

# St Paul's Church Hammersmith

Borough of  
Hammersmith and Fulham



## Interim Archaeological Excavation Report Stage 1



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St Paul's Parochial Church  
Council**

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**St Paul's Church  
Hammersmith  
Borough of Hammersmith and Fulham  
London**

***INTERIM ARCHAEOLOGICAL EXCAVATION REPORT- STAGE 1***

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## SUMMARY

*Between the 5<sup>th</sup> and 26<sup>th</sup> of January 2009, Oxford Archaeology (OA) undertook an archaeological excavation in the western churchyard of St Paul's Church, Hammersmith, for CBR Limited on behalf of the Parochial Church Council of St Paul (PCC). These works were undertaken in advance of a proposed extension to the church, and comprised the first stage of archaeological excavation (Stage 1), in which approximately 10% of the total area of the footprint of the proposed construction was excavated. Stage 1 was undertaken in order to ascertain the nature and scale of burial. This information will be central to the formulation of an appropriate archaeological mitigation strategy for the remaining works.*

*An area of 60.3 m<sup>2</sup> was excavated to a maximum depth of 4 m, and all archaeology within the trench was recorded and removed. This comprised 80 articulated coffined burials dating to the early Victorian period (1828-1853). The skeletons were osteologically analysed on site, and are currently stored in the tower of St Paul's Church, with artefacts retrieved during the excavation. This interim report describes the archaeology, assesses its potential, reviews the methodologies employed and makes recommendations for future fieldwork and osteological approaches to the project.*

## 1 INTRODUCTION

### 1.1 Location and scope of work

- 1.1.1 In January 2009, Oxford Archaeology (OA) carried out an archaeological excavation within the western churchyard of the Church of St Paul, Hammersmith. St Paul's Church is located within the Borough of Hammersmith and Fulham, between Hammersmith Bridge Road and Queen Caroline Street, immediately north of the Hammersmith Flyover (TQ 2327 7846) (Figs 1 and 2). The trench was located within the western churchyard.
- 1.1.2 The works comprised an initial exploratory phase (Stage 1), which involved the excavation, recording and removal of 80 post-medieval burials within the footprint of the proposed extension to the church. The results of this initial excavation will inform on the scale of future works, and assist in the formulation of an efficient and appropriate archaeological mitigation strategy for excavation of the remaining area within the footprint. Stage 1 of the archaeological works fulfills an archaeological condition of both of the Church of England Faculty for the development, and of planning requirements set out by GLAAS and the Hammersmith and Fulham District Council.
- 1.1.3 The total excavated area investigated was 60.3 m<sup>2</sup>, which comprised approximately 10% of the total area of the footprint (approximately 583 m<sup>2</sup>) of the proposed construction. The work involved the excavation, recording and removal of all archaeology within the sample area. The work was commissioned by CBR Limited, on behalf of the PCC of St Paul's Church.

### 1.2 Archaeological and historical background

- 1.2.1 The archaeological and historical background is detailed in the Written Scheme of Investigation that was prepared by OA (2008). A summary is provided here and concentrates on the burial activity in the western graveyard.
- 1.2.2 The present Church, dedicated to St Paul, was completed in 1889. The church and churchyard stand on the site of an earlier church, which was founded in 1630, to serve the burgeoning population of the village of Hammersmith.
- 1.2.3 Burial within the churchyard presumably took place from the date of consecration, but the earliest documentary record of burials dates to 1664. The site in question probably forms part of a land acquisition in 1828, gifted by a Dr William Black.
- 1.2.4 The majority of burials in the western graveyard date from 1828 to 1853. This date range has been estimated based on the date of Dr Black's endowment of land of 1828, and the 1853 Act of Parliament that prohibited further burial in urban churchyards, as a response to severe overcrowding. Several memorials within the churchyard commemorate individuals buried after 1853 however, and it is therefore possible that a few burials later than this date did in fact take place in the churchyard.
- 1.2.5 An archaeological watching brief undertaken by Pre-Construct Archaeology (PCA) suggested a density of 0.91 burials per m<sup>2</sup> in the western churchyard, an approximate estimate of 580 burials (PCA 2005a). Richard Griffiths Architects (2006) have estimated a much higher total figure of approximately 800 burials, based on Parish Records kept at the Lila Husset Library.

