City School, Stradbroke Road, Sheffield, South Yorkshire: An Archaeological Watching Brief

On behalf of Vinci Construction UK Ltd

CS Archaeology
September 2010

On behalf of: VINCI CONSTRUCTION UK LIMITED
Omnia One
125 Queen Street
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National Grid Reference (NGR): SK 40608482

Project Number: 60

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Timing: Fieldwork September 2010
Report September 2010

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Frontispiece: view across the PDA

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1. SUMMARY

1.1 An Archaeological watching brief was undertaken during at City School, Stradbroke Road, Sheffield. The construction was part of the Building Schools for the Future programme and this archaeological work has been prepared to satisfy planning conditions 35, 36 & 38, 10/02467/COND (App. No. 10/01112/FUL).

1.2 The watching brief consisted of monitoring site reduction areas down to formation level ready for the laying of aggregate prior to foundation piling.

1.3 Further to the discover of a Iron Age/Romano-British quern stone during the evaluations, the watching brief found no further evidence for significant archaeological activity across the Proposed Development Area (PDA).

2 INTRODUCTION

2.1 City School is situated 5.7 kms southeast of Sheffield, 1.4 kms south southwest of Handsworth and is centred on National Grid Reference SK 4060 8482 (Figure 1). The school lies in the non civil parish of Sheffield District. Historically the site of the school lay within the manor of Handsworth. St Mary's, Church, Handsworth is mentioned in the Doomsday Book (1086). The parish of Handsworth now lies entirely within the metropolitan boundaries of Sheffield but it predates the modern city by several centuries.

2.2 In the 1960s the site of the Grammar School, (subsequently City School) was carved out of a rural agricultural landscape by the creation of a series of terraced building platforms, playing fields and play grounds.

2.3 The Building Schools for the Future (BSF) project will extend the existing accommodation primarily by a multi-storey extension, east of the present buildings, and by smaller scale infill buildings and a new storage tank to the south of the school.

2.4 The Proposed Development Area (PDA) is defined as those areas of archaeological potential within the Phase 1 building works (total area 1.108 hectares: Figure 2), identified by CS Archaeology in 2008 and evaluated in 2010.

2.5 Following the discovery of significant archaeology during the evaluations, a watching brief was recommended by Sheffield County Council planning conditions 35, 36 & 38, 10/02467/COND (App. No. 10/01112/FUL).

3. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

3.1 Apart from an Archaeological Desk-Based Assessment (CS Archaeology 2008) no previous archaeological work has been carried out in the school or its immediate area and there are no designated heritage assets within a 0.5 km boundary of the school.

3.2 The school is situated on a south facing slope with good drainage which would have been attractive to historic agriculture and settlement. Within the vicinity of the PDA CS Archaeology (2008) identified a number of archaeological sites. These include a Bronze Age sword found in the Wickfield Plantation and a Romano-British coin 1km east of the school in Coisley Hill. During the post-medieval period Handsworth parish's field system developed. This historic field system would have provided the parish with its economic base and was therefore fundamental to the local economy. This agricultural economy would have been increasingly organised to meet the needs of Sheffield's industrial expansion and associated urbanisation, during the 18th and 19th centuries. During this period, an Iron Works and a railway line linking Birley Collieries was superimposed across the historic field system. The colliery railway forms the school's southern boundary.

3.3 During the 1960s the school truncated the higher south facing slopes with unknown impacts to the historic field system. The archaeological survival of these fields within the PDA will have been affected by the Grammar School's construction and subsequent development, and the nature and extent of the field system is unknown.

3.4 Because of the schools' historic development since the 1960s, across the northern third school there is a low potential for encountering any known and unknown archaeology. Archaeological potential is represented by Handsworth's historic field system and heritage assets below this field system.

3.5 Truncation of the hillside during the creation of play grounds and building platforms will have severely affected any in situ archaeological remains. Modern disturbance was estimated, by CS Archaeology in 2008, to be up to 30% of the schools' total area, and following the evaluation work (CS Archaeology 2010) this can be increased to 60-70%. Although the results of the evaluation were largely negative archaeological potential was highlighted by the discovery of a Iron Age/Romano-British quernstone.

4. AIMS AND OBJECTIVES

4.1 To record the presence/absence, character, extent, state of preservation and date of any archaeological deposits within the new build areas of the PDA and, if appropriate, obtain samples of these deposits for further assessment.

5. METHODOLOGY

5.1 This watching brief has been carried out in accordance with the Project Design issued by CS Archaeology in September 2010 (Appendix1).

5.2 General colour digital shots of the works were taken. These have been used to illustrated the report and are listed in Appendix 2.

5.3 Mr J McNeil of South Yorkshire Archaeology was sent a copy of the WSI and was informed of the dates of the evaluation and was also kept informed about the progress of the works and the final results.

6. RESULTS

6.1 The watching brief related to the excavation/site reduction across the upper terrace and for the purposes of the report this area has been sub-divided into the northern and southern proposed development areas (NPDA & SPDA: Figure 2). This area has most recently been subject to the construction of temporary classrooms, which were denoted by an array of concrete foundation pads.

6.2 Work started at the north-eastern corner of the PDA where the electric substation foundation (Area A) was excavated (Figure 2: Plates 1-3). Although there was no significant archaeology a northeast to southwest aligned modern land-drain was revealed, and was consistent with the modern land drains encountered during the previous evaluation works. The area was less disturbed, as evidenced by a subsoil (Plate 3).

6.3 An earth bund had been constructed on a north-south alignment, across the PDA (Figure 2: Plate 4). The bund was removed in shallow (0.1-1.5m spits). Artefacts recovered consisted of two clay pipe stems, a single sherd of transfer decorated 20th century pottery and a melted glass fragment.

