

ARCHAEOLOGICAL WATCHING BRIEF AT GHELUVELT PARK, CLAINES, WORCESTER

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10th August 2010

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Project P3431
Report 1780
WCM 101732

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Archaeological watching brief at Gheluvelt Park, Claines, Worcester

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Part 1 Project summary

An archaeological watching brief was undertaken at Gheluvelt Park, Claines, Worcester (NGR SO 843567), on behalf of Plincke Landscapes Ltd for their client Worcester City Council who intend to carry out improvements at Gheluvelt Park for which a planning application has been approved by Worcester City Council.

The park was established in 1922 within the parish of Claines on the northern side of Worcester. A previous desk based assessment highlighted the potential for the survival of deposits associated with the demolished Barbourne House which stood to the north of the park as well as deposits associated with the Barbourne Brook which runs through it. Groundworks were observed in three areas; a proposed water play area, a playground and the footings for a war memorial. In the water play area waterlogged deposits were observed. These represent stream deposits or flood layers associated with the brook or the pond in the post-medieval period. A series of make-up deposits in this area are probably related to the demolition of Barbourne House in the early 20th century (Phear 2007) and a cobbled surface seen in north of this area may be associated with the gardens of Barbourne House.

In the eastern part of the site, excavation for the war memorial uncovered a palaeochannel and waterlogged deposits. No finds were recovered from these deposits but it is thought that they date from the early post-medieval period. It is probable that the palaeochannel represents an earlier course of or one of several channels of the Barbourne Brook before it was canalised in the late 19th century. Pollen and macrofossil remains suggest an area of damp grassland existed in the vicinity of these channels. A dump of material above these waterlogged deposits represents consolidation of the area, perhaps when the brook was canalised. A soil horizon above this dump was probably topsoil in the late 19th and early 20th century. Another dump of re-deposited natural above this soil represents modern make-up.

No features or layers recorded in the play area predated its construction in the 1960s.

Part 2 Detailed report

1. Background

1.1 Reasons for the project

An archaeological watching brief was undertaken at Gheluvelt Park (NGR SO 843567), Claines, Worcester (Fig 1), on behalf of Plincke Landscapes Ltd, whose client Worcester City Council intended to carry out improvements at Gheluvelt Park including a children's play area, water play areas and ancillary works. A planning application for the works was approved by Worcester City Council (reference number P07A0413) subject to conditions including an archaeological watching brief

The development site is considered to include a heritage asset with archaeological interest, the significance of which may have been affected by the application (WCM 91085, Gheluvelt Park).

1.2 Project parameters

The project conforms to the *Standard and guidance for an archaeological watching brief* (IfA 2008) and *Statement of standards and practices appropriate for archaeological fieldwork in Worcester* (WCC 1999),

The project also conforms to a brief prepared by Worcester City Museum Section (WCMS 2009) and for which a project proposal (including detailed specification) was produced (HEAS 2009).

1.3 Aims

An archaeological resource assessment and research framework for the city of Worcester was published in September 2007 (Worcester City Council 2007), and identifies a series of key period and cross-period themes. Research priorities identified as relevant to this site are referenced in brackets (eg RP 3.12).

Archaeological work on this site presented an opportunity to address a number of research questions, including the following:

- The hinterland of Roman Worcester (RP3.31)
- Other medieval industries (RP5.31)
- Environmental change in Worcester's hinterland (RP7.21)
- Investigation of minor satellite settlements (RP7.22)

2. Methods

2.1 Documentary search

A desk-based assessment was undertaken in 2007 ((Phear 2007, WCM 101498) and further research on the site was not required.

2.2 **Fieldwork methodology**

2.2.1 **Fieldwork strategy**

A detailed specification was prepared by the Service (HEAS 2010). Fieldwork was undertaken between 26 October 2009 and 7 June 2010. The site reference number and site code is WCM 101732.

Observation and recording of archaeological deposits were restricted to areas of ground disturbance associated with construction (ground breaking and preparation, foundations, services etc) following the progress of the construction team. Ground works were undertaken in three areas; the water play area, children's play area and at the war memorial. Deposits were recorded in six foundation trenches. Trenches 1-4 were in the water play area, trench 5 was the foundation trench of a revetment wall in the playground area and trench 6 was the foundation for the war memorial. The location of the trenches is shown on Figure 2.

Selected deposits were excavated to retrieve artefactual material and environmental samples, as well as to determine their nature. Deposits were recorded according to standard Service practice (CAS 1995).

2.2.2 **Structural analysis**

All fieldwork records were checked and cross-referenced. Analysis was effected through a combination of structural, artefactual and ecofactual evidence, allied to the information derived from other sources.

2.3 **Artefact methodology, by Dennis Williams**

2.3.1 **Artefact recovery policy**

The artefact recovery policy conformed to standard Service practice (CAS 1995; appendix 2). Method of analysis

2.3.2 **Method of analysis**

All hand-retrieved finds were examined and a primary record made on a Microsoft Access 2000 database. They were identified, quantified and dated to period, and a *terminus post quem* date produced for each stratified context. These dates were used as a means of determining the broad chronology of the site.

The pottery and ceramic building materials were examined under ×20 magnification and recorded by fabric type according to the reference series maintained by the service (Hurst and Rees 1992; [WHEAS 2009](#)).

2.4 **Environmental archaeology methodology**

2.4.1 **Sampling policy**

The environmental sampling strategy conformed to standard Service practice (CAS 1995, appendix 4). Large animal bone was hand-collected during excavation. A monolith (sample 2) with an adjacent series of spit samples (sample 1) were taken through waterlogged deposits 604 and 605. A further bulk sample was also taken from an area of exposed palaeochannel in the south of Trench 6. All these samples are undated.

2.4.2 **Method of analysis**

2.4.3 **Macrofossil analysis by Liz Pearson**

For each of the samples a sub-sample of 1 litre was processed by the wash-over technique as follows. The sub-sample was broken up in a bowl of water to separate the light organic remains from the mineral fraction and heavier residue. The water, with the light organic fraction was decanted onto a 300µm sieve and the residue washed through a 1mm sieve. The remainder of the bulk sample was retained for further analysis.

The residues were not sorted as the level of identifiable remains in the flots was low. The flots, however, were scanned using a low power MEIJI stereo light microscope and plant remains identified using modern reference collections maintained by the Service, and seed identification manual (Cappers *et al* 2006). Nomenclature for the plant remains follows the New Flora of the British Isles, 2nd edition (Stace 1997).

2.4.4 **Pollen analysis by Nick Daffern**

Three pollen samples of 2cm³ were selected for analysis taken from the top, middle and base of monolith <2> sampling contexts (604) and (605). The samples were submitted to the laboratories of the Department of Geography & Environment at the University of Aberdeen for chemical preparation following standard procedures as described by Barber (1976) and Moore *et al* (1991). The full methodology is described in Appendix 1.

Where preservation allowed, pollen grains were counted to a total of 150 land pollen grains (TLP) for assessment purposes using a GS binocular polarising microscope at x400 magnification, and identification was aided by using the pollen reference slide collection maintained by the Service, and the pollen reference manual by Moore *et al* (1991). Nomenclature for pollen follows Stace (2010) and Bennett (1994).

Fungal spores and parasite ova were noted with rapid identification being undertaken to genus level. Identifications were aided through reference material maintained by the Service and reference manuals Kirk *et al* (2008) and Grant-Smith (2000).

2.5 **The methods in retrospect**

The methods adopted allow a high degree of confidence that the aims of the project have been achieved.

