Geoarchaeological prospection and palaeoenvironmental assessment at IKEA, Spon/Corporation St, Coventry, Warwickshire.

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1. Introduction

The construction site of the new IKEA store, located at the rear of Medieval Spon Street lies on the floodplain of the River Sherbourne and was potentially underlain by some of the richest archaeological and archaeo-environmental deposits in the city of Coventry. This survey and analysis aimed to establish the archaeo-environmental potential of these deposits, and to elucidate floodplain evolution and channel migration of the River Sherbourne and its possible role in the development of medieval and later industrial activity in this sector of the city. Of particular interest was the relationship between a possible palaeochannel of the River Sherborne, a tannery and a dye works at the site. The ready supply of water provided by the river attracted industries such as tanning, fulling and dying, all of which require large quantities of water. A watermill is also thought to have occupied the eastern end of Spon St., the parish church of St. John the Baptist currently occupies the former site of this mill.

Industrial activity in the Spon St. area blossomed during the 12th and 13th centuries with rural population migration into Coventry leading to urban expansion at the periphery of the medieval city (Soden 2005). Spon St. was at the heart of the Coventry Tanning district and lay outside the city walls, many of the more 'noisome' trades such as tanning, being consigned to the edges of the medieval city, tanning continued in this area to the late post medieval period (Soden 2005). Other occupations in the vicinity included fulling, woading, weaving and cobbling (Stephens 1969).

2. Aims and Objectives

The borehole survey, undertaken for the purposes of geoarchaeological and palaeoenvironmental prospection at the Spon St. site, had six specific objectives (Patrick 2006):

- To assess the palaeoenvironmental potential of the river channel and alluvial deposits that are present on the site.
- To record and date the sequence of deposits, whether deliberately dumped or naturally deposited, in order to better understand the River Sherbourne.
- To provide a profile of the river valley.
- To establish a secure site chronology from the earliest to the latest activity.

- To examine the impact of human activity on the local environment through the analysis of environmental samples taken from waterlogged deposits, in particular from palaeochannels and riverine deposits of associated with the River Sherbourne.
- To use environmental archaeology to enhance our understanding of industrial and domestic activities, water conditions, human health, diet, trade and the wider environment in Coventry from the earliest times to the 19th century,

3. Methods

3.1 *Borehole Survey*

Two 40 metre transects; each consisting of four boreholes at 12.5m intervals, ran from the infilled trenches excavated by Northamptonshire Archaeology, in a southeasterly direction from the mid-point of the tannery and dye shop trenches (Figure 1).

A heavy probing rig was required to penetrate the concrete and hardcore overburden that covered much of the site. Global Probing and Sampling Ltd., using a tracked mini 'Competitor' window sampler-coring rig, undertook coring. Dr. Emma Tetlow of Birmingham Archaeo-environmental monitored the work.

The recovered cores were then returned to the archaeo-environmental laboratories at the University of Birmingham for recording and palaeoenvironmental sampling. The lithological characteristics of the sediment sequences were recorded including colour, grain size (where applicable), inclusions of anthropogenic material such as brick, mortar, tile etc., the presence and nature of organic material including larger fragments of wood and shells.

3.2 *Palaeoenvironmental Assessment*

Samples were collected from two cores, one from each transect, containing material deemed to have the most potential for palaeoenvironmental assessment (Core 1/2 and Core 2/2). The top, middle and bottom samples from each core were processed for the purposes of this assessment. Material for further analysis was recovered from four centimetre intervals for pollen analysis with bulk samples was recovered at 30cm intervals throughout each core for insect and waterlogged plant remains. This material has been retained in the archive at the University of Birmingham. Preparation of this material for each form of proxy evidence (pollen, insect, waterlogged plant) followed the standard procedures outlined below:

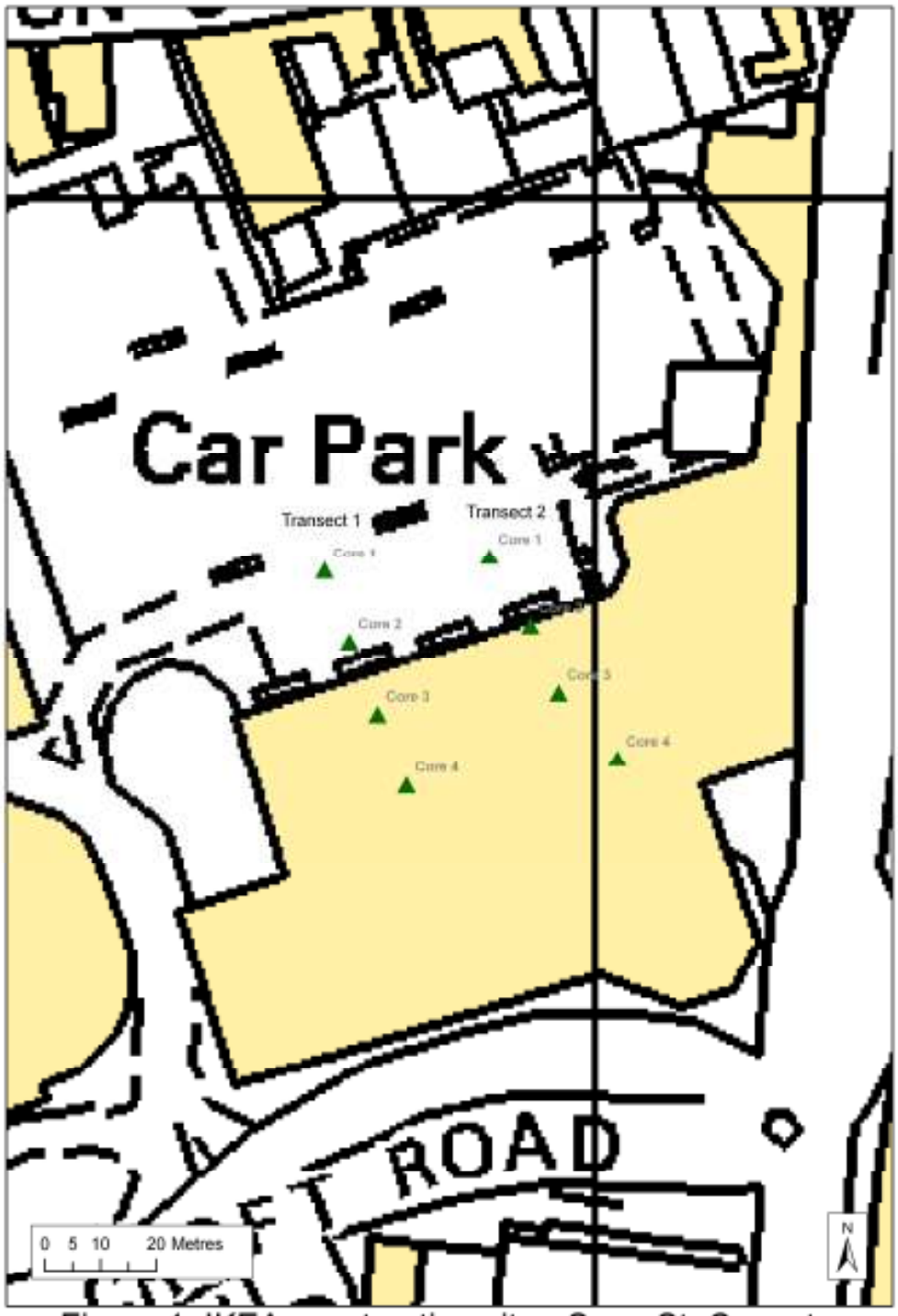

Figure 1: IKEA construction site - Spon St, Coventry

3.2.1 *Pollen*

Six samples were submitted for pollen analysis from Core 1, Transect 1 (Table 1) and Core 2, Transect 2 (Table 2). Pollen preparation followed standard techniques including KOH digestion and acetylation (Moore *et al.*, 1991). At least 125 total land pollen grains (TLP) excluding aquatics and spores were counted for each sample using an Olympus CH-2 microscope, although low

