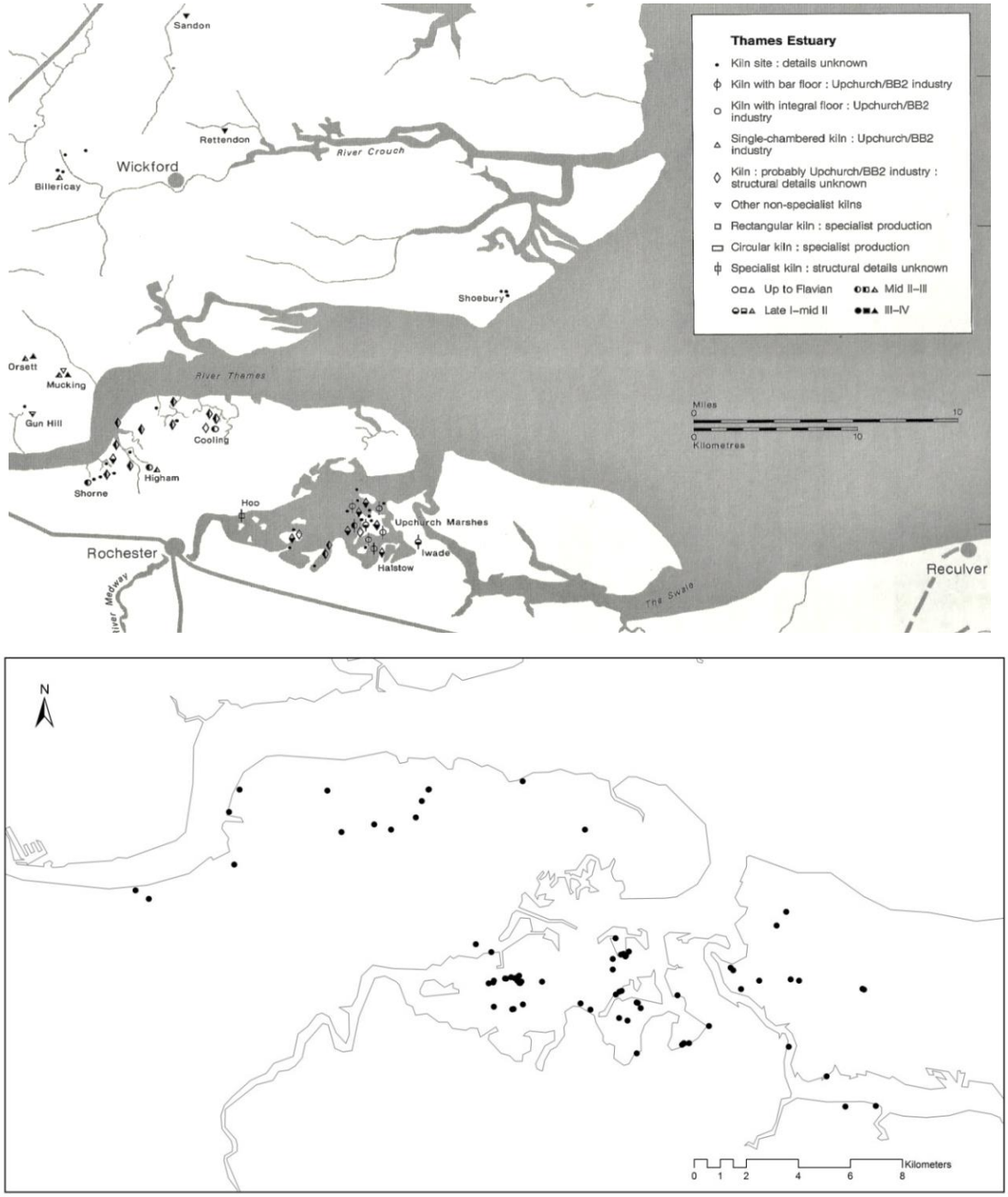


Figure 5.17 Two maps showing the close proximity of pottery production sites (top) (Adapted from Swan 1984: 27), and salt-production sites (including briquetage findspots) in North Kent and the Medway Estuary (bottom), (Ordnance Survey Map Data ©Crown Copyright Database Right 2012. An Ordnance Survey/Edina Supplies Service

Pottery production sites were generally much more permanent, more established and larger than salt-production sites, therefore their presence in such a coastal area of islands and mudflats raises interesting questions. It is possible that the inner environs of the Medway Estuary were more stable and more of the islands were linked forming larger areas of drier ground in the Roman period. However,

the presence of industrial activity on islands is not unique, as this also occurs within Poole Harbour upon Furzey (salt) and Green Island (iron and shale working), (Dyer and Darvill 2010).

It is probable that the Medway Estuary would have been supplied with wooden jetties (similar to Poole Harbour) and trade could have easily taken place using boats that could move goods along the coast and up the Thames.

In the Medway Estuary, Black Burnished Ware II (BBWII) pottery kilns in both areas 2a and 2b have been dated to between the 1st century AD and the middle 2nd century AD, suggesting that salt and pottery production were probably contemporary (Swan, 1984). It is perhaps significant that pottery production in these areas shifted its focus to the North Kent Mainland (Group 1) in the 2nd century AD, at the same time salt-production ceased within Groups 2a and 2b.

One explanation for this shift in focus is a significant rise in sea-level and subsequent flooding during this time (Swan 1984: 130). This would have resulted in contracting land mass and the formation of smaller islands and mudflats. However, salt-production thrives in watery environs and it seems unlikely that these small islands would not have still been exploited. It is possible, however, that sea-level rise also changed the course of some inlets and channels, which could have affected salinity levels and water flow.

5.3 Site Diversity and Trends in Kent

Kent has the most evidence for inter-site diversity in the study area, this is due in part to the particularly good preservation and the high quality of site recording, as well as ancient factors.

The term ‘working area’ was introduced in **4.0**, and describes the area where the bulk of salt-production took place. These areas commonly contain associated hearths and brine tanks. This section will explore this further, by presenting examples of different working areas/hearth formations.

5.3.1 Identification of 'Working Areas' within Kent

Kent can be considered the best county for observing the remains of all three main stages of salt-production and the diversity across Early Roman sites is exceptional.

The nine working areas explored below, provide an opportunity to further consider use of space in salt-production sites, as well as technological trends and innovation.

These distinctive working areas have been illustrated simply and consistently by adapting original site plans. These working areas 'typologies' could potentially be used as a guide to date and understand similar sites found in this region in the future.

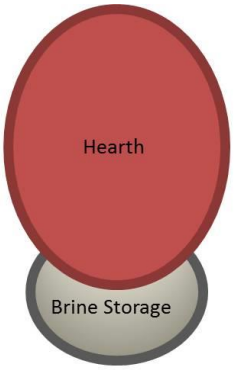
5.3.1.1 Kent Working Area A (Figure 5.18)

This simple working area formation (Figure 5.18) is based upon examples of oval clay-lined hearths at **Site 82** (Priestley-Bell 2006).

As presented throughout **4.0**, there is evidence for several working areas in Kent (Figure 5.15), which had hearths with partitioned areas for brine storage (average c.30cm in length).

This enabled an individual to heat a *single container* set on four pedestals, whilst having ease of access to brine to fill the container whilst it was heated. It is likely, due to the small size of the brine storage area, that individuals either used another brine settling reservoir or larger tank or transferred saltwater directly to the partitioned area as required.

This was confirmed by the presence of multiple separate tanks spread across this site (Figure 5.15).



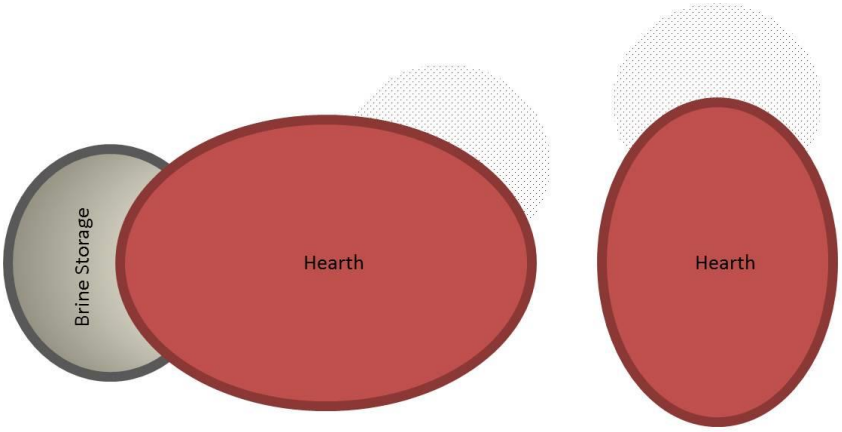
Kent Working Area A

(c. 1st century A.D.)

Figure 5.18 Kent Working Area A (based upon examples in Site 82)

5.3.1.2 Kent Working Area B (Figure 5.19)

Site 316 employed near identical features to Working Area A (Figure 5.18), including a c.1m long oval hearth, but with the addition of a second adjacent oval hearth with no partition (Figure 5.19) (Miles, 1974).



Kent Working Area B

(c. 1st century A.D.)

Figure 5.19 Kent Working Area B at Site 316 (Shaded area represents hearth 'clearout ' areas), (This is based upon the site plan in Figure 4.29)

The main hearth was found to have been relined, suggesting extensive use, and the base was raised up towards the partitioned area (Figure 5.20). Although uncommon in the study area, some hearths in the Fenlands have been found to have similar hearth floors that raise up on one edge, for example at Cowbit (Lane and Morris 2001: 374).