3. **Topographical and archaeological context**

A desk-based assessment was undertaken in 2007 (WCM 101498; Phear 2007) and a historical background to the site is included in that document. The potential impact of the development on the site was considered in the most part to be minor adverse to not significant. Areas within the development highlighted as having archaeological potential were those close to the Barbourne Brook where settlement from the prehistoric period onwards could be expected and in the vicinity of the demolished Barbourne House where pools marked on Doharty's map of 1751 are thought to represent some kind of industrial process.

4. Results

4.1 Structural analysis

The trenches and features recorded are shown in Figures 2-6. The results of the structural analysis are presented in Appendix 2.

4.1.1 Phase 1: Natural deposits

Natural orange sands and gravels were observed in trenches 2 and 3 (contexts 203 and 302) at about 1.6m below the existing ground surface.

4.1.2 Phase 2: Post-medieval/modern deposits

Trench 1

This trench was excavated to a maximum depth of 0.50m. Two layers of make-up outside of the old paddling pool were observed in the north-east corner and in the south-west corner of the trench (contexts 101 and 102). Above this make-up deposit was the topsoil (context 100).

Trenches 2 and 3

Both of these trenches were excavated to at least 1.60m. The same deposits were observed in trenches 2 and 3 apart from topsoil which was absent in Trench 3. Above the natural (Contexts 203 and 302) was a possible waterlogged flood deposit which consisted of silty sands and gravels with humic material (contexts 202 and 301; Plate 1). Overlying this was a mixed make-up layer (contexts 201 and 300) which was overlain by the topsoil (context 200).

Trench 4

The maximum depth of this trench was 0.70m. In the south end of Trench 4 the sequence of deposits recorded in trenches 2 and 3 were observed. The possible waterlogged flood deposit was seen at the limit of excavation (context 408). Above this was a make-up layer (context 407) which equates to contexts 201 and 300. Another make-up layer or 20th century dump of material (context 406) was above context 407 and topsoil was over this (context 400).

At the limit of excavation in the centre and northern part of the trench was a layer of made ground (context 403) This made ground was underneath a cobbled surface (context 402) which was constructed of large rounded cobbles and was about 0.10m thick (Plate 2). Another make-up layer (context 401) was above the cobbles. In the centre of the trench a hardcore make-up with a tarmac path above formed the ground surface (contexts 404 and 405). In the northern part of the trench above context 401 was topsoil (context 400).

Trench 5

A layer of modern make-up was the earliest layer observed (context 502) in this trench. Above this was a layer of scalpings for the tarmac of the playground (contexts 400 and 401). The maximum depth this trench was excavated to was 0.45m.

Trench 6 (Plates 3 and 4)

Trench 6 was the horseshoe shaped base for the War memorial. In the south of the trench patches of sticky light brown clay were seen (context 606) at about 1.30m below the ground surface. Above these clays were soft and waterlogged blue grey clays with occasional organic material (context 605). The top part of context 605 (604) was darker and contained more silt. In the south of the trench a probable old watercourse or palaeochannel of the Barbourne Brook was exposed (context 607). This was waterlogged and consisted of humic silt. A layer of re-deposited sands and gravels (context 603), used as a make-up deposit to consolidate the

area, overlay context 603. A mixed soil horizon (context 602) was seen above 603 and a modern make-up layer (context 601) was above this. Topsoil and turf formed the ground surface (context 600).

4.2 Artefact analysis, by Dennis Williams

4.2.1 The artefact assemblage

The small assemblage recovered during the watching brief is summarised in Table 1. The finds comprised pottery, tile, undiagnostic brick/tile, bottle glass and an oyster shell. A single piece of bone (cattle vertebra) was also recovered.

Material class	Period	Count	Weight (g)
Bone	Undated	1	66
Ceramic	Post-medieval	8	268
Ceramic	Post-med./modern	4	156
Glass	Post-medieval	1	72
Shell	Undated	1	16
Totals:		7	190

Table 1: Quantification of the assemblage.

4.2.2 The pottery

Pottery sherds were grouped and quantified according to fabric type, as shown in Table 2. There were no diagnostic form sherds that could provide precise dating evidence, but the sherds were datable by fabric type to general production spans.

Period	Fabric code	Fabric common name	Count	Weight (g)
Post-medieval	78	Post-medieval red ware	1	22
Post-medieval/ modern	100	Miscellaneous post-med. / modern wares	4	156
Totals:			5	178

Table 2: Quantification of the pottery by period and fabric-type.

Post-medieval

A single base sherd, from a red ware (fabric 78) jar or vase, was found in a unstratified deposit. This vessel was black-glazed and could have been produced during a wide 17th-19th century date range.

Post-medieval/modern

Rim and base sherds, from four different earthenware flower-pots (fabric 100), were recovered from context 600. There were likely to be 19th or 20th century in date.

4.2.3 Other artefacts

Ceramic building materials

Fragments of roof tile from contexts 602 and 604 had sandy, oxidised fabrics, which were probably 16th-19th century in date. Other ceramic building material from these contexts consisted of small fragments that could have been either brick or tile, but were probably post-medieval as well.

Glass

Part of a bottle base was found in context 604. Free-blown from dark green glass, this had a very high kick-up that suggested it was of late 18th or early 19th century manufacture.

Shell

A further find from context 604 was the shell of an oyster, a food popular during the post-medieval period.

4.2.4 Overview of artefactual evidence

The finds were typical of post-medieval occupation and use in the vicinity of this site. The *terminus post quem* dates deduced for the contexts are shown in Table 3.

Context	Material class	Object specific type	Fabric code	Count	Weight (g)	Start date	End date	<i>tpq</i> range
U/S	ceramic	pottery	78	1	22	1600	1900	1600-1900
600	ceramic	pottery	100	4	156	1800	1970	1800-1970
602	ceramic	roof tile	-	1	28	1600	1900	1600-1900
	ceramic	brick/tile	-	3	18	1600	1900	
604	ceramic	brick/tile	-	1	56	1600	1900	1775-1900
	ceramic	roof tile	-	2	144	1600	1900	
	glass	vessel	-	1	72	1775	1825	
	organic	oyster	-	1	16	-	-	

Table 3: Summary of context dating based on artefacts.

4.3 Environmental analysis

4.4 Macrofossil remains, by Elizabeth Pearson

4.4.1 Hand-retrieved material

Only a single cattle vertebra and oyster shell was recovered from a waterlogged layer (604).