pollen concentrations and poor preservation meant that meaningful counts were only possible for a single sample. Pollen nomenclature follows Moore *et al.* (1991), with the modifications suggested by Bennett *et al.* (1994). The pollen sum is based on TLP excluding obligate aquatics and spores. Percentages for these groups are calculated as percentage of the basic sum plus sum of the relevant group.

3.2.2 *Insects*

Bulk samples were processed for Coleopteran remains using the standard method of paraffin flotation as outlined in Kenward *et al.* (1980). The resultant paraffin flot was then sorted and identified where possible under a low power (x10) binocular microscope. The system for "scanning" faunas as outlined by Kenward *et al.* (1985) was followed for this assessment. Where possible, the insect remains were identified by comparison with specimens in the Gorham and Girling collections housed at the University of Birmingham. The taxonomy used for the Coleoptera (beetles) follows that of Lucht (1987).

3.2.3 *Waterlogged Plant Remains*

Bulk samples were processed for waterlogged plan remains using the standard method of Kenward *et al.* (1980). The resultant flot was then sorted and identified where possible under a binocular microscope. The system for "scanning" such material as outlined by Kenward *et al.* (1985) was followed in this assessment. Where possible, the waterlogged plant remains were identified by comparison with the comparative collection housed at the University of Birmingham and by use of various seed identification manuals (Anderberg 1994; Berggren 1969 & 1981; Cappers *et al* 2006, Jacquat 1988), the taxonomy used for the waterlogged plant remains follows that of Stace (1997).

3.3 *Archaeology*

Archaeological intervention, by Northamptonshire Archaeology, had already been undertaken prior to this further phase of geoarchaeological and palaeoenvironmental prospection. The excavation by Northamptonshire Archaeology centred on two areas in which the tannery and dye shop were thought to be located. The tannery (trench 5, Figure 2) is located in the western edge of the construction area and the dye shop to the east (trench 4, Figure 2). Where pertinent, archaeological material recovered from all four cores, such as animal bone or pot-sherds has been identified, this information is included in Table 1.

4 Results

4.1 *Borehole Survey*

The sedimentological record of all eight cores is presented in Table 1.

Transect 1	*Depth*	*Description*	**Notes**
Core 1	0-.83m	Modern made ground.	
	.83-1m	Black (7.5YR 2/0) alluvium with sand, crushed red brick, mortar and some charcoal .	
	1-2.7m	Core lost.	Victorian cellar?
	2.7-2.82m	Black (7.5YR 2/0) alluvium with sand, crushed red brick, mortar and some charcoal.	
	2.82-2.89m	Crushed red brick	Cellar floor
	2.89-3m	Black (7.5YR 2/0) alluvium with sand, crushed red brick, mortar and some charcoal.	
	3m+	Very dark grey (7.5YR 3/0) alluvium.	
Core 2	0-.79m	Modern made ground.	
	.79-.82m	Crushed red brick.	
	.82-.95m	Industrial waste? Friable, granular, black material with hammer scale.	Smithy waste (Swiss pers. comm.).
	.95-1.85m	Very dark grey (7.5YR 3/0) alluvium with abundant charcoal, crushed brick, mortar and woody remains.	
	1.85-2m	Very dark grey (7.5YR 3/0) alluvium with occasional charcoal, crushed brick, mortar and woody remains.	
	2m-2.8m	Core Lost	
	2.8-2.88m	Crushed red brick	
	2.88-3.2m	Very dark grey (7.5YR 3/0) alluvium with occasional charcoal, crushed brick, mortar and woody remains.	
	3.2-3.23m	Very fine straw-like deposit	Possible herbivore coprolite
	3.23-3.29m	Very dark grey (10YR 3/1) silty clay alluvium with some sand.	
	3.29-3.46m	Dark grey (7.5YR 4/0) silty clay alluvium with some sand.	
	3.46-3.57m	Dark grey (10YR 5/1) silty clay alluvium with some sand, siltier than previous samples.	

	3.57-3.68m	Dark grey brown (10YR 4/2) silty clay alluvium with some sand, rootlet bioturbation.	
	3.68-3.78m	Very dark brown (10YR 3/2) silty clay alluvium with sand and some organic material.	
	3.78-3.95m	Very dark brown (10YR 2/2) organic rich sandy silt.	
	3.95m+	Sands and gravels	
Core 3	0-1m	Modern made ground.	
	1-2m	Black (7.5YR 2/0) alluvium with sand, crushed red brick, mortar and some charcoal .	
	2-3m	Lost	
	3-3.2m	Black (7.5YR 2/0) alluvium with sand, crushed red brick, mortar and some charcoal .	
	3.2-4m	Fine grained dark red sand (2.5YR 3/6) organics and manganese/occasional sandy lenses.	
	4-4.5m	Cobbles	
	4.5-4.82m	Diamicton	
	4.82-4.98m	Weathered Keresley sandstone	
	4.98m+	Keresley sandstone	
Core 4	0-1m	Core lost	
	1.4-1.65m	Dark brown (5YR 3/6) alluvial silt and clay.	1.4 animal bone
	1.65-1.95m	Highly weathered Keresley sandstone	
	1.95-2m	Weathered Keresley sandstone	

Transect 2	*Depth*	*Description*	**Notes**
Core 1	0-.7m	Modern made ground.	
	.7-1.52m	Black (7.5YR 2/0) alluvium with sand, crushed red brick, mortar and some charcoal .	
	1.52-1.89m	Very dark grey (5YR 3/1) sandy silt with occasional charcoal, mortar and quartz pebbles.	
	1.89-2.12m	Dark brown almost black peat, rich in woody detritus.	
	2.12-2.44m	Black (5YR 2/5) sandy, clay silt with occasional gravel.	
	2.44-2.53m	Very dark brown (10YR 3/2) silty clay alluvium with sand.	Organic detritus possibly subject to peat-forming activity.
	2.53-2.77m	Black (5YR 2/5) sandy, clay silt with occasional gravel.	
	2.77-3m	Dark reddish brown (10YR 3/3) gravely sand.	
	3-3.2m	Diamicton.	
	3.2-3.32m	Reduced grey (10YR 6/2) fine sandy layer.	
	3.32-3.85m	Cobbles and weathered Keresley sandstone.	
Core 2	0-1.32m	Modern made ground.	
	1.32-1.98m	Black (7.5YR 2/0) alluvium with sand, crushed red brick, mortar and some charcoal.	
	1.98-2.95m	Very dark grey (5YR 3/1) sandy silt with occasional charcoal, mortar, quartz pebbles and woody remains.	2.24-2.29 Fine bands of light reddish brown silt (2.5YR 6/4). Organic detritus possibly subject to peat-forming activity.
	2.95-3.2m	Dark reddish brown (5YR 3/2, slightly sandy silt with occasional gravel inclusions.	