The raising of the base possibly made it easier to drag the burnt hearth residue from the base, as also suggested by Miles (1974).

The hearth section (Figure 5.20) indicates that the hearth was probably not cleared out after its last use and had been left to build up, making the hearth shallower during use.

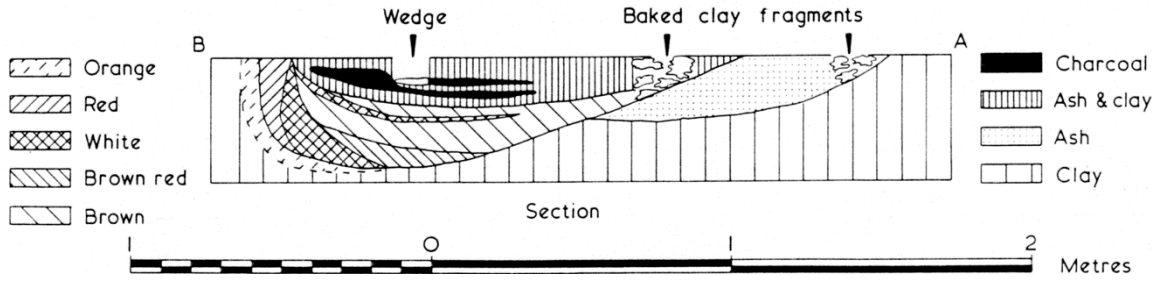


Figure 5.20 Section of the main hearth (the left hearth in Figure 5.19 above) with the partitioned area (Adapted from Miles 1975: 28)

Both hearth lengths within Site 316 are similar to hearths at Site 82 and therefore were also likely to have been used to heat one container at a time *if similar briquetage was used*. However, Site 316 (North Kent) did not have thick briquetage pedestals, but instead used wedge supports with clay containers.

The second, lesser hearth, if indeed contemporary, was perhaps created just after the main hearth to allow more containers to be simultaneously heated. It could also have originally been a water management feature that was later converted into a hearth. The partitioned area was not large enough to concentrate brine and would have only been suitable for storage, suggesting that there were other separate tanks elsewhere in the site environs (Figure 5.21), outside the limit of excavation, or removed by erosion.

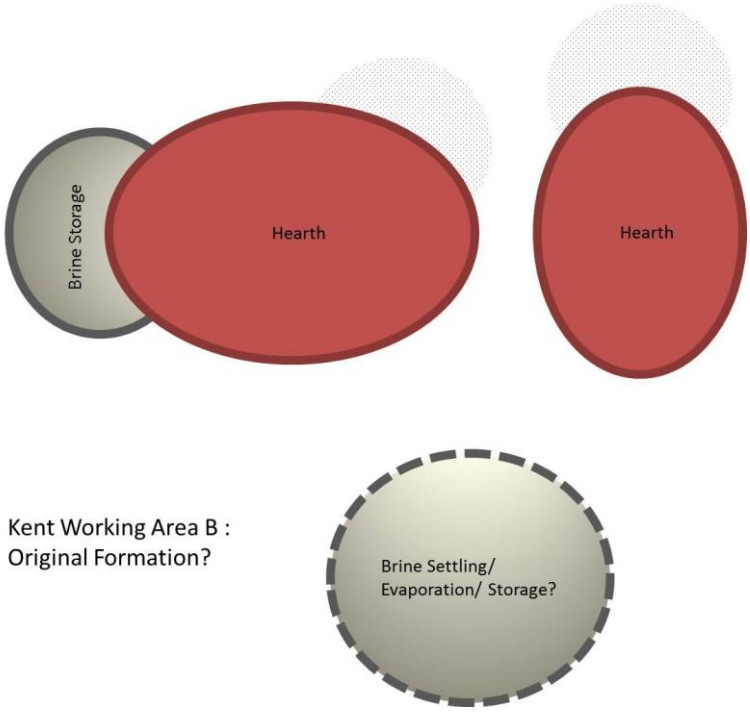


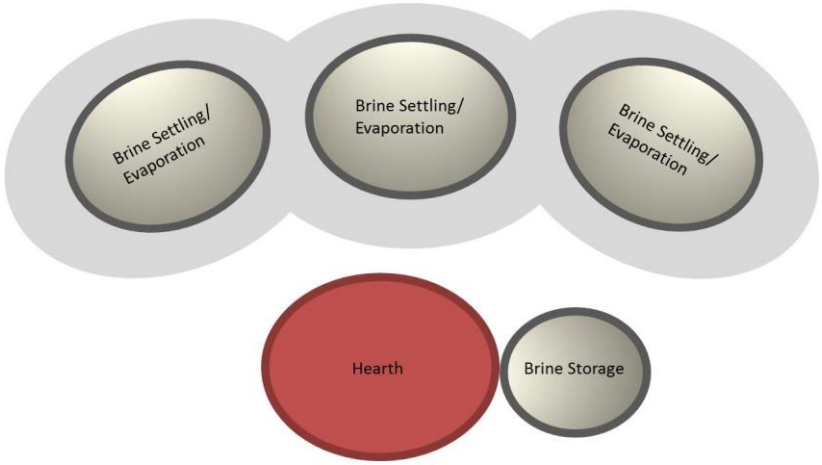
Figure 5.21 Kent Working Area B: Reconstruction of possible original formation

Miles (1974) noted at least three more eroded 1st-2nd century AD salt-production sites along the coastline at Cliffe (Sites 69, 72 and 316). Although little is known about two of these areas, it is possible that they were somehow related and potentially shared water management features.

Site 316 was found during rescue excavations carried out because of rapid coastal erosion, and was observed as being cut into a very large artificial mound, some 45m wide (Miles 1975). Although the contents of the mound were not discussed, it was probably built up from general waste debris including pottery, briquetage and layers of clay. The use of artificial mounds to create higher ground levels for working areas was also used at other sites in Kent, including Site 30 at Cooling.

5.3.1.3 Kent Working Area C (Figure 5.22)

Working Area C in Site 61 is very similar to Working Area A, with the presence of a joined hearth and tank. However, it differs slightly in that the hearth is more circular and shares less adjoining clay lining with the tank (Figure 5.22). The hearth was relined several times indicating intense or long-term use (Miles, 1974).



Kent Working Area C

(c. 1st century A.D.)

Figure 5.22 Kent Working Area C. Based upon Site 61 (based upon Figures 4.20 and 4.27)

In this case there were also three conjoined brine tanks within the working area, which confirms that the smaller tank was for brine storage whilst the larger three were for brine creation and processing.

Working Group C represents a complete, compact working area probably used by a single individual, or two at most (Figure 5.22). The brine tanks are neatly curved around the central hearth and their position creates a boundary for the site.

That this site was created within the low-lying areas of the Medway Estuary islands and mudflats with ease of access to saltwater, shows that brine concentration was important enough to warrant dedicated brine processing and storage tanks, as opposed to taking saltwater directly from the sea.

5.3.1.4 Kent Working Area D (Figure 5.23)

Working Area D, observed in Site 82, is a reversal of the adjoined hearth and tank in Working Area C. For this formation, the larger feature is the brine tank (averaging c.1-1.3m in diameter), and the smaller area is a hearth (averaging c.35-55cm in length) capable of holding only one container (Figure 5.23).

Similarly to Working Group C (Figure 5.22), the adjoined smaller feature was also more pronounced and circular (Figures 5.23-5.24).

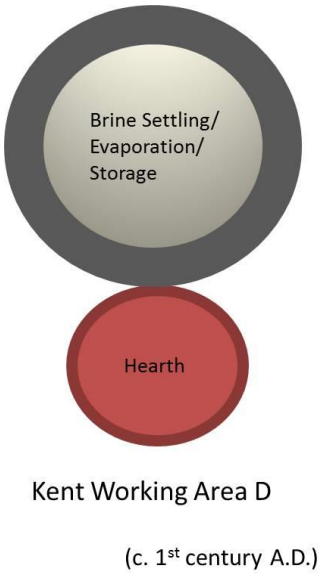


Figure 5.23 Kent Working Area D (based upon Site 82: Figure 4.24 and Figure 5.24 below)

Figure 5.24 Plan of a hearth in Working Area D containing the fragments of a pottery vessel possibly used to transfer brine as well as a set of four *in-situ* round pedestals (Archaeology South-East Site Archive)

This formation provides an easier working area when compared to Working Area A, as the brine tank is wide enough to enable both settling and brine concentration, as well as the storage of saltwater. The hearth, although very small, was perhaps a more efficient use of compact space, and thus only a small fire using a minimal quantity of fuel would be required.

5.3.1.5 Kent Working Area E (Figure 5.25)

This is the third type of Working Area used in Site 82 and was also found at Site 62 (Site Group 2c) in the Upchurch Marshes (Figure 5.25).

This working area in Site 82 appears to have two conjoined oval hearths (average c.1m in length) and a separate small brine storage pit (average c.50cm in length) (Figure 5.25).

However, the smaller feature was very similar in size and form to the hearth in Kent Working Area D (Figures 5.23-5.24) which challenges the interpretation of brine storage. The two larger features were clearly last used as hearths, indicated by the *in-situ* group of four pedestals within one of the hearths (Figure 4.31: top). This naturally led to the conclusion that the smaller feature complimented the hearths and was used for brine storage.

