OAKFORD ARCHAEOLOGY

Archaeological borehole survey and geoarchaeological assessment at Rougemont Gardens, Exeter, Devon

on behalf of
Exeter City Council

Report No. 16-11

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Summary

A geotechnical borehole survey was undertaken in July 2016 by South West Geotechnical Ltd for Exeter City Council, at Rougemont Gardens, Exeter, Devon (SX 9204 9291). Rougemont is a Grade II listed historic park and garden and lies inside the city wall and within the confines of the outer bailey of Exeter castle; both the city wall and castle are scheduled ancient monuments. In addition, both the castle walls and the Norman gatehouse are Grade I listed. The survey work was monitored and recorded by Oakford Archaeology, and, with the subsequent environmental assessment, was undertaken in response to scheduled monument consent granted to Exeter City Council for the borehole survey. The purpose of this survey was to investigate the causes of the apparent slippage to the castle bank and pathways in the gardens.

The sequences of deposits identified during the survey, for the most part, consisted of rampart material belonging to the inner bailey defences of the Norman castle. However, boreholes 4, 6 and 8 identified a buried soil overlying bedrock and sealed by rampart material, while borehole 2 exposed a clay deposits containing a large proportion of small trap fragments, possibly representing the remains of bank material associated with the earlier Roman rampart at the rear of the city wall.

The boreholes through the inner ditch exposed volcanic basalt bedrock at a depth of 3m below ground level. The sequence contained initial silting at the base of the ditch followed by large-scale primary infilling. Deposits of made up ground, associated with the late 18th century Rougemont House and gardens, were recorded in borehole 9.

Finds retrieved during the investigation included 6 sherds of 16th and 17th coarse- and stonewares sherds from path and levelling deposits associated with the construction of Rougemont House and the laying out of the formal gardens

The geoarchaeological assessment indicates that no significant palaeoenvironmental or geoarchaeological deposits or materials were present within the borehole cores. A poorly preserved and mixed buried soil survived under the inner bailey rampart. Its poor survival and disturbance is likely due to activity associated with the construction of the rampart. The absence of pollen in this soil might, in part, be attributed to this disturbance and mixing.

1. INTRODUCTION

This report has been prepared for Exeter City Council and sets out the results of archaeological monitoring and recording by Oakford Archaeology (OA) during a geotechnical borehole survey undertaken by South West Geotechnical Ltd in July 2016 on land at Rougemont Gardens, Exeter, Devon (SX 9204 9291). The work, including a subsequent geoarchaeological assessment, was commissioned in response to scheduled monument consent granted by Historic England (HE) and was monitored for HE by the Inspector of Ancient Monuments and by the city council's Principal Project Manager Heritage (PPMH).

1.1 **The site**

Rougemont Gardens (Fig. 1) occupies a site to the south-west of the Norman castle. The castle lies within the northeast corner of the earlier Saxon burh. The garden comprises part of the outer bailey of the castle to the west of a depression forming part of the castle defences. To the east the rampart of the inner bailey rises steeply above the gardens and a depression that represents the partly infilled defensive ditch of the inner bailey. The boreholes were located within the inner ditch and on the southwest slope of the castle motte, between 47m and 62m AOD.

1.2 **Geological background**

Geologically, the eminence occupied by Exeter (Rougemont) Castle, immediately to the north-east, is composed of the Permian basaltic lavas known as the Exeter Traps. This derives from a lava flow resting on the Carboniferous shales and mudstones of the Crackington formation, extending beyond the lava flow to the west and south (Bristow *et al*. 1985). To the east of the basalt outcrop are the Permian red sandstones of the Whipton formation, the oldest division of the Permian sandstones to be found in the area, overlain by blanket head and regolith (Bristow *et al*. 1985).The basalt was extensively quarried during the Roman period for building stone, including for the adjoining city wall.

2. AIMS

The principal aim of the watching brief was to monitor the drilling of boreholes on the site; to examine the borehole cores to determine the state of preservation, type and quantity of any significant archaeological and palaeo-environmental remains uncovered, to ensure that if any environmental evidence was preserved, that a sufficient sample be retained to allow for further analysis and to retrieve any potential dating evidence to establish, describe and if possible interpret the deposit sequence. The objectives of the archaeological work was to identify and record former land surfaces and areas of archaeological activity and assess the remains within the areas affected by the proposed works and to mitigate the impact of the proposed works; and to report on the results of the work as appropriate

3. METHODOLOGY

The work was undertaken in accordance with a project design prepared by Oakford Archaeology (2016), submitted to and approved by Historic England prior to commencement on site. This document is included as Appendix 1.

A total of eleven boreholes were excavated using a mini-tracked percussive auger rig. The tarmac path surface was first removed with a cylinder-cutting device. The engineer's

sampling method resulted in the retrieval a series of individual 1m long and 100mm diameter core samples contained within a clear plastic liner. These were split on site, logged by the engineer and the archaeologist, with the aim of sampling moat/motte deposits that could be assessed for environmental remains and their potential for geoarchaeological analysis. Suitable deposits were retained by OA for further analysis.

The standard OA recording system was employed. Stratigraphic information was recorded on *pro-forma* context record sheets and individual trench recording forms, plans and sections for each trench were drawn at a scale of 1:10, 1:20 or 1:50 as appropriate and a detailed digital photographic record was made. Registers were maintained for photographs, drawings and context sheets on *pro forma* sheets.

4. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

The historic park and garden is Grade II listed and lies inside the city wall and within the confines of the outer bailey of Exeter castle; both are scheduled ancient monuments. In addition, both the castle walls and the Norman gatehouse are Grade I listed.

The site lies on a low volcanic outcrop, in an area where little evidence for prehistoric activity has been previously identified. It has been suggested that the area around Exeter Castle was a possible focus for Iron Age activity. However, no settlement evidence here has been found to date, and more recently excavated evidence from a site in Southernhay suggests that at least one focus of prehistoric activity was in fact further to the south-east (Stead 2004).

The legionary fortress at Exeter was built probably sometime around *c*.AD55, and was occupied until around AD75. It is during this period that the basalt outcrop of Rougemont, located immediately outside the legionary fortress, was first quarried, being used in part for the construction of the bath house. Remains of the Roman quarries were identified during evaluation trenching inside the Castle in 2006 as well as during the RAMM redevelopment (Steinmetzer 2011).

Following the growth of *Isca Dumnoniorum* the former fortress and the defences of the early Roman town were finally leveled towards the end of the second century (Henderson 1988; Bidwell 1991). The line of a new rampart and wall was laid out incorporating built-up areas and natural defensive features outside the old defences (Bidwell 1980); in this area up to and around the high ground afforded by the volcanic outcrop at Rougemont. The wall itself survives well in this area, and the characteristics of the various phases represented in the internal and external faces were described in some detail in 1995 by Stuart Blaylock. The rampart to the rear of the wall is estimated to be in the region of 10–13m wide, and remnants of it may well survive to the SW of the Norman inner bailey ditch (the large depression in the garden), and under the Norman bank to the inner bailey to the NE. At the head of the depression it appears to have been largely removed, probably when the ditch of the inner bailey was cut, and large expanses of core work of the city wall are visible as a result.

Within the later Roman town masonry buildings started to replace earlier timber ones by the beginning of the 3rd century. Potential evidence for Roman domestic occupation of this date was observed in the general area of the castle in the 1620s, although the exact location of the observation is unknown.

The Roman town seems to have been largely deserted by the early 5th century, probably as a result of a permanent breakdown in the economic and administrative system of the Roman province (Bidwell 1979).

Following the conquest of Devon by the Saxons in the seventh century Exeter was re-founded as an urban centre by King Alfred in the 880s, at which time he refurbished the defences to create a fortified town or *burh*. A number of Saxon boundary ditches were uncovered in 1998 to the southeast of the Phoenix Art Centre, just inside the outer bailey of the later Castle, and therefore deposits of this date (and of earlier Roman date) may be sealed beneath the later Norman outer bailey rampart in this area.

Construction of the Castle began following the siege of the city in 1068 by William the Conqueror, and 48 houses were said to have been destroyed in the process. The Castle itself has remained Royal property throughout, being granted by Edward III to his eldest son, Edward the Black Prince, Duke of Cornwall.

The outer bailey ditch does not survive as a visible feature, having been infilled at a date around the middle or late 12th century. However, Norman bank material belonging to the rampart of the outer castle bailey were identified at the RAMM site (Steinmetzer 2011) and also previously to the SE of the arts centre.

By the 18th century the outer bailey had passed into private hands and Rougemont House (listed grade II*) was constructed between c 1769-70 by John Patch, partly over the line of the infilled ditch to the inner bailey, and its gardens occupied much of the remaining open section of this to the west and also a large area of the outer bailey. The House was sold in 1787 to Edmund Granger, who altered the House and improved the gardens, which included the former ditch and the south-west slopes of the inner bailey rampart, with the advice of William Jackson (Pevsner and Cherry 1989, Hoskins 1974). Rougemont House continued in private ownership until 1910 when it was acquired by the City Council.

The layout of Rougemont Gardens corresponds closely to that shown on Roper's 1820 map of Exeter and the 1890 OS map. The current paths were laid out when the gardens were acquired by Exeter City Council.

5. RESULTS

5.1 **Introduction**

Eleven boreholes were excavated, and between two and six cores removed in one metre sections from each one. The condition of the cores indicated that beneath the path surfaces the ground has remained substantially undisturbed. Clear stratigraphic horizons were observed in all the cores retrieved. A full description of the soil sequence is included in Appendix 4.

5.2 **The inner ditch**

Boreholes 5b and 9 were sited fairly centrally within the inner ditch, while borehole 5a was situated further along the edge. The base of the ditch was observed at a depth of 3.33m (43.44mAOD) and 4.35m (43.30mAOD) respectively. The ditch contained a sequence of clay-based fills (551-556 and 901-905), the lower of which (551 and 901) consisted of homogenous deposits of clay and rare small fragments of volcanic trap. These layers appear

to represent gradual natural infilling, weathering from the side of the rampart and the sides of the ditch above accumulating in the base of the ditch.