	3.2-3.51m	Very dark greyish brown slightly silty, organic rich.	3.28m Tile fragments. Organic detritus possibly subject to peat-forming activity.
	3.51-3.56m	Large woody fragments	
	3.56-3.68m	Dark grey (10YR 4/1) coarse sand.	
	3.68-3.83m	Dark grey (10YR 4/1) coarse, gravely sand.	
	3.83-4m	Dark grey (10YR 4/1) sands and gravels.	
Core 3	0-.94m	Modern made ground.	
	.94-1m	Made ground with some organic component.	
	1-1.45m	Modern made ground.	
	1.45-2.56m	Black (7.5YR 2/0) alluvium with sand, crushed red brick, mortar and some charcoal.	
	2.56-2.85m	Very dark brown (10YR 3/2) with occasional tile, crushed brick and mortar.	Organic detritus possibly subject to peat-forming activity.
	2.85-3m	Very dark greyish brown (2.5YR 3/2) slightly organic sandy silt.	
	3-3.34m	Dark brown (7.5YR 3/2) slightly sandy clay silt with occasional organics.	
	3.34-3.52m	Dark brown (7.5YR 4/2) silty sand with occasional organics.	
	3.52-3.95m	Dark brown (7.5YR 3/3) organic rich sand with occasional woody remains.	
	3.95-4m	Grey brown sands and gravels.	
Core 4	0-4m	Modern made ground.	
	4m+	Diamicton.	

4.1.2 *Geology and Sedimentology*

Two units appear ubiquitous across the site and are recorded in all eight cores. These units comprise of degraded rockhead composed

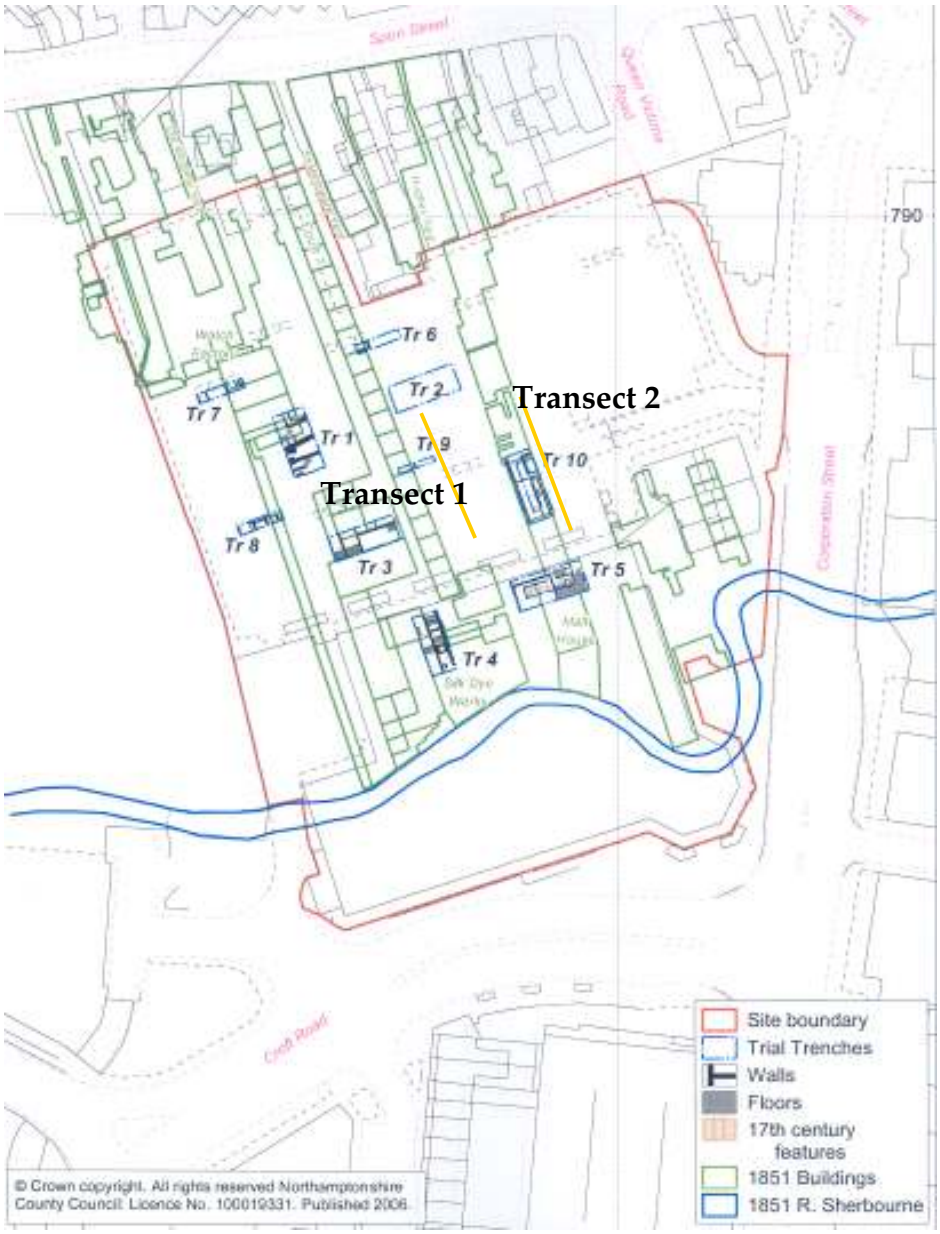

Figure 2: Trenches from excavations by Northamptonshire Archaeology their relationship to the Birmingham Archaeo-environmental transects and association with key buildings from the 1851 Board of Health Map (Burrow and Soden 2006).

of Keresley sandstone and diamicton of mixed alluvial sands and gravels, the composition and depth of which varies locally across the site. In Transect 1, the sands and gravels of the diamict varies between 3.95m (core 2) and 4.5m (core 3). The depth of the rockhead in transect 1 varies significanty, from 1.95 in core 4 to 4.82m in core 3, which represents a significant change in depth. Similarly, the depth of the diamict in Transect 2 varies considerable, in cores 1

and 2 the depth is relatively shallow, 3.56-3.68m deepening in core 3 and 4 to 3.95-4m.

