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ST. PETER'S CHURCH, MONKWEARMOUTH, SUNDERLAND

TYNE AND WEAR

ARCHAEOLOGICAL WATCHING BRIEF REPORT

May 2017

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SUNDERLAND CITY COUNCIL

St. Peter's Church, Monkwearmouth, Sunderland, Tyne and Wear

Archaeological Watching Brief

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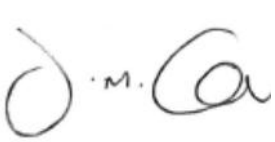		
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SUMMARY

Wardell Armstrong (WA) was commissioned by Sunderland City Council, to undertake an archaeological watching brief at St. Peter's Church, Monkwearmouth, Sunderland, Tyne and Wear, SR6 0EZ (NGR: NZ 40167 57783). The watching brief was undertaken in accordance with Scheduled Monument Consent and a specification provided by Jennifer Morrison, Tyne and Wear Archaeology Officer, acting as the archaeological planning advisor on behalf of Sunderland City Council.

The watching brief monitored the excavation of six post holes for three lectern panels. The two pits for Lectern Panel 1 were located to the west of the church in a grassed area where two paths converged. In this area, a possible grave soil was identified. However, other than some fragments of disarticulated bone no archaeologically significant material was uncovered.

The two pits for Lectern Panel 2 were located to the southeast of the church, east of the monastic area, and excavated though the modern paths. At the depth reached no archaeological deposits were present.

The final pits for Lectern Panel 3 were excavated to the south of the church and the monastic area within a flower bed. The material removed for these pits had been recently deposited and nothing of archaeological significance was revealed.

ACKNOWLEDGEMENTS

Wardell Armstrong (WA) thanks Ian Parkin, Senior Project Manager of Sunderland City Council, for commissioning the project, and for all assistance throughout the work. WA also thank Jennifer Morrison, Tyne and Wear Archaeology Officer, for all her assistance throughout the project.

Wardell Armstrong Archaeology also thanks groundworks staff from Trevor Atkinson for their help and assistance during the project.

The archaeological watching brief was undertaken by Jaime M Levell who wrote the report and the drawings were produced by Martin Railton who edited the report.

1. INTRODUCTION

1.1 Project Circumstances and Planning Background

1.1.1 In May 2017 Wardell Armstrong (WA) undertook an archaeological watching brief at St. Peter's Church, Monkwearmouth, Sunderland, Tyne and Wear (NGR NZ 40167 57783; Figure 1). It was commissioned by the Sunderland City Council who wishes to install lectern panels at the site.

1.1.2 The works are within the area of Monkwearmouth Anglo-Saxon monastery and medieval Benedictine priory, which is a scheduled monument (Monument Number 32066). It was considered possible that remains of these monuments and later burials may be affected by the proposed works. The work was undertaken in accordance with scheduled monument consent (Ref. S00088376), provided by Historic England.

1.1.3 A watching brief is defined as a programme of 'monitoring and investigation carried out during a non-archaeological activity within a specified area of land or development where construction operations may disturb or destroy archaeological remains' (CIfA 2014a).

1.2 Project Documentation

1.2.1 The project conforms to a specification was provided by Jennifer Morrison, Tyne and Wear Archaeology Officer, Newcastle City Council (19/11/2014). This is in line with government advice as set out in Section 12 of the National Planning Policy Framework (NPPF 2012).

1.2.2 This report outlines the work undertaken on site, the subsequent programme of post-fieldwork analysis, and the results of this watching brief.

2. METHODOLOGY

2.1 Standards and guidance

2.1.1 The archaeological watching brief was undertaken following the Chartered Institute for Archaeologists *Standard and Guidance for an archaeological watching brief* (CIfA 2014a), and in accordance with the WA fieldwork manual (2017).

2.1.2 The fieldwork programme was followed by an assessment of the data as set out in the *Standard and Guidance for an archaeological watching brief* (CIfA 2014) and the *Standard and Guidance for the collection, documentation, conservation and research of archaeological materials* (CIfA 2017).

2.2 The Watching Brief

2.2.1 The watching brief comprised the monitoring of all intrusive works associated with the current development, this comprised the excavation of six square, hand excavated, foundation pits that measured between 0.46m by 0.40m to a maximum depth of 0.57m for Lectern Panel 1, 0.36m by 0.36m to a maximum depth of 0.46m for Lectern Panel 2 and 0.47m by 0.45m to a maximum depth of 0.53m for Lectern Panel 3.

2.2.2 The general aims of these investigations were:

- allow the monitoring archaeologist to signal that an archaeological find has been made before it is destroyed
- to provide the opportunity for appropriate resource allocation if the archaeological find cannot be dealt with under the watching brief remit
- to determine the presence or absence of buried archaeological remains within the proposed development site
- to determine the character, date, extent and distribution of any archaeological deposits and their potential significance
- investigate and record all deposits and features of archaeological interest within the areas to be disturbed by the current development
- to determine the likely impact on archaeological deposits from the proposed development
- to disseminate the results of the fieldwork through an appropriate level of reporting.

2.2.3 Deposits were removed by hand. All intrusive groundworks were monitored under close supervision by a suitably trained archaeologist. Where potential archaeological remains were present the groundworks were subsequently cleaned by hand.

2.2.4 Some disarticulated human bone was recovered during the excavation work for Lectern Panel 1. In each case the area was cleaned and inspected by a suitably trained archaeologist to ensure that the bone was disarticulated. Modern brick was retained from the area excavated for Lectern Panel 2. No environmental samples were taken.

2.2.5 A full professional archive has been compiled in accordance with the project specification, and the Archaeological Archives Forum recommendations (Brown 2011). The archive will be deposited with Tyne and Wear Museum, with copies of the report sent to the County Historic Environment Record at Newcastle, Tyne and Wear, where viewing will be available upon request. The archive can be accessed under the unique project identifier WA17, SPS-D, LE 13827.

2.2.6 Wardell Armstrong supports the Online AccesS to the Index of Archaeological InvestigationS (OASIS) project. This project aims to provide an on-line index and access to the extensive and expanding body of grey literature, created as a result of developer-funded archaeological work. As a result, details of the results of this project will be made available by WAA as a part of this national project. The OASIS reference for the project is: wardella2-285425.

3. BACKGROUND

3.1 Location and Geological Context

3.1.1 St. Peters Church is situated in Monkwearmouth, in the northern outskirts of the city of Sunderland and is located at the eastern limits of the Metropolitan County of Tyne and Wear. The site lies on the north bank of the river Wear and is at a height of approximately 14m aOD. The site is within a heavily urbanised area with the University of Sunderland to the south, the National Glassworks to the south east and residential buildings to the north and west. St. Peters Church is also bounded by the A183 to the north and by St. Peter's Way to the south, west and east (Figure 1).

3.1.2 The underlying solid geology of the area consists of Roker Formation – Dolostone sedimentary bedrock formed during the Permian Period (251 – 271 million years ago). The site is underlain by superficial glaciofluvial deposits of Devensian sand and gravel formed in the Quaternary Period (up to 2 million years ago) (BGS 2001).

3.2 Historical and Archaeological Background

3.2.1 *Introduction:* this historical background is compiled mostly from secondary sources, and is intended only as a brief summary of historical developments specific to the study area.

3.2.2 *Prehistoric*: Large quantities of worked flints recovered in Monkwearmouth indicate long term Mesolithic occupation (Turner *et al*. 2013, 81). Late prehistoric sites in the area are not common (*ibid*; 81) and there is no previous evidence of prehistoric activity within the site boundaries.

3.2.3 *Roman:* Although no Romano – British settlement has been located near to Wearmouth, two Roman coins were associated with the earlier Anglo – Saxon cemetery levels, with Samian and colour coated wares also recovered (Cramp 2005, 24). Possible Romano – British worked stone was also re-used in the fabric of the monastery (*ibid*). No other evidence of Roman activity has been recorded within the site boundaries.