These deposits were overlain in borehole 5b by a 0.35m thick deposit of dark reddish-brown clay (557), while in borehole 9 they were overlain by four successive deposits (906-909) containing building rubble and domestic refuse including large quantities of ceramic building material fragments, oyster shells and totalling 2.35m in thickness. These deposits represent the levelling and infilling of the ditch in the 18th century, when the area became a formal garden. This material was in turn sealed by overlain by a 0.25-0.3m thick layer of dark brown clay (557 and 910) representing modern topsoil.

5.3 **The inner bailey rampart**
Boreholes 3, 7 and 10 were sited along the path at the top of the motte, immediately below the castle walls. Following the removal of path deposits, examination of the cores revealed a simple sequence of successive layers of clay based deposits and redeposited natural bedrock (301-311, 701-708 and 1000-1012). Although excavated to depths of 55.55mAOD, 56.13mAOD and 53.33mAOD respectively, none of the cores revealed pre-Norman deposits.

The next row of boreholes (4, 6 and 8) was located approximately half-way down the slope of the motte. Natural subsoil was exposed at a depth of 51.91mAOD, 50.35mAOD and 50.64mAOD respectively. The earliest deposit in the sequence related to an early buried soil (401, 601 and 801). This was c. 0.26-0.36m thick and consisted of a mid-reddish brown silty clay deposit. The former soil was overlain by successive layers of silty clay based deposits (402-407, 602-609 and 802-807) containing redeposited volcanic stone fragments, known locally as 'trap'. This material represents the Norman rampart material; the trap fragments derived from the excavation of the inner ditch. Overlying the later Norman rampart material was a sequence of deposits (408-410, 609-610 and 808-810) containing a large proportion of small stone fragments and representing the remains 18th -20th century paths.

5.4 **The City wall**
Borehole 2 was located at the western end of the inner ditch, immediately behind the city wall. Excavated to a total depth of 49.26mAOD it is unclear if the deposit at the bottom is the solid city wall core or bedrock. Overlying this were three reddish-brown clay deposits (202-205) 3.69m thick, representing part of the Roman city wall rampart. This was in turn overlain by make-up material for the modern path.

6. THE FINDS
by John Allan

6.1 **Introduction**
This is a very small assemblage entirely composed of post-medieval finds. The sherds are largely in a poor condition, although some of the material is heavily abraded. The finds are briefly described below and itemised in Appendix 2.

6.2 **The pottery**
This assemblage comprises 7 sherds weighing 102g. The finds recovered generally came from the make-up of the paths. A single sherd of South Somerset coarseware, dating to the period after 1590, was recovered from deposit 609, while a single sherd of North Devon gravel free, dating to after 1550, was recovered from deposit 709. Finally, a single sherd of

featureless fired ceramic, dating to the early 17th century, was recovered from path make-up material 1014.

A single fragment of 18th century brick and two sherds of 17th century coarseware were recovered from a probable 18th century levelling deposit (909) associated with the construction of Rougemont House and the laying out of the formal gardens. Finally, two sherds of a Frechen stoneware drinking jug, dating to the period 1530-1630, were recovered from the uppermost fill of the inner ditch (503).

7. GEOARCHAEOLOGY AND POLLEN ASSESSMENT
by Catherine Langdon, Rob Scaife and Michael J. Allen

7.1 **Introduction**
South West Geotechnical Ltd had undertaken coring of the inner ditch and motte of Exeter Castle in Rougemont Gardens, Exeter. A number or cores were recorded and one core of 1.5m was supplied from the inner ditch (core 5b), and a second 1m long from the motte, with a buried soil (core 4), were selected by the archaeologist for geoarchaeological description and interpretation, and subsampling for pollen assessment.

The archaeologist reported that the inner ditch (or moat) was only 3m deep. They had tried in two places about 3m apart as they'd been expecting a depth nearer 10m, as the outer moat is 20m deep. The base was not waterlogged. There are lots of Roman quarries in the vicinity which may have had an impact on the inner moat depth.

Cores supplied
Two sleeved cores, one of 1.5m length and one of 1m length were supplied for description and subsampling.

Inner bailey rampart and buried soil	BH4	1m long	3-4m	60mm ∅
Inner ditch	BH5b	1.5m long	1.5-3m	80mm ∅

The English Heritage Regional Advisor (Vanessa Straker) had requested that the cores be described and interpreted by a geoarchaeologist and that 6 samples, each of 10mm thickness, were assessed for pollen from probable buried soil beneath the motte material, and from the basal 20cm of the ditch silting (email to Oakford archaeology dated 8 August 2016).

7.2 **Geoarchaeology**
by Michael J. Allen

The cores were cut open and one face carefully cleaned to reveal the deposits and their structure. Cleaning tried to emphasis structure rather than smearing the deposits. The sediments were recorded following standard notation (Hodgson 1997), with munsel colours recorded moist in daylight conditions (Appendix 1), and the cores photographed (Appendix 2).

Inner bailey rampart and probable buried soil
The finer basal motte detritus of stony dusky red massive/structureless silty clay loam had a sharp boundary at 3.49m with a dark reddish brown silt loam, and possible weak blocky peds containing fine charcoal that was interpreted as a mixed and truncated A horizon of a rendzina

soil or weakly developed brown earth (3.49-3.60/1m). It overlay a loose stony silty clay representing the weathered (A/C or B/C) horizon of the soil.

The archaeologists' interpretation that there is the buried soil is confirmed, but it seems to have been mixed and truncated, possibly during the construction of the large inner bailey rampart. Nine samples were removed for pollen; 2 from the base of the motte, 3 from the A/B horizon of the soil, and 4 from the weathered A-B/C horizon (Appendix 1).

Base of the ditch/moat
The base of the inner ditch/moat was only 3m deep; the basal deposits (2.82-3.00m) were pliable (moist) almost stone-free silty clay and silt under a slightly stony very firm silty clay. This may suggest fine runoff or possibly settling in seasonal, shallow water muddy puddles, over the broken and weathered bedrock. A series of 11 samples were removed for pollen; 3 from the basal deposit and 9 from the deposits above (Appendix 1).

Subsamples for pollen
A series of 20 pollen subsamples were removed it total from key stratigraphic points in both cores. Samples were taken at 10mm band width and at intervals varying from 140mm to 40mm depending upon the depositional context.

Buried soil under the motte
A series of nine samples were taken; 2 from the base of the mound at 80mm intervals; 3 from the buried soil at 40mm intervals; and 3 from the weathered base of the soil again at 40mm intervals. Three subsamples were assessed for pollen and are indicated in bold in the list below and Appendix 1.

Base of the inner bailey rampart	3.34-3.35
	3.42-3.43
Buried soil A/B horizon	**3.50-3.51**
	3.54-3.55
	3.58-3.59
Weathered base of soil B/C	3.62-3.63
	3.66-3.67
	3.70-3-71
	3.74-3.75

List of pollen samples from the buried soil in core 4

Base of the inner ditch
The basal 1.09m of the ditch stratigraphy was sampled for pollen and 11 samples were removed; 2 from a stony fill at 140m intervals; 6 from the near base slightly stony ditch fill at 80mm intervals; and 3 from the basal silt at 40mm intervals. Three were selected for pollen assessment and are indicated in bold in the list below and in Appendix 1.

Stony silty clay ditch fill	1.90-1.91
	2.14-2.15
Stiff slightly stony fill	2.38-2.39
	2.50-2.51
	2.62-2.63
	2.68-2.69
	2.74-2.75

	2.80-2.81
stone-free silty clay	**2.86-2.87**
	2.92-2.93
	2.96-2.97

List of pollen subsamples from the base of the inner ditch (samples assessed in bold)

7.3 **Pollen Assessment**

by Dr Catherine Langdon & Dr Rob Scaife

Pollen assessment has been carried out on 6 sub-samples taken from cores obtained from the inner bailey rampart and old land surface and from the fills of the inner moat (Table 1). The principal aims of the study were to ascertain if sub-fossil pollen and spores are preserved in this soil and sediment and, if so to provide some preliminary information on the past vegetation growing on and in proximity to the site. This study has shown the almost complete absence of pollen in the buried soil under the inner bailey rampart and limited pollen numbers and preservation in the inner ditch sediment.

Core 4: Inner bailey rampart and buried soil		Core 5b; base of moat	
334cm	Inner bailey rampart	190cm	silty fill with stones
342cm	Inner bailey rampart	214cm	silty fill with stones
350cm	**disturbed ?A/B horizon**	238cm	silty fill with stones
		250cm	silty fill with stones
		262cm	silty fill with stones
354cm	**disturbed ?A/B horizon**	268cm	silty fill with stones
		274cm	silty fill with stones
358cm	**disturbed ?A/B horizon**	280cm	silty fill with stones
		286cm	**silty ditch fill**
362cm	A-B/C	**292cm**	**silty ditch fill**
366cm	**A-B/C**	**298cm**	**silty ditch fill**
370cm	A-B/C		
374cm	A-B/C		

Table 1. List of pollen samples with those shown in bold assessed

The pollen data

Six samples were examined; three each from the old land surface under the inner bailey rampart and from the basal despots of the inner moat. Standard techniques for pollen concentration of the sub-fossil pollen and spores were used on these sub-samples of 2.0ml volume (Moore and Webb 1978; Moore *et al*. 1992). Pollen counts of 100 grains per level were made from the inner moat samples.

Buried soil under the inner bailey rampart

Samples were examined at 3.50m, 3.58m and 3.66m (Table 1). Pollen was almost totally absent in these samples and pollen counts were not possible. Scanning of the microscope slides showed only very occasional Lactucoideae (dandelion types) and monolete fern spores. The paucity of even these pollen/spore microfossils is a clear indication of the poor pollen preserving conditions and resultant differential preservation in favour of these most robust taxa. The occasional Lactucoideae may be indicative of grassland.

Inner ditch/moat

Samples were examined from the primary/basal fill of the moat at 2.86m, 2.92m and 2.98m. Pollen counts of 100 grains per level were made. Pollen was found to be sparse with strong indications of differential preservation. Assessment counts of 100 grains per sample level were, however, obtained with difficulty. These data are tabulated (Table 2).