6.4 Work on the general site reduction was undertaken by 360° excavator and a tracked bulldozer. The 360° excavator provided a cleaner site reduction area and these have been depicted in Figure 3). Area B (Plates 5 and 6) revealed no archaeology as did Area D (Plate 7). The bulldozer limited archaeological visibility over 40% of the PDA, generally confined to the former car park Area C (Plate 8). Archaeological visibility across Area E was also limited because the site reduction exceeded 2m and the 360° cut down with a 30° incline, but CS Archaeology estimates that 80% of the area had already been observed during the top soil strip (plate 9). Sandstone bedrock was encountered across Area E and was periodically truncated by the modern land drains (Plate 10).

6.5 The Archaeological visibility across the PDA during the site reduction works has confirmed that extensive truncation into the natural substrate had taken. This had occurred both during initial school construction during the 1960s and more recently during the creation of a range of temporary class rooms sometime during the 1980s/1990s.

7. CONCLUSIONS

7.1 This watching brief has been able to confirm that the historic landscaping works to the PDA have been so extensive the PDA offers very little archaeological potential. No significant archaeological deposits remain and no further unstratified artefacts were recovered.

7.2 No further archaeological mitigation is recommended, with respect to the PDA but within the vicinity of the PDA there still remains an archaeological potential as indicated by the presence of the IA/RB quernstone.

8. BIBLIOGRAPHY

CS Archaeology, 2008, *City School, Stradbroke Road, Sheffield, South Yorkshire: An Archaeological Desk-based Assessment,* unpublished client report

CS Archaeology, 2010, *City School, Stradbroke Road, Sheffield, South Yorkshire: An Archaeological Evaluation*, unpublished client report

South Yorkshire Archaeology Service *c.*2008, *Brief for Archaeological Desk-Based Assessments,* unpublished curators report.

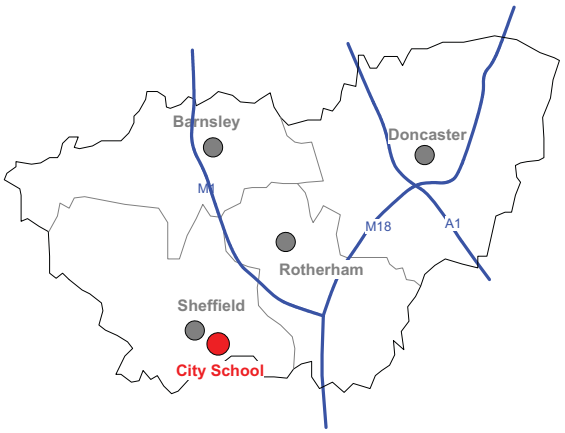
9. ACKNOWLEDGEMENTS

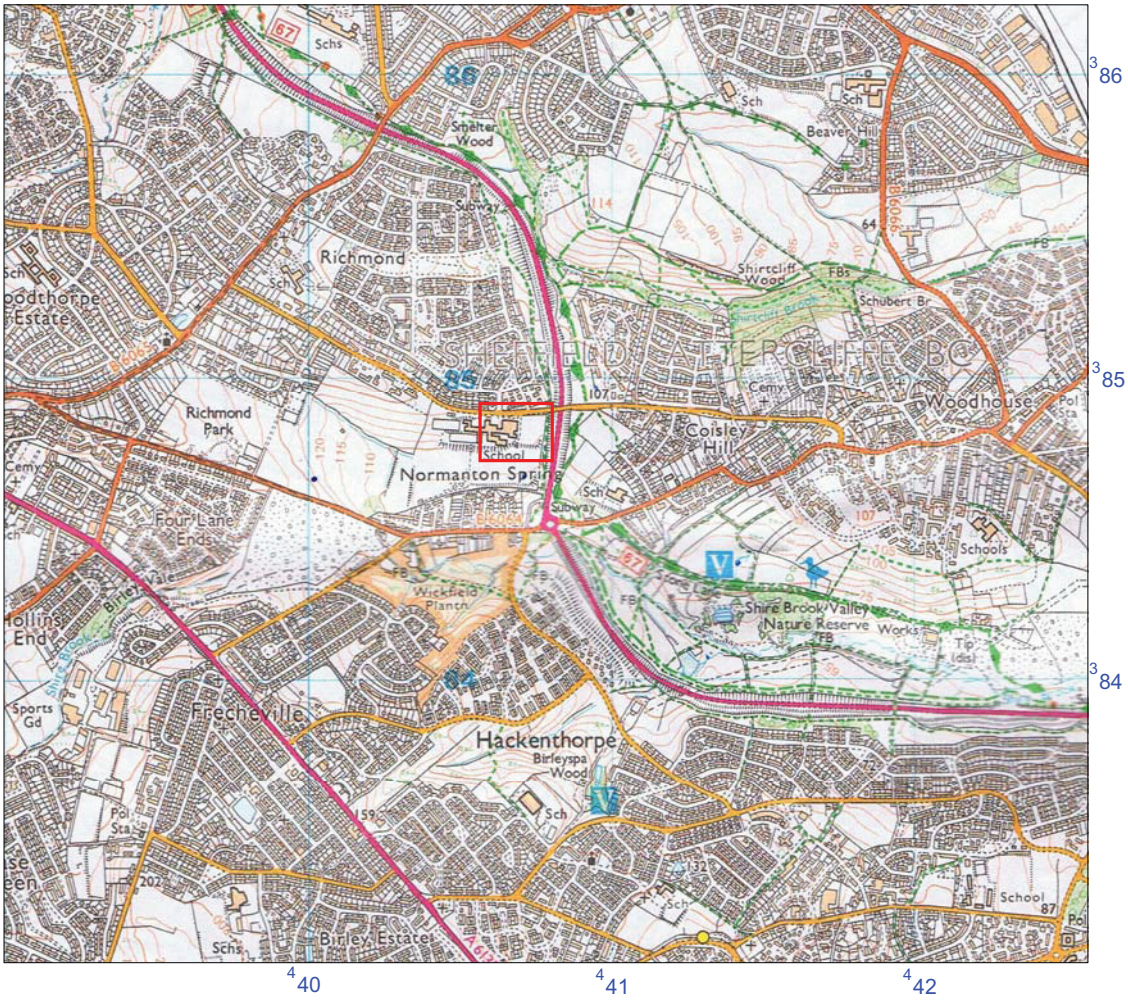
Thank you to Ms J Baxter (Vinci Construction UK Ltd) for commissioning this archaeological works, to Mr J McNeil of South Yorkshire Archaeological Service.