3.2.4 *Medieval:* The construction of the monastery at Jarrow and Monkwearmouth was begun in 674, with Monkwearmouth the earlier of the two sites. The construction of the monastery at Jarrow began at a later date of 682 AD, with a church dedicated to Paul the Apostle started in 684 AD and finished a year later in 685 AD (Cramp 1969). The monastery at Monkwearmouth was abandoned in the 9th century A.D. with an

attempt to re – build the church in the 11th century AD, which continued to function as a cell of Durham until the dissolution in 1540 AD (Barker 2003, 6).

3.2.5 *Post-medieval and Modern:* Industrialization greatly affected the study area and led to its absorption into Sunderland by 1897. Previous to this, three distinct parishes of Monkwearmouth, Bishopwearmouth and Sunderland existed, with Sunderland made a separate Parish, independent of Bishopwearmouth in 1719 due to a surge in the population (Burnett 1834). During this period, and following the dissolution of the monastery in 1540, parts of the monastic building were converted into Monkwearmouth Hall, which was occupied as a rectory until it burnt down in 1790. A single small building survived, and was incorporated into the later Hallgarth Square (Barker 2003, 7). The square, situated to the south of St. Peters Church was constructed at the start of the 19th century (*ibid*), at a time when Monkwearmouth was described as containing ballast hills (Burnett 1834, 63), a result of the growth of Sunderland dock with collieries such as Hetton colliery in 1822 having direct haulage lines which ran to the dock. It was also noted in 1834 that Monkwearmouth had "improved the ballast mounds" and that building permissions were liberalised which resulted in the erecting of "several excellent buildings" (Burnett 1834, 64). Hallgarth square was demolished at the start of the 1960's (Cramp 1969, 21), and the remains were covered by a grass lawn.

3.3 Previous Work

3.3.1 St. Peters Church remained un-excavated until excavations in the late 1950's and during the 1960's conducted by Professor Cramp (Cramp 1969, 21). These excavations were situated to the south of the church and proved the existence and location of the Anglo – Saxon church and of extensive Norman replanning (Cramp 1969 & 2005). An Anglo – Saxon cemetery was interpreted as broadly contemporary with the earliest phase of church at the site, with later burials cutting the remains of early mortared flooring associated with the Anglo – Saxon church. The work also produced evidence of later rebuilding and evidence of the continual occupation of the site into the post – medieval period (Cramp 2005)

3.3.2 A geophysical survey was undertaken in 2003, as part of a Masters thesis for Durham University. The geophysics was conducted on the grounds surrounding the church. The survey revealed several features which were highlighted as being possible archaeological features, notably a rectangular structure to the south of the site (Barker 2003), which was later shown to be modern.

3.3.3 An archaeological evaluation was undertaken by WAA in October 2013 and involved the excavation of eight trenches (WAA 2013). The trenches were located to target key locations to the depths required by the landscaping scheme. Trenches on the northern side identified burial pits containing disarticulated human remains and dumped worked stone, deposited when the cemetery was no longer used in the latter half of the 20th century. One trench on the eastern side contained a post-medieval crypt and on the southern side, remains of 19th century walls were observed and interpreted as part of the buildings that formed Hallgarth Square. A possible earlier wall foundation and a reinforced modern structure were also observed. Disturbed human remains that may be contemporary with the Anglo-Saxon burials identified within Cramp's excavations in the 1960's and were noted and left in situ. Some of these disarticulated remains appeared to have been moved during the construction of an Anglo-Saxon sandstone foundation.

3.3.4 An archaeological watching brief was undertaken by WAA in January 2015 during groundworks associated with landscape enhancements to the grounds (WAA 2015). Twenty tree pits and one bush pit were excavated on the northeast, east and southern areas around the church. Ballast and demolition layers were visible in all the pits but only two pits, on the eastern side of the site contained archaeological features. These features consisted of wall remains that were probably associated with 19th century buildings that formed the former Hallgarth Square. Also monitored, was the re-grading of ground on the northern side of the church. The remains of twelve inhumations, twenty-three burial pits, four spreads and a brick structure associated with the 19th century cemetery were observed under the topsoil. The majority of the human remains observed were re-deposited in these burial pits, the original graves having been disturbed by past activity at the site. The in-situ graves identified were left undisturbed wherever possible. Post-excavation analysis of the human remains revealed a minimum number of 202 individuals, 156 of which were adults and 44 of which were non-adults. The human skeletal remains are likely to be of 19th century date.

3.3.5 A further archaeological watching brief took place in January 2016 (WAA 2016) to excavate four pits for signage and bollards. Three of these pits contained archaeological remains, the pits came down on to sandstone slabs understood to be wall footings, the size of the tests pits were too small to establish date or orientation of the walls and no artefacts were recovered.

4. WATCHING BRIEF RESULTS

4.1 Introduction

4.1.1 The watching brief was undertaken on the 18th May 2017. The archaeological watching brief monitored all excavations associated with the erecting of three lectern panels at the site, associated with the footprint of the Anglo-Saxon monastery that had recently been laid out as part of a new landscaping scheme. Context numbers are provided in brackets, relating also to a summary table provided in Appendix 1.

4.1.2 The development groundworks required the excavation of six small square foundation pits, two for each lectern panel. No archaeologically significant *in-situ* deposits were encountered.

4.2 Results

4.2.1 ***Lectern Panel 1:*** The two pits for Lectern Panel 1 were located to the west of the Church on a lawn area where two foot paths converged (Figure 2). The pits, which were spaced 1m apart, measured 0.46m by 0.40m, to a maximum depth of 0.57m in the most northerly test pit, and 0.27 in the southerly test pit.

4.2.2 Due to the presence of concrete the area in-between was stripped to a depth of 0.12m to establish the extent of the solid material. The top 0.12m comprised compacted modern material **(102)** containing some soil, but mainly remnants from path construction.

4.2.3 Below this was a layer of topsoil **(100)** visible to a depth of 0.5m, which contained modern bottle glass, some disarticulated human bone, and an iron nail. At the base of the foundation pit an organic silty soil was reached **(101)**, interpreted as grave soil (Plate 1). There was no articulated bone visible in this deposit.

4.2.4 ***Lectern Panel 2:*** The two pits for Lectern Panel 2 were located to southeast of the church, east of the monastic area (Figure 2) and were excavated though the modern paths. At the depth reached no archaeological deposits were present.

4.2.5 These pits measured 0.36m by 0.36m to a maximum depth of 0.46m. The excavations uncovered recently buried material and a brick was recovered from the bottom of the most westerly pit. The material uncovered **(103)** was a firm mixed clay with a number of sub angular stone inclusions (Plate 2).

4.2.6 ***Lectern Panel 3:*** The two pits for Lectern Panel 3 were excavated to the south of the church and the monastic area within a flower bed (Figure 2). These measured 0.47m by 0.45m and were excavated to a maximum depth of 0.53m.

4.2.7 The material removed for these pits had been recently disturbed when the shrubs had been planted (Plate 3), and nothing of archaeological significance was uncovered. At the depths reached only a very loose organic topsoil **(104)** was removed with no artefacts present.

5. HUMAN REMAINS

5.1 Disarticulated human bone

5.1.1 A small assemblage of disarticulated human bone was recovered from two deposits during an archaeological watching brief at St Peter's Church, Monkwearmouth.

5.1.2 Guidelines adhered to for the processing, cleaning, handling, examination and analysis of the human remains followed BABAO & Historic England (2017), CIfA (2017), Brown (2011), Watkinson & Neal (2004) and EAC (2014).

5.1.3 The human remains analysis was conducted by Megan Stoakley.

5.1.4 A total of 11 fragments of human bone, weighing 29g, were recovered from deposit (**100**) and three fragments, weighing 5g, were recovered from deposit (**101**). The degree of erosion to the bone was observed using Brickley & McKinley's (2004, 16, Figure 7.1 - 7) grading system and all fragments were attributed a score of 2-3.

5.1.5 All of the human remains originate from adult individuals. Sex determination, metric/non-metric analysis and further age-at-death analysis were not carried out on the remains.

5.1.6 Human remains recovered from deposit (**100**) comprise a left partial clavicle (mid-shaft & partial costo-clavicular end (lateral), a small un-sided femoral fragment, an un-sided fragment of a radius, two fragmentary os coxae fragments (ischial?), four miscellaneous limb bone fragments and a right 2nd carpal phalange.