	2.86m	***2.92m***	***2.98m***
Pollen taxon			
Trees and Shrubs			
Quercus	-	1	1
Herbs			
Poaceae	38	35	53
Cereal type	4	4	6
Ranunculus type	3	1	
Brassicaceae	-	2	1
Sinapis type	1	-	-
Chenopodiaceae	1	1	1
Borago officinalis	-	1	-
Epilobium type	-	1	-
Apiaceae	-	-	3
Plantago lanceolata	2	-	-
Anthemis type	-	1	-
Centaurea cyanus	-	2	-
Lactucoideae	52	54	33
Typha Sparganium	-	1	-
Unidentified/degraded	-	1	1
Fern spores			
Dryopteris type	76	81	70
Pteridium aquilinum	1	5	9
Polypodium	-	1	-
Miscellaneous			
Trichuris (intestinal parasite)	-	1	-
Pre-Quaternary spores	-	4	10

Table 2: Pollen count data obtained from the basal sediment of the moat.

The pollen spectra are dominated by herbs with Poaceae (grasses) and Lactucoideae (dandelion types) being the most important taxa. There are small numbers of other herb pollen types of which Cereal type, *Centaurea cyanus* (blue cornflower) and *Borago officinalis* (Borago) are of interest. There is little tree pollen represented with only two occurrences of *Quercus* (oak). There are very substantial numbers of fern spores of which monolete Pteropsida of *Dryopteris* (typical fern fronds) are most important. There are small

numbers of *Pteridium aquilinum* (bracken) and occasional *Polypodium* (polypody fern). An egg case of the intestinal parasite *Trichuris* was recorded from 2.92m.

Discussion

Pollen preservation is poor in all of the samples and contexts examined. This is noted especially the case in the samples from the buried soil under the inner bailey rampart. Slightly better preservation was noted, as might be expected, from the deeper and probably wetter conditions at the base of the moat. Here, although absolute pollen numbers are small, there is a mix of very robust pollen taxa (Lactucoideae) and Pteropsida spores and of more fragile types (largely Poaceae). This suggests that there is extreme differential preservation in favour of the former which have a longer residence time in the sediment and may also be of secondary derivation from earlier sediment. Those less robust taxa, largely Poaceae are also poorly preserved but may represent pollen which was incorporated into the moat sediment followed by rapid burial. The taphonomy of the pollen is clearly complex.

Given the above factors, it is possible to make some interpretation of the pollen data.

There is an almost complete absence of tree and shrub pollen. This suggest that the environment at least in proximity to the sample site was open. This does not preclude trees within the near region as the pollen catchment of such (ditch/moat) features tends to be restricted (Dimbleby 1957; 1985).

The on-site vegetation appears to have been open as shown by the dominance of herb pollen. As noted, both Poaceae (grasses) and Lactucoideae (dandelion types) are dominant, the latter as a result of differential preservation of these robust pollen grains and longer residence time in the soil/sediment. Both taxa, do, however, suggest that the on and very near site vegetation was open grassland. A small number of other taxa including *Ranunculus* type (buttercups) and *Plantago lanceolata* (ribwort plantain) are also indicative of grass dominated habitat. It should be noted that there is a possibility that the Lactucoideae pollen may be allochthonous having been inwashed along with sediment from soils surrounding the motte ditch.

Cereal pollen and some associated herbs of arable cultivation, especially *Centaurea cyanus* (blue cornflower) are also present. Whilst these taxa may indicate local cultivation, it is perhaps more probable that the pollen derived from domestic waste such as farinaceous products, floor covering and ordure. The latter may be indicated by the, albeit single occurrence, of an egg of the intestinal parasite, *Trichuris.*

Summary and conclusions

The following principal points have been made in this assessment study.

- Pollen is very poorly preserved and with low absolute pollen numbers in the soil/sediment.
- Pollen was almost absent in the motte buried soil with only sporadic and uncountable numbers of Lactucoideae pollen.
- Pollen in countable numbers was present in the basal ditch sediment. This allowed, with difficulty, counts of 100 grains to be made.
- The pollen spectra obtained from the ditch fill (Table 2) are dominated by herbs with almost no tree pollen suggesting an open environment at least in proximity to the site.

- The herb pollen assemblages are dominated by Poaceae and Lactucoideae suggesting that grassland was dominant on the sample site. The base and sides of the ditch.

- Small numbers of cereal pollen, pollen of associated arable taxa and an egg of the intestinal parasite, whip-worm are probably derived from domestic waste which was disposed of in the ditch.

7.4 **Conclusions**
by Michael J. Allen

A poorly preserved and mixed buried soil survived under the inner bailey rampart. Its poor survival and disturbance may have been due the heavy traffic and footfall during the construction of the large inner bailey rampart. The absence of pollen in this soil might, in part, be attributed to this disturbance and mixing.

The inner ditch was not a water-filled feature, but the initial sedimentation was silt washing from the sides of the inner bailey rampart and settling in the base. Subsequently a more typical primary fill of material (*sensu* Evans 1972, 321-326; Limbrey 1975, 290-301) weathered from the sides accumulated. The landscape was largely open with ferns and bracken growing and of a grassland dominated environs. Evidence of faecal waste in the ditch is suggested from the presence of the intestinal parasite *Trichuris*.

7.5 **Recommendations**
No further analysis is recommended due to the poor and differential nature of the pollen preservation and low concentrations. The cores have been discarded.

8. DISCUSSION

8.1 **Introduction**
The archaeological and palaeoenvironmental examination of the borehole columns from Rougemont Gardens exposed the pre-Norman soil sequence, elements of the 11th century Norman inner ditch and inner bailey rampart, and the city wall rampart. The distribution and interpretation of archaeological deposits identified during the evaluation is shown on Fig. 3.

8.2 **Pre-Norman activity**
The earliest deposit present on the site was represented by a buried soil (401, 601 and 801) surviving under the motte. There is little doubt that it represents a pre-Norman soil horizon, although due to the heavy traffic and footfall associated with the construction of the motte the palaeoenvironmental evidence was very poorly preserved.

8.3 **Medieval activity**
The work exposed the infilling sequence of the roughly NW-SE aligned inner ditch. The inner ditch was dug following the siege of the city in 1068 by William the Conqueror, although it is possible that it also incorporated earlier Roman quarries. Subsequent occupation of the city by King Stephen (1097- 1154) resulted in the partial slighting of the outer bailey rampart and infilling of the outer ditch but not the inner ditch. The ditch remained largely open for a long time after, the clean nature of the deposits and the lack of finds prior to the late 18th century suggesting a lack of population pressure to reclaim outlying areas within the city.

For the most part, the borehole sequences revealed a succession of redeposited deposits associated with the motte; overlying the buried soil and sealed by modern topsoil. The motte core material is predominantly bedrock-based, which suggests that its construction entailed the significant quarrying of the local volcanic bedrock. The origin of the construction material cannot be established with certainty but the relatively shallow nature of the inner ditch may indicate that the material was sourced not only from the nearby ditch, but also at least in part, from the outer bailey ditch and the outer castle ditch in Northernhay Gardens.

8.4 **Post-medieval activity**

Documentary evidence indicates that Rougemont House (listed grade II*) partly occupied an area over the line of the infilled inner ditch, and its gardens occupied much of the remaining open section to the west, as well as a large area of the outer bailey. An extensive demolition deposit filled the inner ditch, and although no secure dating was recovered from these deposits, it is likely on balance to represent infilling relating to the construction of Rougemont House and the laying out of the formal gardens and paths in the late 18th century.

9. CONCLUSIONS

The archaeological and palaeoenvironmental investigations have provided a significant new exposure of elements of the pre-Norman soil horizon and of the inner defensive ditch and motte of the Norman Castle. Although substantial features, a full understanding of the date, profile, extent, and inter-relationships is hampered by a number of factors, notably the limited nature of the boreholes, which has resulted in only partial windows into the underlying deposits and features. The virtual absence of secure dating evidence from both the soil horizon, the inner ditch and the motte is also a significant constraint.

Nevertheless, the investigations have provided a useful level of information regarding the nature of Norman activity and the extent and scale of the inner defensive ditch in this area, and an indication of the general level of survival of palaeoenvironmental deposits.

10. PROJECT ARCHIVE

A project archive will not be produced. A summary of the archaeological investigations has been submitted to the on-line archaeological database OASIS (oakforda1-269883).

ACKNOWLEDGMENTS

This work was commissioned by Exeter City Council (ECC). It was administered for ECC by Sherry Rouhipour and Peter Stewart, and for Oakford Archaeology by Marc Steinmetzer. Thanks are due to Neil Forrow and Sam Savery (SW Geotechnical Ltd) and the site crew, Lee, Brett, Jim and Danny. It was monitored for Historic England by Daniel Ratcliffe and Vanessa Straker, and for Exeter City Council by the PPMH, Andy Pye. The fieldwork was carried out by Marc Steinmetzer and the geoarchaeological work by Catherine Langdon, Rob Scaife and Michael J. Allen.

BIBLIOGRAPHY

Unpublished sources

Bedford, J. 2002, *Archaeological assessment of proposed redevelopment to the rear of the Royal Albert Memorial Museum, Bradninch Place, Exeter*. EA Report No. 02.75.
Collings, A. 2003, *Archaeological assessment and field evaluation of proposed the redevelopment to the rear of the Royal Albert Memorial Museum, Bradninch Place, Exeter*. EA Report No. **03.13**
Stead, P.M. 2004, *Archaeological excavation of Southernhay East car park, Exeter.* EA Report No. 04.24 (draft)

Published sources

Allan, J.P 1984, *Medieval and post-medieval finds from Exeter 1971-80*. Exeter Archaeological Reports No. **3**.
Bidwell, P.T. 1980, *Roman Exeter: Fortress and Town*. Exeter City Council
BGS (British Geological Survey), 1995, *Geological Survey of Great Britain (England and Wales) 1:50000 Series Solid and Drift Geology Sheet 325 (Exeter)*.
Dimbleby, G.W. 1957. Pollen analysis of terrestrial soils. *New Phytologist* 56(1), 12-28
Dimbleby, G.W. 1985. *The Palynology of Archaeological Sites.* London: Academic Press
Evans, J.G. 1972. *Land Snails in Archaeology.* London: Seminar Press.
Holbrook, N. and Bidwell, P.T. 1991, *Roman finds from Exeter*. Exeter Archaeological Reports No. **4**.
Hoskins, W.G. 1960, *Two thousand years in Exeter*. Phillimore.
Hodgson, J.M. 1997. Soil Survey Field Handbook. Silsoe: Soil Survey and Land Research Centre
Limbrey, S. 1975. *Soil Science and Archaeology.* London: Academic Press
Moore, P.D. and Webb, J.A. 1978. *An Illustrated Guide to Pollen Analysis*. London: Hodder and Stoughton
Moore, P.D., Webb, J.A. and Collinson, M.E. 1991. *Pollen Analysis***.** Second edition. Oxford: Blackwell Scientific
Stoyle, M. 2003, *Circled with Stone: Exeter's City Walls 1485-1660*. University of Exeter Press.