FIGURES

FIGURES

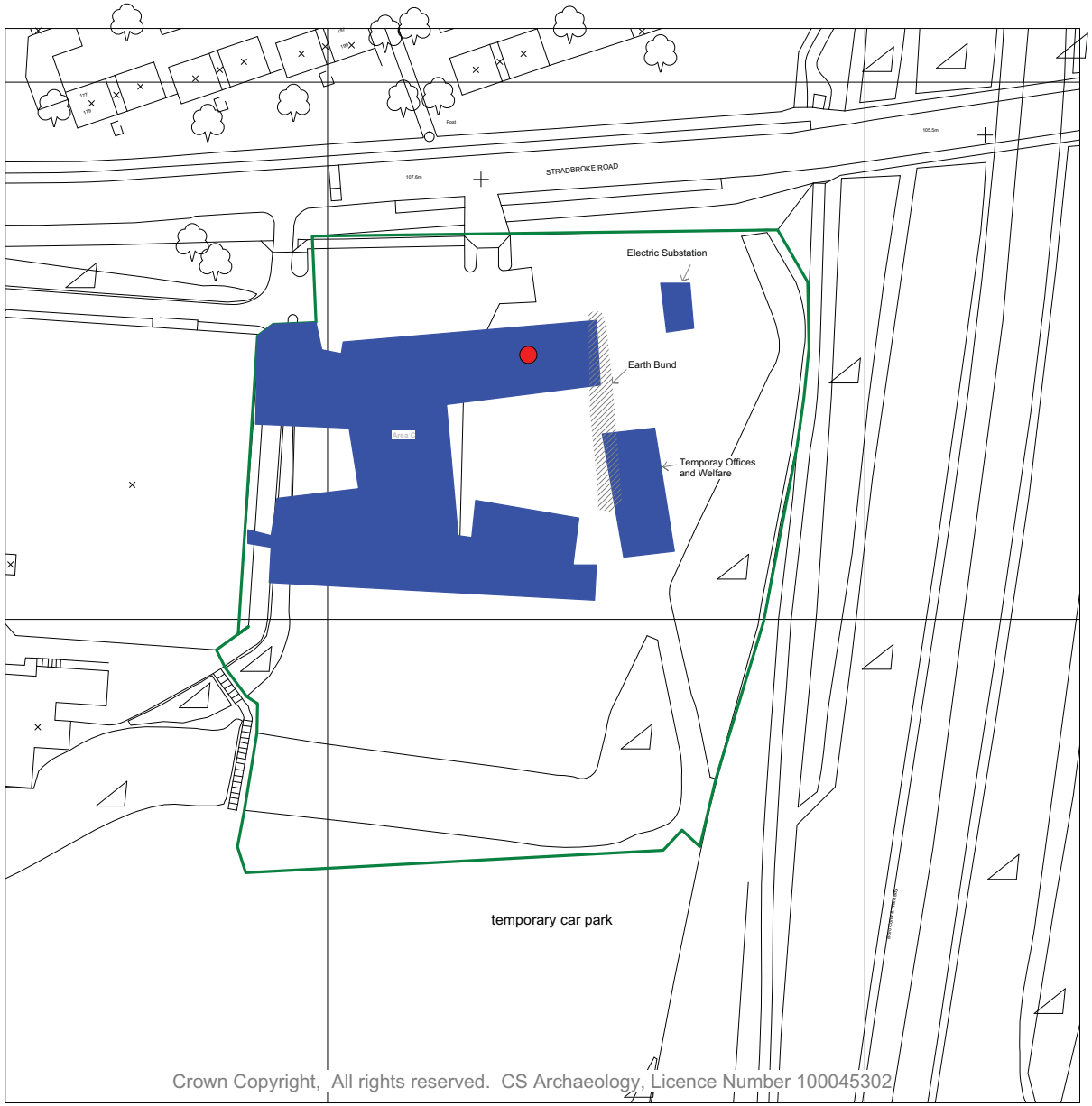
SOUTH YORKSHIRE





for inset see Figure 2

City School, Stradbroke Road: An Archaeological Watching Brief	Figure 1: Location Maps	CS Archaeology September 2010



City School, Stradbroke Road Sheffield: An Archaeological Watching Brief

key

- PDA (Phase 1) boundary
- Location of IA/RB quernstone
- PDA (Phase 1) boundary

scale 1:1250

Figure 2: Map of the PDA

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key

- PDA (Phase 1) boundary
- location of IA/RB quernstone
- phase 1 buldings
- earth bund
- modern land drains (representative)
- area excavated by 360

scale 1:5000

Figure 3: Map of the northern PDA

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PLATES

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Plate 1: general view during the removal of the upper natural substrate at the electric substation, looking northwest

Plate 2: view of the sub station trench with modern land drain, looking south

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Plate 7: view along the western edge of the NPDA, looking south

Plate 8: view of the NPDA (west) at formation level (generally obscured), looking southwest

Plate 9: general view of the start of the basement excavations to the SPDA, looking north

Plate 10: view of a land drain cutting into the natural substrate, looking north

APPENDICES

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PROJECT DESIGN FOR AN ARCHAEOLOGICAL WATCHING BRIEF AT CITY SCHOOL, STRADBROKE ROAD, SHEFFIELD, SOUTH YORKSHIRE

CS Archaeology

July 2010 (Rev 9/2010)

0 SUMMARY

0.1 This Project Design (PD) is in response to a condition (No. 34 App. No. 10/01112/FUL) and following on from an archaeological evaluation of the site (CS Archaeology 2010) for the proposed new buildings.