4.4.2 Remains from bulk samples

The environmental evidence recovered is summarised in Tables 4 and 5

Context	Sample	Sample type	Spit/Sub-sample	Feature type	Period	Residue assessed	Flot assessed
605	1	General	0.30-0.35	Layer	Post-medieval?	No	No
605	1	General	0.20-0.25	Layer	Post-medieval?	No	Yes
605	1	General	0.25-0.30	Layer	Post-medieval?	No	No
605	1	General	0.35-0.40	Layer	Post-medieval?	No	No
605	1	General	0.40-0.45	Layer	Post-medieval?	No	Yes
605	1	General	0.15-0.20	Layer	Post-medieval?	No	No

605	1	General	0.45-0.50	Layer	Post-medieval?	No	No
604	1	General	0.00-0.05	Layer	Post-medieval?	No	Yes
604	1	General	0.05-0.10	Layer	Post-medieval?	No	No
604	1	General	0.10-0.15	Layer	Post-medieval?	No	No
604/605	2	Monolith		Layer	Post-medieval?	n/a	n/a
607	3	General		Palaeochannel	Undated	No	Yes

Table 4: List of environmental samples

	Family	Common name	Habitat	604	605	605	607
Spit level				0.00-0.05m	0.20-0.25m	0.40-0.45m	
Latin name							
Cereal sp indet culm node	Poaceae	cereal	F				++
<i>Ranunculus acris/repens/bulbosus</i>	Ranunculaceae	buttercup	CD	++			+++
cf <i>Ranunculus acris/repens/bulbosus</i>	Ranunculaceae	buttercup	CD			+	
<i>Chenopodium album</i>	Chenopodiaceae	fat hen	AB				+
<i>Lychnis/Silene</i> sp	Caryophyllaceae	catchfly/campion	ABD	+			+
<i>Polygonum aviculare</i>	Polygonaceae	knotgrass	AB	+			+
<i>Rumex acetosella</i>	Polygonaceae	sheep's sorrel	ABD				+
<i>Rumex</i> sp	Polygonaceae	dock	ABCD	+			++
<i>Carduus/Cirsium</i> sp	Asteraceae	thistle	ABDE				+
<i>Juncus</i> sp	Juncaceae	rush	DE	+			
<i>Carex</i> spp (3-sided)	Cyperaceae	sedge	CDE				+
unidentified twig/bud fragments	unidentified						+
unidentified wood fragments	unidentified			++++			
unidentified herbaceous fragments	unidentified			+++	++++	++++	++++

Table 5: waterlogged plant remains from environmental samples

Key for plant table:

Habitat	Quantity
A= cultivated ground	+ = 1 - 10
B= disturbed ground	++ = 11- 50
C= woodlands, hedgerows, scrub etc	+++ = 51 -100
D = grasslands, meadows and heathland	++++ = 101+
E = aquatic/wet habitats	
F = cultivar	

Environmental remains were poorly preserved in a sequence of waterlogged deposits (604 and 605). Only unidentified herbaceous material and one seed of possible buttercup (cf *Ranunculus* sp) were recorded from the base of the sequence (0.40 – 0.45m bgs) with a similar assemblage being identified from the middle of the sequence (0.20 – 0.25m bgs). The upper most assemblage (0.00 to 0.05m bgs) was dominated by unidentified woody fragments but herbaceous material was less abundant. Identifiable plant remains were more common from this spit. These included moderately abundant seeds of buttercup (*Ranunculus acris/repens/bulbosus*) in association with occasional nutlets of knotweed (*Polygonum aviculare*) and dock (*Rumex* sp) and seeds of catchfly/campion (*Lychnis/Silene* sp) and rush

(*Juncus* sp). These are likely to derive from grassy vegetation in the vicinity, but otherwise it is difficult to determine the nature of the surrounding environment in much detail.

Waterlogged plant remains were better preserved in context 607, an area of palaeochannel exposed in the south of Trench 6. Herbaceous material predominated with occasional twig fragments. A similar seed assemblage to that noted from the top of context 604 was evident with other seeds/nutlets of sheeps sorrel (*Rumex acetosella*), fat hen (*Chenopodium album*), sedge (*Carex* sp) and thistle (*Carduus/Cirsium* sp) also present.

4.4.3 Discussion

The plant remains from these deposits provided only limited information on the surrounding local environment, suggesting the presence of generally damp grassland with possibly some weeds of disturbed or cultivated ground. No further analysis was considered appropriate for these deposits.

4.5 Palynological remains, by Nick Daffern

4.5.1 Pollen Analysis

Monolith <2> (604): 0.04m

Pollen was present in low concentrations with a complete assessment count being unachievable. The grains were also in relatively poor states of preservation with several grains exhibited pitting/damage to the exine (pollen wall) suggesting taphonomic processes had affected the preservation of grains leading to preferential preservation. This hypothesis is supported by the dominance of Poaceae indet (grasses), *Cichorium intybus*-type (chicory/dandelion) and Lactuceae indet (chicory/dandelion/sow thistle) which are often more resistant to decay.

Additional herbaceous species that were identified within this sample were *Urtica dioica* (stinging nettle), Chenopodiaceae (goosefoots), *Cerealia* indet (unidentifiable cereal) *Centaurea cyanus* (cornflower).

Trees and shrubs were represented by two grains of *Alnus glutinosa* (alder) and a solitary grain of *Pinus sylvestris* (Scot's pine)

The grains of aquatic species *Potamogeton natans*-type (broad-leaved pondweed) and Lemnaceae (duckweed family) were also identified as were the spores of *Pteropsida* (mono) indet (ferns) and a single spore of *Pteridium aquilinum* (bracken).

Monolith <2> (605): 0.24m

Pollen concentrations in this sample were extremely low with only three grains being identified in total; these were two grains of Poaceae indet and a single Rosaceae (rose family) grain, both of which exhibited pitting or damage to the surface sculpturing, the latter of which was more pronounced upon the Rosaceae grain. Several spores of *Pteropsida* (mono) indet (ferns) were also present.

Monolith <2> (605): 0.40m

This final sample contained no identifiable polliniferous material. Rare folded or damaged grains were present although due to the damage to the grain and the general dearth of material within the sample, identifications were not attempted.

4.5.2 **Fungal Spores**

The solitary identification of a fungal spore came from 0.04m, context (604) which infrequently contained the spores of *Cladosporium*. This genus includes some of the most common indoor and outdoor moulds although many species of *Cladosporium* are commonly found on living and dead plant material often as a pathogen or parasite.

4.5.3 **Discussion**

Overall, the results from the sequence were extremely disappointing with no samples containing enough material to complete an assessment count. As suggested above, it would appear that post-depositional processes have greatly affected the preservation of remains from within this sequence with the upper sample exhibiting preferential preservation and the lower two samples being virtually absent of palynological remains.

The only observation that can be made from the extremely limited data retrieved from the assessment is that the upper sample is likely to be medieval or, more probably, post-medieval/modern in date due to the presence of cornflower which is often associated with medieval agriculture (Colledge and Greig 1992, Greig 1991, Greig 1999) but this is a tenuous observation based on a single grain and therefore no emphasis should be placed upon this.

5. **Synthesis**

5.1 **Post-medieval to modern**

Although no finds were recovered from the earlier waterlogged deposits and probable palaeochannel in Trench 6 it can be suggested that these deposits date from the early post-medieval period. It is possible that the palaeochannel represents an earlier course of or one of several channels of the Barbourne Brook before it was canalised in the late 19th century. The land around these channels would probably have been marshy. Pollen and macrofossil remains suggest an area of generally damp grassland. A dump of material above these waterlogged deposits probably represents consolidation of the area, perhaps when the brook was canalised. A soil horizon above this dump was probably topsoil formed in the late 19th and early 20th century. Another dump of re-deposited natural above this soil represents modern make-up.

In trenches 2 and 3 and the southern part of Trench 4 waterlogged deposits were also observed. These probably represent stream deposits or flood layers associated with the brook or the pond in the post-medieval period. A series of make-up deposits in this area are probably related to the demolition of Barbourne House sometime in the early 20th century (Phear 2007). The cobbled surface seen in Trench 4 could be associated with the gardens of Barbourne House.

In trenches 1 and 5 no deposits excavated date from before the construction of the paddling pool and playground in the 1960s.