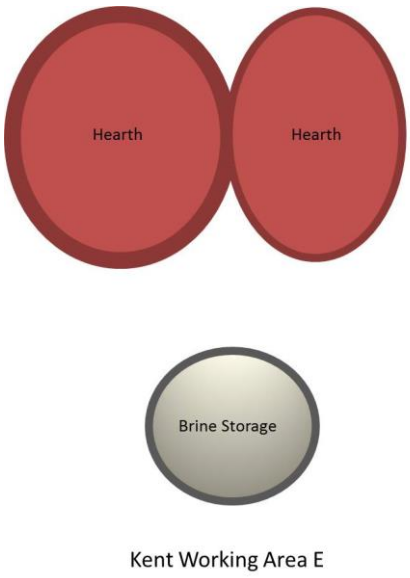


Figure 5.25 Kent Working Area E: Site 82 (based upon example in Figure 4.31: top)

The less common, twinned formation of these hearths, along with the similarity of the smaller feature to the hearth in Working Area D (Figure 5.23), probably indicates that this working area was 'reversed' during its lifespan. Originally, this working area could have resembled Working Area D. Later, the larger tank was converted and split into two hearths, and the small hearth then became a brine storage tank (Figure 5.26).

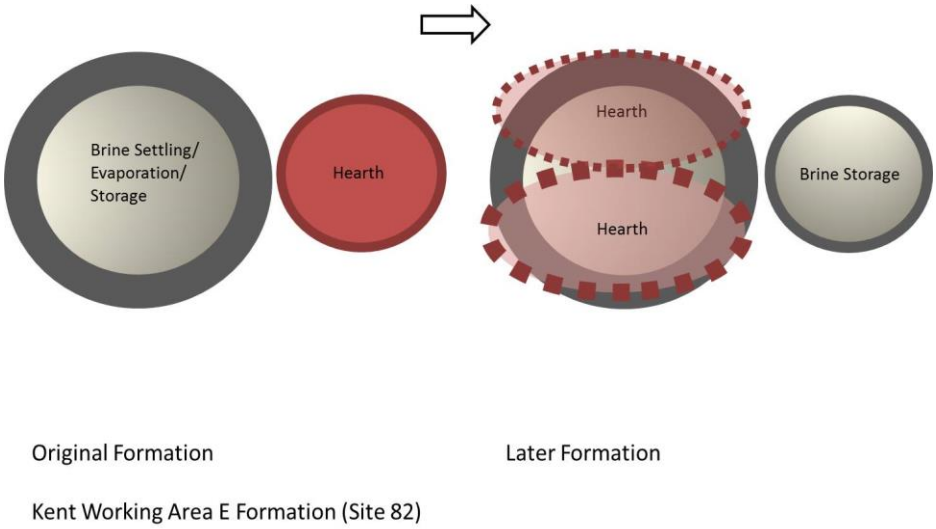


Figure 5.26 Reconstruction showing the original, then later re-arrangement and addition of features in Working Area E (Site 82)

If this was the case, then the working area could then have utilised nearby scattered separate tanks, of which there was an abundance in this site. It is possible that this working area could have been converted in response to a need to increase production.

The second example of a Working Area E formation is at Site 62. There are similarly, two alternative scenarios for this site (Figure 5.27).

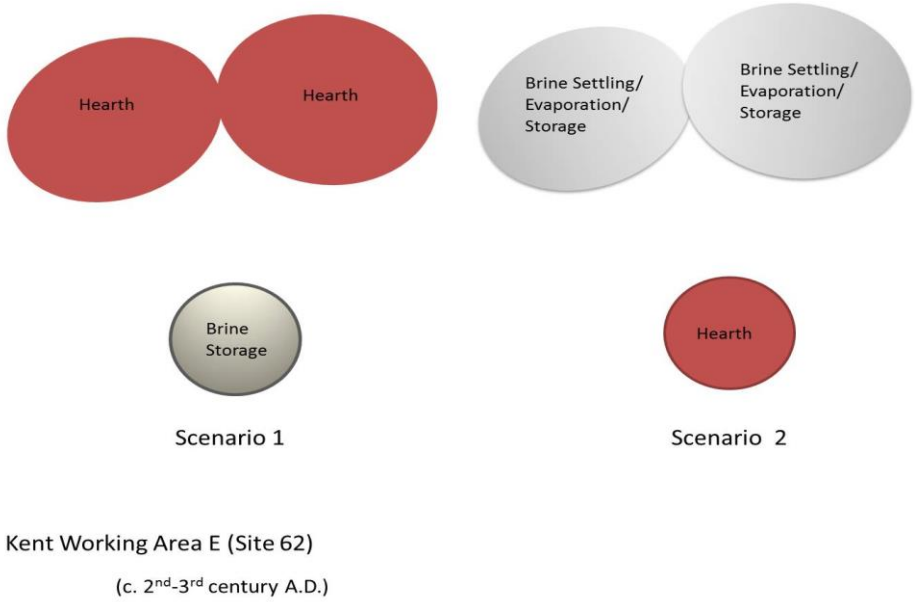
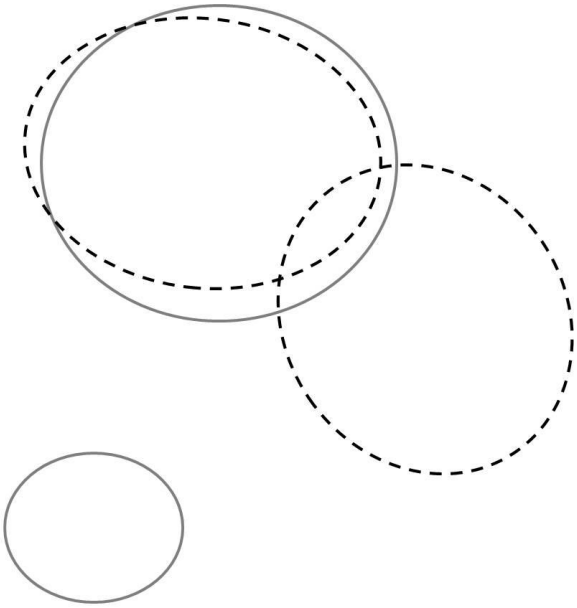


Figure 5.27 Kent Working Area E: Site 62 (based upon Figure 4.31: bottom)

In both interpretations, the group probably started as a single separate larger tank and smaller hearth (Figure 5.28: grey solid lines). Then, the formation was converted with the extension of the tank and the creation of new adjoining feature (Figure 5.28: black dashed lines). This later splitting of the larger feature is supporting by the 'odd' angle at which the larger features are positioned; one appears to cut into the other (Figure 4.31: bottom).



Two phases of Kent Working Area E at Site 62

Figure 5.28 Kent Working Area E at Site 62: Dashed lines represent later conversion of the single feature into two

5.3.1.6 Kent Working Area F (Figure 5.29)

Kent Working Area F was observed on Site 90, Funton Marsh. Similarly to Working Area C, this site also has a set of three conjoined brine tanks. However, these are more sub-rectangular in plan (Figures 4.19 and 5.29). The main hearth is only just over 50cm in length internally.

Although the use of space is similar to Working Areas C and G, the tanks and hearth are clearly different in form. The hearth has a unique feature in the form of a temporary structure evidenced by two ash-filled holes at one end (Figure 5.29) which probable represents a wind-break. The site contained no briquetage suggesting the debris at this site was well-managed and deposited away from site.

The top ‘dog-legged’ feature (Figure 5.29) was associated with dragged ash deposits and could have functioned as a hearth, at least at the last time the site was used.

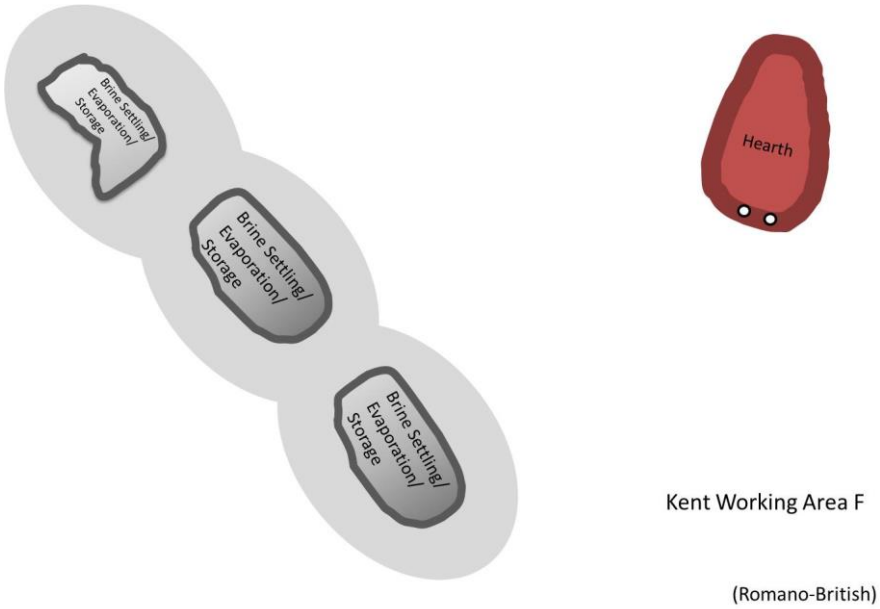


Figure 5.29 Kent Working Area F: Based upon Site 90 (Based upon Figure 4.19)

5.3.1.7 Kent Working Area G (Figure 5.30)

Working Area G occurred within the large, multi-phased Site 30 at Cooling (Site Group 1). The formation of an arc of round clay-lined brine tanks around a main hearth is similar to Kent Working Area C. However, within this formation there are four tanks with a twin hearth (Figure 5.30). Twin hearths are not seen on any other sites in the study area. The nearest parallel is a set of Early Romano-British twin circular ovens at Leigh Beck, Essex (Figure 4.49).