The diamict is replaced between 3.95m and 1.6m by silty clay alluvium with some sand, once again depths vary locally across the site. The composition of this unit varies greatly and inlcudes large qunatities of anthropogenic material, which varies from tile and crushed brick to butchered animal bone across both, transects:

Core 1/1:
1.7m of this core was lost between the depths of 1m and 2.7m, it is likely that this loss is due to the void created by one of the many Victorian cellars. Subsequent deposits consist of a shallow (12cm) deposit of alluvium, crushed brick, mortar and charcoal, the alluvium is possibly derived from flood waters entering the cellar, a significant flood event occurred in Spon St. on the 31st December 1900. Below this, at 2.82-2.89m lies a layer of crushed brick, the depth of this deposit is commensurate with the depth of a house brick and it seems likely that this is the floor of the cellar.

Core 1/2:
This core was selected for palaeoenvironmental assessment and analysis since the lowermost alluvial contexts from this core probably contain the leas disturbed deposits with greatest palaeoenvironmental potential. Between 3.23-3.78m the stratigraphy contains no direct evidece of human activity, in contrast, the upper alluvium (2.88-3.23m) contains distinct evidence of human modification: a fine band of highly fragmented, straw like material between 3.2-3.3m is interpreted as possible herbivorous coprolite, between 2m and 2.8m sediment was not retrieved, probably again due to the presence of a cellar. The final deposit (.82-.95cm) worthy of note is a thin band of friable, granular material, thought to be the detritus of smithy work at the site. The deposit contains hammerscale and possible melted coping sand (Swiss pers. comm.). Animal bone was also recovered from this core in the form of vertebrae, probably of cattle (*Bovis* spp.) from 1.4m and 3.2m. The rib of a deer, perhaps red deer (*Cervus elaphus*), was also recovered from 3.2m.

Core 1/3, 1/4:
The alluvium from all three cores contains large quantities of anthropogenic material including crushed brick, mortar and woody remains. It is likely that this material was incorporated into this deposit by human agency and the dumping of general building waste into the relict channel of the River Sherbourne.

Core 2/1, 2/2, 2/3:
The first three cores from Transect 2 were very similar, very dark brown alluvium with inclusions of organic material with little if no evidence of deposition by human agency were found at 3.5m in cores 2/2 and 2/3. Evidence of human agency in core 2/1 disappears at a much shallower depth (1.89m) and is replaced by a highly organic deposit, possibly degraded peat. This is replaced by dark grey alluvium containing small amounts of crushed brick, mortar and other detritus, this alluvial deposit was found at 2.9m, in cores 2/2 and 2/3 and slightly shallower (1.89m) in core 1. This mix of alluvium and rubble is replaced in all three cores, by a darker alluvium containing significantly larger quantities crushed brick, mortar and charcoal. Core 2/2 was selected for palaeoenvironmental analysis.
A fragment of Coventry Tripod pitcher-ware dating from the 12th or 13th century was recovered from a depth of 3.28m.

Core 2/4:
This core consisted of four metres of modern, made ground, composed of hardcore and brickwork overlying a sand and gravel diamict that sat directly upon the Keresley Sandstone.

4.2 *Biostratigraphy*

Insects and waterlogged plant remains
Material was analysed for waterlogged plant remains, pollen and palaeoentomological purposes. The insect taxa recovered from the flots are listed in Table 2, waterlogged plant in Table 3, full insect and waterlogged plant reports can be found in Appendix 1 (insects), Appendix 2 (Waterlogged plant) and Appendix III (Pollen).

The taxonomy used for the Coleoptera (beetles) follows that of Lucht (1987). A number of Dipterous (fly) puparia remains were found. The numbers of individuals present is estimated using the following scale: * = 1-2 individuals ** = 2-5 individuals *** = 5-10 individuals **** = 10+ individuals. The taxonomy used for the Coleoptera (beetles) follows that of Lucht (1987).

1. *Are any insect or waterlogged plant remains of interpretative value?*

Limited insect remains were extracted from core 2/2, the uppermost sample from Core 2/2 produced limited but well-preserved material, which precludes any further meaningful interpretation. The subsequent samples from Transect 1/2 (samples 3-3.32m and 3.64-4m) produced a small, well-preserved and interpretable assemblage.

Waterlogged plant remains were recovered from all six samples, preservation varied considerably between samples from poor to good (see Table 2).

2. *Do any of the insects or waterlogged plant present suggest the nature of human activity at the site?*

There were no emphatic indicators of human occupation or activity at the site during deposit formation recovered from either the waterlogged plant or insect remains. Limited insect evidence was found in the form of several specimens of the anobid, *Anobium punctatum* (the common woodworm). Whilst these taxa constitute part of Kenwards' 'House Fauna' (Kenward 1997, Hall and Kenward 1990, Kenward and Hall 1995), there is a dearth of other taxa associated with this group.

3. *Are any of the insect or waterlogged plant species recovered particularly associated with the tanning or dying process (Hall & Kenward 2003)?*

None of the insect or plant taxa associated with tanning or dying deposits by Hall and Kenward (2003) were recovered from either sample.

4. *Do any of the insects or waterlogged plant remains present suggest the nature of the environment and land use of the area around the palaeochannel at the time of the deposits formation*

The insects from both samples 3-3.32m and 3.64-4m provide information on the environment surrounding the River Sherbourne during deposit formation. The faunal remains from both samples indicate damp, boggy environment colonised by grasses and tall reeds, with evidence for herbivorous beasts grazing close by.

The chrysomelid, *Plateumaris bracatta,* is a monophagous species found amongst stands of the common reed (*Phragmites australis*) (Menzies and Cox 1996). Indicators of drier grassland include the scarabeaid, *Cetonia aurata*, specimens of which were found in both samples, and further members of the Chrysomelidae family, *Phyllotreta* spp., which are found on Umbellifers (Apiaceae) and Brassicas (Bullock 1993). A further grassland and meadow family are the Curculionidae, *Sitona* spp., recovered from sample 3-3.32m, found on vetches (*Vicia* spp.) and other nitrophilous taxa such as gorse (*Ulex* spp.) and clover (*Trifolium* spp.) (Koch 1992). Further Scarabaeidae or 'dung beetles' were recovered from the basal sample; both *Aphoidus* spp. and *Geotrupes* spp. are associated with the dung of herbivorous beasts (Jessop 1986).

The plant macrofossil remains also suggest meadow, pasture and disturbed ground. Plant species present included grassland taxa such a meadow/ creeping/bulbous buttercup (*Ranunculus acris/repens/bulbosus* L.), and dock (*Rumex* L.), indicators of cultivated or waste ground include: thistles (*Cirsium* Mill. sp.), red campion (*silene dioica* (L.) Clairv.), stinging nettles (*Urtica dioica* L.), bramble (*Rubus fructicosus*) and sedges (*Carex* L. sp.), which are commonly found on, damp ground.

Waterlogged plant remains were also recovered from Transet 2, Core 2; species of damp ground and grassland persist such as spike rush (*Eleocharis* R. Br.) and meadow/ creeping/bulbous buttercup (*Ranunculus acris/repens/bulbosus*). The fruits and seeds of other herbaceous taxa suggest shrubs and shadier ground including elderberry (*Sambucus nigra* L. fragments), Campions (*Silene* L. sp.), and hazelnut (*Corylus avellana* L.).