5.2 **Research frameworks**

From the archaeological resource assessment and research framework for the city of Worcester (Worcester City Council 2007) several research aims were identified for this project. One of these aims was:

- Environmental change in Worcester's hinterland (RP7.21)

Identification of buried flood plain deposits and the analysis of these deposits for environmental remains was a research priority. The fieldwork identified a possible

palaeochannel and waterlogged deposits which were sampled for environmental remains. However, the results from the environmental analysis were disappointing with post-depositional processes probably affecting the preservation of remains.

6. **Publication summary**

The Service has a professional obligation to publish the results of archaeological projects within a reasonable period of time. To this end, the Service intends to use this summary as the basis for publication through local or regional journals. The client is requested to consider the content of this section as being acceptable for such publication.

An archaeological watching brief was undertaken at Gheluvelt Park, Claines, Worcester (NGR SO 843567), on behalf of Plincke Landscapes Ltd for their client Worcester City Council who intend to carry out improvements at Gheluvelt Park for which a planning application has been approved by Worcester City Council.

The park was established in 1922 within the parish of Claines on the northern side of Worcester. A previous desk based assessment highlighted the potential for the survival of deposits associated with the demolished Barbourne House which stood to the north of the park as well as deposits associated with the Barbourne Brook which runs through it. Groundworks were observed in three areas; a proposed water play area, a playground and the footings for a war memorial. In the water play area waterlogged deposits were observed. These represent stream deposits or flood layers associated with the brook or the pond in the post-medieval period. A series of make-up deposits in this area are probably related to the demolition of Barbourne House in the early 20th century (Phear 2007) and a cobbled surface seen in north of this area may be associated with the gardens of Barbourne House.

In the eastern part of the site, excavation for the war memorial uncovered a palaeochannel and waterlogged deposits. No finds were recovered from these deposits but it is thought that they date from the early post-medieval period. It is probable that the palaeochannel represents an earlier course of or one of several channels of the Barbourne Brook before it was canalised in the late 19th century. Pollen and macrofossil remains suggest an area of damp grassland existed in the vicinity of these channels. A dump of material above these waterlogged deposits represents consolidation of the area, perhaps when the brook was canalised. A soil horizon above this dump was probably topsoil in the late 19th and early 20th century. Another dump of re-deposited natural above this soil represents modern make-up.

No features or layers recorded in the play area predated its construction in the 1960s.

7. **Acknowledgements**

The Service would like to thank the following for their kind assistance in the successful conclusion of this project, Reno Whitehead of Plincke Landscape Architects and James Dinn Archaeological Officer, Worcester City Council.

8. **Personnel**

The fieldwork and report preparation was led by Jo Wainwright. The project manager responsible for the quality of the project was Tom Rogers. Fieldwork was undertaken by Adam Lee, Jo Wainwright, Simon Sworn and Nick Daffern, finds analysis by Dennis Williams, environmental analysis by Nick Daffern and Liz Pearson and illustration by Carolyn Hunt.

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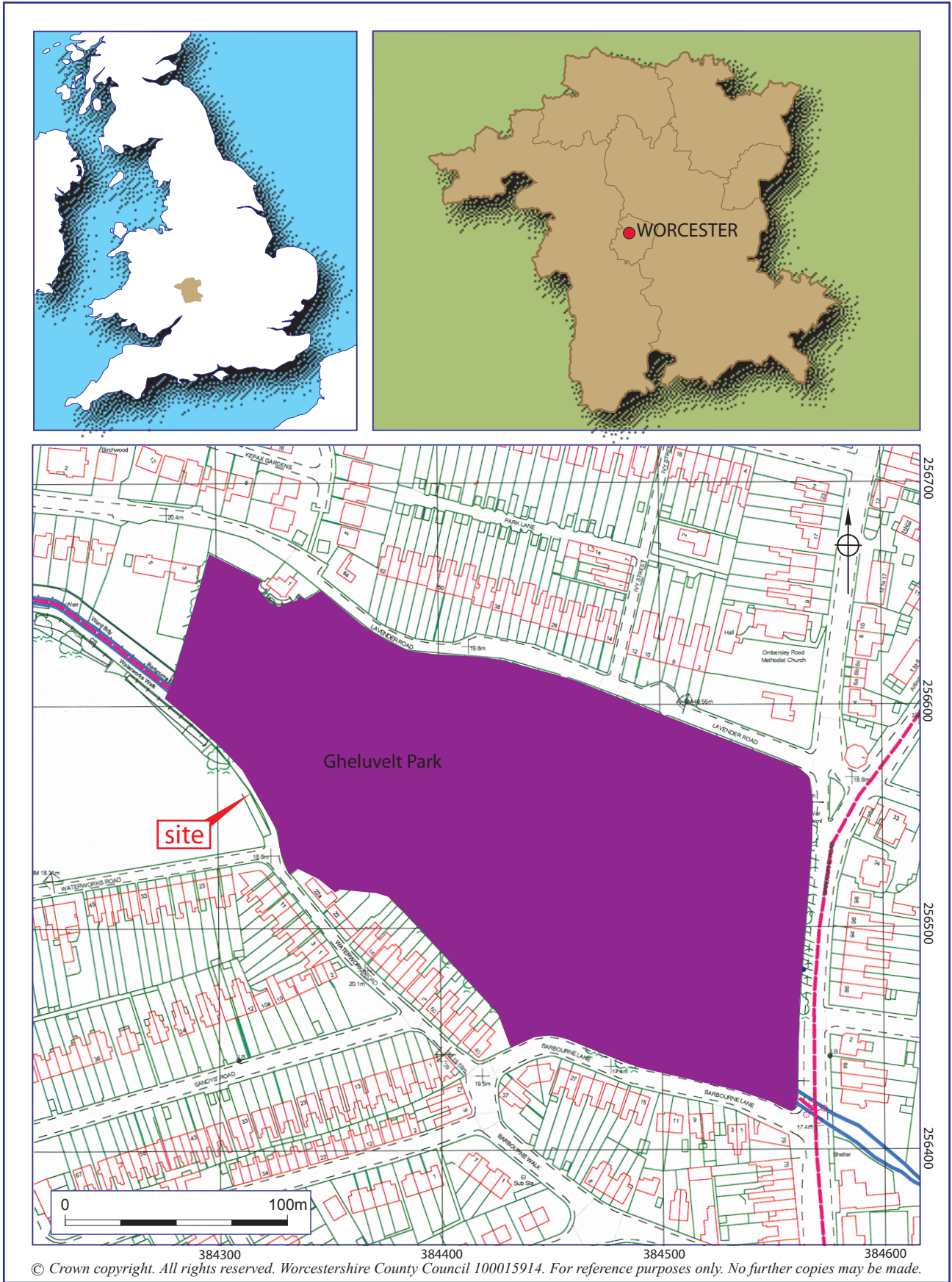
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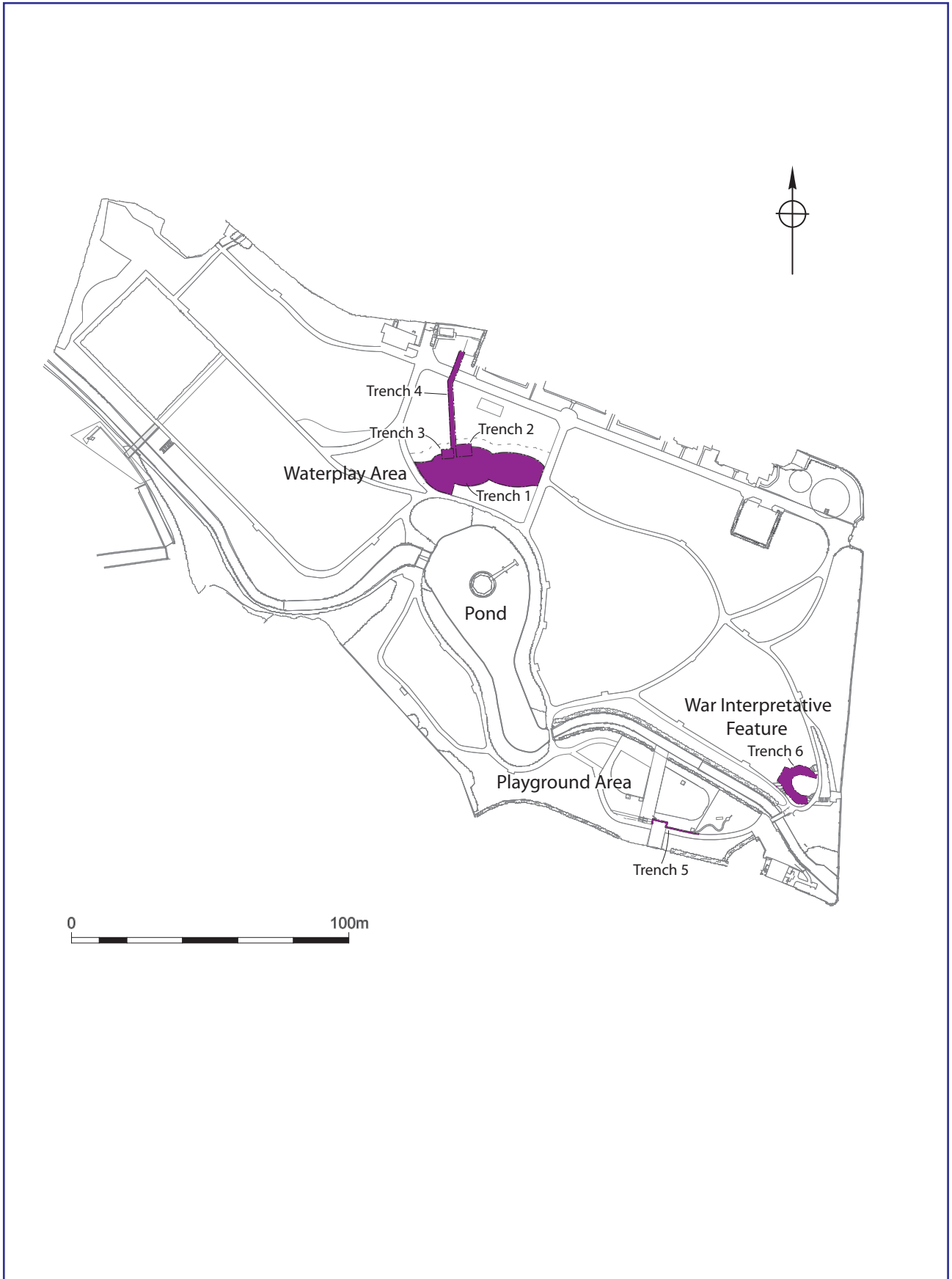
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Figures