0.2 This PD proposes that an archaeological watching brief is implemented to record any artefacts or deposits revealed which could be potentially revealed during the site strip operation.

0.3 The results from this archaeological work will provide a more detailed record of the PDAs heritage assets and will allow potential archaeological deposits to be 'preserved by record'.

1 INTRODUCTION

1.1 Details

1.1.1 *Site Name:* City School

1.1.2 *Location:* Stradbroke Road, Sheffield, South Yorkshire.

1.1.3 *Grid reference:* SK 40608482

1.1.4 *Area of site (Proposed Development Area):* *c*.12.2 (0.28) hectares (Figure 1)

1.1.5 *Purpose of Record:* To record the presence/absence, character, extent, state of preservation and date of any archaeological deposits within the new build areas of the PDA and if appropriate obtain samples of these deposits for further assessment.

1.2 Archaeological Background

1.2.1 Handsworth's rural landscape was subjected to a final phase of enclosure, which was carried by acts of parliament, between 1802 and 1805. This ended an agricultural system that had evolved from the medieval period with open fields and common land.

1.2.2 The PDA occupies the site of Handsworth's historic field system which can be dated to at least the late 18th/early 19th centuries. This post medieval field system would have provided the parish's economic base and as such was fundamental to the local economy and the provision of food to meet the needs of regional industry and urbanisation that this entailed. The archaeological survival of these fields within the PDA has been affected by construction of the Grammar School which not only removed sections of potential archaeology but the land use as playing fields have facilitated the potential preservation of heritage assets.

1.2.3 The PDA represents an area that was suitable for agriculture being well drained with a south facing aspect it has the potential to have been attractive to historic agriculture and associated settlement. Across the northern third of the PDA there is generally a low potential for encountering any known and unknown archaeology within the PDA. Truncation of the hillside during the creation of play grounds and building platforms will have severely affected any in situ archaeological remains. The southern two thirds of the PDA appears to have been left relatively untouched by the 'historic' school buildings and therefore represent areas of archaeological potential, which could retain its post medieval field system. There is a potential for further assets below the field system.

1.2.4 City school was formerly known as City Grammar School and operated from 1964 to 1969 before this it was located within Sheffield's city centre. The school is a specialist Business and Enterprise College whose notable alumni include Sir Peter Middleton, Roy Hattersley, and Jarvis Cocker.

1.2.5 Potential impacts have been identified to the known heritage assets namely the dating and possible construction techniques of the historic field boundaries identified in the desk-based assessment. The extensive evaluations across the footprint of the new buildings did not reveal any evidence for these features and a large proportion of the PDA was found to

have been leveled and was subject to re-deposition of disturbed subsoil. In trench 2 of the evaluation in situ subsoil was identified to the southern end of the trench and some undated flint flakes were recovered. The principal result of the evaluation was the recovery of a quern stone (SF2) which evidences an agricultural settlement in the area between 200 BC and 100 AD. There is therefore potential for further artefacts to be revealed and it is hoped that a context for such artefacts will also be able to be recorded.

1.3 Planning Background

1.3.1 This PD is in response to a condition on planning consent (App. No. 10/01112/FUL) granted in June 2010.

1.3.2 This PD represents a summary of the broad archaeological requirements to finalise the archaeological mitigate of the PDA. This is in accordance with local plan policies and the National Planning Policy PPS5, 2010. This PD has been written in response to planning condition on planning consent and in accordance with the recommendations set out in the evaluation report (CS Archaeology 2010).

1.3.3 Sheffield City Council is the Local Planning Authority, who will be advised by South Yorkshire Archaeology Service (Mr. J. McNeil).

2 OBJECTIVES

2.1 The objectives of this stage of the programme of archaeological work, are to establish presence/absence, character, extent, state of preservation and date of any archaeological deposits within the areas new build within the PDA.

2.2 Particular attention will be paid to related the results of the evaluation with the watching brief.

3 METHODOLOGY

3.1 Watching Brief

3.1.1 All CS Archaeology staff have been trained in site safety training and evidence is available on request.

3.1.2 A mechanical excavator (JCB) will be used with a toothless ditching bucket after the proposed area has been CAT scanned for live services. The principal contractor will ensure that services are located prior to excavation by means of site plans, surface examination and hand held scanners. Mechanical excavation will be used extremely judicially, under constant archaeological supervision down to the top of the archaeological deposits (if present) or the top of the sub-soil. The topsoil will be kept separate from the subsoil. Thereafter, hand excavation of any archaeological deposits will be carried out.

3.1.3 The project will be undertaken in a manner consistent with the guidance of MAP2 (English Heritage 1991) and professional standards and guidance (IFA, 2001).

3.1.4 The watching brief will be maintained during all site reduction works.

3.1.5 CS Archaeology will be aware of, and comply with, provisions of Section 25 of the Burial Act of 1857, and pay due attention to requirements of Health and Safety.

3.1.6 All deposits will be fully recorded on standard context sheets, photographs and conventionally-scale plans and sections. Each trench will be recorded to show the horizontal and vertical distribution of contexts. All trenches will be planned at 1:20, with individual features being planned at 1:10 where additional detail is required. One representative long section will be produced, at an appropriate scale. All feature sections sampled will be drawn at 1:10 or 1:20 depending on the size of the feature. The elevation of the underlying natural where encountered will also be recorded. Even if no archaeology is recorded the stratigraphy will be recorded. The limits of excavation will be shown in all plans and sections, including where these limits are coterminous with context boundaries.

3.1.7 All anthropogenic features will be investigated – discrete features will initially be half-sectioned; linear features will be excavated to 20% of their extent, not less than 1m in extent. Archaeological contexts at junctions or interruptions in linear features will be sufficiently excavated for the relationship between components to be established.

3.1.8 Any human remains that are discovered must initially be left *in-situ*, covered and protected. SYAS will be notified at the earliest opportunity. If removal is necessary the remains must be excavated archaeologically in accordance with the *Guidance for Best Practice for Treatment of Human Remains Excavated from Christian Burial Grounds in England* published by English Heritage (2005), a valid Ministry of Justice licence, if appropriate, and any local environmental health regulations.