5.1.7 No pathological conditions were noted on any of the remains, although the clavicular fragment exhibited a rugose and pitted partial cost-clavicular ligament MSM (musculo-skeletal marker).

5.5.8 Human remains recovered from deposit (**101**) comprise a partial un-sided femoral fragment, an un-sided limb bone fragment and a miscellaneous un-sided os coxae fragment.

5.1.9 No pathologies were noted on any of the human remains from deposit (**101**).

5.2 Discussion

5.2.1 The assemblage comprises a small collection of disarticulated human bone, likely originating from several adult individuals. Although St Peter's Church has been in use as a place of worship and a burial ground since the 7th century AD, it is likely that these remains are of a much later date (possibly late 19th century). A significant quantity of

human remains was recovered during a watching brief at the church (WAA 2015: CP11089, SPS-C) with many of the remains originating from topsoil and subsoil deposits; it is highly likely that this small quantity of human remains is of a contemporary date.

5.2.2 No further analysis is required on the human bone assemblage.

5. CONCLUSIONS

5.1 Interpretation

5.1.1 The archaeological watching brief monitored all excavations associated with the installation of three lectern panels. No archaeologically significant remains were identified within the pits. Human bone was collected from the area around Lectern Panel 1 but this was not associated with any articulated human remains. A possible grave soil was identified but not excavated.

5.1.2 The data recovered is indicative of past activity of inhumation on the site, but dating is unclear as the foundation pits contained no *in-situ* remains. The disarticulated human remains were of likely late 19th century date.

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APPENDIX 1: CONTEXT TABLE

Context Number	*Context Type*	*Area*	*Description*
(100)	Deposit	Lectern Panel 1	Modern material with path material imbedded
(101)	Deposit	Lectern Panel 1	Topsoil
(102)	Deposit	Lectern Panel 1	Grave Soil
(103)	Deposit	Lectern Panel 2	Modern backfill associated with path building
(104)	Deposit	Lectern Panel 3	Topsoil

APPENDIX 2: PLATES

Plate 1; Lectern Panel 1, showing excavated pits, 1x1m looking east

Plate 2; Lectern Panel 2 excavation, looking northeast

Plate 3; Lectern Panel 3, showing excavated pits, looking west

APPENDIX 3: PROJECT SPECIFICATION

Tyne and Wear Specialist Conservation Team

Specification for Archaeological Watching Brief at the Church of St. Peter's, Monkwearmouth, Sunderland

Planning Application: n/a

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Date: 3 November 2015

County Archaeologist's Reference Number: MON13723

The Tyne and Wear Specialist Conservation Team is the curatorial service for archaeology, industrial archaeology and historic buildings throughout the Tyne and Wear districts. It helps and advises Newcastle, Gateshead, North Tyneside, South Tyneside and Sunderland Councils to carry out their statutory duties to care for the precious historic environment of Tyneside and Wearside. The Team can be found at the Development Management Section of

Introduction

Site grid reference: NZ 4016 5779

Sunderland City Council wishes to install signage and two timber bollards at St. Peter's Church. The purpose of the signage and bollards is to prevent church visitors from parking on the footprint of the Anglo-Saxon monastery, which has recently been laid out in a new landscaping scheme.

The proposed signage has foundations 500mm deep. The concrete haunching around each timber post will be 415mm wide.

The two bollards will also have foundations 500mm deep. The concrete haunching around each bollard will be 425mm wide.

Monkwearmouth Anglo-Saxon monastery and medieval Benedictine priory is protected as a Scheduled Ancient Monument (Monument Number 32066). This specification will accompany an application for Scheduled Monument Consent. A church faculty might also be required.

The monastery was founded in AD 674 by benedict Biscop. The only upstanding remains of the Anglo-Saxon monastery are the west wall of the nave and lower part of the tower of St. Peter's Church. The rest of the remains are buried, as proven by archaeological excavations between 1959 and 1969. The remains of the monastery and cemetery lie 1m below present ground level.

The monastery was abandoned circa 874. But some activity continued. In 1072 Alwine revived the monastery and it continued as a cell of the Durham Benedictine foundation until the Dissolution in 1540. There are upstanding remains of the medieval priory in the fabric of St. Peter's Church. Buried remains of the cloister, east range and south range survive.

After the Dissolution, the cell was granted to Thomas Whytehead. The east and south ranges were adapted into an L-shaped hall. In 1735 the hall became the parson's house. It was destroyed by fire in 1790. It was rebuilt in 1854 and demolished in 1962-3.

Given that the monastic remains lie 1m below present ground level, it is probable that the erection of the signage and bollards will not damage buried archaeological remains. However, given the scheduled status of the site and the importance of the buried remains, an archaeological watching brief is required as a precaution, in order that buried archaeological remains can be protected and recorded.

Given the shallow depth of the proposed foundations, it is probably unlikely that human remains will be disturbed. If human bone is found, it should be left in-situ. A church faculty and/or Ministry of Justice Burial Licence would be required to remove it. See appendix 3 of this specification.

The watching brief must be carried out by a suitably qualified and experienced archaeological organisation.

ALL WORK MUST BE CARRIED OUT IN COMPLIANCE WITH THE CODES OF PRACTICE OF THE INSTITUTE OF FIELD ARCHAEOLOGISTS AND MUST FOLLOW THE IFA STANDARD AND GUIDANCE FOR WATCHING BRIEFS (REVISED 2001).

The work will record any archaeological deposits of importance found on the plot. Significant remains (such as structural remains associated with the monastery or priory) must be left in-situ. Remains which post-date the priory can (if necessary) be recorded, excavated and then removed. Environmental sampling might be required. The purpose of this brief is to obtain tenders for this work. The report must be the definitive record for deposition in the Tyne and Wear HER.

A toothless bucket will be used on the plant employed on site to reduce damage to archaeological remains.

THE NORTH-EAST REGIONAL RESEARCH FRAMEWORK FOR THE HISTORIC ENVIRONMENT (2006) NOTES THE IMPORTANCE OF RESEARCH AS A VITAL ELEMENT OF DEVELOPMENT-LED ARCHAEOLOGICAL WORK. IT SETS OUT KEY RESEARCH PRIORITIES FOR ALL PERIODS OF THE PAST ALLOWING COMMERCIAL CONTRACTORS TO DEMONSTRATE HOW THEIR FIELDWORK RELATES TO WIDER REGIONAL AND NATIONAL PRIORITIES FOR THE STUDY OF ARCHAEOLOGY AND THE HISTORIC ENVIRONMENT. THE AIM OF NERRF IS TO ENSURE THAT ALL FIELDWORK IS CARRIED OUT IN A SECURE RESEARCH CONTEXT AND THAT COMMERCIAL CONTRACTORS ENSURE THAT THEIR INVESTIGATIONS ASK THE RIGHT QUESTIONS.

The commissioning client will provide plans indicating the location of the proposed work.

Notification

The appointed Archaeological Contractor must inform Lee McFarlane, Inspector of Ancient Monuments, Historic England (0191 2691239) and the County Archaeologist of the start and end dates of the Watching Brief and must keep both parties informed of the degree of archaeological survival.

PROJECT DESIGN

Because this is a detailed specification, a Project Design from the appointed archaeologist is **not** required. The appointed archaeologist is expected comply with the requirements of this specification.

The tasks

1 A construction timetable has yet to be agreed. Tenders for the Watching Brief should therefore be a cost per day including overheads such as travel costs and equipment. Contingency costs will be provided for environmental sampling and scientific dating per sample and for finds analysis. Any variation on the agreed timetable will be notified by the client, who will give a minimum of 48 hours notice of a change on the days of site attendance. Close liaison between the parties involved will be needed to co-ordinate this element of the work.

2 The work involves undertaking a structured watching brief to observe and record any archaeological deposits and finds from this locality. The absence of deposits and finds must be recorded as negative evidence. **The Watching Brief will not aim to hinder the construction programme, however should archaeological remains be found, the appointed archaeologist must be allowed sufficient time to fully record (by photograph and scale plan and section), excavate and environmentally sample (if necessary) the archaeological deposits.** Within the course of the Watching Brief, it may be possible to record sections through the stratigraphy exposed during the construction work.