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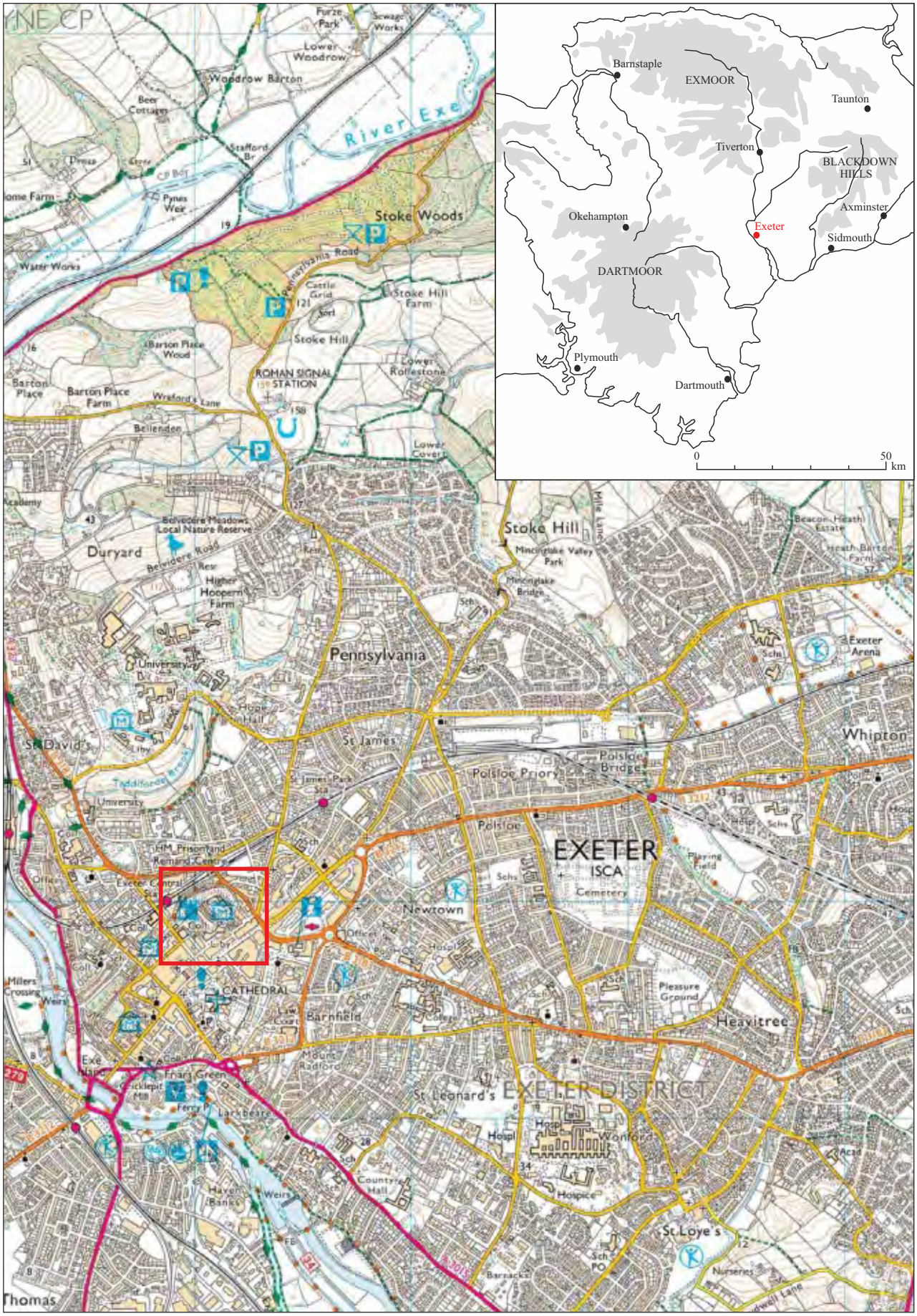


Fig. 1 Location of site.

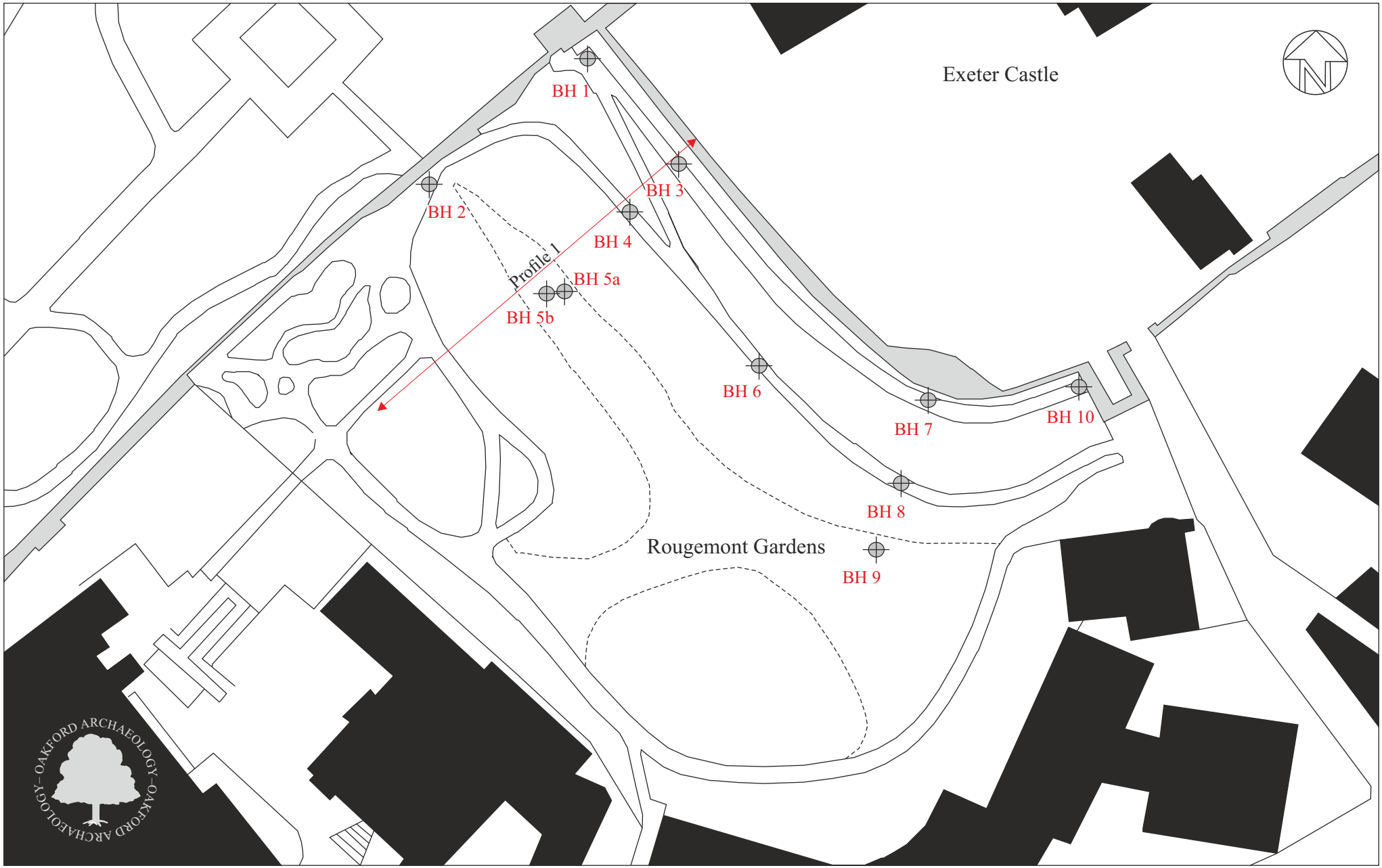


Fig. 2 Plan showing location of boreholes (1-10) and profile (red).