3.1.9 If there is, in the professional judgment of CS Archaeology, unexpectedly significant or complex discoveries made that warrant more detailed recording than possible within the terms of this specification, then the CS Archaeology will immediately contact SYAS with the relevant information to enable the matter to be resolved with the developer.

3.1.10 All finds that are 'treasure' will be reported to the coroner in accordance with the Treasure Act Code of Practice (1997).

3.1.11 Attention will be paid to artefact retrieval and conservation, ancient technology, dating of deposits and the assessment of potential for the scientific analysis of soil, sediments, biological remains, ceramics and stone.

3.1.12 All artefacts and ecofacts visible during the excavations will be collected and processed, unless variations to this are agreed by the archaeological monitor (SYAS). In some cases sampling may be most appropriate.

3.1.13 Finds will be appropriately packaged and stored under optimum conditions, as detailed in First Aid for finds (Watkins and Neal, 1998). In accordance with the procedures of MAP2 (English Heritage 1991), all iron objects, a selection of non-ferrous artefacts (including all coins) and a sample of any industrial debris relating to metallurgy should be X-radiographed before assessment. Where there is evidence for industrial activity, large technological residues should be collated by hand, with separate samples collected for micro-slags. In these instances, the guidance of Bayley *et al* (2001) will be followed.

3.1.14 Analysis of the samples will be carried out by a suitably qualified subcontractor who will adhere to the sampling strategy fully outlined in Appendix 1.

3.2 Sampling Strategy

3.2.1 For palaeoenvironmental research different sampling strategies will be employed according to established research targets and the perceived importance of the strata under investigation. CS Archaeology conventionally recovers three main categories of sample;

i) Routine Soil Samples; a representative 500g sample from every excavated soil context on site. This sample is used in the characterisation of the sediment, potentially through pollen analysis, particle size analysis, pH analysis, phosphate analysis and loss-on-ignition;

ii) Standard Bulk Samples; a representative 50-60 litre sample from every excavated soil context on site, in accordance with English Heritage Guidelines (2002). This sample is used, through floatation sieving, to recover a sub-sample of charred macroplant material, faunal remains and artefacts;

iii) Purposive or Special Samples; a sample from a sediment which is determined, in field, to either have the potential for dating (wood charcoal for radiocarbon dating or in situ hearths for magnetic susceptibility dating) or for the recovery of enhanced palaeo-environmental information (waterlogged sediments, peat columns, etc).

3.2.2 Samples will be taken for scientific dating, principally radiocarbon (C14) and archaeomagnetic dating, where dating of artefacts is insecure and where dating is a significant issue for the development of subsequent mitigation strategies.

3.2.3 Environmental samples will be collected from primary and secondary contexts, where applicable, from a range of representative features, including pit and ditch fills, postholes, floor deposits, ring gullies and other negative features. Positive features should also be sampled. Sampling will also be considered for those features where dating by other methods (e.g. pottery and artefacts) in uncertain. Animal bones will be hand collected, and from bulk samples collected from contexts containing a high density of bones.

3.2.4 Standard Bulk Samples of 30-40 litres or more will be recovered from every archaeologically significant soil context as part of a comprehensive environmental sampling strategy.

3.2.5 Within each significant archaeological horizon a minimum number of features required to meet the aims of the project will be hand excavated. Pits and postholes normally will be sampled by half-sectioning although some features may require complete excavation. Linear features will be sectioned as appropriate. No deposits will be entirely removed unless this is unavoidable. As the objective is to define remains it will not necessarily be the intention to fully excavated all trenches to natural stratigraphy. However, the full depth of archaeological deposits across the entire site will be assessed. Even in the case where no remains have been located the stratigraphy of all evaluation trenches will be recorded.

3.2.6 Any excavation, whether by machine or by hand, will be undertaken with a view to avoiding damage to any archaeological features or deposits which appear to be demonstrably worthy of preservation in situ.

3.2.7 For full details of potential post-excavation analyses see Appendix 1.

3.3 Site Monitoring

3.3.1 SYAS will be responsible for monitoring the evaluation. A minimum of one week's notice of the start of the field work will be given by CS Archaeology to the SYAS so that arrangements for monitoring can be made.

3.3.2 Site inspections will be arranged so that the general site stratigraphy can be inspected when field work is near completion, but before any trenches have been backfilled.

3.4 Health and Safety

3.4.1 CS Archaeology will operate with due regard to health and safety and a copy of the risk assessment will be sent for approval to the archaeological monitor (SYAS).

3.5 Post –Recording Work and Report Preparation

3.6.1 Once the watching brief has been completed, a full and appropriate programme of analysis and publication of the results will be completed. The post-excavation assessment of material will be undertaken in accordance with the guidance of MAP2 (English Heritage, 1991). The report will include: background information, methods, detailed results, grid references, conclusion and discussion.

3.6.2 The report will integrate and update the results of the desk-based assessment and evaluation.

3.6.3 The watching brief will include a phased interpretation of the site, if possible.

3.6.4 The watching brief report will also consist of a detailed context index to the archive and will supplement the existing context index in the evaluation report.

3.6.5 The results of the potential palaeo-environmental assessment, which will be carried out by an appropriate specialist, will outline the potential of the samples taken and all data will be included within the final report.

3.6.6 The report will provide an interpretation of the results, placing them in local and regional context.

3.6.7 A copy of the PD will be included as an appendix to the final report.

3.7 Report Submission

3.7.1 Copies of the completed report will be submitted to:

- The client, Vinci Construction;
- SYAS's Historic Environment Record in both hard and digital formats.

3.7.2 A summary report of an appropriate length, accompanied by illustrations, will be prepared and submitted in digital format (word/jpg >300dpi), for publication in *Archaeology in South Yorkshire*.

