

Specialist Report 16

Charred Plant Remains and Charcoal

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Introduction

Bulk sediment samples for the recovery of charred plant remains and charcoal were taken and processed from five sites: the Rail Corridor (Broadhope Loop, COMWR12), the Access Road (COARD12), the Logistics Park Infrastructure (COOR14), the Pipeline Diversion (COLP15) and Salt Fleet Flats on the Cooling Marshes, Kent (CSCOX13).

A preliminary assessment of each processed sample was made shortly after the fieldwork for each site was completed. These descriptions form part of the interim evaluation reports for each site and are part of the site archive, with the main results summarised below. These interim assessments highlighted two samples for which further work might add to the understanding of past human activity in and around the sites; the results of analysis carried out on the basis of these recommendations is also described below.

Methodology

Each sample was processed by the team at Oxford Archaeology South (OAS) using a modified Siraf-style flotation machine. Flots were collected onto 250µm meshes and the heavy residues were sieved to 500µm, after which both flots and residues were dried in a heated room. The residues were sorted by eye for artefacts and ecofactual remains. A preliminary assessment of each sample was made, with a representative subsample of each flot scanned using a stereomicroscope at low magnification. A brief record was made of abundance and preservation of charred plant remains and charcoal and the main plant taxa present.

Sample 101 was recovered from a middle Bronze Age pot excavated at the Rail Corridor site (Broadhope Loop; COMWR12). Initial assessment showed that the pot contained a large number of charred flax seeds. The charred plant remains from the sample were therefore fully extracted, identified and quantified. Identifications were made with reference to published guides (eg Cappers *et al.* 2006 and Jacomet 2006)

and the modern reference collection held at OAS. Nomenclature follows Stace (2010). Sample 6 from the Pipeline Diversion (COLP15) contained abundant charcoal and species identifications were carried out in order to characterise the range of wood taxa present. The sample came from pit 2640, dated to the late Iron Age/early Roman period. A hundred charcoal fragments were selected randomly, and each piece examined on the transverse, radial and tangential sections as required at up to x400 magnification using a Brunel SP-400BD metallurgical microscope. Species identifications were made on the basis of diagnostic anatomical characteristics and with reference to the keys published in Schweingruber (1990) and Hather (2016).

Prehistoric

Rail Corridor (COMWR12)

The fills of two middle Bronze Age vessels were sampled and the resultant flots assessed. While the fill of flint-tempered vessel 113, which was truncated, contained only rare charred seeds and scarce fragmentary charcoal, pot 141, a barrel-shaped vessel also in a flint-tempered fabric (Brudenell, Specialist Report 1), contained a large number of charred flax (*Linum usitatissimum*) seeds. The charred plant remains from this second pot were subsequently fully extracted and quantified, and the results are given in Table 16.1. The flax seeds were a mixture of whole and fragmentary seeds, and the total given is a minimum number of individual seeds calculated primarily on survival of the distinctive ‘beak’ at the top of the seed.

Flax has been cultivated in Britain since the Neolithic period and was part of the Linearbandkeramik culture that also brought emmer wheat and barley to western Europe (Zohary *et al.* 2012, 104). One of the oldest finds of flax in Britain was identified a short distance from London Gateway further along the Essex coast on the estuary of the River Blackwater at the Stumble, where carbonised flax seeds were recovered from three contexts dated to the Neolithic period (Murphy 1990). Bronze Age finds of flax have more commonly come from waterlogged contexts in the form of seeds, seed capsules and fibres and have been interpreted as residues from the ‘retting’ of the harvested plant to produce linen, for example at West Row Fen, Suffolk (Murphy 1988) and Runnymede Bridge, Surrey (Greig 1991).

In addition to its use as a textile fibre, flax seed (or linseed) can be used to produce oil and may also have formed part of the diet. Flax seed has a high nutritional

value, being rich in protein, fibre and several essential minerals, and has medicinal qualities, such as being suitable as a purgative (Ganorkar and Jain 2013). At the middle Bronze Age settlement at Weir Bank Stud Farm in Bray, Berkshire, charred flax seed was present in seven out of nine sampled postholes from a roundhouse. The large number of seeds and their concentration around the entrance was taken to suggest that the seeds were being stored in the building (Clapham 1995, 45). Flax has also been recovered from Bronze Age contexts at two excavations at Heathrow: Perry Oaks and Terminal 5 (Carruthers 2006 and 2010). At Perry Oaks, waterlogged capsule fragments, and the absence of seeds and whole capsules, was taken to suggest that rather than representing retting debris, the fragments might be the result of ‘rippling’ the dried stalks to collect the seeds for food or oil, with the waste product possibly used as animal feed (Carruthers 2006, 4).