Profile 1

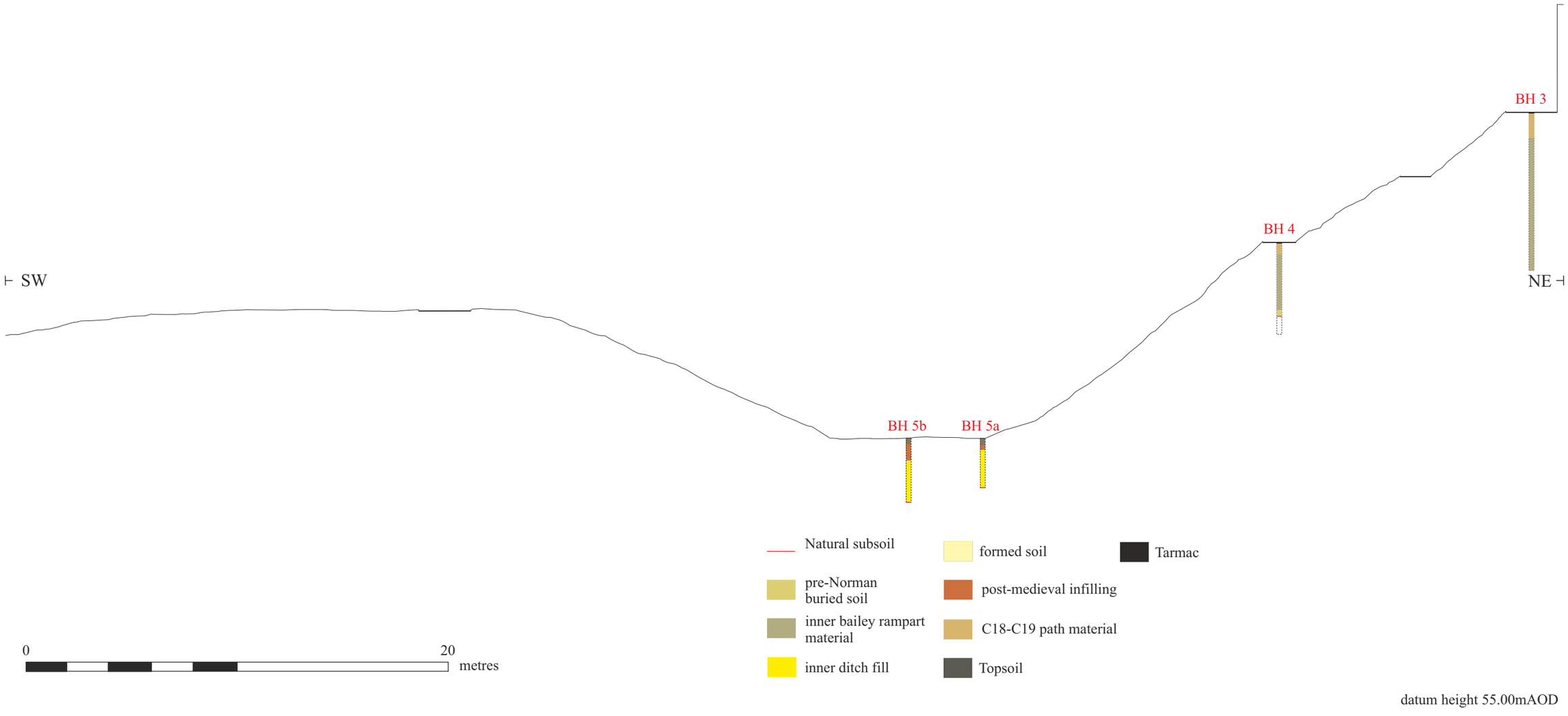


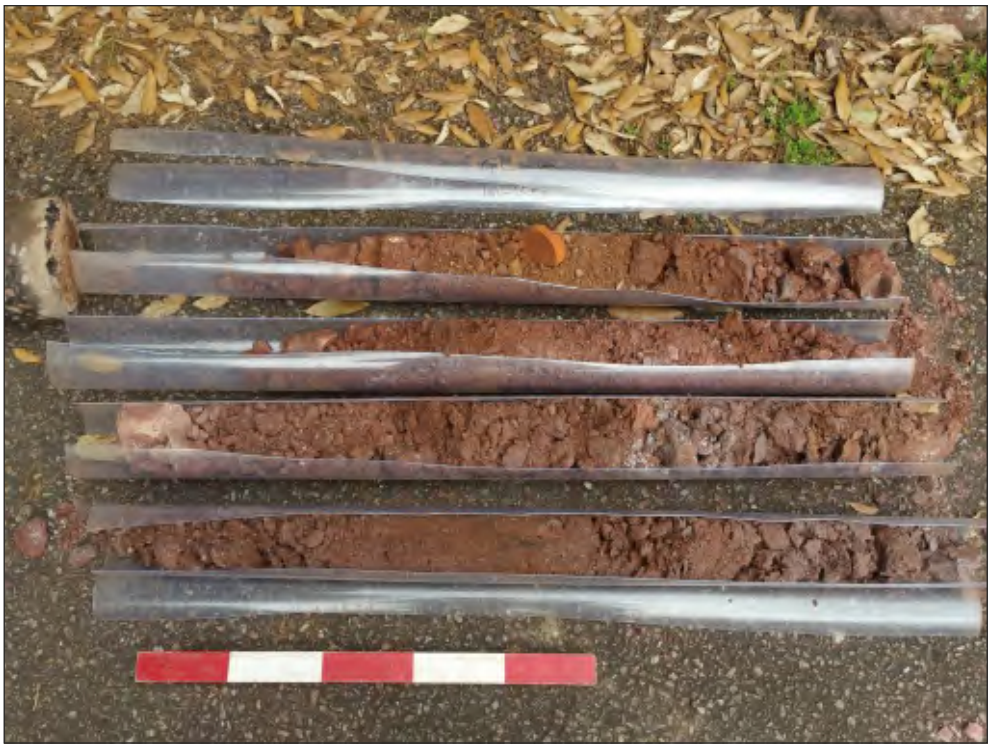
Fig. 3 Deposit profile through Rougemont Gardens.

Pl. 1 Excavating Borehole 1 using a tracked percussive auger rig. Looking northwest.

Pl. 2 Borehole 1 showing deposit sequence. 0.25m and 0.5m scales.

Pl. 3 Borehole 2 showing deposit sequence. 1m scale.

Pl. 4 Borehole 3 showing deposit sequence. 1m scale.



Pl. 5 Borehole 4 showing deposit sequence with buried soil (bottom centre). 0.5m scale.

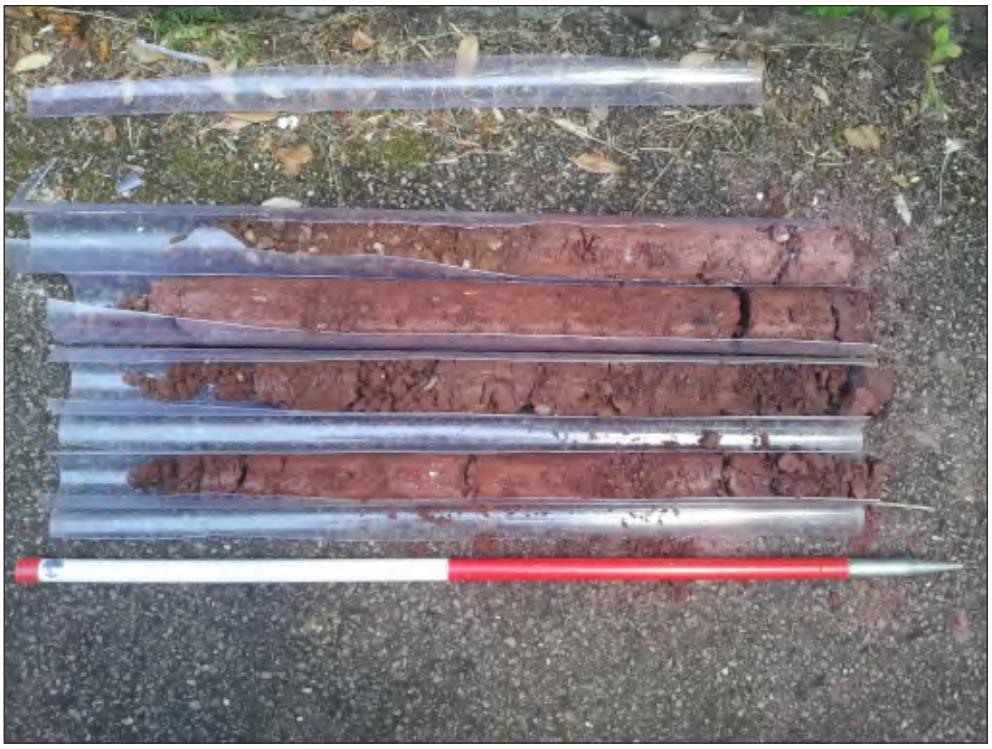
Pl. 6 General view of tracked percussive auger rig excavating Borehole 5a. Looking northwest.

Pl. 7 Borehole 5a showing deposit sequence. 1m scale.

Pl. 8 General view of tracked percussive auger rig excavating Borehole 5b. Looking southeast.

Pl. 9 Borehole 5b showing deposit sequence with inner ditch deposits (top left). 0.25m and 0.5m scales.

Pl. 10 Close-up of inner ditch deposits (top left). 0.25m and 0.5m scales.



Pl. 11 Borehole 6 showing deposit sequence with buried soil (bottom left). 1m scale.

Pl. 12 Excavating Borehole 7 using a tracked percussive auger rig. Looking southeast.

Pl. 13 Borehole 7 showing deposit sequence. 1m scale.

Pl. 14 Borehole 8 showing deposit sequence and buried soil (bottom left). 1m scale.

Pl. 15 General view of tracked percussive auger rig excavating Borehole 9. Looking west.

Pl. 16 Borehole 9 showing deposit sequence with top of inner ditch deposits (bottom right). 1m scale.

Pl. 17 Excavating Borehole 10 using a tracked percussive auger rig. Looking northeast.

Pl. 18 Borehole 10 showing deposit sequence. 1m scale.

Appendix 1:

Written Scheme of Investigation for Archaeological works

1. INTRODUCTION

1.1 This document has been prepared by Oakford Archaeology (OA) for Exeter City Council to describe the methodology to be used during a borehole survey at Rougemont Gardens, Exeter (SX 9204 9291) to be undertaken by South West Geotechnical Ltd. This document represents the 'Written Scheme of Investigation' for archaeological work that will be required under scheduled monument consent that has been applied for the borehole survey and subsequent repair works that are anticipated to the bank and pathways in the gardens. A further written scheme will be produced to cover the repair works themselves once the details of these have been finalized. The historic park and garden is Grade II listed and lies inside the city wall and within the confines of the outer bailey of Exeter castle; both are scheduled ancient monuments. In addition, both the castle walls and the Norman gatehouse are Grade I listed.

The monitoring of boreholes, even when these are not primarily designed for archaeological evaluation, can provide useful information on the nature and extent of archaeological deposits. This will contribute to the formulation of a strategy for the preservation or management of those remains; and/or the formulation of an appropriate response or mitigation strategy to the repair and stabilization works to the bank and the pathways. The work is therefore required by Historic England (HE) as a condition of scheduled monument consent.

