Assessment of the environmental samples from Crossrail Central, Broadgate (XSM10) (post-Roman)

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ENV/BOT/ASS/

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1 Quantification and assessment

1.1 Site archive and assessment: finds and environmental

Category	Description	Weight
Bulk Soil Samples	Flots from 56 samples; sub-samples from unknown number of samples retained unprocessed.	6 boxes

Table 1 Finds and environmental archive general summary(all phases)

1.2 The plant remains etc

Introduction/Methodology

169 environmental samples, ranging from five to 40 litres in volume, were taken during excavation at Broadgate. They represent a variety of context types and periods, from prehistoric waterlain deposits to post-medieval garden features. This report summarises the organic remains from the samples dating to the post-Roman phases of activity at the site. Summary results of the botanical remains can be seen below in Table 2.

The samples were processed by flotation, using meshes of 0.25mm and 1.00mm to catch the flot and residue respectively. The residues from flotation were dried, and sorted by eye for any finds or environmental material, and any flots which contained waterlogged organic material were stored in water. All other flots were dried. All flots were then scanned briefly, using a low-powered binocular microscope. Many of the flots were very large and subsamples of c 100 ml were assessed in these cases. The abundance, diversity and general character of the plant, animal and artefactual remains present within the samples were recorded on the MOLA Oracle database, and the botanical information is summarised below in Table 1.

Plant remains were preserved primarily by waterlogging, with some preservation by charring and mineralisation.

Results from previous phases of assessment work have been included in this report.

Charred remains

Charcoal was recovered in about two-thirds of the samples dating to this phase. In most cases charcoal was record in very low amounts but in five samples it was recorded as ‘abundant’.

Waterlogged and mineralised remains

Waterlogged preservation of organic material in the samples was excellent, with abundant and diverse assemblages in 33 of the 56 samples. Wet ground taxa were very well represented with aquatic taxa such as pondweed (*Potamogeton* spp.) and hornwort (*Ceratophyllum* spp.) recorded in many samples, alongside wet ground or channel edge plants like celery-leaved crowfoot (*Ranunculus sceleratus*), bur-marigold (*Bidens* sp.) and

gipsy wort (*Lycopus europaeus*). Wood fragments, twigs, stems and leaves were also quite common in the samples, which suggests a degree of wood or shrubland near the site.

Food remains were also common, with cherries (*Prunus avium/cerasus*), plums (*Prunus domestica*), grapes (*Vitis vinifera*), figs (*Ficus carica*) and mulberry (*Morus nigra*) all represented. Low numbers of mineralised remains were recorded in 3 samples in low concentrations.

Signs were seen in a few samples of textile industries in the neighbourhood, with seeds of flax (*Linus usitatissimum*) and hemp (*Cannabis sativa*) in several samples and also flax seed capsules in {74} [1312]. Sample {10} [283], an organic deposit thought to date from the post-medieval period, contained many stem fragments and numerous seeds of hemp (*Cannabis sativa*), along with mainly weeds of arable and/or waste ground. Hemp was cultivated for the use of its stem fibres in textile manufacture, and its seeds were crushed to extract oil. Many seeds of teasel (*Dipsacus* sp.) were seen in sample {44} [1034].The spiny seed-heads of this plant were used for raising the nap on woollen cloth, and cultivated teasel grounds are known to have existed to the east of Bishopsgate during the medieval period.

Occasional finds of cultivated garden plants were also present in some of the samples, including seeds of ornamental plants such as marigold (*Calendula* sp.), opium poppy (*Papaver somniferum*) and leaves of box. Numerous hop (*Humulus lupulus*) seeds, seen in samples {69} [1150] and {71} [1177] may also result from garden crops grown for home brewing in the post-medieval period.

Faunal remains

Freshwater molluscs were very common in the samples taken from the site, occurring in almost all of the samples. In most cases these were in low to moderate numbers, but occasional samples with abundant molluscs were noted.

Animal bones were also common from the samples at the site, again mostly in low numbers, though there were a number of exceptions to this, such as the abundant bird bone recorded in {408} [8264]. Mammal, bird and fish bones were all recorded. All animal bones from sampling are assessed in the animal bone assessment report (Appendix XX)

Fragments of beetle exoskeleton occurred frequently in the samples. In most cases these were in low to moderate numbers. Larval cases of caddis fly (Trichoptera) and leech eggs were also recorded in a number of samples, both of which are good indicators of wet habitats.