There is also an additional small rounded hearth in close proximity to the hearth and tanks, which probably represents an open hearth (Figure 5.30). This is the only site in the study area that has produced such a clear and complete working area containing both a grouped tanks for Stage 1, as well as a hearth for brine evaporation (Stage 2) and a hearth for the drying of salt (Stage 3).

Both hearths were a little longer than normal (c.1.5m in length) and as well as being twinned, are both, uncommonly for Kent, rectangular in form, potentially enabling more containers to be held.

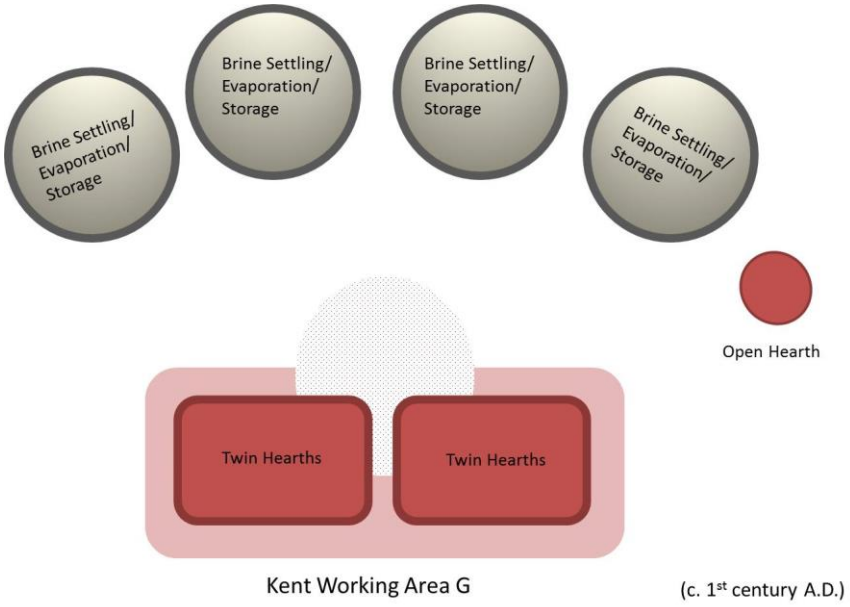


Figure 5.30 Kent Working Area G (Site 30: based upon Figure 4.18)

It is possible that two brine tanks were associated with each hearth if they were used primarily for brine concentration. It is not clear whether the central area between the hearths was a shared clearout area (for the removal of ash) or a stokehole providing a fire to heat both hearths.

It is likely that fires were placed separately within each hearth, and the clearout area provided access to the hearth bases in order to manage the fire and to add fuel as needed. If this was the case, the hearths could have been used either simultaneously or alone. The presence of two hearths and four tanks suggests that at least two people could have worked within this area.

As with Site 316 (Kent Working Group B), this site was situated on a substantial artificial mound (constructed of alluvial clay and debris including pottery from pottery production and briquetage) (Miles 1975). This particular Working Area, appears to have been cut into the edge of a 1st century AD mound (which was c.36m in size) which also contained a later and significantly different 2nd-3rd century AD working area (Working Area H).

5.3.1.8 Kent Working Area H (Figure 5.31)

This working area was found just over a metre to the north of Working Area G at Site 30 (Miles 1975).

This site is unusual because of its later date and because there is a single very narrow irregular linear hearth (Figures 4.18 and 5.31). Also, unusually, there were two irregular-sized rectangular and square brine tanks (Figure 5.31) as well as four chalk piers and chalk surfaces.

Of particular interest is that a flanged pottery bowl was found within one of these brine tanks (Miles 1975). Similarly to the flanged jar found at Site 61, this vessel also represents a container used to transfer brine. Similar evidence was also recorded at Osea Road, Essex, where a small 'cooking pot' had been deposited in the fill of a grouped brine tank formation (De Brisay 1975: 8: Figure 3f).

The hearth is longer than usual (nearly 2m in length) and could therefore have fitted perhaps up to three large containers or multiple smaller containers.

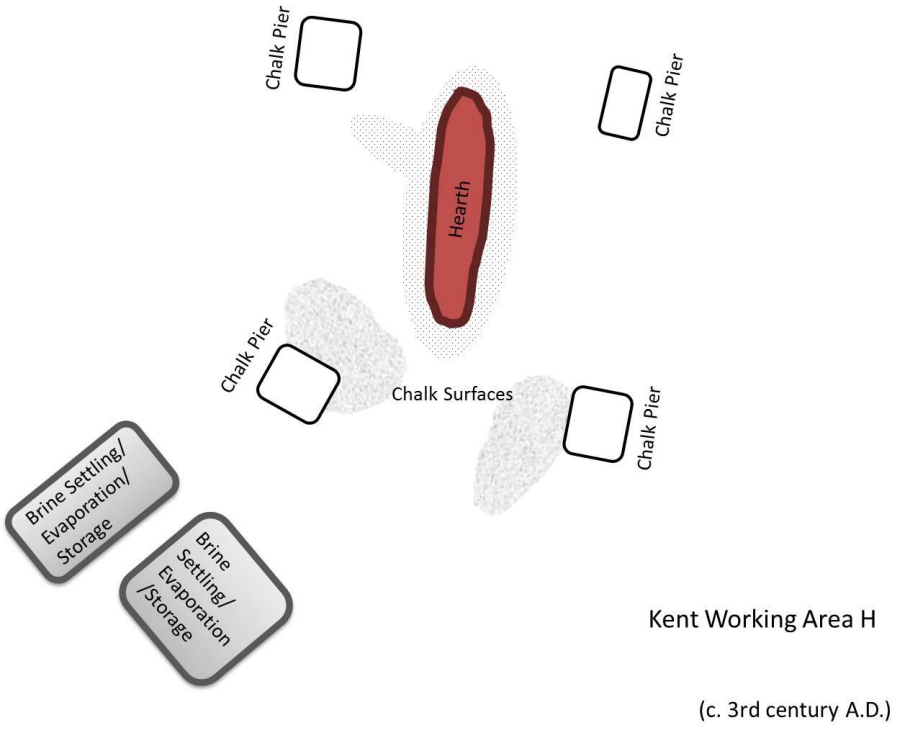


Figure 5.31 Kent Working Area H (based upon site plan of Site 30 in Figure 4.18)

The chalk piers could represent a small building. The size of the blocks (c.60cm in length) suggests a permanent substantial structure as opposed to a temporary windbreak.

Evidence for 2nd-3rd century AD circular huts were found surrounding this Working Area suggesting that structures played an important role in the use of this site at this time. It is possible that the chalk blocks supported wooden posts that held a roof over the hearth with no sides. This would have kept the wind circulating in and around the hearth, but would have held the rain off and possibly would have enabled all year round salt-production.

However, the irregularity of the blocks (Figure 4.18), suggests that they were not cut consistently to be used within one building. Their shape and large size suggests that they have been taken from a demolished substantial building nearby, and simply re-used. Their arrangement is also uneven which challenges their function as structural foundations. An alternative explanation, is that the blocks were placed roughly around the hearth to either act as a boundary, or to act as ‘tables’, or areas to sit, or even provided the base upon which a temporary, light cover could have been placed.

5.3.1.9 Kent Working Area I (Figures 5.32-5.34)

There is a final hearth group (Figure 5.32) which came to the author's attention well after the date collection phase had ended and therefore has not been assigned a Site ID (Figures 10.3.17-10.3.18).

The hearth was revealed as part of a larger prehistoric and Roman, occupation and funerary landscape excavated for the 'Sittingbourne Northern Relief Road' (Dawkes 2011). The grouped hearth area sat alone in this landscape, and the limits of excavation meant that no further evidence for areas of debris deposition or potential water management features was revealed.

The main feature of this site was a group of four linear/rectangular features cut into an earlier sunken area. All four sub-rectangular features appeared to have been

hearths and were all c.2.3m in length except for the furthest left linear which was extended to c.2.7m (Figure 5.33).

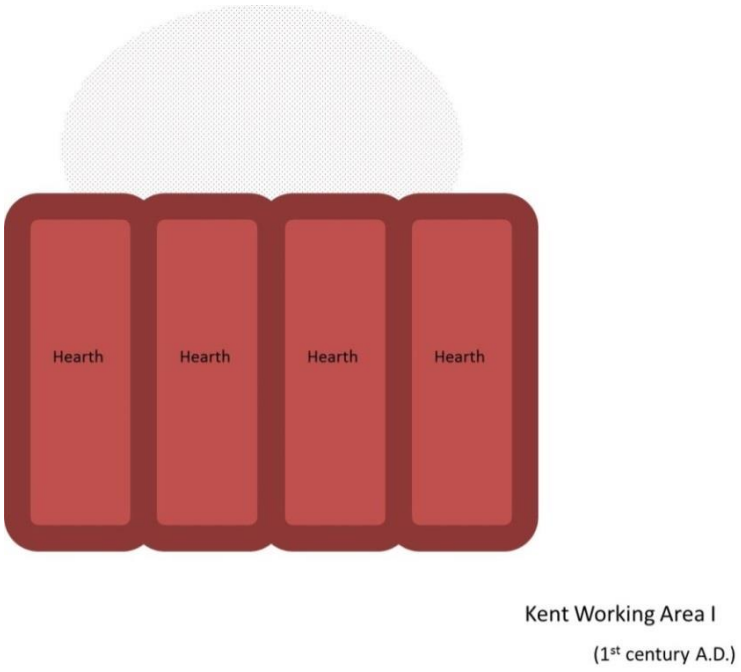


Figure 5.32 Kent Working Area I: Based upon feature plan in Figure 5.33

The semi-circular area at the northern end represents a clearout zone and an area to access the fires within the hearths when more fuel was required (Figure 5.32). The central two 'hearths' were deeper than the outside 'hearths' (Figure 5.33).