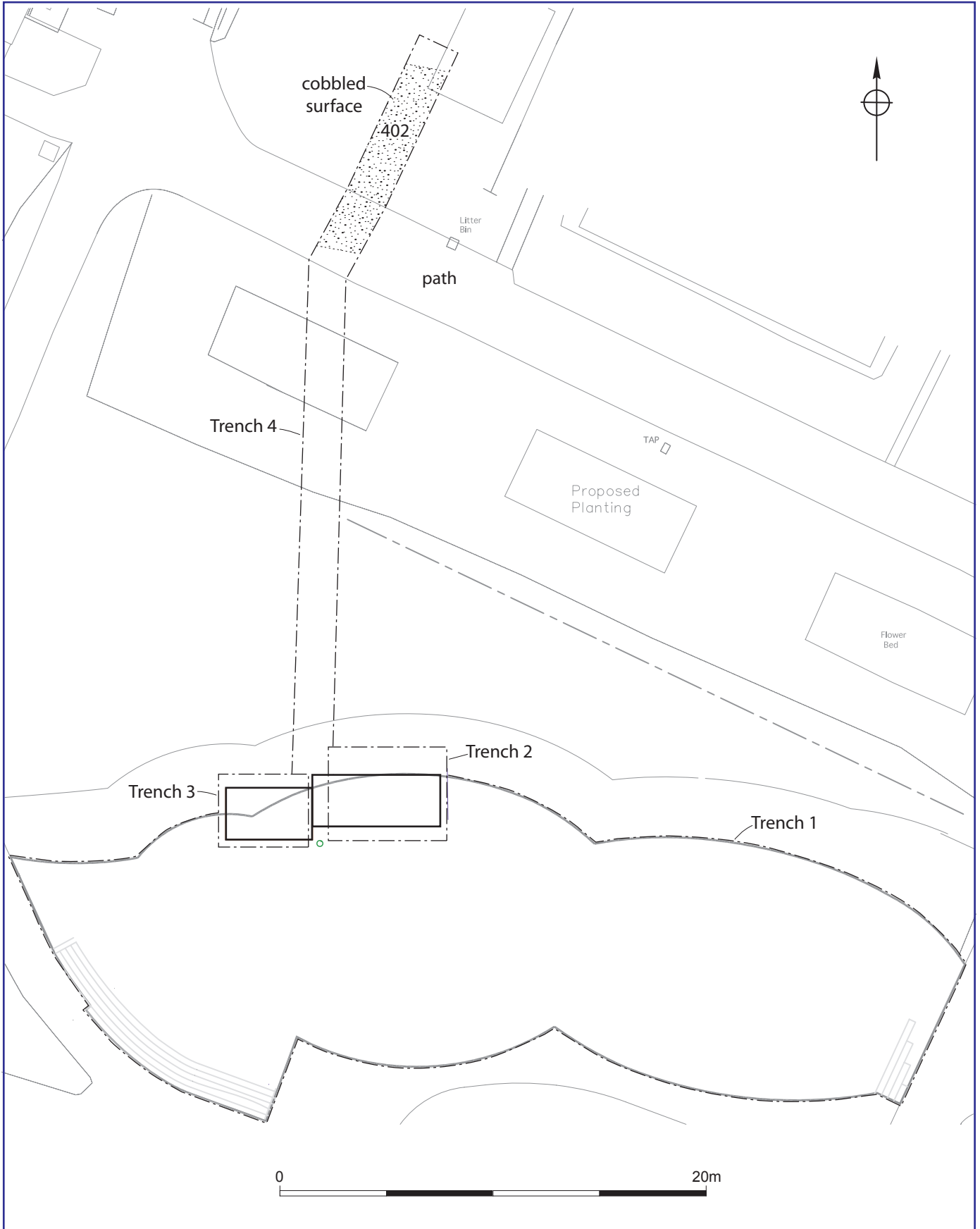
Location of the site

Figure 1



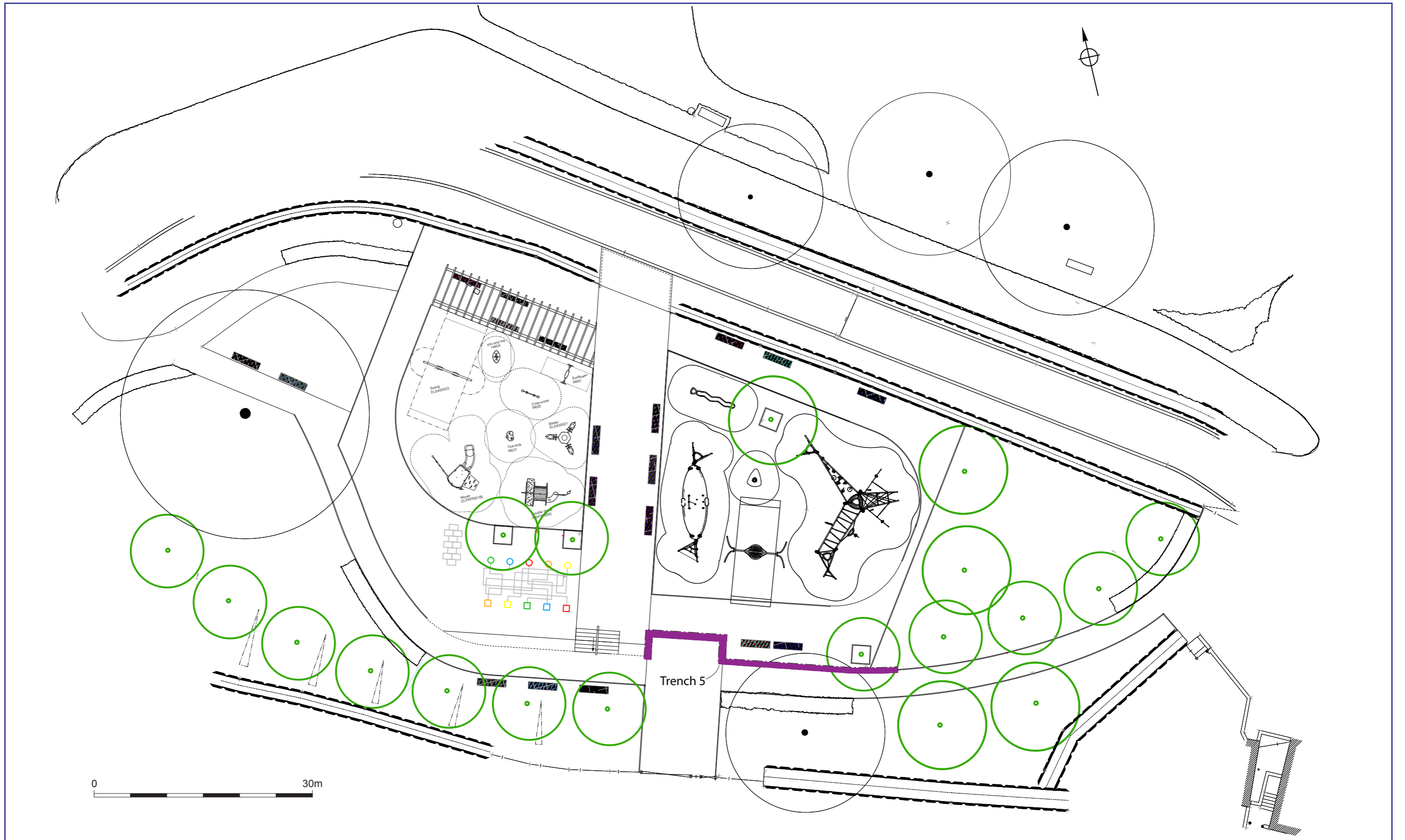
Trench location plan

Figure 2