1.2 Rougemont Gardens occupies a site to the south-west of the Castle which comprises part of the outer bailey of the castle to the west of a depression forming part of the castle defences. To the east the castle mound rises steeply above the gardens

The site lies on a low volcanic outcrop, in an area where little evidence for prehistoric activity has been previously identified.

1.3 The legionary fortress at Exeter was built probably sometime around *c*.AD55, and was occupied until around AD75. It is during this period that the basalt outcrop of Rougemont, located immediately outside the legionary fortress, was first quarried, being used in part for the construction of the bath house. Remains of the Roman quarries were identified during evaluation trenching inside the Castle in 2006 as well as during the RAMM redevelopment (Steinmetzer 2011).

Following the growth of *Isca Dumnoniorum* the defences of the early Roman town were finally leveled towards the end of the second century (Henderson 1988; Bidwell 1991). The line of a new rampart and wall was laid out incorporating built-up areas and natural defensive features outside the old defences (Bidwell 1980); in this area up to and around the high ground afforded by the volcanic outcrop at Rougemont. The wall itself survives well in this area, and the characteristics of the various phases represented in the internal face were described in some detail in 1995 by Stuart Blaylock. The rampart to the rear of the wall is estimated to be in the region of 10–13m wide, and remnants of it may well survive to the SW of the Norman inner bailey

ditch (the large depression in the garden), and under the Norman bank to the inner bailey to the NE. At the head of the depression it appears to have been largely removed, probably when the ditch of the inner bailey was cut, and large expanses of core work of the city wall are visible as a result.

The later Roman town was densely built up, with masonry buildings starting to replace earlier timber structures by the beginning of the third century. Potential evidence for Roman domestic occupation of this date was observed in the general area of the castle in the 1620s, although the exact location of the observation is unknown.

The Roman town seems to have been largely deserted by the early 5th century, probably as a result of a permanent breakdown in the economic and administrative system of the Roman province (Bidwell 1979).

1.4 Following the conquest of Devon by the Saxons in the seventh century Exeter was re-founded as an urban centre by King Alfred in the 880s, at which time he refurbished the defences to create a fortified town or *burh*. A number of Saxon boundary ditches were uncovered in 1998 to the southeast of the Phoenix Art Centre, inside the outer bailey of the later Castle, and therefore deposits of this date (and of earlier Roman date) may be sealed beneath the later Norman castle bank in this area.

1.5 Construction of the Castle began following the siege of the city in 1068 by William the Conqueror, and 48 houses were said to have been destroyed in the process. The Castle itself has remained Royal property throughout, being granted by Edward III to his eldest son, Edward the Black Prince, Duke of Cornwall. The deep ditch surrounding the inner bailey of the castle, represented by the depression in the gardens, is therefore likely to include waterlogged deposits of high environmental interest.

The outer bailey ditch does not survive as a visible feature, having been infilled at a date around the middle or late 12th century. However, Norman bank material belonging to the city wall and defences of the outer castle bailey were identified at the RAMM site (Steinmetzer 2011).

1.6 By the 18th century the outer bailey had passed into private hands and Rougemont House (listed grade II*) was constructed between c 1769-70 by John Patch partly over the line of the infilled ditch to the inner bailey, and its gardens occupied much of the remaining open section of this to the west and also a large area of the outer bailey. The House was sold in 1787 to Edmund Granger, who altered the House and improved the gardens, which included the former ditch and the south-west slopes of the castle mound, with the advice of William Jackson (Pevsner and Cherry 1989, Hoskins 1974). Rougemont House continued in private ownership until 1910 when it was acquired by the City Council.

The layout of Rougemont Gardens corresponds closely to that shown on Roper's 1820 map of Exeter and the 1890 OS map. The current paths were laid out when the gardens were acquired by Exeter City Council.

2. AIMS

2.1 The aims of the watching brief are to monitor the drilling of boreholes on the site; to record the borehole cores; to record the presence of sensitive archaeological material within these and to retrieve any potential dating evidence to establish, describe and if possible interpret the deposit sequence; and to ensure that if any environmental evidence is preserved, that a sufficient sample be retained to allow for further analysis; and to report on the results of the work as appropriate.

3. METHOD

Guidance on the scope of work required under this condition was provided by e-mail dated 11-01-2016 from the Principal Project Manager Heritage (PPMH) to the client and by correspondence with Historic England.

Liaison will be established with the client and their contractor prior to the works commencing, in order to obtain details of the works programme and to advise on OA requirements.

3.1 10 boreholes of 100mm diameter will be augured across Rougemont Gardens (Fig. 1).

3.2 The archaeologist will be in attendance throughout the borehole survey to monitor and record all geotechnical site investigations (boreholes) and to identify the deposit sequence revealed by the works, with reference to the anticipated sequence described above (1.2-1.6). The engineer's sampling method will result in the retrieval a series of individual 1m long and 100mm diameter core samples contained within a clear plastic liner. These will be split on site, logged by the engineer and the archaeologist and, if necessary, i.e. if contexts suitable for environmental analysis survive and can be practically retrieved in a useful state (see separate geotechnical method statement), retained by the archaeologist for further analysis. The Historic England Regional Science Advisor will be informed of the date of the borehole survey so that she can inspect the works in progress and provide advice and/or recommendations.

If it becomes clear that environmentally sensitive deposits will be impacted upon by the subsequent repair works that are anticipated to the bank and pathways in the gardens, then in mitigation of this impact any further analysis that is necessary will be undertaken in accordance with the HE Guidelines for Environmental Archaeology, and this work will be set out in a further written scheme to be submitted with a further SMC application for these repair works.

3.3 The description and recording of all deposits will follow standard archaeological terminology and will aim to characterise the visible properties of each deposit, in particular relating to its texture, colour, structure, depositional boundaries, inclusions and evidence for depositional and post-depositional processes. The datum height will be recorded by the engineer and the archaeologist for all the boreholes.

The results will be used to produce a preliminary interpretation and depositional sequence and environment. Description of the soil sequences recovered will provide important, primary information on the nature of the depositional environment through time.

3.4 Health and Safety requirements will be observed at all times by archaeological staff working on site, particularly when machinery is operating nearby. Personal protective equipment (safety boots, helmets and high visibility vests) will be worn by staff when plant is operating on site. A risk assessment will be prepared prior to excavation.

3.5 Should any significant finds be retrieved from the core samples, then initial cleaning, conservation, packaging and any stabilisation or longer term conservation measures will be undertaken in accordance with relevant professional guidance (including *Conservation guidelines No 1 (*UKIC, 2001); *First Aid for Finds (*UKIC & RESCUE, 1997) and on advice provided by Alison Hopper-Bishop, Specialist Services Officer, RAM Museum, Exeter.

3.6 Should items be exposed that fall within the scope of the Treasure Act 1996, then these will be removed to a safe place and reported to the local coroner. Where removal cannot be effected on the same working day as the discovery, suitable security measures will be taken to protect the finds from theft.

3.7 HE and the PPMH will be informed of the start of the project, and will monitor progress throughout and will wish to inspect the works in progress. A date of completion of all archaeological site work related to the borehole survey will be confirmed with HE and the PPMH and the timescale of the completion of items under section 5 will run from that date.

4. ARCHAEOLOGICAL RECORDING

4.1 The standard OA recording system will be modified and recording will consist of annotated borehole recording sheets; standardised single context record sheets; survey drawings, plans and sections at scales 1:10,1:20, 1:50 as appropriate; and colour digital photography;

5. REPORTING AND ARCHIVING

5.1 The reporting requirements will consist of a completed ECC HER entry, including a plan showing location of boreholes. The text entry and plan will be produced in an appropriate electronic format suitable for easy incorporation into the HER, and sent to HE and the PPMH within 1 month of completion of the borehole survey.

5.2 Should significant deposits environmental potential be identified then a short description of these will be produced, in liaison with the HE scientific advisor, within 1 month of the end of the borehole survey.

5.3 An ordered and integrated site archive will be prepared with reference to *The Management of Archaeological Projects* (English Heritage, 1991 2nd edition) upon completion of the project.

The archive will consist of two elements, the artefactual and digital - the latter comprising all born-digital (data images, survey data, digital correspondence, site data collected digitally etc.) and digital copies of the primary site records and images.

The digital archive will be deposited with the Archaeology Data Service (ADS) within six months of the completion of site work, while the artefactual element will be deposited with the Royal Albert Memorial Museum (*ref. pending*). The hardcopy of the archive will be offered to the RAMM and if not required will be disposed of by OA

OA will notify HE and the PPMH upon the deposition of the digital archive with the ADS, and the deposition of the material (finds) archive with the RAMM.

5.4 Should particularly important deposits or information result from this survey, then these results may merit wider publication, in the form of a short note in the county archaeological journal for example. If this is the case this will be undertaken after the completion of any archaeological work required in relation to the main repair works; in accordance with details set out in the written scheme for the latter.

6. COPYRIGHT

6.1 OA shall retain full copyright of any commissioned reports, tender documents or other project documents, under the Copyright, Designs and Patents Act 1988 with all rights reserved, excepting that it hereby provides an exclusive licence to the client for the use of such documents by the client in all matters directly relating to the project as described in this document.

7. PROJECT ORGANISATION

7.1 The project will be undertaken by suitably qualified and experienced archaeologists, in accordance with the Code of Conduct and relevant standards and guidance of the Chartered Institute for Archaeologists (*Standards and Guidance for Archaeological Evaluation,* 1994, revised 2008, and *Standards and Guidance for an Archaeological Watching Brief,* 1994, revised 2008), plus *Standards and Guidance for Archaeological Excavation* 1994, revised 2008). The project will be managed by Marc Steinmetzer. Oakford Archaeology is managed by a Member of the Chartered Institute for Archaeologists.

Health & Safety

7.2 All monitoring works within this scheme will be carried out in accordance with current *Safe Working Practices (The Health and Safety at Work Act 1974*).

Bibliography

Bidwell, P.T. 1980, *Roman Exeter: Fortress and Town*. Exeter City Council.

Bristow, C.R., Edwards, R.A., Scrivener, R.C. & Williams, B.J. 1985, *Geology of Exeter and its Environs* (British Geological Survey).

Blaylock, S. 1995 'Exeter City Wall Survey', English Heritage and Exeter City Council.