Artefactual remains

Artefacts were recorded in all of the 56 samples. In many cases these were in very low quantities, but both clinker and ceramic building material was recorded in greater amounts than any other artefact type. Pot, leather, iron objects and glass were all recorded with some frequency and these have been assessed by the relevant specialists.

2 Potential of the data

2.1 General discussion of potential

Preservation of organic remains in the post-Roman samples was very good in almost all the samples, with large and diverse waterlogged plant assemblages in particular.

Rich and diverse food remains assemblage were recorded in a number of the samples and these have the potential to inform us about diet, trade and status in the post-medieval period of activity at the site.

Many of the samples also contained abundant evidence of the natural environment, particularly indicating wetland environments. Evidence of dumping, of household and possibly industrial waste, was also evidenced in a number of the samples, and analysis of these will inform us about a variety of activities taking place at or near the site.

The presence of possible garden material is also interesting and can hopefully be tied in to analysis of the historical use of the site and the locality.

3 Significance of the data

The excellent preservation of organic remains in many of the samples suggests that their study will produce information of high significance in relation to the understanding of many aspects of the activities there in the post-Roman period. Domestic and indust

4 Publication project: aims and objectives

4.1 Revised research aims

Post-Roman

RRA1: What can the waterlogged plant assemblages tell us about the diet of the site's inhabitants? Do they show change through time?

RRA2: What information can the plant assemblages provide about past activities and land-use on the site, in all periods?

*RRA*3: What can the wild plant, insect and mollusc assemblages tell us about the vegetation and appearance of the area, and is there any evidence of change through time?

RRA4: Can the plant remains help reconstruct local use of gardens in the post medieval period?

4.2 Botanical method statement

34 of the samples were found to contain abundant plant remains assemblages. A number of these samples however are likely to be duplications of the same context and need not be analysed. At the current time this is likely to be c. 12 samples. It is suggested that all remaining samples containing abundant plant remains be analysed, though selection of other samples may be required based on revised research aims
Methodology will follow standard procedures in use by MOLA. Any charred plant remains will be sorted, identified and quantified numerically, while waterlogged remains will be scanned, and estimates made of their abundance..

Accessing stratigraphic data & selection of samples for study (in consultation with strat. team):	0.5 days
Scanning & id of 22 rich waterlogged samples:	15.75 days
ID of plant remains from sample residues:	0.5 days
Data entry, production & editing of tables:	1 days
Analysis and research, production of archive report :	6.0 days
Total time required:	**23.75 days**

Insect samples

As almost all of the samples contained insect remains, selection of those samples that are best likely to contribute to the revised research aims will be undertaken.
Costings for the analysis should be obtained from the insect specialist and can vary, depending on the level of analysis required.
In addition, the following work will need to be carried out by MOLA staff:

Retrieval of the samples from store, and wet-sieving samples:	0.25 days per sample
Packing and dispatch:	0.5 days
Liaison between botanist and insect specialist:	0.25 days

				Charred grain		Charred chaff		Charred seeds		Charred wood		W'logged seeds		W'logged misc		W'logged wood		Min seeds		
Sample	Context	Flot. Volume	Proc	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	Comments
2	237	10	F									3	3	2	2					WET. WETLAND/AQU PLANTS, MOLLUSCS
3	239	100	F							1	1	3	3	2	2					WET.MOSTLY WETLAND PLANTS, SOME DRY
7	231	20	F							1	1	3	2							WET. MOD PRES. WET & DRY GRND PLANTS
7	231	20	W							1	1									
9	244	100	F							2	1	3	3	3	1					WET.ROOT? EPIDERMIS, WET & DRY GRNDSEEDS
10	283	250	F									3	2	3	2					WET. MANY HEMP SEEDS. DISTBD, FEW WET PL
20	697	10	F	1	1	1				1	1	3	3							DRY. AQUATIC/WETLAND PLANTS, MOLLUSCS
24	707	30	F							1	1	3	3	3	1					WET. AQUATIC PLANT REMS & INVERTS
25	708	100	F			1				1	1	3	3	3	3					WET.AQUATIC/WETLAND PLANTS & INVERTS
27	714	500	F					1	1	3	1	3	3	3	3					WET.WOODY, FEW FOODS,MOSTLY DRY SPP.
28	715	20	F			1		1	1	3	1	3	2	1	1					DRY. MOSTLY DRY GRND PLANTS & RANSC
32	1018	200	F									2	2	2	2					WET. V FINE-ONLY MOLLUSCS IN >2MM
44	1034	1000	F	1	1					2	1	3	3	3	3					WET. 2 BAGS. V MANY DIPSACUS SEEDS