3.8 Submission and Deposition of the Archive

3.8.1 The archive, including a copy of the report, will be compiled, indexed and then offered for deposition with South Yorkshire Museums Service (Sheffield). The document 'Transfer of Archaeological Archives to South Yorkshire Museums' will be completed and sent prior to commencement of the evaluation works.

3.9 Publicity

3.9.1 Provision will be made for publicising the results of the work locally, and an OASIS form will be completed for the project.

3.9.2 CS Archaeology is aware that this work may lead to further archaeological dissemination.

3.10 References

Bayley J, Dungworth D and Paynter S	2001 *Archaeometalurgy*, Centre for Archaeology Guidelines, English Heritage
CS Archaeology	2008 City School, Stradbroke Road, Sheffield, South Yorkshire: An Archaeological Desk-based Assessment unpublished client report
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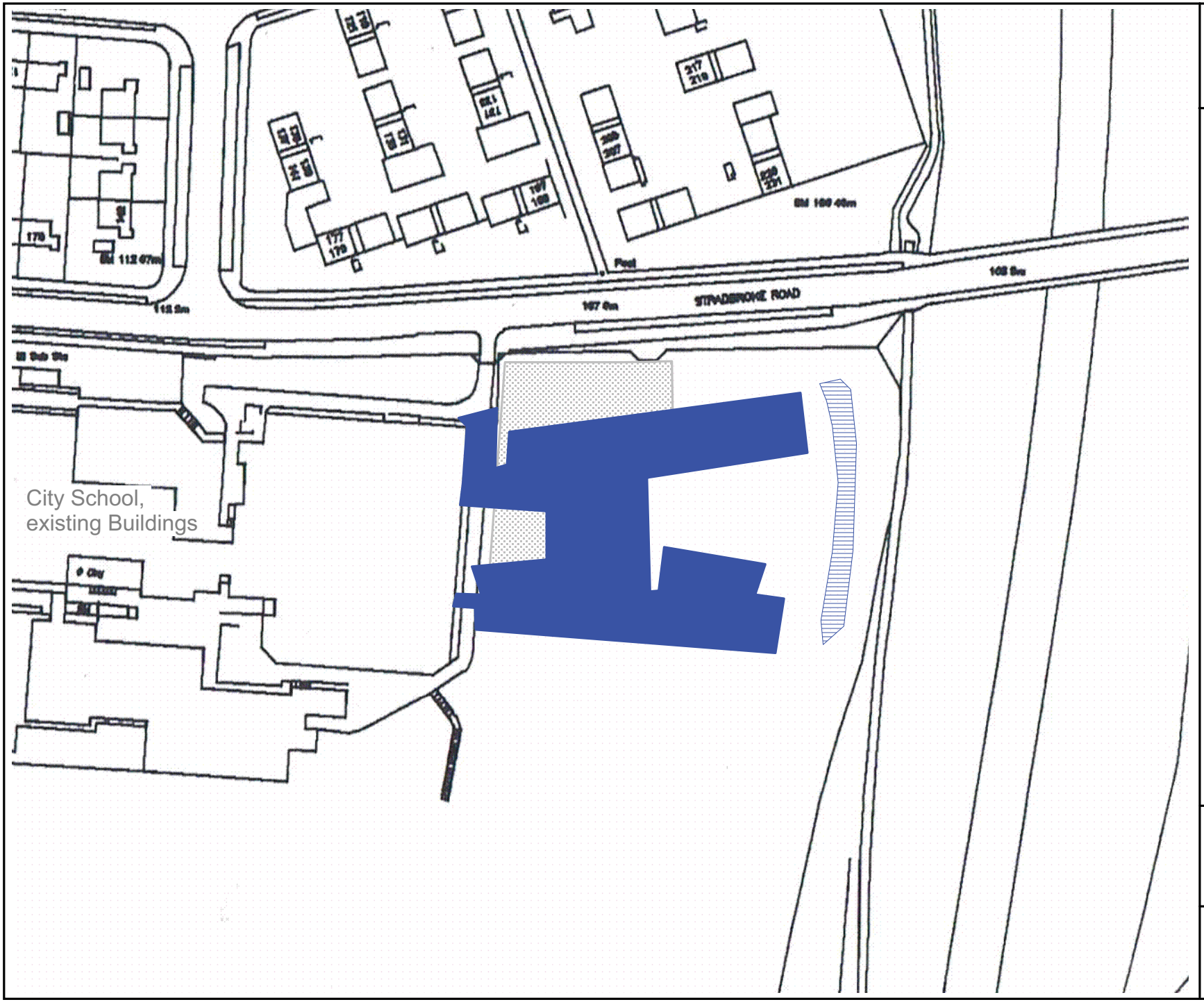

City School, Stradbroke Road Sheffield: Project Design for An Archaeological Watching Brief

key

area of the watching brief which consists of the footprint of the new building and is consistent the Phase 1 site works

additional watching brief area further area consisting of stored top/subsoil

scale 1:1250

Figure 1: Location Map of the PDA

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July 2010

Appendix 1: Sampling Strategy

1. POST-EXCAVATION

1.1 *Sample Flotation*

Sample flotation is a water recovery technique designed to separate organic remains from the soil matrix. A Siraf style system of flotation and wet-sieving will be operated by the archaeological contractor. This system comprises an enclosed area of water into which the soil samples are deposited and agitated. Due to the difference in densities of organic and inorganic remains the light fractions will float, the heavy fractions will sink and the silt fraction will be washed away. The resulting floating material (flot) is collected in sieves of 0.3 mm and 1 mm, the non-floating residue (retent) is wet-sieved through a 1 mm mesh.

All flots and retents are air dried, bagged and labelled accordingly. Throughout this process all equipment is kept clean to prevent contamination of the samples. For each sample, a Sieving Assessment sheet is completed. This gives basic information about the sample, retent and flot. Prior to flotation and wet-sieving, the volume of each sample is measured by means of a graduated bucket.