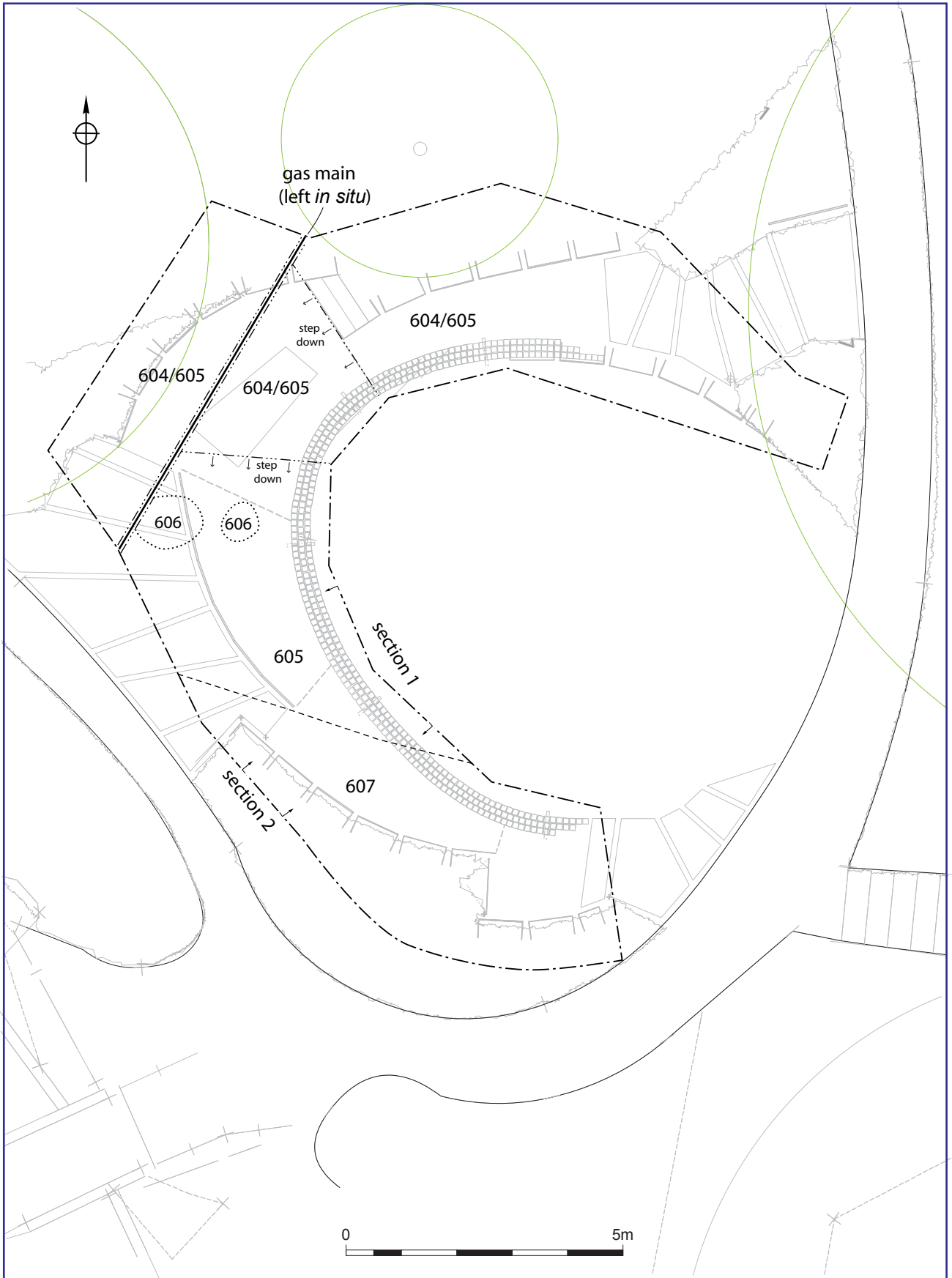
Plan of Trenches 1, 2, 3 and 4

Figure 3



Location of Trench 5 (based upon Plincke dwg No. PLL - M29.06)