5. *What were the flow regime and water conditions within the palaeochannel and do the insects present provide information on how these deposits formed?*

Direct evidence of the aquatic environment and water regime is scant, with only two, distinct aquatic taxa recovered. In the uppermost sample (3-3.32m) a specimen of the dytiscid family, *Agabus* spp., was identified, this family generally require deeper pools of standing or slow moving water (Nilsson and Holmen 1995). In the basal sample, a single hydrophilid, *Chaetarthria seminulum* was found, a species is associated with standing or slow flowing waters beneath organic detritus (Hansen 1987).

Pollen

Transect 1, Core 1 (Table 1)

Pollen concentration was found to be either too low to permit a significant count (top – 0.97m) or in the case of the basal sample (4.0m), no palynomorphs were present. This is likely to be due to the low organic content of the sediment. The middle sample contained sufficient pollen concentrations for a meaningful count. The spectrum is dominated by two taxa: *Alnus glutinosa* (alder) and Poaceae (wild grasses). Other tree and shrub taxa are recorded in fairly low percentages. However, a relatively wide range of herbs is recorded including: *Rumex* (sorrels), Caryophyllaceae (pink family), *Plantago lanceolata* (ribwort plantain), Apiaceae (carrot family), *Potentilla*-type (tormentils), *Centaurea nigra* (black knapweed), Lactuceae indet. (dandelions) and some grains of Cereal-type pollen.

This pollen spectrum reflects a largely open environment with alder presumably growing on the damper soils around the river and on the

Site/Sample depth m	Pollen Spectra: Main Features
T1/C1 TOP 0.97	Very low pollen concentration: rare grains of Poaceae, Cyperaceae and Lactuceae indet. observed.
MIDDLE 2.90	**Trees and shrubs:** *Betula* (3%), *Alnus glutinosa* (40%), *Corylus* (4%), *Quercus* (5%) **Herbs**: Poaceae (33%), Cyperaceae (5%), *Plantago lanceolata* (4%), Apiaceae (4%), Caryophyllaceae (3%), *Potentilla*-type (2%), *Rumex* (4%), Cereal-type (2%). *Centaurea nigra,* Lactuceae indet., Brassicaceae all recorded at trace values (<1%). **Spores**: Pteropsida (6%), *Polypodium* (2%)
BASE 4.0m	Very low organic residue. No palynomorphs observed

Table 2: Core 1/1: Summary of pollen assessment

Site/Sample depth m	Pollen Spectra: Main Features
T2/C2 TOP 0.97	Very low pollen concentration: rare grains of Poaceae and Lactuceae indet. observed. Pre-Quaternary spores abundant.
MIDDLE 2.90	No palynomorphs observed.
BASE 4.0m	No palynomorphs observed.

Table 3: Core 2/2: Summary of pollen assessment

floodplain. Few other trees or shrubs are likely in the near vicinity of the sampling site. The suite of herbs is somewhat typical of a grazed meadow or damp pasture. The presence of cereal pollen indicates arable cultivation somewhere in the pollen catchment, but given the context of the sample, it is unlikely that this was taking place in close proximity to the sampling site.

Transect 2, Core 2 (Table 2)
None of the samples from this core contained sufficient concentrations of pollen to permit a significant count. One likely cause of this is that the deposits have been re-worked – this is suggested by the presence of quantities of pre-Quaternary spores in the top sample (0.64m), indicating the re-deposition of material from secondary sources.

5 Discussion

5.1 *Borehole Survey*
The floodplain of the River Sherbourne to the south of Spon St. has been subject to intensive anthropogenic manipulation since the 12th century. This renders the interpretation of these deposits problematic, particularly any attempt to define the extent of the palaeochannel to the south of the site. This is further complicated by the culverting of the River Sherbourne in 1972, as part of flood relief works.

Beneath the modern hardcore, the entire site is underlain by a deposit of mixed alluvium containing large quantities of crushed brick, mortar and other artefacts. It seems likely that the inclusion of this material within the alluvium was an effort to stablise the boggy, infilled palaeochannel or wetlands which would allow the expansion of industry into the previously unusable wetter areas. Similar activity has been observed at Buckingham Palace, Central London, where hardcore and waste building materials were used to stabilise the site from the early post medieval period onwards. As at Spon St. the primary function was to reclaim marshlands, associated with the River Tyburn, and render them useable for the construction of Buckingham House and subsequently Buckingham Palace (Tetlow pers. comm.).The most extensive 'natural' alluvial deposit was recovered from core 1/2 and core 2/2, these deposits suggest subtle changes to the flow regime of the River Sherbourne during the earliest episodes of deposit formation and limited human activity in the area immediately surrounding the river channel. The Coventry pitcher ware recovered from core 2/2 suggests that deposition of this alluvium occurred prior to 12th or 13th centuries. This would be

commensurate with documentary evidence, which indicates that the earliest phases of settlement in the Spon St. area occurred during the early medieval period.

Sedimentary evidence from core 2/2 suggests that the flow regime was relatively rapid, depositing sands and gravels; over time the speed of flow decreased depositing coarse sand. The stratigraphic evidence reflects further 'fining up' and ultimately a transition to very slow moving water with the deposition of very fine-grained alluvium composed of silts and clays. Just prior to increased human activity at Spon St., the channel appears to have migrated away from this area of the Sherbourne floodplain, with the former channel becoming a meander cut-off. Alternatively, and perhaps more likely is that this cessation of flow could be directly related to the construction of a watermill and pooling as result of the millpond. A watermill in the Spon 'vill' owned by the Hamilton family is recorded as early as 1221 and documents also record a mill owned by Richard Burton dating from 1411 and located near Spon Bridge (Stephens 1969). Records of a mill in the area end in 1849 with a mill, known as the Spon End Mill owned by William Wilberforce (Stephens 1969). It should be noted that the location of these earlier mills is somewhat ambiguous, no trace of them has yet been found in the archaeological record. Of further note is the sinuosity demonstrated by the River Sherbourne to the south of Spon St., with

(Figure 3) three, relatively large meanders clearly shown on the 1807 map of the area. It seems likely that river has been prone to such meandering throughout much of its development; hence both of the two possibilities for later deposit formation are plausible. Stratigraphic evidence from core 2/1 and Core 2/3 clearly indicate deposition of highly organic material, resulting from peat formation activity between the depths of 2.4 and 2.9m perhaps representing the shallow margins of the mill pool or meander cut-off.

5.2 *Botanical and Entomological Evidence*

The palaeoenvironmental evidence from the site sheds little light on the nature of human activity at the site. Direct evidence of human occupation or industrial activity at the site is exceptionally limited; none of the insect or plant taxa recovered are associated with human housing, habitation or industrial activities. The insects, pollen and waterlogged plant suggest an expanse of marshy grassland colonised by a variety of herbaceous taxa commonly associated with meadowland and pasture. These include species such as knapweed, buttercups, vetches and clover, rushes and sedges colonised the marshier areas with taller reeds fringing the areas of open water, pollen data also suggests nearby alder carr.