It is possible that this reflects a later extension to the central two hearths. It could also indicate a different function or purpose. Perhaps in the later stages, the central two linear features were hearths, whilst the outer linears were used for brine management/storage (Figure 5.34).

The overall hearth/tank area had been repaired and relined suggesting intense and/or longer-term use (Dawkes 2011).

The use of hearths with joined or multiple linear 'chambers' does not occur within the rest of the study area but their size is comparable to the larger hearths seen in the Somerset Levels (**6.0**).

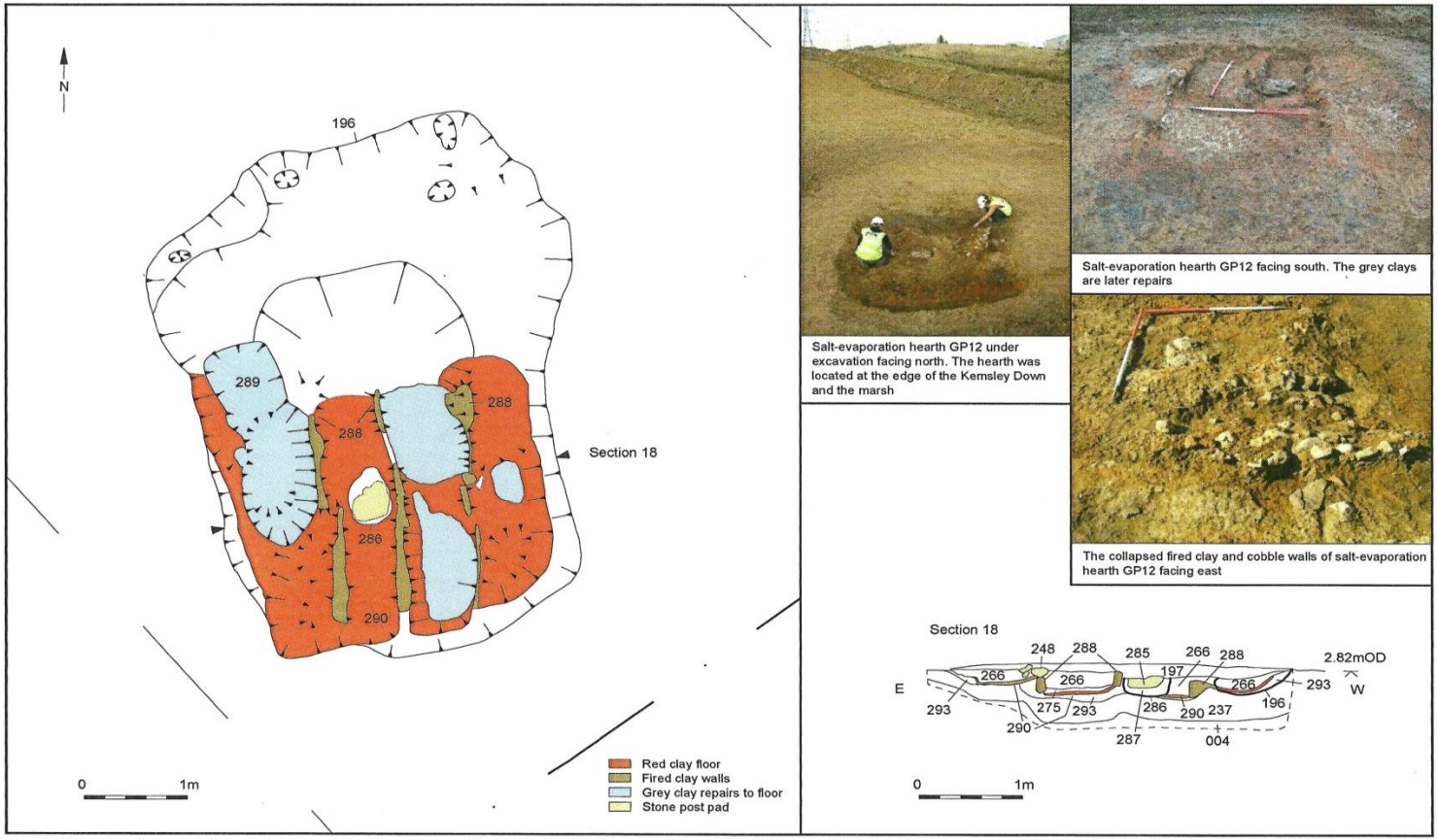


Figure 5.33 Large grouped Early Romano-British hearth area revealed during excavations for the Sittingbourne Northern Relief Road (Dawkes 2011: Figure 11)

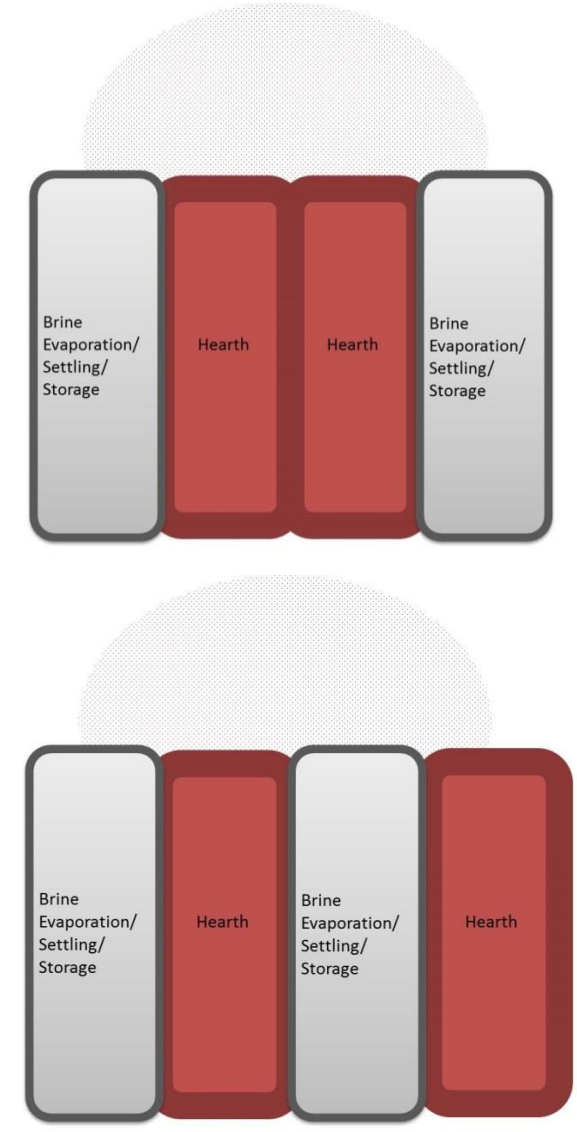


Figure 5.34 Alternate uses for the four 'hearth' areas in Kent Working Area I

This feature clearly represents a large-scale salt-production hearth, in a very compact and efficient working area. This multiple linear parallel hearth feature is similar in form to hearths used within Lincolnshire during the Iron Age and Romano-British periods (Lane and Morris, 2001). For example, at Cowbit Wash, this site contained an Iron Age working area consisting of two parallel linear hearths (with a central dividing partition) and a hearth clearout area (ibid). These were also excavated into an earlier sunken feature but were smaller in length at *c.*1.6-1.75m.

Unusually, there is a cut for a stone slab, perhaps a post-pad cut into the fills of the second hearth from the left (Figure 5.33). This feature appears not to have

been related to the hearths, although there are echoes of the chalk 'piers' within Working Group H (Site 30). Four 'post-holes' were also found within the sunken area to the north and it was suggested that they represented 'part of a shelter' (Dawkes 2011: 15).

With the exception of the fourth upper oval post-hole (which has a different shape) the three remaining post-holes provide a curve respecting the outline of the hearths. These three posts at least, could be associated with a windbreak.

This hearth appears to have been not only set within the ground, but also to have had raised vertical 'cobble walls' which provided 'hearth cells and gullies' (Dawkes 2011: 15). This indicates a high level of investment and technological choice into the function and survival of these hearths.

Of particular note is the lack of briquetage. The presence of Roman building material within the hearth, including combed flue tiles, *tegula* and *imbrex* roofing material is surprising. It was probably from a villa or higher status building nearby and it was suggested that the material was used within the hearth lining. However, none was observed *in-situ* (*ibid*). It would seem more plausible if the CBM had been used to create a tunnel or stoke hole. However, this does not appear to have been the case. Another explanation, given the lack of briquetage is that the CBM was recycled to be used in salt-production. Given that clay slabs were used on a variety of salt-production sites, it is conceivable that building or roof tiles were recycled in this manner.

An alternate explanation is one of incorrect identification as very possibly, the right-angled roof tile could have been the base and side of a flat container, and the curved tile could represent a large fragment of a trough vessel. Unfortunately the artefacts have bot be retained.