The large number of seeds from pot 141 may therefore represent a store of a valuable crop plant, potentially a store of food or a reserve of seed for the next season’s sowing. However, the context of the seeds, in a placed vessel, suggests that there may be a more symbolic or ritual purpose to their presence. Isolated finds of middle Bronze Age whole pots are often funerary vessels containing cremated bone (Brudenell, Specialist Report 1), and although there are placed pots of this date in which no human remains or positively human remains are recovered, as is the case at Broadhope Loop, it is generally argued that such vessels also have an association with funerary rituals. Charred plant remains from cremation vessels most commonly derive from the funeral pyre, usually dominated by charcoal remains of the pyre itself. It is difficult to distinguish whether other plants found associated with cremations were simply caught up in the fuel used to burn the body, as appears to be the case in the numerous finds of onion couch grass commonly found in Bronze Age cremations (Campbell 2012; Roehrs *et al.* 2013), or they represent a deliberately placed ‘offering’ or pyre good, as has been argued for finds of lesser celandine (Klooss *et al.* 2016). In the absence of pyre debris or cremated bone in the pot from Broadhope Loop, one of the possible interpretations of the flax seeds is that they are a deliberately placed offering with ritual, perhaps funerary, connotations.

Access Road (COARD12)

Of the twenty-four sediment samples processed from the Access Road, all but one was dated to the prehistoric period. The earliest dated sample was taken from pit 1004,

which also contained a middle Bronze Age vessel. However, this sample produced only a single indeterminate cereal grain and a small quantity of charcoal.

Three of the sampled features have been dated to the late Bronze Age/early Iron Age. Neither of the flots from the two sampled pits contained any charred plant remains and the charcoal from pit 5003 was only fragmentary; the charcoal from pit 2009, although including some larger pieces, was not sufficient to justify further analysis. Charcoal was also fragmentary in a sample from the upper fill of ditch 8087, and charred plant remains from this sample were limited to occasional poorly preserved cereal grains and wheat glume bases.

Four postholes and a single pit dating to the Iron Age were sampled. The four posthole samples contained only scarce plant remains, mostly charred weed seeds, although a charred stone of sloe (*Prunus cf spinosa*) was recovered from posthole 1024. Although charcoal was present in all four posthole samples, it was present in quantity only in postholes 1027 and 1044. Pit 1087 contained little identifiable material, with rare indeterminate cereal grains and mostly fragmentary charcoal.

The remaining fourteen samples could not be dated more closely than as prehistoric. Of these, seven were taken from postholes, five from pits, and one each from a tree-throw hole and a horse burial. The flots of the seven posthole samples were mostly dominated by modern root, and charred plant remains were entirely absent from features 1033, 1042, 1047 and 1183. The remaining three posthole samples contained occasional poorly preserved cereal grain, including wheat (*Triticum* sp), while a small number of wheat glume bases were also recovered from posthole 1018. Charcoal was fragmentary in all samples, with the exception of that from posthole 1182, which contained larger pieces although these were encrusted with a mineral precipitate.

Most of the prehistoric pit samples produced small flots, particularly pits 1085 and 1091, which were mostly composed of modern roots and contained no charcoal of identifiable size and few identifiable plant remains. The flots from pits 2017 and 8039 mostly consisted of powdered charcoal, although larger, mineral encrusted pieces were recovered from the heavy residues of pit 2017. A moderate number of cereal grains were also present in pit 2017 and, although many were poorly preserved, included both wheat and barley (*Hordeum vulgare*). Pit 8030 produced a greater quantity of charred material compared to the other four pit samples, with abundant charcoal recovered. The samples from tree-throw hole 1017 and from a fill associated with horse burial 8018 contained no significant remains, with only modern intrusive material and small flecks

of charcoal present.

Pipeline Diversion (COLP15)

Late Bronze Age pottery was recovered from the fill of natural depression 3202. A sediment sample from this deposit produced a small flot almost entirely comprised of fine roots with a very small amount of poorly preserved charcoal. The charcoal is most likely to be the result of wind-blown or washed-in material, rather than resulting from an episode of burning or from deliberate deposition.