If in a sample a high concentration of clay can be observed and therefore separation of the different fractions of the soil is difficult, an aqueous solution of defloculant 'Calgon' is added and the sample is left to soak overnight, before processing by flotation and wet-sieving.

Sample flotation will be carried out on site and/or at the premises of the archaeological contractor.

1.2 *Sample Wet sieving*

Sample wet sieving, also a water recovery technique, is carried out in laboratory conditions and is designed to recover waterlogged material. For the recovery of waterlogged botanical material, small soil samples (0.5 to 1.0 litre) are processed through a 0.3 mm sieve. The sediment is placed in a bucket with water and agitated before being washed through the 0.3 mm sieve. This process is repeated until the sample is totally disaggregated. The resulting material is stored in water or ethanol depending on the length of the storage period. Sample wet sieving can also be used to recover larger waterlogged material such as leather and wood in which case larger volumes of soil are processed.

1.3 *Sample Dry sieving*

Sample dry sieving is carried out to retrieve smaller artefacts that might be missed during normal excavation procedure, eg. small sherds of pottery and bone . Done in laboratory conditions, all samples are air dried in the first instance. Done in the field, the samples are processed with the sample in a field-moist state. In both cases the sample is passed through a 4 mm mesh and any items of interest are recovered and recorded.

1.4 *Residue sorting*

All residue (retent) sorting is carried out in laboratory conditions, and is designed to recover not only material that might be missed during normal excavation procedure (see dry sample sieving), but also material that would be impossible to recover during normal excavation procedure eg. charred and uncharred plant remains, insect remains and small fragments of charcoal.

The volume of the residue is recorded and then passed through a set of sieves (mesh sizes 8 mm, 4 mm, 2 mm and 1 mm). Each fraction is spread out onto a separate tray, is scanned with the naked eye and all items of interest are recovered. Under normal circumstances all identifiable material from all fractions is recovered. The only exception to this is burnt wood (charcoal) which is only retrieved from the > 4 mm fractions. All material recovered is bagged individually by material type and the material types and weights recorded on the Retent Sorting Sheet. Also recorded on this sheet are the project number, context number, area, sample number, the sorters initials, date, sample volume, retent volume and percent of the retent sorted. Under normal circumstances 100 % of all fractions are sorted. In those instances where this is not the case, this will be recorded. Where no material is recovered from a retent, the Retent Sorting Sheet will be filled out as usual, with the word sterile written across it.

1.5 *Flot sorting*

All flot sorting is carried out in laboratory conditions. The volume of each flot is measured. The flots are sorted by means of a low powered binocular microscope. The macro plant remains and other archaeological or ecological material are extracted from the flots and put into gelatine capsules or glass tubes. An estimate of the number of items recovered and the species represented are recorded. The charcoal larger than 4mm is extracted from the flots and weighed. All extracted items are bagged and labelled accordingly.

1.6 *Routine Soils Analysis*

All the samples taken on-site will have a routine partner. Four standard routine soil tests will be carried out by the archaeological contractor. These are pH analysis, Loss on Ignition, Calcium Carbonate content and Easily available phosphate content.

The pH value is the measure of the acidity (H+) or alkalinity (OH+) of the sample. Dissolving a portion of the soil in distilled water, then measuring the sample using pH meter carries this out. This is to allow us to estimate the potential for preservation within the sediment.

Loss on Ignition is the measure organic content of the sample. This is measured by burning a small amount of the sediment in a furnace at 400^0C for four hours. By measuring the weight before and after burning the organic content can be calculated. The organic content allows us to examine whether manuring or treatment of the natural soil has taken place.

Calcium Carbonate content can be measured by dissolving a few grains of the sample using Hydrochloric acid. If calcium carbonate is present then a small amount of Carbon Dioxide is given off, the greater the amount of CO_2 released the greater the amount of $CaCO_2$. The Calcium Carbonate content shows us if

there is any natural calcium carbonate within the sediment, or if not, any mortar or shell has been included artificially.

The amount of phosphate within a sample is examined at the same time as $CaCO_2$. After the CO_2 has been released Ascorbic acid is applied, if Phosphate is present a colour change will occur. The phosphate content may show the presence of animals or to a lesser degree indicate where animals were kept.

1.7 *Soil Micromorphological Analysis*

Micromorphology is the study of undisturbed soils and loose sediments and other materials at a microscopic scale. A 25-30 micron thick slice of soil or sediment is mounted on glass and studied using a petrographic microscope. The samples are prepared for thin section analyses at the Department of Environmental Science, University of Stirling using the methods outlined by Murphy (1986). The samples are analysed using the descriptive terminology of Bullock *et al* (1985) and FitzPatrick (1993).

2.8 *Charcoal ID*

Only charcoal retrieved from the 4mm sieve (see Sieving and Sorting procedures) is used for species identification, mainly because fragments below that threshold are too small to identify. If there is no charcoal larger than 4mm present then attempts will be made to identify the largest fragments present for the purpose of C14 samples.

Surfaces are prepared for identification by using a surgical blade to prise off flakes of charcoal revealing fresh surfaces on which diagnostic features can be identified. The charcoal fragment is bedded in sand for examination under a reflected-light microscope.

On average, up to 10 fragments of charcoal are identified per bulk sample. If a single species is present then identification can stop at 5 fragments. However, if a great variety of species is present, ie more than four, then identification should continue until the analyst is happy that a representative sample has been examined. Unusual or exotic species should be bagged and labelled separately within the bulk sample.

Other variables, such as whether the fragment is young roundwood, with sub-bark surfaces intact, whether it has come from a large piece of wood and whether it is fast or slow grown, should be noted. Species identification is undertaken with reference to Schweingruber (1982).

2.9 *Wood ID*

Waterlogged wood; Surfaces on waterlogged wood are prepared for identification by using a cut-throat razor or a double-sided razor blade to pare off thin-sections which are cell-thick and transparent so that diagnostic features can be identified. It is consequently difficult to identify fragments of waterlogged wood smaller than 10 mm^2. The thin-sections are temporarily mounted in water on slides for examination under a transmitted-light microscope.