Bedford, J. 2002, *Archaeological assessment of proposed redevelopment to the rear of the Royal Albert Memorial Museum, Bradninch Place, Exeter*. EA Report No.**02-75**.

Collings, A. 2003, *Archaeological assessment and field evaluation of proposed the redevelopment to the rear of the Royal Albert Memorial Museum, Bradninch Place, Exeter*. EA Report No. **03-13.**

Historic England 2011 *Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation*.

Hoskins, W.G. 1974, *Two thousand years in Exeter.* Phillimore.

Pevsner, N. and Cherry, B. 1989 *Devon*.

Steinmetzer, MFR 2011 *Archaeological investigation and building recording at the Royal Albert Memorial Museum, Exeter.* Exeter Archaeology Report No**. 11-06**.

Stoyle, M. 2003 *Circled with Stone: Exeter's City Walls 1485-1660.* University of Exeter Press.

Westcote, T. 1630 *A view of Devonshire.* published by Roberts W. 1845.

ADDITIONAL INFORMATION

Specialists contributors and advisors
The expertise of the following specialists can be called upon if required:

Bone artefact analysis: Ian Riddler;
Dating techniques: University of Waikato Radiocarbon Laboratory, NZ;
Building specialist: Richard Parker;
Illustrator: Sarnia Blackmore;
Charcoal identification: Dana Challinor;
Diatom analysis: Nigel Cameron (UCL);
Environmental data: Vanessa Straker (Historic England);
Faunal remains: Lorraine Higbee (Wessex);

Finds conservation: Alison Hopper-Bishop (Exeter Museums);
Human remains: Louise Loe (Oxford Archaeology), Charlotte Coles;
Lithic analysis: Dr. Linda Hurcombe (Exeter University);
Medieval and post-medieval finds: John Allan;
Metallurgy: Gill Juleff (Exeter University);
Numismatics: Norman Shiel (Exeter);
Petrology/geology: Roger Taylor (RAM Museum), Imogen Morris;
Plant remains: Julie Jones (Bristol);
Prehistoric pottery: Henrietta Quinnell (Exeter);
Roman finds: Paul Bidwell & associates (Arbeia Roman Fort, South Shields);
Others: Wessex Archaeology Specialist Services Team

MFR Steinmetzer
12 January 2016
WSI/OA1323/01

Appendix 2:

Finds Quantification

Context	Feature	Spot date	Quantity	weight	Notes
503		1530-1630	2	10g	2 sherds of Frechen stoneware drinking jug, 1530-1630.
609		after 1590	1	7g	1 sherd of possible South Somerset redware, after 1590.
709		after 1550	1	5g	1 sherd of North Devon gravel free ware, after 1550.
909		18C	3	51g	2 sherds of 17th century coarseware; 1 frag. Hard fired brick 18th century.
1014		18C	1	15g	1 sherd of featureless fired ceramic, early 17th century.

Appendix 3:

Core logs

Core 4: motte
core described from 3.00-4.00m (description in orange by Oakford Archaeology)

Context	***Depth***	***Samples***	***Oakford Archaeology Description*** ***Core description MJA***
410	0-0.1m		Tarmac
409	0.1-0.4m		mid purple red silty clay limestone frags (5-10%) - 18/19C path
408	0.4-0.67m		mid yellowish brown silty clay cbm (5%) - 18/19C path
407	0.67-1.3m		mid reddish brown silty clay volcanic trap frags (35-40%) – inner bailey rampart material
406	1.3-2.13m		mid reddish brown silty clay volcanic trap frags (20-25%) - inner bailey rampart material
405	2.13-2.71m		mid reddish brown silty clay volcanic trap frags ((25-30%) - inner bailey rampart material
404	2.71-2.84m		mid reddish brown silty clay volcanic trap frags (25-30%), mortar flecks? (5%) - inner bailey rampart material
403	2.84-3.25m 3.00-3.32m		mid reddish brown silty clay volcanic trap frags (10-15%), mortar flecks? (2-3%) - inner bailey rampart material [loose in core] dark reddish brown (2.5YR 3/4) silty clay loam, common medium stones – disturbed -, abrupt boundary inner bailey rampart material
402	3.25-3.54m 3.32-3.49m	 3.34-3.35 3.42-3.43	mid brown silty clay charcoal flecks (1%) - inner bailey rampart material Very dusky red to dusky red (2.5YR 2.5/2 to 3/2) firm silty clay loam, massive, common small stones, rare medium stones, rare very fine charcoal, heterogeneous, sharp boundary
401a	3.54-3.70m 3.49-3.60/1	**3.50 -3.51** 3.54-3.55 **3.58-3.59**	mid brown silty clay volcanic trap frags and flecks (5%) - buried soil? Dark reddish brown (2.5YR 3/4), some fine charcoal esp. at 3.61m, rare small stones, inclusions up to 13mm of very dark grey (5YR 3/1) silt loam, no clear structure observable but possible weak blocky peds present, abrupt boundary ?A/B horizon - ?disturbed buried soil
401b	3.61-3.76	3.62-3.63 **3.66-3.67** 3.70-3.71 3.74-3.75	[loose in core] Dark reddish brown (2.5YR 3/4) silty clay loam with common small and rare medium stones. Stony mixed ?A-B/C horizon – weathered parent material/base of soil
400	3.70m+ 3.76-4.00+m		Bedrock Loose brecciated small and medium stone, no matrix bedrock

Total depth 4.32m Samples in bold to were assessed for pollen.

Core 5b: inner ditch
core described from 1.50-3.00m (description in orange by Oakford Archaeology)

Context	***Depth***	***Samples)***	***Oakford Archaeology Description*** ***Core description MJA***
558	0-0.3m		mid to dark brown sandy clay charcoal flecks (1%), cbm flecks (1%) - topsoil
557	0.3-0.65m		mid to dark reddish brown silty clay charcoal flecks (1%), slate frags (1%) volcanic trap frags (1%) - 18-19C garden soil
556	0.65-1.1m		mid reddish brown silty clay slate frags (1%), volcanic trap frags (1%) - gradual ditch infill
555	1.1-1.14m		mid yellow brown silty clay - soil horizon?
554	1.14-1.5m		mid reddish brown silty clay volcanic trap frags (5%) - gradual ditch infill
553	1.5-1.65m 1.50-1.68m		mid reddish brown silty clay slate frags (2-3%), charcoal flecks (1%) - gradual ditch infill [upper 10cm disturbed in core] Dark reddish brown (2.5YR 4/3) silty clay, many loose 'soil' pieces, rare medium stones, abrupt boundary
552	1.65-2.4m 1.68-1.81m		mid reddish brown silty clay volcanic trap frags (5-10%) - gradual ditch infill Dark reddish brown (2.5YR 4/3), very firm compact silt clay loam, some dark red (10T 3/6) silty inclusions, common small stones Ditch fill
	1.81-1.87m		Medium stones
	1.87-2.15m	1.90-1.91 2.14-2.15	Reddish brown (2.5YR 3/4) very firm silty clay, massive, some to many small stones, rare medium stones, clear boundary
551	2.15-2.82m 2.42-3.33m	2.38-2.39 2.50-2.51 2.62-2.63 2.68-2.69 2.74-2.75 2.80-2.74	mid to dark reddish brown silty clay volcanic trap frags (1%) - gradual ditch infill Reddish brown (2.5YR 4/6) very stiff firm massive silty clay with some small and medium stones, abrupt boundary Ditch fill
	2.82-3.00m	**2.86-2.87** **2.92-2.93** **2.98-2.99**	Reddish brown (2.5YR 4/6) stiff but pliable massive silty clay almost stone-free, rare medium stones Fine near-basal silt
550	3.00-3.33m+		Weathered bedrock and bedrock

Appendix 4:

Borehole descriptions

Core 1

Context	*Depth*	*Description*
112	0-0.05m	Tarmac
111	0.05-0.8m	Mid reddish-brown silty clay volcanic trap frags (10-15%) – 19/20C path
110	0.8-1.65m	Mid reddish brown silty clay volcanic trap frags (2-3%) – inner bailey rampart material
109	1.65-2m	Mid reddish brown silty clay volcanic trap frags (1%) - inner bailey rampart material
108	2-3.56m	Mid reddish brown silty clay volcanic trap frags (1%), mudstone frags (1%), charcoal flecks (1%) – inner bailey rampart material
107	3.56-4m	Mid reddish brown silty clay volcanic trap frags (1%), mudstone frags (1%), charcoal flecks (1%) – inner bailey rampart material
106	4-4.8m	Mid reddish brown silty clay volcanic trap frags (20-25%) – inner bailey rampart material
105	4.8-5.06m	Mid reddish brown silty clay volcanic trap frags (1%), charcoal flecks (1%) – inner bailey rampart material
104	5.06-5.3m	Mid reddish brown silty clay volcanic trap frags (15-20%) - inner bailey rampart material
103	5.3-5.6m	Mid reddish brown silty clay volcanic trap frags (5%) – inner bailey rampart material
102	5.6-5.77m	Mid reddish brown silty clay volcanic trap frags (10%), mudstone frags (2-3%) – inner bailey rampart material
101	5.77-6m	Mid reddish brown silty clay volcanic trap frags (1%), mudstone frags (1%), charcoal flecks (1%) – inner bailey rampart material
100	6-6.5m	Mid reddish brown silty clay volcanic trap frags (1%) – inner bailey rampart material

Total depth 6.5m.

Core 2

Context	*Depth*	*Description*
206	0-0.05m	Tarmac
205	0.05-0.15m	Mid reddish brown silty clay – bank material
204	0.15-0.95m	Mid yellowish brown silty clay peagrit (5-10%), volcanic trap frags (5%) – bank material
203	0.95-1.05m	Mid reddish brown silty clay volcanic trap frags (15-20%) – bank material
202	1.05-1.19m	Volcanic trap frags - bank material
201	1.19-3.74m	Mid purple brown silty clay volcanic trap frags (30-35%) - bank material
200	3.74m+	Wall core or bedrock

Total depth 3.74m.