Roman period

Logistics Park Infrastructure (COOR14)

The National Monuments Record notes the discovery of red hill material and 2nd and 3rd century pot sherds within the former site of the Shell Haven West Refinery, indicating the presence of a Romano-British saltern (NMR 417007; SMR 7102). The NMR listing is likely to refer to material discovered during the development of the refinery in the 1950s, but few other details are known. The reported location of the possible saltern falls within the area of the London Gateway Logistics Park Infrastructure, and archaeological evaluation works investigating a proposed drainage swale across the site provided the opportunity to establish whether the saltern was present.

Two environmental samples were taken from alluvial layer 501 at depths of 4m (sample 1) and 5.8m (sample 2) below ground level. The samples were taken primarily to recover finds such as briquetage which might provide evidence of a saltern. Plant remains were also extracted from the samples to see if the species present provided further evidence for human activity in the area.

Both flots were similar in composition, containing mostly dried out waterlogged roots and degraded, indeterminate plant material. No charred plant remains or charcoal were present in either flot, but waterlogged seeds of wet or damp ground occurred in low numbers, including *Suaeda maritima* (seablite), *Carex* sp (sedge) and *Juncus* sp. (rush). These are consistent with the saltmarsh environment that would have been present at the time the alluvial deposit was accumulating, but provide no evidence for contemporary human activity.

Pipeline Diversion (COLP15)

A sample taken from a burnt dump deposit from the north-western end of pit 2640 contained abundant charcoal. The results of the identification of a selection of charcoal fragments is shown in Table 16.2. The assemblage was mixed and the relative proportions of each wood taxon is shown in Figure 1. Oak (*Quercus* sp) is most common, followed by hawthorn type (Maloideae; this group of anatomically indistinguishable species also includes rowan, apple and whitebeam), and more occasional occurrences of birch (*Betula* sp), hazel (*Corylus avellana*), field maple (*Acer campestre*) willow/poplar (*Salix/Populus*) and ash (*Fraxinus excelsior*). The range of wood identified is similar to that identified both from late Roman features and in the pollen analysis carried out at Stanford Wharf Nature Reserve, which suggested local deciduous woodlands dominated by oak, hazel and alder, with elements of willow and field maple (Druce 2012; Peglar 2012).

Medieval and post-medieval period

Access Road (COARD12)

A very small flot (*c* 5ml) was recovered from a burning layer within pit 8092, which contained pottery dated 1270-1350. The flot was mainly composed of modern roots and charcoal. However, a number of small Asteraceae seeds, a seed of ribwort plantain (*Plantago lanceolata*) and occasional cereal grains, including wheat and barley, were present.

Salt Fleet Flats, Cooling Marshes, Kent (CSCOX13)

A series of artefact and organic-rich medieval dump deposits were excavated in Trench 32, representing episodes of rubbish dumping dating to the medieval period. Pottery recovered from its fills dates to *c* 1175-1350. A sample from one of the organic layers produced a large number of marine shells, frequent pottery fragments, iron, fish bone and animal bone. The flot was mostly composed of modern roots, containing little charcoal and few charred seeds. However, two seed capsules of thrift (*Armeria maritima*) were noted, together with a complete seed and a small seed fragment. Seeds of this plant were found in abundance at Stanford Wharf Nature Reserve. At that site, the presence of large quantities of thrift was believed to be related to the fuel used during salt production (Hunter 2012). However, the amount found during in the current

sample would seem insufficient to reach any such conclusion. Thrift is a common plant around the coasts of the British Isles and would be expected to grow naturally in this location.

A second sample thought to be medieval or later in date was taken from the alluvial fill of a palaeochannel in Trench 33, in which a localised layer of charcoal was noted. However, the charcoal recovered from the fill was only of small size, and had no potential to be studied further.

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Charred Plant Remains and Charcoal Tables

TABLE 16.1: CHARRED PLANT REMAINS FROM SAMPLE 101, RAIL CORRIDOR: BROADHOPE LOOP (COMWR12)