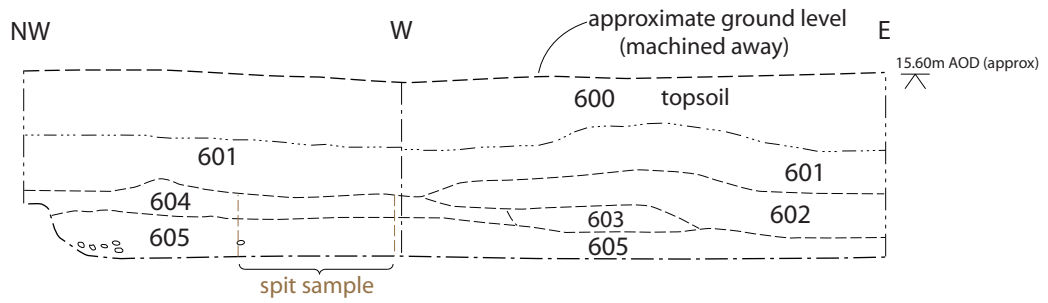
Figure 4



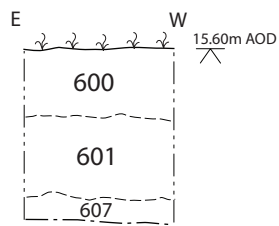
Trench 6 plan (based upon Plincke Dwg no. PLL - M29.06

Figure 5

TRENCH 6: SECTION 1



TRENCH 6: SECTION 2



Trench 6 sections

Figure 6

Plates



Plate 1 Trench 2 showing base of layer 202 View south-west



Plate 2 Trench 2 showing cobbled surface 402. View south-west



Plate 3 Trench 6 showing palaeochannel 607 in background and grey deposit 605 in foreground. View east

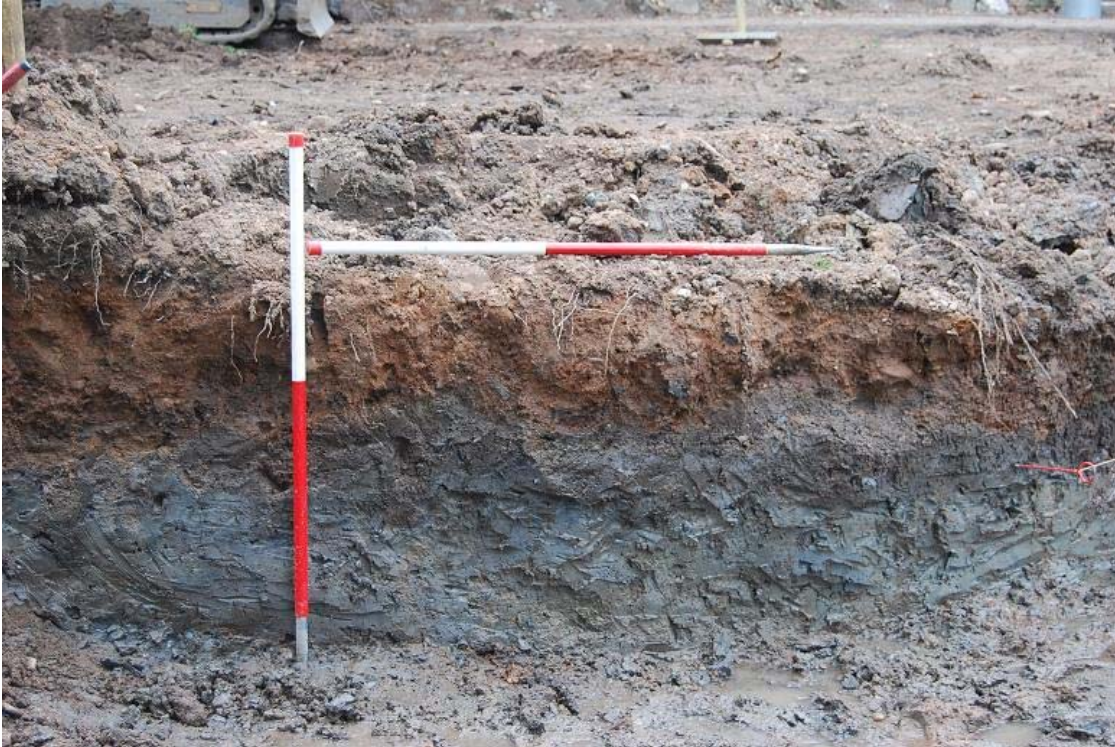


Plate 4 Trench 6 showing north-western part of drawn section (Figure 6; section 1). View north-east

Appendix 1 Pollen processing methodology (Tim Mighall, Department of Geography & Environment, University of Aberdeen)

ABSOLUTE POLLEN ANALYSIS: PREPARATION SCHEDULE

PRECAUTIONARY NOTES: All procedures, up to stage 25, should take place in the fume cupboard. Read precautionary notices on fume cupboard before starting. Ascertain whereabouts of First Aid equipment NOW. Please wear laboratory coat, gloves and goggles when dealing with all chemicals. Please organize fume cupboard carefully to maximize workspace. Use the containment trays provided. Always keep the fume cupboard door down as far as practically possible. Make sure the fume cupboard is switched on and functioning correctly.

A) SOLUTION OF HUMIC COMPOUNDS

1) Switch on hotplate to heat water bath. Prepare 12 to 16 samples concurrently.

HCl is an irritant and can cause burns. Wear gloves. Wash with water if spilt on your skin.

Using a clean spatula, place a known volume or weight of sediment (c. 2cm³) and one spore tablet in each 50ml centrifuge tube. Add a few cm³ of distilled water (enough to cover the pellet and tablets) and a few drops of 2M HCl. Wait until effervescence ceases, then half fill tubes with 10% KOH; place in a boiling water bath for 15 minutes. Stir to break up sediment with clean glass rod. Return HCl and KOH bottles to the chemical cabinet.

2) Centrifuge at 3,000 rpm for 5-6 minutes, ensuring first that tubes are filled to the same level. This applies throughout the schedule (Mark 7 on centrifuge).

3) Carefully decant, i.e. pour away liquid from tube, retaining residue. Do it in one smooth action.

4) Disturb pellet using vortex mixer; add distilled water, centrifuge and decant.

5) Using a little distilled water, wash residue through a fine (180 micron) sieve sitting in filter funnel over a beaker. NB Be especially careful in keeping sieves, beakers and all tubes in correct number order. Wash residue on sieve mesh into petri dish and label the lid. If beaker contains mineral material, stir contents, wait four seconds, then decant into clean beaker, leaving larger mineral particles behind. Repeat if necessary. Clean centrifuge tube and refill with contents of beaker.

6) Centrifuge the tubes and decant.

B) HYDROFLUORIC ACID DIGESTION

(Only required if mineral material clearly still present. Otherwise, go to stage 13)

NB Hydrofluoric acid is extremely corrosive and toxic; it can cause serious harm on contact with eyes and skin. Rubber gloves and mask/ goggles MUST be worn up to and including stage 11. Please fill sink with H₂O; have CaCo₃ gel tablets ready. Place pollen tube rack into tray filled with sodium bicarbonate.

7) Disturb pellet with vortex mixer. Add one cm³ of 2M HCl.

8) With the fume cupboard sash lowered between face and sample tubes, very carefully one-third fill tubes with concentrated HF (40%). Place tubes in water bath and simmer for 20 minutes.

9) Remove tubes from water bath, centrifuge and decant down fume cupboard sink, flushing copiously with water.