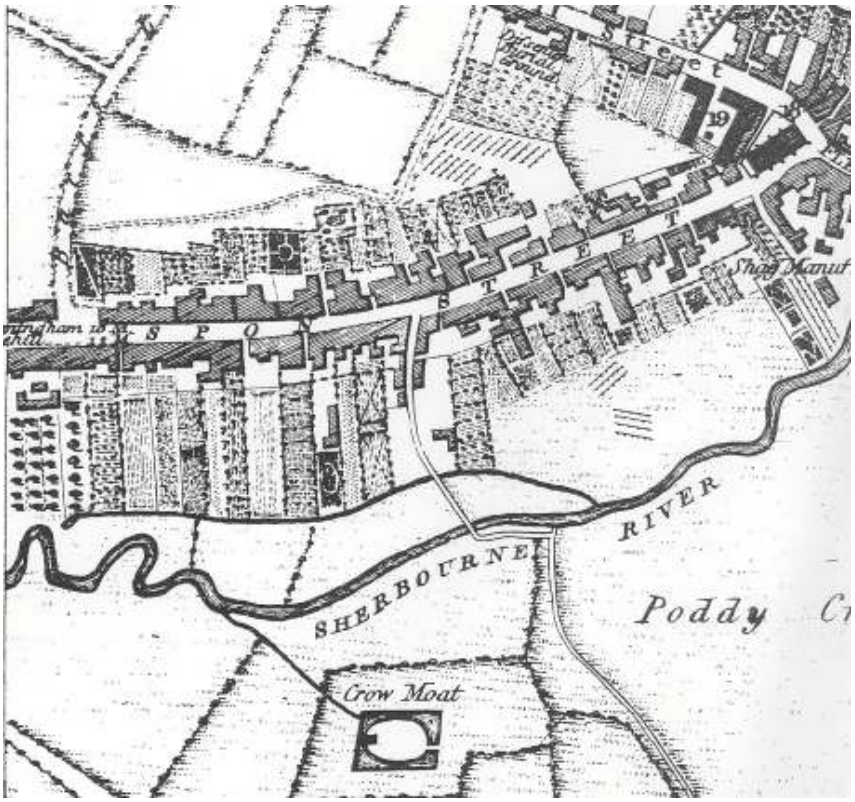

Figure 3: 1807 map of Spon St. and the River Sherbourne, note the pronounced meanders to the left of the image.

There are a number of possible reasons for poor preservation in core 2/2 and the upper sample from core 1/2. The area has been subject to significant anthropogenic manipulation since the early medieval period. Initially, ponding as a result of milldams would have enhanced waterlogging, but efforts to stabilise the area have evidently been considerable. A significant layer of hardcore covers the site and it is also not unfeasible that the site was subject to drainage prior to the construction of the later post medieval buildings. The canalisation of the River Sherbourne in 1972 would also have had a significant effect on the water table at the site; deeper watertables would have had a detrimental effect on the preservation of the organic remains and contained sub-fossil material. The differential preservation of organic remains in core 1/2 and core 2/2 is intriguing, with the most feasible explanation is that the degree of anthropogenic activity indicated in each transect varies considerably between core locations.

Disturbed and waste ground, colonised by nettles, thistles, bramble and elderberry is also indicated. Causes of this disturbance are ambiguous on the basis of the current data but are likely to be related to either human agency (agricultural activities such as grazing) or changes in the fluvial environment such as channel avulsion or flood events. The insect evidence also indicates that this damp grassland was likely to have been used as pasture, prior to the

12th century. The Coventry tripod-ware pot, recovered from a depth of 3.28m from Core 2/2, provides a suitable *terminus ante quem* for these early deposits, whilst aptly framing the later episodes of mid-medieval to very late post medieval deposit formation.

What is clear is that this patch of land was marshy during the formation of this deposit and it is likely that the site occupies the former wetlands associated with Bablake. Archaeo-environmental evidence of human impact during the early phases of deposit formation (below 3m) is absent. This corresponds well with the findings of Burrow and Soden (2006), which suggest sparse occupation at the site prior to the 19th century as a result of floodplain activity and possible human agency related to the mills that operated along the Sherbourne.

6 Conclusions

The stratigraphic and palaeoenvironmental assessments at the site of the new IKEA superstore have demonstrated that this area has been wetland for much of its previous history. Archaeological evidence also suggests that human activity between the mid medieval period and the very late post-medieval period is limited (Burrow and Soden 2006), this is likely to be related to the proximity of the River Sherbourne and floodplain activity with evidence of a flood-event possibly present in core 1/1. Fine-grained silt of alluvial origin is a key characteristic of deposits between 0.95m and 3m across much of the site. This deposit may have formed under natural processes of channel migration or due to ponding associated with the construction of a milldam.

Human agency for housing and industrial purposes since the 19th century has had a significant effect on the preservation of organic remains and environmental evidence from this period is limited and does not provide any evidence of industrial activity at the site. What the environmental data does indicate is that just prior to the 12/13th century, an area of damp meadow or pasture, used for grazing, occupied the site.

Due to the limited assemblages and poor preservation of the environmental evidence recovered, no further work on the assessed samples or material currently held in archive at The University of Birmingham is recommended.

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Appendix I

An assessment of the Insect Remains from IKEA, Spon/Corporation St, Coventry, Warwickshire.

Dr Emma Tetlow
Birmingham Archaeo-Environmental

An assessment of the Insect Remains from IKEA, Spon/Corporation St, Coventry, Warwickshire.

Introduction

A series of eight cores were extracted from two auger transects at the construction site of the IKEA store, at the rear of Medieval Spon St., Coventry. The objective was to establish the archaeo-environmental potential of alluviak deposits associated with a palaeochannel of the River Sherbourne. This area of Coventry, which lay outside the medieval city walls, was long the domain of more noxious and water demanding trades such as tanning, dying and woading. Previous archaeological investigation by Northamptonshire Archaeology established the existence of tannery and dyers shop at the Spon St. site.

Three of the eight augers contained significant deposits of alluvium which had been subject to considerable anthropogenic modification. Much of the upper deposits of dark, fine-grained alluvium contained mortar, crushed brick and other minerogenic detritus. Alluvium from the lower sections had received significantly less modification and appeared to be intact, consisting of bands of fine grained alluvium with large fragments of wood and other organic material. The minerogenic component becoming progressively coarser grained with depth.

Six samples were recovered for palaeoentomological assessment, it was hoped that an assessment of the insect remains from these samples would provide information on the following:

1. Are any insect remains of interpretative value?

2. Do any of the insects present suggest the nature of human activity at the site?

3. Are any of the insect species recovered particularly associated with the tanning or dying process (Hall & Kenward 2003)?

4. Do any of the insects present suggest the nature of the environment and land use of the area around the palaeochannel at the time of the deposits formation

5. What were the flow regime and water conditions within the palaeochannel and do the insects present provide information on how these deposits formed?