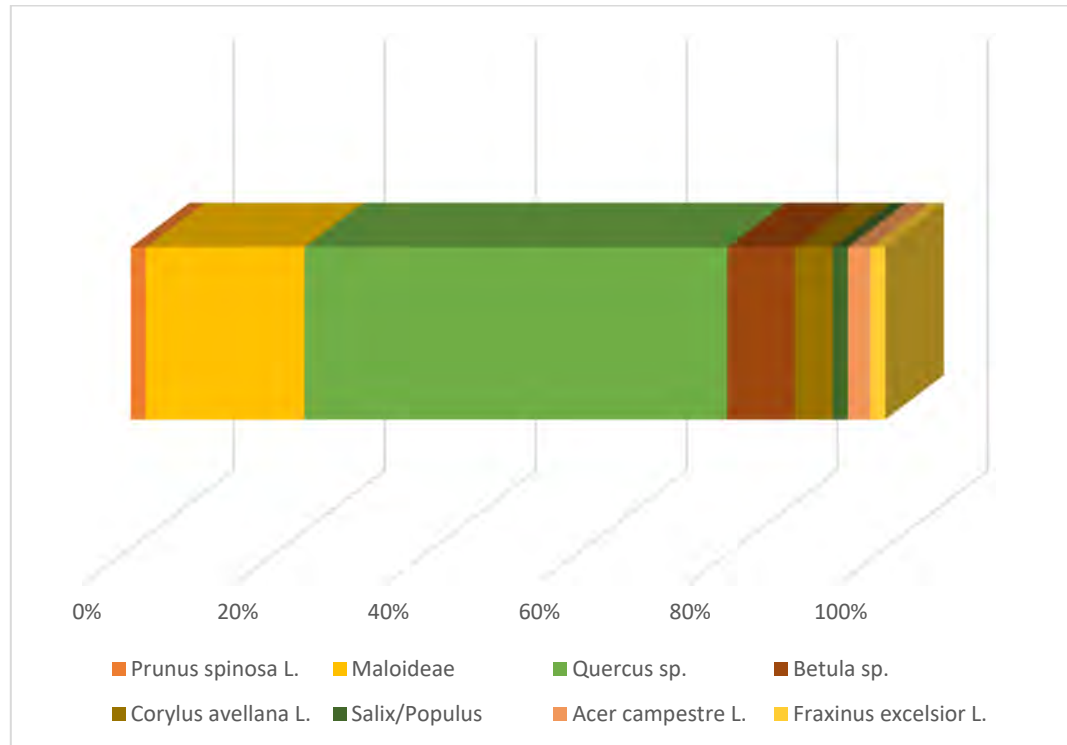
		Site Code	COMWR12
		Sample no.	101
		Context no.	142
		Feature no.	141
		Feature Type	Pot Fill
		Date	Middle Bronze Age
		Volume Processed	2.5L
<i>Triticum spelta</i>	spelt wheat	glume base	1
Indet	cereal	grain	1
<i>Linum usitatissimum</i> L.	flax	seed	105
Indeterminate		seed	3