10) Add 8cm³ 2H HCl to each tube. Place in water bath for 5 minutes. Do not boil HCl.

- 11) Remove tubes, centrifuge while still hot, and decant.
- 12) Disturb pellet, add distilled water, centrifuge and decant.

C) ACETYLATION

NB Acetic acid is highly corrosive and harmful on contact with skin. Wash with H₂O if spilt on skin.

- 13) Disturb pellet, add 10cm³ glacial acetic acid, and centrifuge. Decant into fume cupboard sink with water running during and after.
- 14) Acetic Anhydride is anhydrous. Avoid contact with water. The acetylation mixture can cause severe burns if spilt on skin. Wash with water.
- 15) Make up 60cm³ of acetylation mixture, just before it is required. Using a measuring cylinder; mix acetic anhydride and concentrated sulphuric acid in proportions 9:1 by volume. Measure out 54cm³ acetic anhydride first, then add (dropwise) 6cm³ concentrated H₂SO₄ carefully, stirring to prevent heat build—up. Stir again just before adding mixture to each tube.

Disturb pellet; then add 7cm³ of the mixture to each sample.

- 16) Put in boiling water bath for 1-2 minutes. (Stirring is unnecessary—never leave glass rods in tubes as steam condenses on the rods and runs down into the mixture reacting violently). One minute is usually adequate; longer acetylation makes grains opaque. Switch off hot plate.
- 17) Centrifuge and decant all tubes into large (1,000ml) beaker of water in fume cupboard. Decant contents of beaker down fume cupboard sink.
- 18) Disturb pellet, add 10cm³ glacial acetic acid, centrifuge and decant.
- 19) Disturb pellet, add distilled water and a few drops of 95% ethanol centrifuge and decant carefully.

D) DEHYDRATION, EXTRACTION AND MOUNTING IN SILICONE FLUID

- 20) Disturb pellet; add 10cm³ 95% ethanol, centrifuge and decant.
 - 21) Disturb pellet; add 10cm³ ethanol (Absolute alcohol), centrifuge and decant. Repeat.
 - 22) Toluene is an irritant. Avoid fumes.
Disturb pellet; add about 8cm³ toluene, centrifuge and decant carefully into 'WASTE TOLUENE' beaker in fume cupboard (leave beaker contents to evaporate overnight).
 - 23) Disturb pellet; then using as little toluene as possible, pour into labelled specimen tube.
 - 24) Add a few drops of silicone fluid - enough to cover sediment.
 - 25) Leave in fume cupboard overnight, uncorked, with fan switched on. Write a note on the fume cupboard '*Leave fan on overnight - toluene evaporation*', and date it. Collect specimen tubes next morning and cork them. Turn off fan.
 - 26) Using a cocktail stick, stir Contents and transfer one drop of material onto a clean glass slide and cover with a cover slip (22mm x 22mm). Label the slide.
 - 27) Wash and clean everything you have used. Wipe down the fume cupboard worktop. Remove water bath from fume cupboard if not needed by the next user. Refill bottles and replace them in chemical cabinets.
-

Appendix 2 Context descriptions

Context	Area	Context type	Feature type	Description	Max Depth (m)	Interpretation
100	Trench 1	Layer	Topsoil	Brown Moderately Compact sandy silt	0.5	Topsoil
101	Trench 1	Layer	Layer	Mid Orangish Brown Moderately Compact Sandy silt loam	0.25	Made ground in north-east corner outside old pool
102	Trench 1	Layer	Layer	Dark Blackish Brown Friable mixed deposit	-	Mixed make-up. Deposit seen outside old pool in south-western corner of site
200	Trench 2	Layer	Topsoil	Dark Brown Moderately Compact Sandy silt loam	-	Topsoil only seen in North-east corner of trench
201	Trench 2	Layer	Layer	Mid Greyish Brown Loose Silty sand	0.7	Mixed deposit. Make-up layer
202	Trench 2	Layer	Layer	Dark Greyish Black Loose Silty sand	0.7	Possible flood-waterlogged deposit
203	Trench 2	Layer	Natural	Orange Loose Clayey sand	-	Natural
300	Trench 3	Layer	Layer		0.6	As 201
301	Trench 3	Layer	Layer		1	As 202
302	Trench 3	Layer	Natural		0.5+	As 203. Natural
400	Trench 4	Layer	Topsoil	Dark Brown Compact Sandy silt loam	0.25	Topsoil
401	Trench 4	Layer	Layer	Mid Orangish Brown Compact Clay loam	0.4	Mixed make-up layer. Seen in north of trench
402	Trench 4	Structure	Surface		0.1	Cobbled surface made of large rounded cobbles. Make-up underneath 403
403	Trench 4	Layer	Layer	Moderately Compact Silt loam	0.1	Make-up for cobbled surface 402
404	Trench 4	Structure	Surface		0.1	Modern tarmac
405	Trench 4	Layer	Layer		-	Hardcore make-up for tarmac surface 404
406	Trench 4	Layer	Layer		-	Demolition material from Barbourne House. Seen in south of trench under 400
407	Trench 4	Layer	Layer		0.7	Same as 201. Make-up deposit
408	Trench 4	Layer	Layer		0.7	As 202. Waterlogged/flood deposit?
500	Trench 5	Structure	Surface		0.45	Tarmac
501	Trench 5	Layer	Layer		0.2	Scalpings as make-up for tarmac 500
502	Trench 5	Layer	Layer	Mid Greyish Brown Sandy silt loam	0.19+	Make-up layer below scalpings 501
600	Trench 6	Layer	Topsoil	Dark Greyish Brown Friable Sandy silt loam	0.35	Topsoil and turf
601	Trench 6	Layer	Layer	Orange Loose Sand	0.65	Orange sands and gravels. Modern make-up
602	Trench 6	Layer	Layer	Dark Greyish Brown Clay loam	0.3	Possible earlier 19th c? soil horizon
603	Trench 6	Layer	Layer	Mid Orangish Brown Friable Sand	0.25	Re-deposited sands and gravels used as make-up to consolidate a wet area
604	Trench 6	Layer	Layer	Dark Greyish Black Soft Sandy silty clay	0.2	Waterlogged deposit. Top part of 605
605	Trench 6	Layer	Layer	Blueish Grey Soft Sandy clay	0.4	Waterlogged deposits. Probable part of marshy area directly to north of Barbourne brook
606	Trench 6	Layer	Layer	Light Brown Soft Clay	0.1+	Layer underneath 605
607	Trench 6	Layer	Palaeochannel	Brownish Grey Soft Silt	0.2+	Possible earlier stream channel. Very humic and seen in southern part of the trench

Appendix 3 Technical information

The archive

The archive consists of:

- 5 Context records AS1
- 14 Fieldwork progress records AS2
- 2 Photographic records AS3
- 6 Trench record sheets AS41
- 1 Sample number catalogue AS18
- 1 Spit sample record AS16
- 1 Drawing number catalogue AS4
- 7 Scale drawings
- 1 Box of finds
- 1 Computer disk
- 4 Flot records AS21
- 3 Polen samples in vials
- 3 Pollen score sheets

The following samples will be discarded after 3 months of the submission of the report unless there is a specific request to retain them.

- Monolith <2>
- Flots from contexts 604, 605 and 607
- Remaining sample material from 604, 605 and 607

The project archive is intended to be placed at:

Worcester City Museum and Art Gallery,
Foregate Street,
Worcester
WR1 2PW
Tel: 01905 25371