Methods.
Six samples were processed using the standard method of paraffin flotation as outlined in Kenward *et al.* (1980), weight and volume of the processed material may be found in table 1. This paraffin flot was then sorted and identified where possible under a binocular microscope. The system for "scanning" faunas as outlined by Kenward *et al.* (1985) was followed in this assessment.

When discussing the faunas recovered, two considerations should be taken into account:

1) The identifications of the insects present are provisional. In addition, many of the taxa present could be identified down to species level during a full analysis, producing more detailed information. As a result, the data presented here should be regarded as preliminary.

2) The various proportions of insects are subjective assessments. Minimum numbers of individuals can be obtained through a full sample analysis.

Results.
The insect taxa recovered from the flots are listed in Table 1. The taxonomy used for the Coleoptera (beetles) follows that of Lucht (1987). A number of Dipterous (fly) puparia remains were found. The numbers of individuals present is estimated using the following scale: * = 1-2 individuals ** = 2-5 individuals *** = 5-10 individuals **** = 10+ individuals. The taxonomy used for the Coleoptera (beetles) follows that of Lucht (1987).

1. *Are any insect remains of interpretative value?*

No insect remains were extracted from cores recovered from Transect 2, the uppermost sample from Core 2, Transect produced limited but well-preserved material which precludes any further meaningful interpretation. The subsequent samples from Transect 1, Core 2 (samples 3-3.32m and 3.64-4m) produced a small, well-preserved and interpretable assemblage.

2. *Do any of the insects present suggest the nature of human activity at the site?*

There are no emphatic indicators of human occupation or activity at the site during deposit formation. Several specimens of the anobid *Anobium punctatum* were recovered. Whilst this taxa constitutes part of Kenwards' 'House Fauna' (Kenward 1997, Hall and Kenward 1990, Kenward and Hall 1995), there is a dearth of other taxa associated with this group.

3. *Are any of the insect species recovered particularly associated with the tanning or dying process (Hall & Kenward 2003)?*

None of the taxa associated with tanning deposits by Hall and Kenward (2003) were recovered from either sample.

4. *Do any of the insects present suggest the nature of the environment and land use of the area around the palaeochannel at the time of the deposits formation*

Insect remains from both samples indicate a damp, boggy environment colonised by grasses and tall reeds, evidence also indicates herbivorous beasts grazing at close by.

The chrysomelid *Plateumaris bracatta* is a phytophagous taxa found amongst stands of the common reed (*Phragmites australis*) (Menzies and Cox 1996). Indicators of drier grassland include the scarabeaid *Cetonia aurata*, specimens of which were found in both samples, and further members of the Chrysomelidae family, *Phyllotreta* spp. which are found on Umbeliferae and Brassicas (Bullock 1993). A further grassland and meadow family is *Sitona* spp., recovered from sample 3-3.32m, this family are found on vetches (*Vicia* spp.) and other nitrophilous taxa such as gorse (*Ulex* spp.) and clover (*Trifolium* spp.) (Koch 1992). Further Scarabaeidae or 'dung beetles' were recovered from the basal sample; both *Aphoidus* spp. and *Geotrupes* spp. are associated with the dung of herbivorous beasts (Jessop 1986).

5. *What were the flow regime and water conditions within the palaeochannel and do the insects present provide information on how these deposits formed?*

Direct evidence of the aquatic environment and water regime is scant, only two, distinct aquatic taxa were recovered. In the upper sample (3-3.32m) a specimen of the the dytiscid family, *Agabus* spp., was recovered, this familt generally require deeper pools of standing or slow moving water (Nilsson and Holmen 1995). In the basal sample, a single hydrophilid, *Chaetarthria seminulum* was found, a species is associated with standing or slow flowing waters beneath organic detritus (Hansen 1987).

Disucssion

The insect remains from Spon St. provide limited evidence of both human activity and environmental conditions at the site during deposit formation. Dating evidence, in the form of Coventry Tripod ware, dated to the 12th/13th century (Ratkai pers. comm.) was recovered from 3.28m in core 2 from Transect 1. This evidence suggests that deposition of the upper sample (3-3.32m) is contemporary with the earliest occupation of the Spon St. area.

Palaeoentomological evidence would suggest that the environment surrounding the river was open grassland, used for grazing and that the effects of human agency were limited.

Conclusions

The limited nature of the material from these samples precludes further, meaningful interpretation. On the basis of this assessment, no further palaeoentomological work on this material is recommended.

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Table 1: The Insect remains from Spon St.

Transect no.	1			2		
Core no.	2			2		
Sample depth	1-1.5m	3-3.32cm	3.64-4cm	1-1.6cm	2.5-2.8cm	3.7-4m
Volume (l)	1.5l	1.5l	1.5l	3l	1.5l	1.5l
Weight (kg)	1kg	1kg	1kg	1kg	1kg	1kg
COLEOPTERA						
Carabidae						
Nebria spp.			*			
Dytiscidae						
Agabus spp.		*				
Hydrophilidae						
Chaetarthria seminulum (Hbst.)			*			
Silphidae						
Silpha spp.			*			
Staphylinidae						
Olophrum spp.			*			
Trogophloeus spp.			*			
Oxytelus rugosus (F.)		**				
Platystethus spp.		*				
Lathrobium spp.	*		**			
Aleocharinae gen. & spp. Indet.			**			
Anobiidae						
Anobium punctatum (Geer.)		**	*			
Scarabaeidae						
Geotrupes spp.			*			
Aphodius spp.			*			
Cetonia aurata (L.)		*	*			
Chrysomelidae						
Plateumaris braccata (Scop.)			*			
Phylotreta spp.			*			
Curculionidae						
Sitona spp.		*				
DIPTERA			*			
TRICHOPTERA			*			

Appendix II

An assessment of the waterlogged plant remains from IKEA, Spon/Corporation St, Coventry, Warwickshire.

Dr Pam Grinter
Birmingham Archaeo-Environmental

Where possible, the waterlogged plant remains were identified by comparison with the comparative collection housed at the University of Birmingham and by use of various seed identification manuals (Anderberg 1994; Berggren 1969 & 1981; Cappers *et al* 2006, Jacquat 1988) The taxonomy used for the waterlogged plant remains follows that of Stace (1997).

Results

Transect 1, Core 2

Three samples were assessed for waterlogged plant remains (see table 1). The samples were taken from the core at depths of 100-150cms, 300-332cms and 364-400cms. Organic preservation of material from the middle and bottom of the core was good. Although the density of plant remains in form of fruits, nuts or seeds was low. Plant species present included some grassland species: meadow/ creeping/bulbous buttercup (*Ranunculus acris/repens/bulbosus* L.) and dock (*Rumex* L.), together with taxa from cultivated or waste ground: thistles (*Cirsium* Mill. sp.), red campion (*silene dioica* (L.) Clairv.), stinging nettles (*Urtica dioica* L.), bramble (*Rubus fructicosus*) and spike-rushes (*Eleocharis* R. Br.) which are commonly found on wet ground.