Photographic Recording

The photographic record can be taken in **either** black and white print and colour transparency **or** with a digital camera. All images must include a clearly visible graduated metric scale.

All photographs forming part of the record should be in sharp focus, with an appropriate depth of field. They should be adequately exposed in good natural light or, where necessary, sufficiently well-lit by artificial means.

Use of digital cameras

Use a camera of 10 megapixels or more.

For maximum flexibility digital Single Lens Reflex cameras offer the best solution for power users. 10 megapixels should be considered a minimum requirement.

When photographing with digital SLR cameras, there is often a magnifying effect due to smaller sensor sizes.

If the JPEG (Joint Photographic Experts Group) setting is used, set the camera for the largest image size with least compression. The JPEG format discards information in order to reduce file size. If the image is later manipulated, the quality will degrade each time you save the file.

For maximum quality, **the preferred option** is that the RAW (camera-specific) setting is used. This allows all the information that the camera is capable of producing to be saved. Because all of the camera data is preserved, post processing can include colour temperature, contrast and exposure compensation adjustments at the time of conversion to TIFF (Tagged Interchangeable File Format), thereby retaining maximum photographic quality.

The RAW images must be converted to TIFF before they are deposited with the HER and TWAS because special software from the camera manufacturer is needed to open RAW files.

Uncompressed formats such as TIFF are preferred by most archives that accept digital data.

Post photography processing:

The submitted digital images must be 'finished', ready to be archived.

Post photography processing workflow for RAW images:

1 Download images
2 Edit out unwanted shots & rotate
3 Batch re-number
4 Batch caption
5 Batch convert to TIFF
6 Edit in Photoshop or similar
7 Save ready to burn to CD
8 Burn to CD
9 Dispatch

Batch caption – the image files should be named to reflect their content, preferably incorporating the site or building name. Consistent file naming strategies should be used. It is good practice not to use spaces, commas or full stops. For advice, go to http://ads.ahds.ac.uk/project/userinfo/deposit.html#filenaming . In order to find images at a future date and for copyright the site or building name, photographer's name and/or archaeological unit etc must be embedded in the picture file. The date can be appended from the EXIF data. Metadata recording this information must be supplied with the image files. A list of images, their content and their file names should be supplied with the image files on the CDs.

Batch conversion to TIFF – any white balance adjustments such as 'daylight' or 'shade' be required then this can be done as part of the conversion process. Ensure that any sharpening settings are set to zero.

Edit in 'Imaging' software such as Photoshop – tonal adjustments (colour, contrast) can be made. Rotate images where necessary, crop them to take out borders, clean the images to remove post-capture irregularities and dust. Check for sensor dust at 100% across the whole image.

Save ready for deposit – convert to TIFF and save. Retain the best colour information possible – at least 24 bit.

If the JPEG setting has been used and the image has been manipulated in any way it should be saved as a TIFF to prevent further image degradation through JPEGing.

Burn to CD – the NMR recommends using Gold CDs. Use an archive quality disk such as MaM-E gold. Gold disks have a lower burn speed than consumer disks.

Disks should be written to the 'Single Session ISO9660 – Joliet Extensions' standard and not UDF/Direct CD. This ensures maximum compatibility with current and future systems.

Images should be placed in the root directory not in a folder.

The CD will be placed in a plastic case which is labelled with the site name, year and name of archaeological contractor.

For more guidance on digital photography:

Digital Imaging Guidelines by Ian Leonard, Digital Archive Officer, English Heritage 22 September 2005)

Understanding Historic Buildings – A guide to good recording practice, English Heritage, 2006

Duncan H. Brown, 2007, "Archaeological Archives – A guide to best practice in creation, compilation, transfer and curation"

IFA, Guidance on the use and preservation of digital photographs

FISH (Forum on Information Standards in Heritage), September 2006 v.1, A Six Step Guide to Digital Preservation, FISH Fact Sheet No. 1

Visual Arts Data Service and Technical Advisory Service for Images, Creating Digital Resources for the Visual Arts: Standards and Good Practice http://vads.ahds.ac.uk/guides/creating_guide/contents.html

AHDS Guides to Good Practice – Julian Richards and Damian Robinson (eds), Digital Archives from Excavation and Fieldwork: Guide to Good Practice, Second Edition

Printing the images:

In view of the currently unproven archival performance of digital data it is always desirable to create hard copies of images on paper of archival quality.

A selection of the images will be printed in the finished report for the HER, two images per A4 page.

When preparing files for printing, a resolution of 300dpi at the required output size is appropriate.

A **full set** of images will also be professionally printed in black and white and colour for submission as part of the site archive (if the results warrant the production of an archive).

Use processing companies that print photos to high specifications. Commercial, automatic processing techniques do not meet archival standards and must not be used.

All prints for the archive must be marked on the back with the project identifier (e.g. site code) and image number.

Store prints in acid-free paper enclosures or polyester sleeves (labelled with image number)

Include an index of all photographs, in the form of running lists of image numbers

The index should record the image number, title and subject, date the picture was taken and who took it

The print sleeves and index will either be bound into the paper report or put in an A4 ringbinder which is labelled with the site name, year and archaeological unit on its spine.

General Conditions

All staff employed by the Archaeological Contractor shall be professional field archaeologists with appropriate skills and experience to undertake work to the highest professional standards.

The Archaeological Contractor must maintain a Site Diary for the benefit of the Client, with full details of Site Staff present, duration of time on site, etc. and contact with third parties.

The Archaeological Contractor must be able to provide written proof that the necessary levels of Insurance Cover are in place.

The Client may wish to see copies of the Archaeological Contractor's Health and Safety Policies.

Finds Processing and Storage

Finds shall be recorded and processed in accordance with the IFA Guidelines for Finds Work

Finds will be assessed by an experienced finds specialist.

The Archaeological Contractor will process and catalogue the finds in accordance with Museum and Galleries Commissions Guidelines (1992) and the UKIC Conservation Guidelines, and arrange for the long term disposal of the objects on behalf of the Client. A catalogue of finds and a record of discard policies, will be lodged with the finds for ease of curation.

Assessment should include x-radiography of all iron objects (after initial screening to exclude recent debris) and a selection of non-ferrous artefacts (including all coins). Refer to "Guidelines on the x-radiography of archaeological metalwork, English Heritage, 2006.

If necessary, pottery sherds and bricks should be recommended for Thermo-luminescence dating.

Finds processing, storage and conservation methods must be broadly in line with current practice, as exemplified by the IFA "Standard and guidance for the collection, documentation, conservation and research of archaeological materials", 2001. Finds should be appropriately packaged and stored under optimum conditions, as detailed in the RESCUE/UKIC publication "First Aid for Finds" (Watkinson and Neal 1998). Proposals for ultimate storage of finds should follow the UKIC publication "Guidelines

for the Preparation of Excavation Archives for Long-term Storage" (Walker 1990). Details of methodologies may be requested from the Archaeological Contractor.

Other useful guidance – "A Strategy for the Care and Investigation of Finds", English Heritage, 2003, "Finds and Conservation Training Package", English Heritage, 2003.

All objects must be stored in appropriate materials and conditions to ensure minimal deterioration. Advice can be sought from Jacqui Huntley of English Heritage (07713 400387) where necessary.

The report

The production of Site Archives and Finds Analysis will be undertaken according to English Heritage Guidelines (Managing Archaeological Projects 2nd Edition).

The archaeological contractor will provide a report of archaeological operations, including:

- a site location plan and grid reference
- brief description of recording procedures
- plans and sections of stratigraphy recorded (if practical)
- report on the finds (if any)
- environmental report (if relevant)
- colour photographs of the site and any significant archaeological features/finds
- a summary of the results of the work
- copy of this specification

The report will form an addition to the *Short Reports* files in the Tyne and Wear Historic Environment Record.

One bound and collated paper copy of the report needs to be submitted:

- for deposition in the County HER

Three pdf copies on CD are needed:

- one for Historic England
- one for the commissioning client

- and one for deposition in the County HER at the address on the first page. Please do not attach this to the paper report.