Core 3

Context	*Depth*	*Description*
315	0-0.3m	Mid yellowish brown silty clay – 18/19C path
314	0.3-0.8m	Mid purple silty clay slate frags (10%), volcanic trap frags (20%) – 18/19C path
313	0.8-1m	Reddish purple limestone frags – 18/19C path
312	1-1.25m	Mid reddish brown silty clay and limestone frags – 18/19C path
311	1.25-1.32m	Mid reddish brown silty clay – inner bailey rampart material
310	1.32-1.52m	Mid reddish brown silty clay – inner bailey rampart material
309	1.52-1.65m	Mid reddish brown silty clay – inner bailey rampart material
308	1.65-2.05m	Mid reddish brown silty clay volcanic trap frags (10-15%), slate frags (5%) – inner bailey rampart material
307	2.05-2.23m	Mid reddish brown silty clay – inner bailey rampart material
306	2.23-2.65m	Mid reddish brown silty clay – inner bailey rampart material
305	2.65-3.45m	Mid reddish brown silty clay – inner bailey rampart material
304	3.45-3.65m	Mid reddish brown silty clay volcanic trap frags (5%) – inner bailey rampart material
303	3.65-3.8m	Mid reddish brown silty clay charcoal flecks (1%) – inner bailey rampart material
302	3.8-4m	Mid reddish brown silty clay – inner bailey rampart material
301	4-4.75m	Mid reddish brown silty clay – inner bailey rampart material
300	4.75m+	Decayed bedrock or motte material

Total depth 7.5m.

Core 4

Context	*Depth*	*Description*
410	0-0.1m	Tarmac
409	0.1-0.4m	mid purple red silty clay limestone frags (5-10%) - 18/19C path
408	0.4-0.67m	mid yellowish brown silty clay cbm (5%) - 18/19C path
407	0.67-1.3m	mid reddish brown silty clay volcanic trap frags (35-40%) - inner bailey rampart material
406	1.3-2.13m	mid reddish brown silty clay volcanic trap frags (20-25%) - inner bailey rampart material
405	2.13-2.71m	mid reddish brown silty clay volcanic trap frags (25-30%) - inner bailey rampart material
404	2.71-2.84m	mid reddish brown silty clay volcanic trap frags (25-30%), mortar flecks? (5%) - inner bailey rampart material
403	2.84-3.25m	mid reddish brown silty clay volcanic trap frags (10-15%), mortar flecks? (2-3%) - inner bailey rampart material
402	3.25-3.54m	mid brown silty clay charcoal flecks (1%) - inner bailey rampart material
401	3.54-3.70m	mid brown silty clay volcanic trap frags and flecks (5%) - buried soil
400	3.70m+	Bedrock

Total depth 4.32m.

Core 5a

Context	*Depth*	*Description*
505	0-0.3m	Mid to dark brown silty clay cbm flecks (1%), charcoal flecks (1%), slate flecks (1%) – topsoil
504	0.3-0.5m	Mid to dark reddish brown silty clay slate flecks (1%), charcoal flecks (1%), coal frags (1%), mortar flecks (1%), volcanic trap frags (2-3%) – 18/19C levelling
503	0.5-1.15m	Mid reddish brown silty clay volcanic trap frags (2-3%) – inner ditch fill
502	1.15-1.3m	Mid reddish brown silty clay – inner ditch fill
501	1.3-2.3m	Mid reddish brown silty clay – inner ditch fill
500	2.3m+	Bedrock

Total depth 2.32m.

Core 5b

Context	*Depth*	*Oakford Archaeology Description* *Core description MJA*
558	0-0.3m	Mid to dark brown silty clay charcoal flecks (1%), cbm flecks (1%) - topsoil
557	0.3-0.65m	Mid to dark reddish brown silty clay charcoal flecks (1%), slate flecks (1%), volcanic trap frags (1%) – 18/19C levelling
556	0.65-1.1m	Mid reddish brown silty clay slate frags (1%), volcanic trap frags (1%) – inner ditch fill
555	1.1-1.14m	Mid yellowish brown silty clay – formed soil
554	1.14-1.5m	Mid reddish brown silty clay volcanic trap frags (5%) – inner ditch fill
553	1.5-1.65m	Mid reddish brown silty clay slate flecks (2-3%), charcoal flecks (1%) – inner ditch fill
552	1.65-2.4m	Mid reddish brown silty clay volcanic trap frags (5-10%) – inner ditch fill
551	2.4-3m	Mid to dark reddish brown silty clay volcanic trap frags (1%) – inner ditch fill
550	3m+	bedrock

Total depth 3.33m.

Core 6

Context	*Depth*	*Description*
610	0-0.1m	Tarmac
609	0.1-0.2m	mid purple red silty clay limestone frags (5-10%) - 18/19C path
608	0.2-0.63m	Mid reddish brown silty clay – inner bailey rampart material
607	0.63-0.81m	Mid reddish brown silty clay volcanic trap frags (5%), slate flecks (1%) – inner bailey rampart material
606	0.81-1.25m	Mid reddish brown silty clay volcanic trap frags (5%) – inner bailey rampart material
605	1.25-2.24m	Mid reddish brown silty clay charcoal flecks (1%), volcanic trap frags (2-3%) – inner bailey rampart material
604	2.24-2.57m	Mid reddish brown silty clay volcanic trap frags (5%) – inner bailey rampart material
603	2.57-2.69m	Mid reddish brown silty clay volcanic trap frags (1%) – inner bailey rampart material
602	2.69-3.5m	Mid reddish brown silty clay volcanic trap frags (5-10%) – inner bailey rampart material
601	3.5-3.8m	mid brown silty clay volcanic trap frags and flecks (5%) - buried soil
600	3.8m+	bedrock

Total depth 4m.

Core 7

Context	*Depth*	*Description*
712	0-0.1m	Tarmac
711	0.1-0.3m	light reddish brown silty clay gravel (5%) – 18/19C path
710	0.3-0.6m	Mid reddish brown silty clay limestone frags (20-25%) – 18/19C path
709	0.6-0.85m	Mid brown yellow silty sand gravel (5%) – 18/19C path
708	0.85-1.25m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
707	1.25-1.5m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
706	1.5-1.7m	mid reddish brown silty clay volcanic trap frags (5-10%) - inner bailey rampart material
705	1.7-3.25m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
704	3.25-3.5m	mid reddish brown silty clay volcanic trap frags (10-15%) - inner bailey rampart material
703	3.5-3.65m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
702	3.65-4.5m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
701	4.5-5m	mid reddish brown silty clay volcanic trap frags (25-30%) - inner bailey rampart material
700	5m+	inner bailey rampart material

Total depth 7m.

Core 8

Context	*Depth*	*Description*
810	0-0.1m	Tarmac
809	0.1-0.23m	Light to mid-reddish brown silty clay gravel (5%) – 19/20C path
808	0.23-0.43m	Mid reddish brown silty clay gravel (5%) – 19/20C path
807	0.43-0.73m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
806	0.73-1m	mid reddish brown silty clay volcanic trap frags (5-10%) - inner bailey rampart material
805	1-1.54m	mid reddish brown silty clay volcanic trap frags (1%) - inner bailey rampart material
804	1.54-1.67m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
803	1.67-2.14m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
802	2.14-2.9m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
801	2.9-3.26m	mid brown silty clay volcanic trap frags and flecks (5%) - buried soil
800	3.26m+	bedrock

Total depth 4.39m.

Core 9

Context	*Depth*	*Description*
910	0-0.25m	Dark brown silty clay charcoal flecks (1%), slate flecks (1%), volcanic trap frags (2-3%) – topsoil
909	0.25-1.2m	Mid to dark brown silty clay mortar flecks (5%), cbm frags (1%), charcoal flecks (1%), slate flecks (2-3%) – 18C levelling
908	1.2-1.4m	Mid to dark reddish brown silty clay slate flecks (1%), charcoal flecks (1%), mortar flecks (1%) – 18C levelling
907	1.4-2.05m	mid to dark reddish brown silty clay volcanic trap frags (5-10%) – 18C levelling
906	2.05-2.6m	Mid to dark reddish brown silty clay charcoal flecks (1%), cbm flecks (1%), slate flecks (2-3%) – 18C levelling
905	2.6-3m	Mid to dark reddish brown silty clay volcanic trap frags (5%) – inner ditch fill
904	3-3.2m	Mid to dark reddish brown silty clay volcanic trap frags (2-3%) – inner ditch fill
903	3.2-4m	Mid to dark reddish brown silty clay volcanic trap frags (5%) – inner ditch fill
902	4-4.25m	Mid to dark reddish brown silty clay volcanic trap frags (2-3%) – inner ditch fill
901	4.25-4.35m	Mid to dark reddish brown silty clay volcanic trap frags (5%) – inner ditch fill
900	4.35m+	Bedrock

Total depth 4.35m.

Core 10

Context	*Depth*	*Description*
1016	0-0.2m	Mid brownish yellow pea gravel – 19/20C path
1015	0.2-0.4m	Mid reddish brown silty clay oyster shell frags (1%), mortar flecks (1%) – 18/19C path
1014	0.4-0.5m	Light reddish brown silty clay mortar flecks (10-15%) – 18/19C path
1013	0.5-0.6m	Mid reddish brown silty clay charcoal flecks (1%) – 18/19C path
1012	0.6-1.35m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
1011	1.35-1.8m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
1010	1.8-2.35m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
1009	2.35-3m	mid reddish brown silty clay volcanic trap frags (5-10%) - inner bailey rampart material
1008	3-3.45m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
1007	3.45-3.6m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
1006	3.6-4.1m	mid reddish brown silty clay volcanic trap frags (10-15%) - inner bailey rampart material
1005	4.1-4.55m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
1004	4.55-5m	mid reddish brown silty clay volcanic trap frags (5%) - inner bailey rampart material
1003	5-5.5m	mid reddish brown silty clay volcanic trap frags (25-30%) - inner bailey rampart material
1002	5.5-6m	mid reddish brown silty clay volcanic trap frags (5-10%) - inner bailey rampart material
1001	6-7.5m	mid reddish brown silty clay volcanic trap frags (25-30%) - inner bailey rampart material
1000	7.5m+	inner bailey rampart material

Total depth 7.5m.