Sampling for identification is carried out on the same basis as that for charcoal. Species identification is undertaken with reference to Schweingruber's (1982) *Microscopic Wood Anatomy* and the in-house reference collection of the archaeological contractor.

2.10 *Non-charcoal charred plant macrofossil analysis & waterlogged plant analysis*
Analysis of the charred plant macrofossils and waterlogged plants involves identification, quantification and interpretation. Identification of the macro plant remains is done using a low power binocular microscope with x10 and x40 magnifications. The modern reference collection of the archaeological contractor and various seed atlases (Beijerinck 1947, Berggren 1969 & 1981 and Anderberg 1994) will be used to ease identification. The botanical nomenclature follows Flora Europaea (Tutin *et al* 1964-1981). A standardised counting method is used for quantification. Habitat information for the plant species will be taken from Hanf (1983).

2.11 *Dendrochronological analysis*
Sample size and species type; Three conditions are necessary to ensure the successful dating of a building or archaeological site. The timber must be a species for which there are already dated chronologies which in the UK usually means oak. Cross-matching is a statistical process, and therefore a number of timbers are required, usually at least 8 per building or phase. Finally, and for the same reasons the ring-patterns must be over a certain length, usually 70 rings. With these conditions observed it can be relatively straightforward to obtain a date for a building.

On-site sampling; In situ timbers in a standing building are usually sampled using a corer, which is attached to a power-driven drill and removes a core leaving a hole in the timber 10 mm in diameter. The core must be taken so that the maximum radius from pith to bark is sampled, thus ensuring the maximum number of growth-rings for analysis. It is also important to select those timbers which have retained as full a ring sequence as possible, ie those where the outermost rings have not been trimmed off or destroyed by woodworm.

Coring is an intrusive method of sampling and it is occasionally impossible to use this method, as in the case of painting ceilings and carved panels. If the end-grain is exposed the ring sequence can be measured *in situ* using a hand lens. Silicone rubber casts can also be taken.

If structural timbers have been removed during the renovation of a building then slices, approximately 50 mm thick can be sampled by saw, usually a chainsaw, from a point along the timber where the maximum radius survives.

Timbers only survive below ground in waterlogged conditions. Waterlogged timbers are sampled as above, by the removal of a 50 mm slice by sawing.

2.12 *Sample preparation;*
Cores are mounted in angle moulding and then the surface is prepared by paring with a Stanley knife followed by fine sanding with Wet & Dry sandpaper until the ring-pattern is clear and measurable.

Slices (dry); The surface of the slice is sanded, usually with a power sander, using progressively finer sandpaper until the ring-pattern is clear and measurable. It is often necessary to finish off the surface with W&D sandpaper.
*Slices (wet); T*he slice is usually frozen for 24 hours and then the surface is planed flat using a Surform plane. This often achieves the necessary clarity of ring-pattern but where the wood is particularly hard it will be necessary to use a razor blade to pare the surface to achieve a clear ring-pattern.
Silicone rubber casts; These are fixed to battens of wood using silicone rubber, for ease of measurement.

2.13 *Measurement and analysis;* The samples are measured on a custom-made measuring table and the data logged onto the computer using DENDRO (Tyers 2000). Data graphing and statistical analysis are also carried out using the same package.

Appendix 2: Photographic Register

PHOTOGRAPHIC REGISTER A

Digital colour at 7 mega-pixel resolution

No.	Plate	Location	Description	Looking
1		Northern PDA (NPDA)	General view during the top soil strip	E
2		Southern PDA (SPDA)	View of the removal of the earth bund	NE
3		NPDA	General view of the removal of the earth bund	NE
4		Temporary car park	General view	NW
5	**4**	NPDA	View of the excavation and removal of the earth bund	N
6 & 7		SPDA	View during the top soil strip	E
8		NPDA	Initial excavation of the electric station	SW
9		NPDA	General view of the top soil strip of the electric substation	S
10		NPDA	view of the trench top soil	SW
11 & 12		NPDA	Detail of the stratigraphy	NE
13		NPDA	General view during excavation	SSW
14		NPDA	View of the modern land drains with clinker/slag infill	SE
15		NPDA	General view with the natural substrate	SSW
16	**3**	NPDA	Detail of the stratigraphy to the east facing section of the sub station trench	W
17	**2**	NPDA	View of the sub station trench with modern land drain	S
18		NPDA	General view	S
19	**1**	NPDA	General view during the removal of the upper natural substrate at the electric substation	NW
20		NPDA	General view during removal of the tarmac to the pre-existing car park	W
21		NPDA	General view during removal of the tarmac to the pre-existing car park	NW
22		NPDA	General view after the removal of the tarmac and the reduction of the pre-existing service road	SW
23		NPDA	Site reduction of the car park to the Phase 1 Offices and Welfare	SE
24		NPDA	Site reduction of the car park to the Phase 1 Offices and Welfare	NW
25	**8**	NPDA	View of the excavated surface (generally obscured)	N
26		NPDA	General view of the PDA during removal of the tarmac with the remains of the former	NNE

			electric substation in the foreground	
27	**5**	NPDA	General view during site reduction adjacent to where the quernstone (SF2) was recovered during the evaluations	WNW
28	**6**	NPDA	view of the NPDA with modern land drains and adjacent foundation pads (now removed and backfilled	SW
29		NPDA	Post-reduction view	W
30	**7**	NPDA	View along the western edge of the PDA	S
31		NPDA	General view of the PDA with site reduction area being covered over with aggregate in preparation for the piling rig (foundations)	NNE
32 & 33		NPDA	View along the western edge of the PDA	N
34		NPDA	General view	NE
35		SPDA	General view	
36		SPDA	General view of the start of the deep (>2m) excavations	SE
37	**10**	SPDA	Detail of the truncated land drain	N
38	**9**	SPDA	General view of the start of the basement excavations to the SPDA	N

NB No artefacts have been retained as part of the archive