Site Archive

The archive should be a record of every aspect of an archaeological project – the aims and methods, information and objects collected, results of analysis, research, interpretation and publication. It must be as complete as possible, including all relevant documents, records, data and objects {Brown, 2007, 1}.

The site archive (records and materials recovered) should be prepared in accordance with Managing Archaeological Projects, Second Edition, 5.4 and appendix 3 (HBMC 1991), "Archaeological documentary archives" IFA Paper No. 1, "Archaeological Archives – creation, preparation, transfer and curation" Archaeological Archives Forum etc., Guidelines for the Preparation of Excavation Archives for Long Term Storage (UKIC 1990) and "Archaeological Archives – A guide to best practice in creation, compilation, transfer and curation" by Duncan H. Brown, Archaeological Archives Forum, July 2007.

Documentary Archive

The documentary archive comprises all records made during the archaeological project, including those in hard copy and digital form.

This should include written records, indexing, ordering, quantification and checking for consistency of all original context sheets, object records, bulk find records, sample records, skeleton records, photographic records (including negatives, prints, transparencies and x-radiographs), drawing records, drawings, level books, site note-books, spot-dating records and conservation records, publication drafts, published work, publication drawings and photographs etc.

A summary account of the context record, prepared by the supervising archaeologist, should be included.

All paper-based material must at all times be stored in conditions that minimise the risk of damage, deterioration, loss or theft.

Do not fold documents

Do not use self-adhesive labels or adhesive or tape of any kind

High quality paper (low-acid) and permanent writing materials must be used.

Original drawings on film must be made with a hard pencil, at least 4H.

Do not ink over original pencil drawings.

Use polyester based film for drawings (lasts longer than plastic).

Store documents in acid-free, dust-proof cardboard boxes

Store documents flat

All documents must be marked with the project identifier (e.g. site code) and/or the museum accession number.

All types of record must use a consistent terminology and format.

Use non-metal fastenings, and packaging and binding materials that ensure the longevity of documents.

Copies of reports and appropriate drafts, with associated illustrative material, must be submitted for inclusion with the archive.

Material Archive

The material archive comprises all objects (artefacts, building materials or environmental remains) and associated samples of contextual materials or objects.

All artefacts and ecofacts retained from the site must be packed in appropriate materials.

All finds must be cleaned as appropriate to ensure their long-term survival

All metal objects retained with the archive must be recorded by x-radiograph (except gold or lead alloys or lead alloys with a high lead content and objects too thick to be x-rayed effectively e.t.c.)

All finds must be marked or labelled with the project and context identifiers and where relevant the small-finds number

Use tie-on rot-proof labels where necessary

Bulk finds of the same material type, from the same context, may be packed together in stable paper or polythene bags

Mark all bags on the outside with site and context identifiers and the material type and include a polyethylene label marked with the same information

Use permanent ink on bags and labels

Sensitive finds must be supported, where appropriate, on inert plastic foam or acid-free tissue paper. It is not advisable to wrap objects in tissue as the unwrapping could cause damage.

The archive will be placed in a suitable form in the appropriate museum (Tyne and Wear Museums (contact Alex Croom at Arbeia Roman Fort 0191 4544093).

A letter will be sent to the County Archaeology Officer within six months of the report having been submitted, confirming where the archive has been deposited.

OASIS

The Tyne and Wear County Archaeologist supports the Online Access to the Index of Archaeological Investigations (OASIS) project. This project aims to provide an online index/access to the large and growing body of archaeological grey literature, created as a result of developer-funded fieldwork.

The archaeological contractor is therefore required to register with OASIS and to complete the online OASIS form for their watching brief at http://www.oasis.ac.uk/. Please ensure that tenders for this work takes into account the time needed to complete the form.

Once the OASIS record has been completed and signed off by the HER and NMR the information will be incorporated into the English Heritage Excavation Index, hosted online by the Archaeology Data Service.

The ultimate aim of OASIS is for an online virtual library of grey literature to be built up, linked to the index. The unit therefore has the option of uploading their grey literature report as part of their OASIS record, as a Microsoft Word document, rich text format, pdf or html format. The grey literature report will only be mounted by the ADS if both the unit and the HER give their agreement. The grey literature report will be made available through a library catalogue facility.

Please ensure that you and your client understand this procedure. If you choose to upload your grey literature report please ensure that your client agrees to this in writing to the HER at the address below.

For general enquiries about the OASIS project aims and the use of the form please contact: Mark Barratt at the National Monuments Record (tel. 01793 414600 or oasis@english-heritage.org.uk). For enquiries of a technical nature please contact: Catherine Hardman at the Archaeology Data Service (tel. 01904 433954 or oasis@ads.ahds.ac.uk). Or contact the Tyne and Wear Archaeology Officer at the address below.

APPENDICES

1 Environmental Sampling, Scientific Analysis and Scientific Dating

This is a compulsory part of the watching brief exercise where suitable archaeological features are found.

Advice on the sampling strategy for environmental samples and samples for scientific dating etc. must be sought from Jacqui Huntley, English Heritage Advisor for Archaeological Science (07713 400387) **before** the evaluation begins. The sampling strategy should include a reasoned justification for selection of deposits for sampling.

Scientific investigations should be undertaken in a manner consistent with "The Management of Archaeological Projects", English Heritage 1991 and with

"Archaeological Science at PPG16 Interventions: Best Practice for Curators and Commissioning Archaeologists", English Heritage, 2004.

See also 'Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post excavation', English Heritage, second edition 2011.

http://www.english-heritage.org.uk/publications/environmental-archaeology-2nd/

English Heritage guidance documents on archaeological science can be downloaded as pdf files from www.helm.org.uk or www.English-Heritage.org.uk > Learning and Resources > Publications > Free Publications.

See also the Environmental Archaeology Bibliography (EAB):
http://ads.ahds.ac.uk/catalogue/specColl/eab_eh_2004/

and the NMR sciences thesaurus:

http://thesaurus.english-heritage.org.uk/thesaurus.asp?thes_no=560

There must be full specialist liaison throughout the project – this need not necessarily be face-to-face.

Sampling should be demonstrated to be both fit for purpose and in-line with the aims and objectives of the project.

The choice of material for assessment should be demonstrated as adequate to address the objectives.

Evaluations and assessment of scientific material should provide clear statements of their potential and significance in addition to descriptive records. These statements should relate to the original objectives but may also lead to new or modified objectives.

Post excavation analysis and interpretation requires sufficient information exchange and discussion to enable scientific specialists to interpret their material within the established intellectual framework.

Archaeological and scientific analyses should be integrated as fully as possible. It is not acceptable to leave the scientific analyses simply as appendices.
Archive reports should include full data from all specialist materials. All reports, including any publications, must present sufficient primary data to support the conclusions drawn.

{From '10 principles of good practice in archaeological science' by English Heritage 2010}.

Types of sample

Flotation samples are used to recover charred and mineral-replaced plant remains, small bones, industrial residues etc. Such samples should be whole earth, 40-60 litres or 100% of small features. The flot mesh size should be 0.25-0.3mm. The residue sieve size should be 0.5-1mm. The flot and <2mm residue should be sorted under the microscope. >2mm residues can be sorted by eye.

Coarse-sieved samples are used to recover small bones (such as bird and fish), bone fragments, molluscs and small finds (beads, pottery, coins etc). Such samples should be 100 or more litres, wet or dry sieved, minimum mesh 2mm. Specialist advice is recommended.

Other types of sample are monoliths, specialist, cores and small spot. These are taken for specific reasons and need specialists.

Aims and objectives

Aims of environmental sampling – to determine the abundance/concentration of the material within the features and how well the material is preserved, to characterise the resource (the site) and each phase, to determine the significance of the material and its group value, what crop processing activities took place on the site? What does this tell us about the nature of the site? Is there any evidence for changes in the farming practice through time? How did people use this landscape? Can we place certain activities at certain locations within the site? Function and date of individual features such as pits, hearths etc. Are the charred assemblages the result of ritual deposition or rubbish? Is the charcoal the result of domestic or industrial fuel?