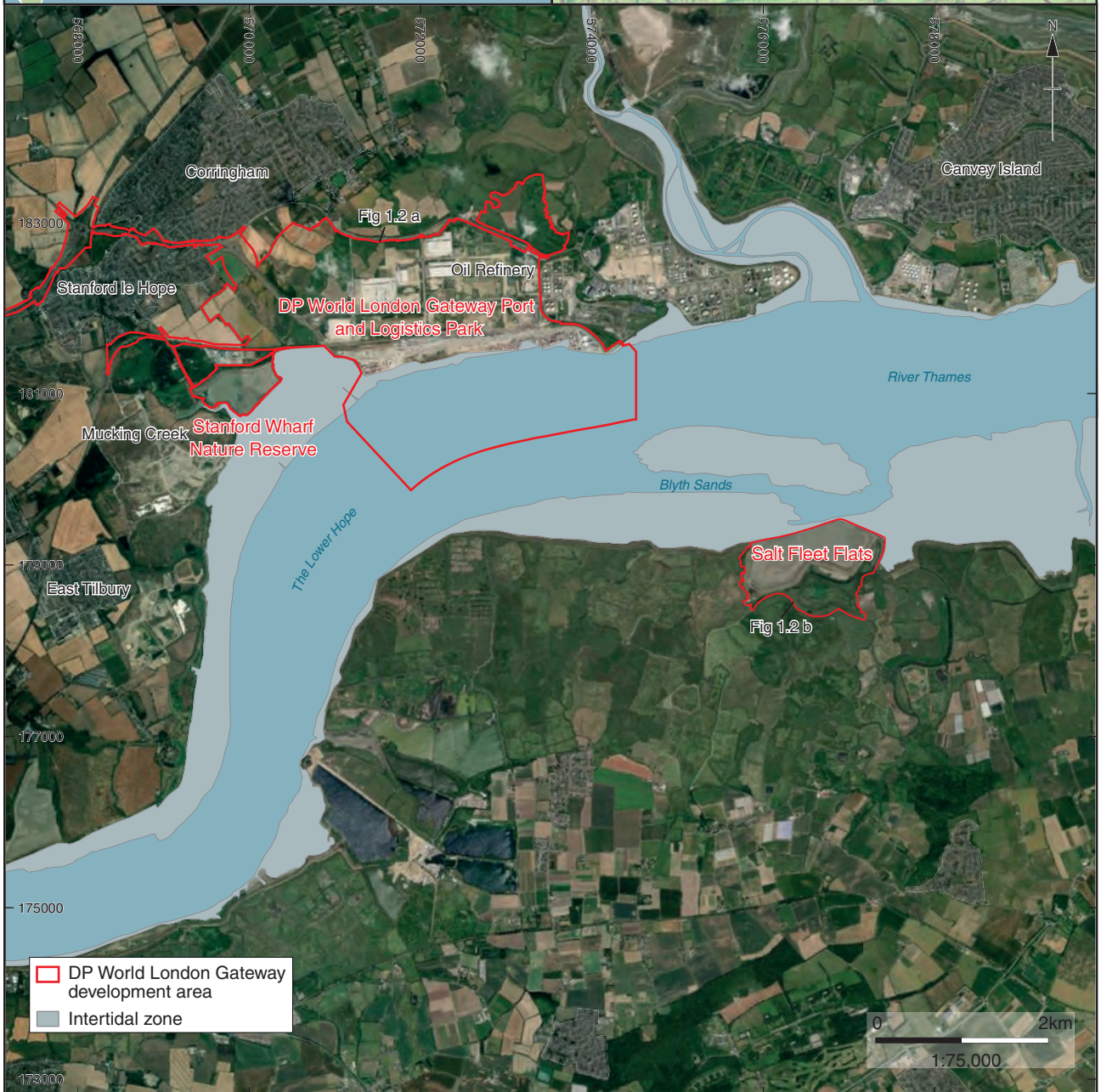
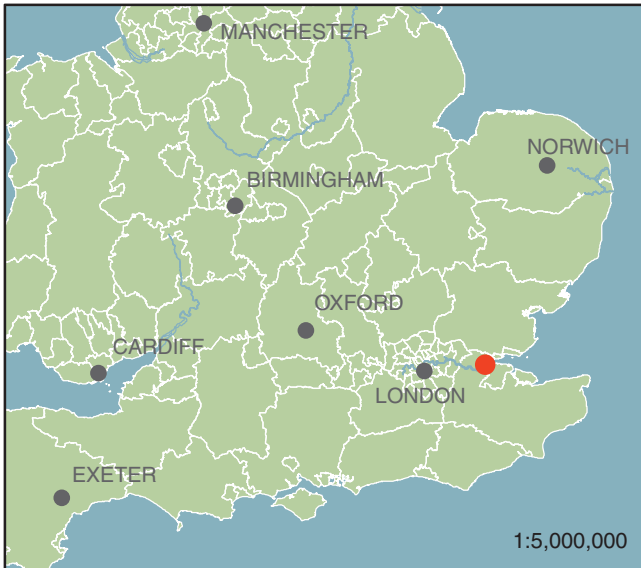
**TABLE 16.2: WOOD TAXA IDENTIFIED FROM SAMPLE 6,
PIPELINE DIVERSION**

	Site Code	COLP15
	Sample No.	6
	Context no.	2639
	Feature no.	2640
	Feature Type	Pit Fill
	Date	3rd/4th century AD
<i>Prunus spinosa</i> L.	blackthorn	2
<i>Prunus</i> /Maloideae	blackthorn/cherry/hawthorn type	1
Maloideae	hawthorn/rowan/apple/whitebeam type	20 (r)
<i>Quercus</i> sp.	oak	56 (r,h)
<i>Betula</i> sp.	birch	9
<i>Corylus avellana</i> L.	hazel	5
<i>Salix</i> / <i>Populus</i>	willow/poplar	2
<i>Acer campestre</i> L.	field maple	1
cf. <i>Acer campestre</i> L.	cf. field maple	2
<i>Fraxinus excelsior</i> L.	ash	1
cf. <i>Fraxinus excelsior</i> L.	cf. ash	1
Total		100

r = roundwood, h = heartwood

FIG. 1: PROPORTIONS OF WOOD TAXA IDENTIFIED IN SAMPLE 6, PIPELINE DIVERSION





This is one of 16 specialist reports
within a digital volume that supports the findings
presented in
London Gateway:
Settlement, farming and industry from prehistory to the present
in the Thames Estuary
(ISBN 978-0-904220-81-0)

The digital volume can be accessed here:
<https://library.oxfordarchaeology.com/5778/>