44	1034	1000	W							1	1	1	1							MANY NUTSHELLS, SOME FRUIT STONES
58	1066	1200	F							3	1	3	3	3	3					WET. ORGANIC BUT SEEDS SPARSE. ROSEMARY
58	1066	1200	W							1	1	1	1							SOME FOODS INCL 1 OLE
69	1150	120	F							1	1	3	2	3	2					WET. MUCH CLINKER, SPARSE FOODS ETC.
69	1150	120	W									1	1							FEW FOODS
70	1169	600	F							1	1	2	2	2	2					WET. CLUMPS HAIR/FIBRE
70	1169	600	W							1	1	1	1							NUTS & FRUITS INCL ALMOND?
71	1177	150	F							1	1	3	3	3	3					WET. FOODS, HOPS, SOME WILD
71	1177	150	W							1	1									
72	1187	70	F							1	1	3	3	3	2					V MANY MOLLUSCS & SEEDS
74	1177	80	F									3	3	3	2					WET. MANY MOLLS. WETLND SEEDS+SOME FLAX
78	1187	300	F									3	2	3	2					WET.STRAW?, SOME ARABLE WEEDS
78	1187	300	W							1	1									
79	1345	80	F									2	1	3	1					WET. MOSTLY MOLLUSCS
80	1343	300	F							1	1	3	3	3	3					WET. STEMS, A WEEDS
80	1343	300	W									1	1							FRUIT & NUT, 4 OLE,CANS,ILEAQ,CND
81	1373	150	F							1	1	3	3	3	2					WET. STEMS, MIXED SEEDS
81	1373	150	W									1	1							FEW FOODS
82	1369	600	F							1	1	3	2	3	2					WET.STEMS & MANY GRASS SEEDS
82	1369	600	W									1	1							FEW FOODS INCL 4 OLE
112	2053	350	F							1	1	2	2	2	1					
301	3704	450	F							1	1	3	3	1	1			1	1	
303	3264	80	F							1	1	3	3	2	1					
304	3849	50	F									2	2	2	1					
312	6313	25	F									1	1							POOR PRES
316	6320	25	F							1	1	2	2	1	1			1	1	

317	6376	100	F							2	1	2	2	1	1					ABUNDANT CHEN
318	6341	450	F	1	1					1	1	3	3							2 BAGS
319	6397	400	F							1	1	3	3	2	1					LOTS OF ONTERESTING APIA
323	6397	150	F									2	2	2	1					
328	4855	25	F							2	1	2	2	1	1					
329	6569	50	F									2	1							
332	4764	600	F							1	1	3	3	1	1					
335	6587	500	F									3	3	1	1					
336	6607	80	F	1	1					1	1	1	2							337 ON BAG
337	6639	1200	F	1	1					1	1	3	3	3	2					2 BAGS
339	6737	500	F									3	3	2	1					
347	6756	40	F									1	1	1	1					
348	6758	150	F							1	1	2	2	1	1					
349	6639	700	F							1	1	3	3	3	2					
349	6639	700	W									1	1							
407	8257	1000	F							1	1			3	1					
407	8257	1000	W									2	2							
408	8264	900	F	1	1					2	1	2	1					2	1	+++BIRD BONE
408	8264	900	W							3	1									
409	8276	40	F							1	1	1	1	1	1					
410	8277	100	F							1	1	1	1	1	1					
411	8278	100	F									1	1	1	1					
412	8279		W							3	1	1	1							
413	8285	250	F							1	1	3	2	3	1					
414	8282	750	F									2	2	1	1					
414	8282	750	W									3	1							
419	8282		W					3	1			2	1							
420	6640	100	F									1	1							2 BAGS
428	6506	500	F							1	1	3	3	3	2					

429	6543	600	F							1	1	3	3	3	2				LOTS OF TWIGS/ROUNDS
431	6549	1500	F									3	3	3	1				

Table 2: Summary of botanical assessment data (Post-Roman)
A: abundance, D: diversity (1 = occasional, 2 = moderate, 3 = abundant)

F: Flot, W: Residue