Deposits should be sampled for retrieval and assessment of the preservation conditions and potential for analysis of biological remains (English Heritage 2002). Flotation samples and samples taken for coarse-mesh sieving from dry deposits should be processed at the time of fieldwork wherever possible. Sieving recovers fish, amphibian, small bird and mammal bone, small parts of adult mammals and young infused bones which may be under-represented otherwise. However it is noted that sticky clay soils in this region make sieving difficult. Discuss the potential for sieving with Regional Advisor for Archaeological Science.

Environmental samples (bulk soil samples of 30-40 litres volume) will be collected by the excavator from suitable (i.e. uncontaminated) deposits. It is suggested that a large number of samples be collected during evaluation from which a selection of the most suitable (uncontaminated) can be processed. All tenders will give a price for the assessment, full analysis, report production and publication per sample.

The full 30-40 litre sample must be assessed by the laboratory, not just a small sub-sample.

The following information should be provided with the environmental samples to be processed – brief account of nature and history of the site, aims and objectives of the project, summary of archaeological results, context types and stratigraphic relationships, phase and dating information, sampling and processing methods, sample locations, preservation conditions, residuality/contamination etc.

Laboratory processing of samples shall only be undertaken if deposits are found to be reasonably well dated, or linked to recognisable features and from contexts the derivation of which can be understood with a degree of confidence.

A range of features, and all phases of activity, need to be sampled for charred plant remains and charcoal. Aceramic features should not be avoided as the plant remains from these features may help to date them. Deep features should be sampled in spits to pick up changes over time. Part or all of each of the contexts should be processed. In general samples should be processed in their entirety. All flots should be scanned, and some of the residues.

Scientific Dating

Deposits will be assessed for their potential for radiocarbon, archaeomagnetic and Optically Stimulated Luminescence dating.

See 'Archaeomagnetic Dating: Guidelines on producing and interpreting archaeomagnetic dates', English Heritage, 2006 and

'Luminescence Dating: guidelines on using luminescence dating in archaeology', English Heritage, 2008.

Timbers will be assessed for their potential for dendrochronology dating. Sampling should follow procedures in "Dendrochronology: guidelines on producing and interpreting dendrochronological dates", Hillam, 1998.

All tenders will quote the price of these techniques per sample.

For large excavations, particularly of prehistoric sites, a specialist scientific dating consultant must be part of the post-excavation assessment team. They will ensure that money set aside for dating is well spent, that the most appropriate soil samples are submitted for dating, that the right number of samples are submitted for dating. The expert will explain what to date and why. Don't send off samples for dating just for sake of it. The English Heritage Scientific Dating team (contact Pete Marshall) can provide contact details for scientific dating experts.

Once radiocarbon date results come back from the lab, avoid eyeballing your C14 dates. Modelling gives better date estimates.

AMS can now be used to date cremated bone.

Pollen

Pollen samples can be taken from features such as lakes, ponds, palaeochannels, estuaries, saltmarshes, mires, alluvium and colluvium, and from waterlogged layers in wells, ditches and latrines etc. Substances such as honey, beer or food residues can be detected in vessels. Activities such as threshing, crop processing and the retting of flax can be identified. When taken on site, pollen samples should overlap. Your regional science advisor can advise on the type of corer or auger which would be most appropriate for your site. Samples need to be wrapped in clingfilm and kept dark and

cool. Make a description of the sediments in which the pollen was found, and send this with the sample to be assessed.

Forams and diatoms

Coastal or estuary sites (even those which are now well drained) are suitable for sampling for foraminifera. Diatoms can also be found on marine sites, but also in urban settings (sewers, wells, drains, ditches etc). They only survive in waterlogged conditions. These aquatic microfossils are used as proxy indicators of the former aquatic ecological conditions on site, changes in sea levels and temperature, salinity, PH and pollution. Forams are taken from cores, monolith tins or bulk samples. Diatoms are cut from monolith tins or cores or taken as spot samples.

Insects

Insects, which are useful as palaeoenvironmental indicators, survive best in waterlogged deposits such as palaeochannels and wells. They can provide information on climate change and landscape reconstruction as some species are adapted to particular temperatures, habitats or even particular trees. Certain insects can indicate the function of a feature or building (eg. Weevils, which were introduced by the Romans, often indicate granary sites, parasites will indicate the presence of particular animals such as sheep or horse, latrine flies survive in the mineral deposits in latrines, or in the daub of medieval buildings etc). Samples need to be sealed (eg. in a plastic box).

Industrial Activity

Where there is evidence for industrial activity, macroscopic technological residues should be collected by hand. Separate samples should be collected for micro-slags (hammer-scale and spherical droplets). Guidance should be sought from the English Heritage Regional Science Adviser on the sampling strategy for metalworking features and advice on cleaning and packaging. Specialist on-site advice must be sought on identification of metalworking features. Slag and metal working debris must be assessed by a specialist. Scientific analysis (such as x-ray fluorescence, chemical analysis, metallography or scanning electron microscope) of slag can provide information on the melting temperature, chemical composition (is it iron, zinc, copper etc), microstructure (the type and shape of the crystals), physical properties (the

hardness or viscosity), isotopic composition (strontium_87 or strontium_88 etc) and mineralogical composition.

See "Archaeomagnetic dating", English Heritage, 2006

"Guidelines on the X-radiography of archaeological metalwork", English Heritage, 2006.

Historical Metallurgy Society, 2008, "Metals and metalworking: a research framework for archaeometallurgy".

Centre for Archaeology Guidelines on 'Archaeometallurgy' 2001.

'Science for Historic Industries: Guidelines for the investigation of 17th to 19th century industries', English Heritage, 2006.

Buried soils and sediments

Buried soils and sediment sequences should be inspected and recorded on site by a recognised geoarchaeologist. Procedures and techniques in the English Heritage document "Environmental Archaeology", 2002 and "Geoarchaeology", 2004 should be followed.

See also 'Geoarchaeology. Using earth sciences to understand the archaeological record', English Heritage, 2007.

Wood

Sampling strategies for wooden structures should follow the methodologies presented in "Waterlogged wood. Guidelines on the recording, sampling, conservation and curation of waterlogged wood" R. Brunning, 1996. If timbers are likely to be present on your site, contact a wood specialist beforehand. Pre-excavation planning – determine questions to ask, agree on a sampling strategy, allocate reasonable time and budget. Soil samples should be taken of the sediments surrounding the timber. Keep the timbers wet! Record them asap on-site – plan, photograph, record the size and orientation of the wood (radial, tangential,transverse), any toolmarks, joints, presence of bark, insect damage, recent breaks, and if another piece of wood was on top of or below the piece sampled. Both vertical and horizontal positioning of wattling

must be recorded. Wood samples can provide information on woodland management such as medieval coppicing, type of taxa (native or foreign), conversion technology (how the wood was turned into planks), building techniques and type of tools used.

Suitable samples should be submitted for dendrochronological dating. See English Heritage guidelines, 2004, "Dendrochronology".

Leather and organic materials

Waterlogged organic materials should be dealt with following recommendations in "Waterlogged Organic Artefacts – Guidelines on their Recovery, Analysis and Conservation", English Heritage, 2012 and "Guidelines for the care of waterlogged archaeological leather", English Heritage and Archaeological Leather Group 1995.

Glass

As glass-making furnaces are above ground structures, they rarely survive. However sample residues can produce glass fragments which define glass working even though no traces of furnaces survive.
Excavations at Whitby Abbey recovered glassworking waste from preliminary sampling. Targeted bulk sampling in subsequent years recovered more evidence for glass working. Raw glass, twisted rods of glass and a possible glass inlay for an illustrated book were found. Similar glass rods were found at St. Gregory's Minster at Kirkdale, North Yorkshire.

Analysis can find out where glass was imported from (a lot of Roman glass came from Alexandria).

Analysis of the composition of glass can show varying additives and salt composition. At Whitby Abbey the varying salt composition in glass throughout the Early Medieval period reflected climate change.

Is the glass made from recycled glass waste or raw materials?

Is there evidence of glass blowing?

English Heritage has guidance forthcoming in 2010.