5.3.2 Key Technological Trends

Given the close proximity of contemporary salt-production in Essex and Kent, it is natural to look for any links between sites in the two areas. There is some

evidence for technological links between the two areas, as well as a possible link to the production of secondary products:

The Stanford Wharf site (Biddulph *et al.* 2012), (Figure 5.35), has three characteristics in common with sites in the Medway Estuary (Group 2) especially. This includes the use of triangular bars/wedges, grouped/combined tanks (usually in sets of 3) and possibly, evidence for the salting of beef.

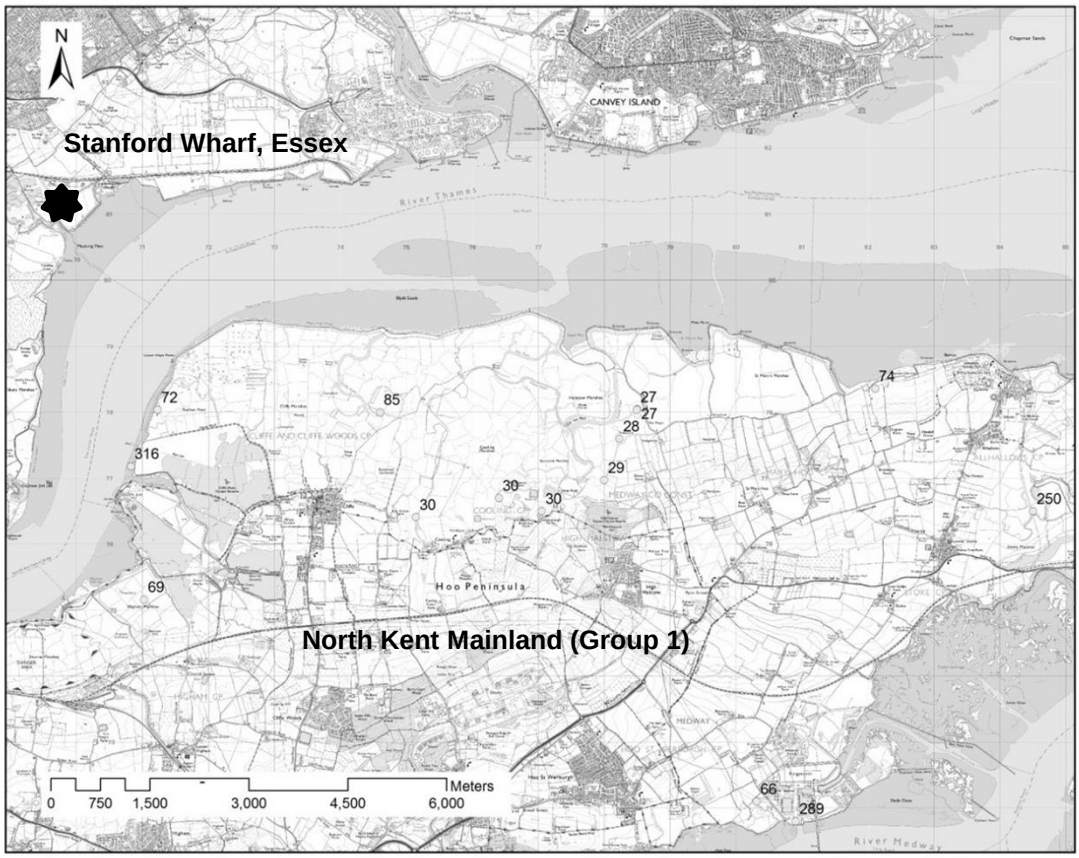


Figure 5.35 Map of salt-production sites in North Kent (Group 1), showing the closest Red Hill salt-production sites in the Thames Estuary, Essex (orange star) (Ordnance Survey Map Data: © Crown Copyright/database right 2011. An Ordnance Survey/EDINA supplied service)

The use of these distinctive grouped tanks seen in Kent Working Areas C and F, is common salt-production sites in Essex (Fawn *et al.* 1990), including Stanford Wharf (Biddulph *et al.* 2012), and Lincolnshire (Lane and Morris 2001), and even in France (Daire 2003).

The animal bone assemblage at Stanford Wharf included quantities of pierced cattle scapulae, similar to the assemblage found at Site 62 (Biddulph *et al.* 2012: 157), (Figure 5.35) which could potentially suggest salting of beef was taking place

at both sites. However, it is interesting that these bones would still be present on these sites if salted joints were being created and then distributed, as only the leftover bones from butchery would be expected.

Chronologically, the main phases of salt-production at Stanford Wharf (Middle Iron Age and Late Romano-British), (Biddulph *et al.* 2012) are different to the main phases of salt-production in Kent (Early Romano-British).

5.3.2.1 Grouped Tanks in Working Areas: Kent and Essex

The tanks shown in Figures 5.22 and 5.29 (Sites 61 and 90), are created by excavating a large semi-circle shaped hole (often kidney shaped), which is then filled with thick, good quality clay within which three shallow tanks are scooped out. This is commonly also the technique used to create grouped tanks in many Essex Red Hills (Figure 5.36).

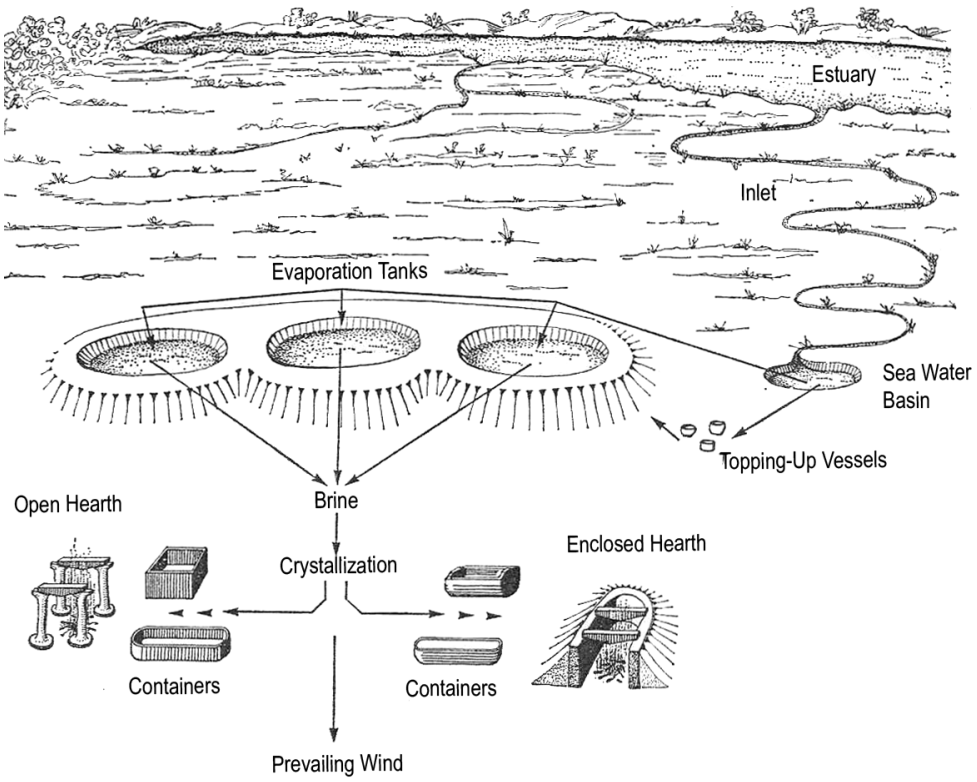


Figure 5.36 A reconstruction of a classic Romano-British 'Red Hill' salt-production site in Essex (Adapted from De Brisay 1978: 40)

As suggested in **4.8**, the use of grouped tanks for Stage 1, in Techniques II and III would have been ideal. It is possible that all the tanks could have been used simultaneously for brine concentration and storage. Alternatively, on some sites, the tanks were potentially used within a rotation, to obtain brine from the roasting of tank lining and/or the burning and washing of organic salt-impregnated material.

In Technique II for example, whilst one tank was being used to concentrate brine (Figure 5.37: Tank 1), another could have been broken up and roasted (Figure 5.37: Tank 2), whilst a third could be used to mix the roasted material and the brine (Figure 5.37: Tank 3).

Groups of tanks can equally be attributed to Technique III. As outlined earlier, Site 90 was particularly interesting as it contained a group of three rectangular tanks with a separate hearth. Unusually, all three of the tanks had not only burnt linings, but all had *in-situ vitrified linings* which could indicate that the linings were not always broken up and mixed with the burnt organic material.

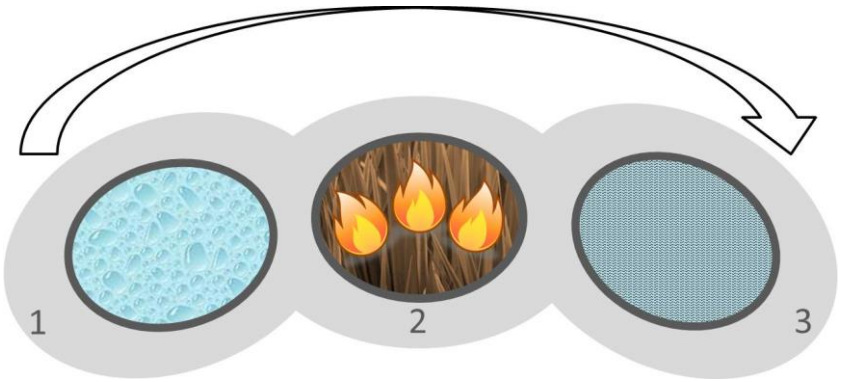


Figure 5.37 Roasting clay tank lining in a group of brine tanks (Technique II)

However, if Technique III was being used, then it could be expected that one tank could be used for the roasting/burning of the material, and then soaked in saltwater and left to settle, the brine could then be moved to another tank for more settling and concentration whilst the original tank was cleaned and then used again. The third tank could potentially be used to concentrate brine from seawater, and the resulting brine poured into the burnt organic material (Figure 5.38).