Transect 2, Core 2

Three samples were assessed for waterlogged plant remains (see table 1). The samples were taken from the core at depths of 100-160cms, 220-250cms and 370-400cms. Organic preservation was generally poor with the most organic material present in the sample taken from 220-250cms. Density of the plant remains in the form of fruits, nuts or seeds was low. Plant species present included: elderberry (*Sambucus nigra* L. fragments), Campions (*Silene* L. sp.), meadow/ creeping/bulbous buttercup (*Ranunculus acris/repens/bulbosus*) and a fragment of uncharred hazelnut shell (*Corylus avellana* L.) and spike-rushes (*Eleocharis* R. Br.).

<u>Discussion</u>

The two cores sampled for waterlogged plant remains had variable organic preservation, with the best preservation occurring in Transect 1, Core 2. Seeds/nuts/fruits were present in low numbers in both cores together with the

stems of grass and some wood fragments. Although the assemblage is limited in size and diversity, the plant species present give an indication of the local flora which represent: grassland, cultivated/disturbed ground, woodland and damp ground. There is no direct evidence for industrial activity or any anthropogenic influences. It is not recommended that any further analysis should be undertaken.

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Table 1: Assessment results for waterlogged plant remains from two cores taken from IKEA, Spon Street/Corporation Street, Coventry

Transect	Core	Depth	Charcoal	*Mollusc* Or Marine Shell	Waterlogged Plant Remains (nuts, fruits, seeds)	Further Analysis	Comments on Flot
1	2	100-150cms (Top)	-	-	+	NO	100% of flot examined. Organic preservation poor. A few seeds of *Chenopodium* L.sp. present.
1	2	300-332cms (Mid)	-	-	+	NO	2/3 of flot examined. Organic preservation good. Fragments of grass and wood present together with seeds of *Chenopodium* cf. *album L.,, Rumex* L. sp. , *Carex* L. sp. *Ranunculus acris/repens/bulbosus* L. and *Circium* Sp.
1	2	364-400cms (Bottom)	-	-	+	NO	2/3 of flot examined. Organic preservation good. Fragments of wood present together with seeds of *Silene dioica* ((L.) Clairv.),, *Urtica dioica* L., *Rubus* fructicosus L. agg., *Ranunculus acris/ repens/bulbosus* L. and *eleocharis* R. Br. sp.
2	2	100-160cms (Top)	-	-	+	NO	100% of flot examined. Organic preservation poor. A few fragments of *Sambuca nigra* L. seeds present.
2	2	220-250cms (Mid)	-	-	-	NO	100% of flot examined. Organic preservation fair. Fragments of wood present together with the seeds of *Ranunculus acris/ repens/bulbosus* L. and *eleocharis* R. Br. sp.
2	2	370-400cms (Bottom)	-	-	+	NO	100% of flot examined. Organic preservation poor. Seeds of *Silene* L. sp. and a fragment of uncharred hazelnut shell (*Corylus Avellana* L.) present.

Key: . + = < 10 items, ++ = 10 – 30 items, +++ > 30

Appendix III

An assessment of Pollen from IKEA, Spon/Corporation St, Coventry, Warwickshire.

Dr Ben Gearey
Birmingham Archaeo-Environmental

Pollen Assessment: Ikea, Coventry

1. Introduction

Six samples were submitted for pollen analysis from Core 1, Transect 1 (Table 1) and Core 2, Transect 2 (Table 2). Pollen preparation followed standard techniques including KOH digestion and acetylation (Moore *et al*., 1991). At least 125 total land pollen grains (TLP) excluding aquatics and spores were counted for each sample using an Olympus CH-2 microscope, although low pollen concentrations and poor preservation meant that meaningful counts were only possible for a single sample. Pollen nomenclature follows Moore *et al.* (1991), with the modifications suggested by Bennett *et al.* (1994). The pollen sum is based on TLP excluding obligate aquatics and spores. Percentages for these groups are calculated as percentage of the basic sum plus sum of the relevant group.

2. Results

Transect 1, Core 1 (Table 1)

Pollen concentration was found to be either too low to permit a significant count (top – 0.97m) or in the case of the basal sample (4.0m), no palynomorphs were present. This is likely to be due to the low organic content of the sediment. The middle sample contained sufficient pollen concentrations for a meaningful count. The spectrum is dominated by two taxa: *Alnus glutinosa* (alder) and Poaceae (wild grasses). Other tree and shrub taxa are recorded in fairly low percentages. However, a relatively wide range of herbs is recorded including: *Rumex* (sorrels), Caryophyllaceae (pink family), *Plantago lanceolata* (ribwort plantain), Apiaceae (carrot family), *Potentilla*-type (tormentils), *Centaurea nigra* (common knapweed), Lactuceae indet. (dandelions) and some grains of Cereal-type pollen. This pollen spectrum reflects a largely open environment with alder presumably growing on the damper soils. Few other trees or shrubs are likely in the near vicinity of the sampling site. The suite of herbs is somewhat typical of a grazed meadow or damp pasture. The presence of cereal pollen indicates arable cultivation somewhere in the pollen catchment, but given the context of the sample, it is unlikely that this was taking place in close proximity to the sampling site.

Transect 2, Core 2 (Table 2)

None of the samples from this core contained sufficient concentrations of pollen to permit a significant count. One likely cause of this is that the deposits have been re-worked – this is suggested by the presence of quantities

of pre-Quaternary spores in the top sample (0.64m), indicating the re-deposition of material from secondary sources.

3. Conclusions and recommendations

The poor preservation of pollen in the samples precludes much meaningful comment. The spectrum from T1, C1 (2.90m) indicates an open, meadow environment with damp woodland. Whilst the generally open aspect of the vegetation and presence of 'anthropogenic indicators' such as ribwort plantain and cereal pollen suggest a human influence on the local landscape, the impression is not of a heavily disturbed environment. No further work is recommended on these samples.

Site/Sample depth m	Pollen Spectra: Main Features
T1/C1 TOP 0.97	Very low pollen concentration: rare grains of Poaceae, Cyperaceae and Lactuceae indet. observed.
MIDDLE 2.90	**Trees and shrubs:** *Betula* (3%), *Alnus glutinosa* (40%), *Corylus* (4%), *Quercus* (5%) **Herbs**: Poaceae (33%), Cyperaceae (5%), *Plantago lanceolata* (4%), Apiaceae (4%), Caryophyllaceae (3%), *Potentilla*-type (2%), *Rumex* (4%), Cereal-type (2%). *Centaurea nigra,* Lactuceae indet., Brassicaceae all recorded at trace values (<1%). **Spores**: Pteropsida (6%), *Polypodium* (2%)
BASE 4.0m	Very low organic residue. No palynomorphs observed

Table 1: Transect 1, Core 1: Summary of pollen assessment

Site/Sample depth m	Pollen Spectra: Main Features
T2/C2 TOP 0.97	Very low pollen concentration: rare grains of Poaceae and Lactuceae indet. observed. Pre-Quaternary spores abundant.
MIDDLE 2.90	No palynomorphs observed.
BASE 4.0m	No palynomorphs observed.

Table 2: Transect 2, Core 2: Summary of pollen assessments

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