2 Animal Bone

Animal bone can explore themes such as hunting and fowling, fishing, plant use, trade network, seasonality, diet, butchery, animal husbandry, food procurement, age structures, farrowing areas, species ratios, local environment.

Domestic animal bone was used in prehistoric and Roman cremation rituals.

Post medieval cattle bones – small cow bones invariably represent animals which produced high quality buttermilk for cheese. Big 'improved' cattle with large bones were produced for large quantities of meat and poorer quality milk. Large and small cattle bones are often found together on post medieval sites, usually with less of the small bones.

Animal bone assemblages should be assessed by a recognised specialist.

The specialist will need to know a brief account of the nature and history of the site, an account of the purpose, methods (details of sampling) for recovery of animal bones, and the main aims and results of the excavation, details of any specific questions that the excavator wants the animal bone specialist to consider, information about other relevant finds from the excavation (e.g. bone tools, fishing equipment, weaving equipment), specific information about each context that has produced significant quantities of animal bone (recovery method, phase, context type, position in relation to major structures, contamination by more recent material, some indication of the amount of bone (by weight or by container size). See "Ancient Monuments Laboratory Advisory Note, "Assessment of animal bone collections from excavations", Sebastian Payne, 1991and "The Assessment of a collection of animal bones", S. Davis, n.d., Ancient Monuments Laboratory.

Fish bone

Because fish bones are so small, particularly freshwater and estuarine species, they are often only recovered in large bulk samples. Samples must always be sieved.

Rescue excavations carried out in the 1970s at the Iron Age hillfort of Broxmouth in East Lothian produced an assemblage of fish bone. Recent analysis of this material has proved the presence of large specimens of ling and other species which suggests that the Broxmouth population carried out deep-sea fishing. It has previously been

suggested that Iron Age fishing would only have been undertaken by lines from the shore. It has also been suggested that fish was not consumed in Iron Age Britain due to religious or cosmological reasons {Hannah Russ, Ian Armit, Jo McKenzie, Andrew Jones, 2012, Deep-sea fishing in the Iron Age? New evidence from Broxmouth hillfort, South-east Scotland in Environmental Archaeology, Vol 17, Number 2, pp 177-184).

Roman agenda – did the Romans eat fish? Were they sourced locally or imported? Use of fish as a sauce (garum).
Excavations at Bridge Street, Chester showed that in the Roman period fish was eaten and was both locally sourced and imported (mullet and Spanish mackerel).
Medieval and post medieval agenda – evidence for the deep sea fishing 'revolution', size-biased collections, replacement or supplement of freshwater and estuarine fish in the diet by deep sea fish.

There was some herring exploitation in the early medieval period. Christian fasting from around 970 allowed fish to be eaten on Fridays which led to a huge demand for fish. There was an increase in marine fishing, fish trade and fish consumption (cod, haddock, ling, herring etc) around 1000 AD. Middens provide evidence of commercial fishing. There was a decline in freshwater fish (cyprinid or carp, salmon, smelt, eel, pike) from the eleventh century.

Smoking fish is a recent practice. They were previously air dried and salted.

Newcastle was a major port. Samples should be sieved to retrieve fish and bird bones along with small parts of other animal skeletons and young infused bones.

A crane bone was recovered from excavations at Tuthill Stairs, Newcastle – a rare find.

Herring bones are so small that they can only be retrieved by 2mm sieving.

Clay soils are difficult to sieve, hot water can help.

Acidic soils mean poor preservation of bone.

See English Heritage 2002, "Environmental Archaeology – a guide to the theory and practice of methods from sampling and recovery to post excavation", Centre of Archaeology Guideline 1.

Isotope analysis can determine where the fish were coming from – North Sea, Scandinavia, Newfoundland, Iceland etc.

There is an excellent reference collection of fish bone at York.

Fish bones should be archived to museums for future dating and isotope analysis where this is not undertaken as part of the post-excavation process.

www.fishlab.org

3 Human Remains

Human remains must be treated with care, dignity and respect.

Excavators must comply with the relevant legislation (essentially the Burial Act 1857) and local environmental health concerns. If found, human remains must be left in-situ, covered and protected. The archaeological contractor will be responsible for informing the police, coroner, local Environmental Health department and the County Archaeologist. If it is agreed that removal of the remains is essential, the archaeological contractor will apply for a licence from the Home Office and their regulations must be complied with.

The excavation area must be shielded from public view with screens.

The excavation of human remains is a delicate and time consuming operation. The process can take one or two days per skeleton. If the skeleton cannot be excavated all in one day cover it with plastic sheeting overnight to prevent it from drying out. The remains should be excavated as completely as possible to give the bioarchaeologist the maximum amount of data.

A bioarchaeologist should be employed for any burial excavation from the start of the project.

A basic diagram of a skeleton should be available on site for staff to consult (such as that in Abrahams et al, 2008, McMinn's the human skeleton).

Once the top of a skeleton is reached, excavation will be undertaken using delicate tools such as paintbrushes, teaspoons, dental equipment and plasterers' leaves.

Recover all teeth, hand and foot bones.

Excavate the pubic symphysis of the pelvis with care as it is needed for age estimation of adults.

The ends of the ribs that meet the sternum are useful for age estimation of adults.

There will be a possibility that gall, bladder and kidney stones may survive.
Sesamoid bones may be present in the hands and feet, calcified cartilages in the neck, on the ribs and on the hyoid bone in the neck.

Foetal bones may be present in the abdominal area of female skeletons.

The bones should be shaded from strong sunlight so they do not dry out and crack.

Bones should be drawn at 1:10 using a planning frame. Manual and digital photographs should be taken with a scale and a magnetic north arrow clearly visible. 3D recording using an EDM may be undertaken.

Site inspection by a recognised osteologist is desirable for isolated burials and essential for cemeteries. The remains will be recorded in-situ and subsequently lifted, washed in water (without additives). They will be marked and packed to standards compatible with "Excavation and post-excavation treatment of cremated and inhumed human remains", McKinley and Roberts, 1993. After excavation, the remains will be subject to specialist assessment.

Analysis of the osteological material should take place according to published guidelines "Human Remains from Archaeological Sites, Guidelines for producing assessment documents and analytical reports, English Heritage, 2002.

There is a new (2013) English Heritage guideline for the destructive sampling of archaeological human remains for scientific analysis 'Science and the Dead'.

Some of the potential benefits from the study of human skeletons – demography, growth profiles, patterns of disease, genetic relationships, activity patterns, diet, burial

practices, human evolution. New scientific techniques available include DNA and stable isotope analyses.

Diseases which yield ancient DNA – leprosy, syphilis, tuberculosis, mycobacterium bovis (animal form of TB passed to humans when they shared a living space from Neolithic period onwards).

Radiocarbon dating can be used to chronologically phase burial grounds and track developments in demographic change and variations in the health of the population.

Cremation destroys the crown of the tooth so it cannot be dated (the closure of the cranium vault can be used in adults for dating instead). Cremation also fragments bone, distorts it due to lack of water, shrinks the bone, causes microstructural alteration and destroys organic components (so DNA analysis not possible).

AMS can now be used to date cremated bone.

Carbon and nitrogen stable isotope analysis can be used to study diet, usually to address broad questions about a wider population, rather than to study an individual. Most studies use 30 or more skeletons. Studies have included how social position influenced diet and how diet varied with geographic location.

Strontium and oxygen stable isotope analysis can be used to determine where individuals originated from.

The final placing of the remains after scientific study and analysis will be agreed beforehand.

Health & Safety associated with human remains:

Micro-organisms that might cause harm to humans are extremely unlikely to survive beyond about 100 Years.

More recent remains could be more hazardous to health as they may be in sealed lead coffins. Lead coffins should not be opened. They should be reburied intact without archaeological examination.

There is a danger of lead poisoning arising from high levels of lead in the atmosphere generated by lead coffins (see H. Needleman, 2004, Lead poisoning in Annual Review of Medicine, 55, pp. 209-22).

The possible risks of contracting disease from excavated human remains are highly negligible but could include the virus smallpox, tetanus and anthrax spores, the bacterial infection leptospirosis and the fungal disease mycoses (a problem in dry dusty soils and in crypts).