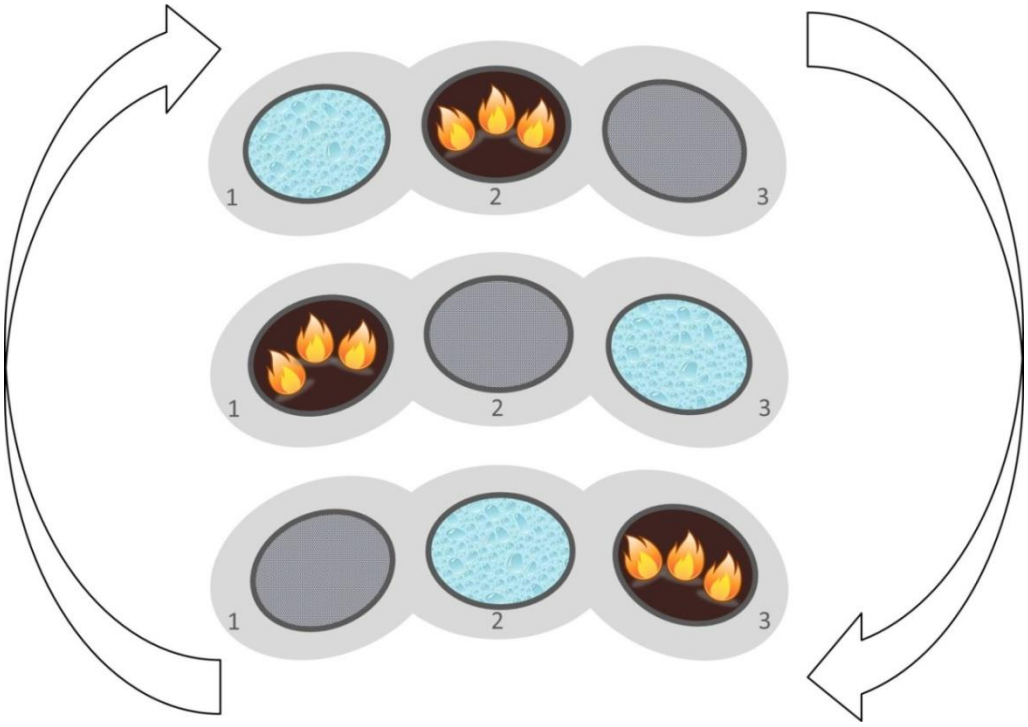


Figure 5.38 Rotation of tanks within Technique III

Working Areas F and G, similarly to examples from Essex (Figure 5.36), were closely associated with mounds (Figures 4.18-4.19). Similarly, two hearths at Cliff, also in North Kent (Kent Working Area B: Site 316), were created within a very large mound some 45m in length (Miles, 1974).

Working Area G most closely resembled a working area typically seen in Romano-British Red Hills in Essex (Figure 5.38), albeit with an extra tank, in that it had evidence for the use of an oven, and had a probable open hearth used for drying salt. Therefore, this working area is one of the most complete surviving examples of the 'whole site package' in the study area.

Overall, typological differences between Kent and Essex still remain. Site 61, did not appear to be obviously associated with a mound and all the working areas in Kent within grouped tanks differed in overall site formation, with distinctively different hearths.

Apart from the links to Essex explored here, there are also two distinct technologies that are particularly distinct to Kent; in the form of the 'Slotted Lumps' outlined previously, and the 'Partitioned Hearths', and these are considered below.

5.3.2.2 Overview of Partitioned /Combined Hearths/Tanks (Figure 5.39)

Nearly all the working areas identified above contain examples of joined tanks/hearths (Figure 5.39). With one exception at Site 228 in Poole Harbour, this is unique to the study area but similar to hearth/tank technology in Essex and the Fenlands (discussed further in **7.4.2**).

Although each working area is slightly different, this shared technology is indicative of a traditional site formation in Kent. The combining of hearths with tanks is particularly interesting as a technological innovation and creation of a compact working area, suitable for use on a *large site complex*.

The use of shared spaces for multiple working areas, as seen at Site 82 and within the Medway Estuary, would have meant that *compact, clearly defined working areas* were ideal. The introduction of this particular hearth/tank combination appears to commence in the 1st century AD, however at Site 82, this could potentially be earlier (Late Iron Age).

It is also possible, that the partitioned brine storage areas could have been subtly heated from the conjoined hearth whilst in use for brine evaporation. This would have further aided brine concentration and efficiently used heat already generated from the main hearth. It is hoped experimental archaeology could verify this in the future.

The development of these working area formations is particularly efficient and suggests salt producers really thought about the use of space and best methods of producing salt. Site 82 contains three variants of this formation, and clearly represents an area rich in skill with the ability and opportunity to develop particularly efficient and productive working areas. This represents a real investment in a site and the more sophisticated development of salt-production in Kent during the Romano-British period.

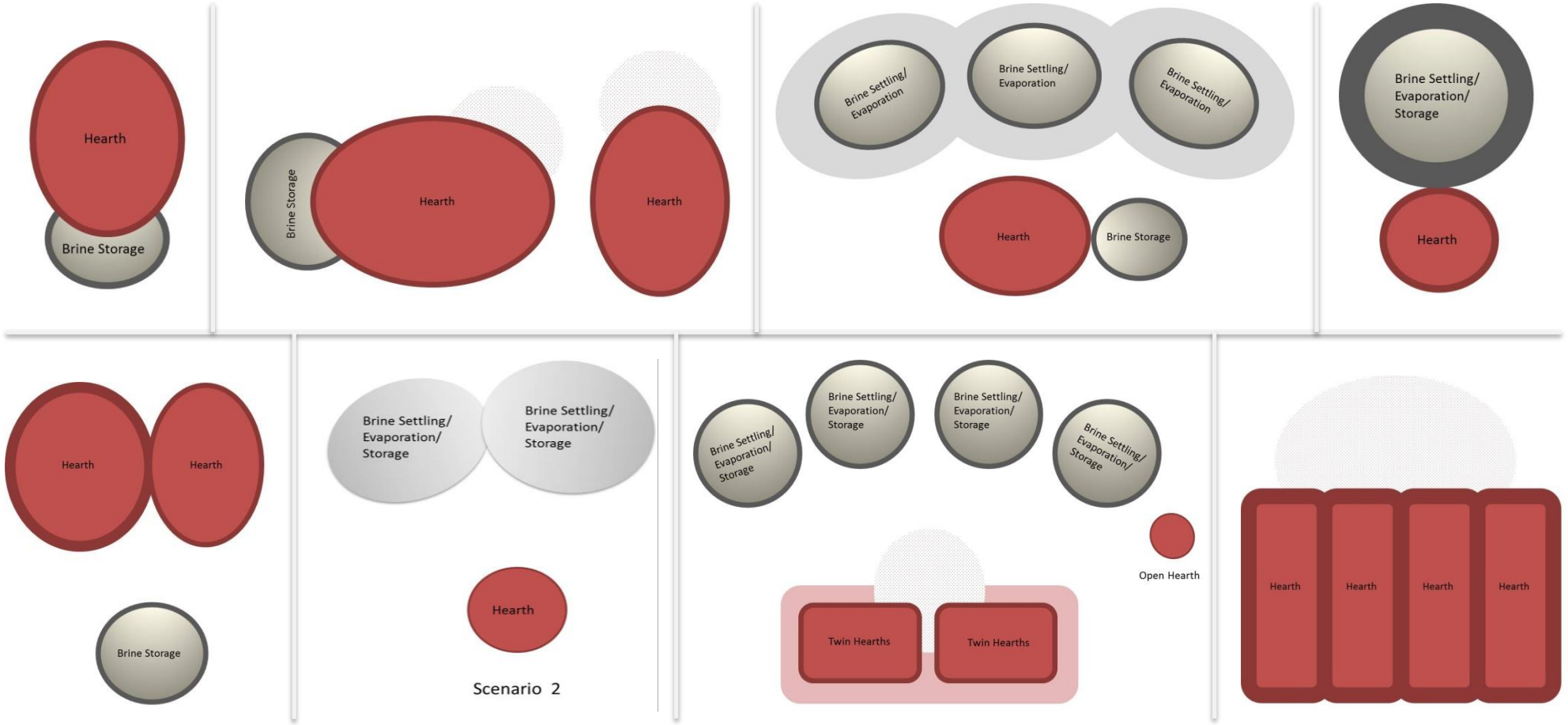


Figure 5.39 All working areas in Kent with joined hearth/tanks (Top left to right: Sites 82, 316 and 61 Bottom left to right: Site 82 x2 and Site 62)

5.3.2.3 Slotted Lumps: Portable Hearths (Figure 5.40)

As well as the evidence for hearths within the working area formations outlined in **5.3.1**, there was also another hearth type: a possible portable hearth.

This innovation, which is unique to Kent, was first outlined in **3.4.3.2** and explored in **4.6.1.5** and these 'slotted lumps' are distributed across at least nine sites within the Medway Estuary environs. Five of these sites were located within Group 2b (Sites 57, 59, 61, 301 and 311), two in Group 2a (Sites 19 and 44) and two in Group C (Sites 42 and 62), (Figure 5.41).