Excavators should be up-to-date with tetanus inoculations.

Anthrax can come from materials derived from animals – coffin pads, pillows or coffin packing.

Working with human remains may cause psychological stress (see J. Thompson, 1998, Bodies, minds and human remains, in M. Cox (ed) 1998, Grave concerns: Death and Burial in England 1700-1850, pp 197-201).

Normal hygiene measures should be undertaken – washing hands, wearing masks and gloves. Heavily soiled clothing should be burned at an HSE approved site.

Further guidance is available in:

"Guidance for best practice for treatment of human remains excavated from Christian burial grounds in England", The Church of England and English Heritage, 2005 (www.english-heritage.org.uk/upload/pdf/16602_HumanRemains1.pdf)

"Church Archaeology: its care and management", Council for the Care of Churches, 1999

Charlotte A. Roberts, 2009, 'Human Remains in archaeology: a handbook', CBA Practical Handbooks in Archaeology No. 19
S Mays, 2010, The Archaeology of Human Bones, second edition

The Advisory Panel on the Archaeology of Christian burials in England can provide free well-informed advice with consideration of relevant religious, ethical, legal, archaeological and scientific issues. Panel's website:
http://www.britarch.ac.uk/churches/humanremains/index.html

or email the secretary simon.mays@english-heritage.org.uk

4 Treasure

All finders of gold and silver objects, and groups of coins from the same finds, over 300 years old, have a legal obligation to report such items under the Treasure Act 1996. Prehistoric base-metal assemblages found after 1st January 2003 also qualify as Treasure.
Summary Definition of Treasure (Portable Antiquities Scheme ***www.finds.org.uk***)

The following finds are Treasure under the Act, if found after 24 September 1997 (or, in the case of category 2, if found after 1 January 2003):

- Any metallic object, other than a coin, provided that at least 10 per cent by weight of metal is precious metal (that is, gold or silver) and that it is at least 300 years old when found. If the object is of prehistoric date it will be Treasure provided any part of it is precious metal.
- Any group of two or more metallic objects of any composition of prehistoric date that come from the same find (see below)
- Two or more coins from the same find provided they are at least 300 years old when found and contain 10 per cent gold or silver (if the coins contain less than 10 per cent of gold or silver there must be at least ten of them). Only the following groups of coins will normally be regarded as coming from the same find: Hoards that have been deliberately hidden; Smaller groups of coins, such as the contents of purses, that may been dropped or lost; Votive or ritual deposits.
- Any object, whatever it is made of, that is found in the same place as, or had previously been together with, another object that is Treasure.

Any object that would previously have been treasure trove, but does not fall within the specific categories given above. Only objects that are less than 300 years old, that are made substantially of gold or silver, that have been deliberately hidden with the intention of recovery and whose owners or heirs are unknown will come into this category.

Note: An object or coin is part of the 'same find' as another object or coin if it is found in the same place as, or had previously been together with, the other object. Finds may have become scattered since they were originally deposited in the ground.

If anything is found which could be Treasure, under the Treasure Act 1996, it is a legal requirement to report it to the local coroner within 14 days of discovery. The Archaeological Contractor must comply with the procedures set out in The Treasure Act 1996. Any treasure must be reported to the coroner and to The Portable Antiquities

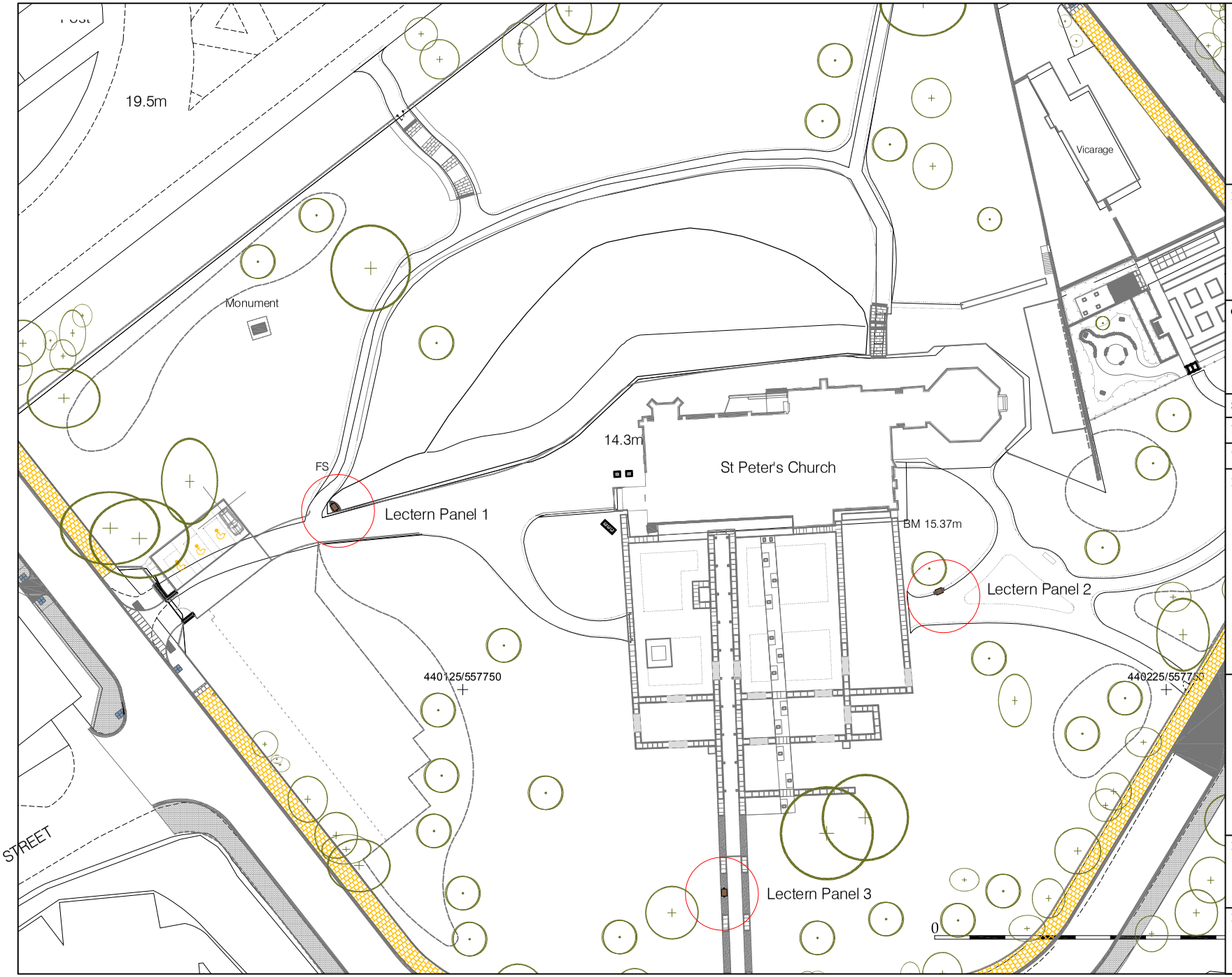
Scheme Finds Liaison Officer, Rob Collins (0191 2225076 or Robert.Collins@newcastle.ac.uk) who can provide guidance on the Treasure Act procedures.

If you need this information in another format or language, please contact Jennifer Morrison, Archaeology Officer.

APPENDIX 4: FIGURES

wardell armstrong Wardell Armstrong 2017	PROJECT: St. Peter's Church, Sunderland, Tyne & Wear SCALE: 1:25,000 at A4 REPORT No: LE13827 CLIENT: Sunderland City Council DRAWN BY: MDR DATE: May 2017 FIGURE: 1	KEY: Site location

Figure 1: Site location.



Wardell Armstrong
2017

PROJECT:
St. Peter's Church, Sunderland, Tyne & Wear

CLIENT:
Sunderland City Council

SCALE: 1:750 at A4

DRAWN BY: MDR

DATE: May 2017

KEY:

Lectern panel location

REPORT No:
LE13827

FIGURE:
2

Figure 2: Location of archaeological watching brief.

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