The original reconstruction, created by Ian Jackson (Figure 4.48) showed the slotted lumps being used to support a single container precariously balancing on the top. However , after further consideration, it seems just as plausible that they were placed side by side with containers spanning the gap (Figure 5.40).

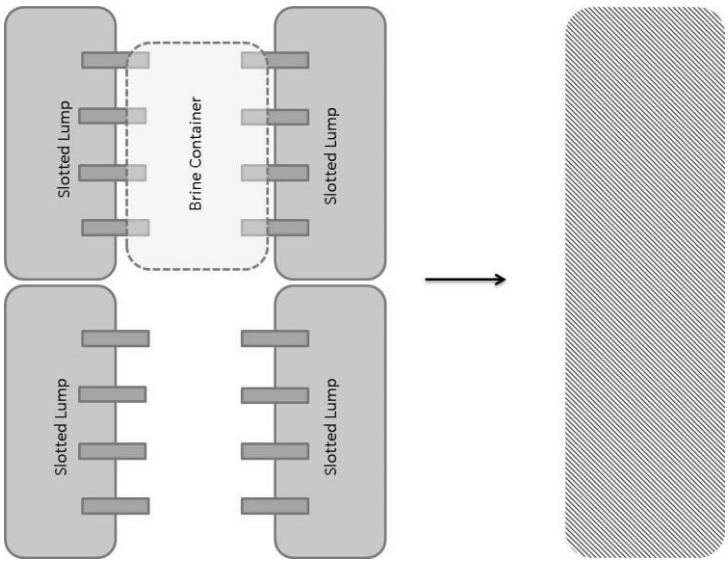


Figure 5.40 An alternative reconstruction of the method for using slotted lumps as portable hearths leaving a 'liner burnt surface'

These portable hearths could be transported from site to site and used on the ground surface, or on clay platforms/floors or within shallow linear ditch hearths. It is therefore possible, that if a hearth cutting was not required, that they would have potentially left little trace archaeologically, other than a 'non-descript' linear area of burning.

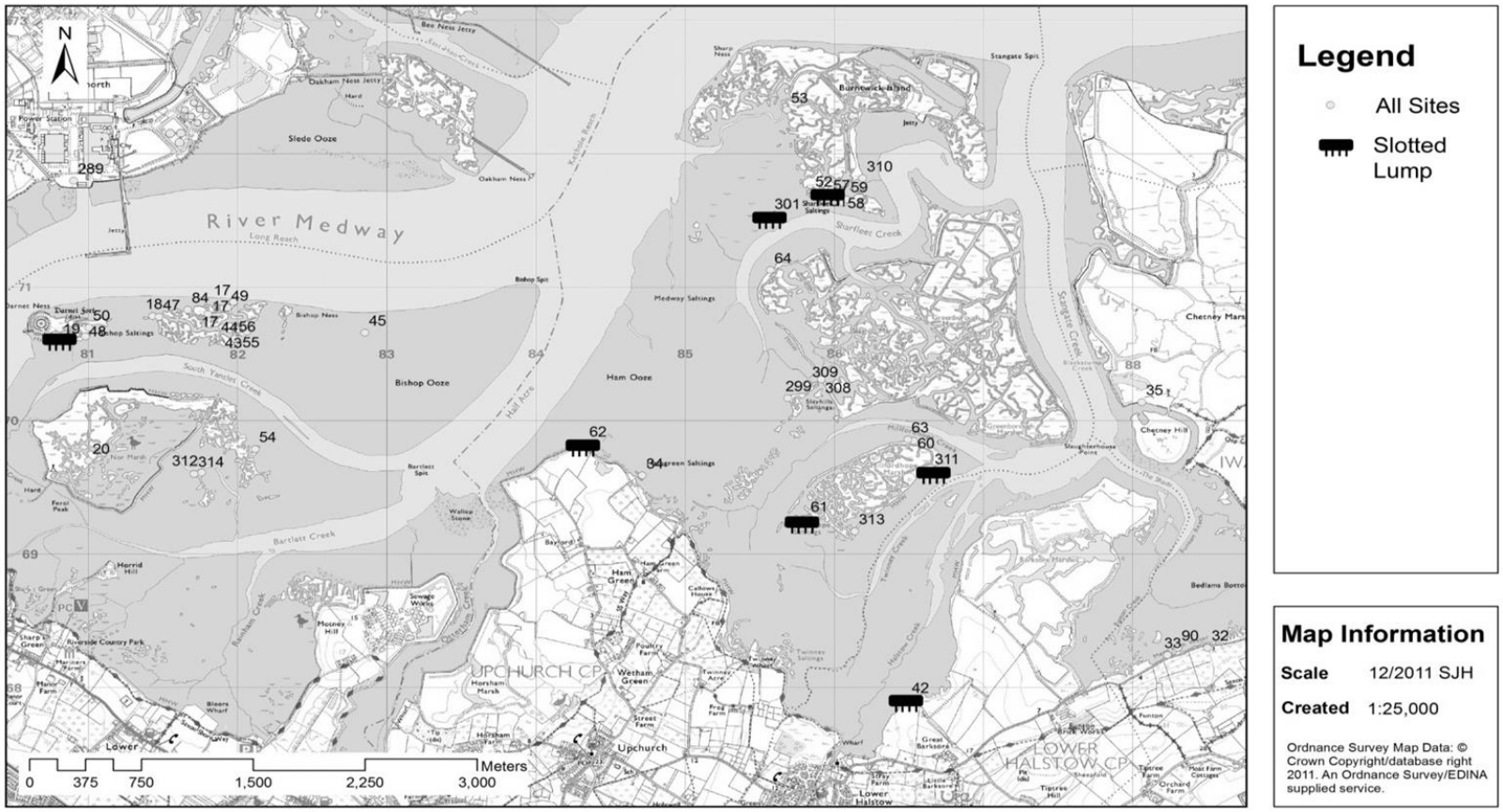


Figure 5.41 Slotted Lump distribution in the Medway Estuary, Kent (1st century AD)

This local innovation, restricted to the Medway Estuary in the 1st century AD, suggests a choice by local salt producers to employ this particular method of salt-production. The limited evidence for features across the sites containing slotted lumps, suggests that although these sites share this particular technology, these sites employed different working area formations.

Again, this suggests that there was a sharing of knowledge and skill between these sites, but that each site employed working areas preferred by individual salt producers.

However, the apparent uniformity of slotted lump material across these sites is remarkable, and would suggest that the material was produced centrally, perhaps in one location, and then distributed to salt producers. This is a rare example of uniformity in briquetage technology.

Portable hearths would have suited the unstable nature of the Medway Estuary perfectly. They would have allowed salt-production to adapt to changes in sea and land in this area.

However, the use of slotted lumps was short-lived, and was restricted to the Early Romano-British period, possibly only for a few decades or even less. Later sites used the traditional briquetage and hearths usually found across the study area. It could represent a period of salt-production that was quick, intense and carried out by producers new to salt-production, who perhaps did not continue salt-production for very long. It seems likely, that these individuals were local pottery-producers, who developed a new technology for producing salt, based upon their rich knowledge of general pyrotechnical technology through pottery production.

5.4 Overview

The main points covered by this chapter are listed below:

- Salt-Production was particularly prolific in Kent during the 1st century AD
- Romney Marsh contained an extensive complex of several combined working areas
- The Medway Estuary was a large salt and pottery production zone, and possibly specialised in the salting of beef

- Salt-producers in the Medway Estuary experimented with 'Portable Hearths', but this technology was never adapted elsewhere in the study area, or elsewhere in Kent and was short-lived
- Working Area formations often included combined hearths and tanks which was an efficient method for water management
- Salt and pottery production was chronologically, as well as potentially technologically linked in North Kent
- Symbolic behaviour associated with salt and pottery production was particularly significant in Kent

This chapter has explored the significance of salt-production in Late Iron Age-Roman Kent on a level not previously achievable. The dedication of individuals and groups in the recording of salt-production sites within this area has resulted in a rich archive enabling a greater depth of assessment and interpretation. It has been possible to explore the archaeology of salt-production in this area using a more detailed approach and this has demonstrated the potential these sites have when consistently recorded have to inform on issues of technology, identity and skill

The diversity of sites and technology across Kent created an impression of competitive sites and has shown clear evidence for identity and individuality attributed to the producers. Technology differed over time and space according to preferences and traditions of the salt-producers. Most sites in Kent indicate that multiple family units and/or small groups operated single salt-production sites in the Late Iron Age and particularly, the Romano-British period.

Different areas in Kent used different types of features and briquetage. People appear to have responded to the topography and waterscape of each area differently and adapted briquetage and features to this. There is also strong evidence for the sharing of technological knowledge between salt producers in Kent and in Essex.

It has been clearly shown that there was a significant diversity in the use of space and the creation of hearth and brine management areas in Kent. This diversity is not matched elsewhere within the study area. The diversity is especially apparent in sites dated to the 1st century AD.

Although this chapter has focused primarily upon characterising salt-production in Kent through technology and working area types, it is also important to consider the sites in the wider context.

The Medway Estuary sites, with evidence for probable wooden jetties (Jackson 2003), were perfectly placed for sea and road transport and the large 'complex' of salt-production working areas at Site 82 was also perfectly placed for supplying coastal military installations (if contemporary) and could equally utilise strong road and sea trade, potentially for the growing population of London, and even with France.

This chapter has focused primarily upon characterising salt-production sites in Kent using evidence for technology and working area formation. The organisation of these sites in the wider context of Kent and southern Britain, including the identification of different 'modes of production' and discussion of potential distribution networks, will be presented in **7.0**.