## 2 PROJECT AIMS AND METHODOLOGY

### 2.1 Aims

- To identify and record the density, depth, location and nature of burials within the area of investigation.
- To record the spatial distribution of the graves within the trench, and their stratigraphic relationship to one another and to other features and layers.
- To record the stratigraphic relationship between successive burials within each grave.
- To record the remains of the wood and metal coffin fittings decorating the coffins and to compare them with the growing corpus of coffin fittings from other sites of this period.
- To identify individuals from *depositum* plate inscriptions wherever possible.
- To excavate, record and remove skeletal remains, coffin remains and associated artifacts.
- To excavate and record all non-burial archaeology within the excavation area.
- To osteological analyse all skeletons in a cabin on site using OA's rapid recording methodology.

- To ensure the safe storage of human remains and archaeological artifacts within the tower of St Paul's Church.
- To make available the results of the archaeological investigation in the form of an interim report that will be submitted to the client, Richard Griffiths Architects, GLAAS and the DAC. It is envisioned that the results of this first stage of archaeological excavation will establish the nature and potential of the burial assemblage, and will form the basis of future archaeological fieldwork and post-excavation strategies.

## 2.2 Methodology

### *Fieldwork methodology*

- 2.2.1 The trench location was set out by CBR Limited. The area was mechanically excavated initially using a 3 tonne Kabouta and then a 13 tonne JCB fixed with a toothless bucket. The modern tarmac, and levelling layers (001), underlying modern made ground (002) were rapidly stripped. The underlying buried soil horizon (005), the topsoil and subsoil of the earlier churchyard, was mechanically excavated under archaeological supervision until the underlying brick earth (003) was revealed. Clear grave cuts were visible from the top of the brick earth. The outline and location of these features was mapped using a Total Station (GIS), as was the limit of excavation.
- 2.2.2 The brick earth was further reduced using the mechanical excavator until the coffin stain of the uppermost burial within each grave was revealed. Given that the level of the shallowest, or uppermost burial in each grave ranged from 1.98 m to 3.25 m below current ground level (BCGL), considerable machining was required.
- 2.2.3 Once the coffin stain and/ or skeleton was revealed within a grave, the skeleton and coffin were hand excavated by an experienced archaeologist or osteoarchaeologist. Each skeleton was rapidly cleaned to reveal the body position and orientation and its relationship to underlying burials.
- 2.2.4 Each burial was assigned an unique context number. Individual skeletons and their associated coffin and artefacts within each grave were identified by the burial group number and a letter (e.g. 303A, B, C and D). A group sheet described the grave cut and its contents, as well as its stratigraphic relationship with other features and layers. The skeleton was recorded on a *proforma* skeleton sheet, which detailed its body position, orientation, skeletal condition and completeness, presence of soft tissue and artefacts (such as shroud pins and buttons). The coffin was also recorded on a *proforma* context sheet, which described the materials, construction, size and shape of the coffin, as well as the decorative metal fittings (including fixing nails and screws, upholstery and upholstery studs, grips, grip plates, breastplates, lid motifs and escutcheons). Motifs on these fittings were described and, where possible, were matched to the coffin fittings catalogue of Christ Church Spitalfields (Reeve and Adams 1993) and the unpublished OA catalogue compiled from numerous burial assemblages previously excavated by OA. Where no parallels could be made, the new type was hand drawn. Coffin fittings were collected and are currently retained in the church tower in bags which are tagged with their unique burial number.

- 2.2.5 The location, depth and orientation of each skeleton were surveyed using a Total Station. The skeleton was then collected in a single large opaque bag and tagged with its unique context number. The human remains and coffin fittings were temporarily stored in a secure, locked container on site, before being relocated to the church tower.
- 2.2.6 The foot ends of seven graves lay beyond the eastern limit of the trench, and along the western limit, the end of only one grave (106) protruded slightly into the trench and remains unexcavated. Bone elements lying beyond the limit of excavation were retrieved where possible, but the lower torsos and legs of most burials along the eastern edge were left *in situ*, and were clearly tagged with their context numbers. This will facilitate the re-union of skeletal elements in the later stage of excavation.
- 2.2.7 Generous bulk soil samples were taken from around and beneath subadults in order to maximise small bone recovery. These samples were sorted on site and outstanding bones were reunited with the rest of the skeleton prior to osteological analysis.
- 2.2.8 A plan of the trench indicating the spatial distribution of the graves and skeletons was generated in CAD from survey points taken using the Total Station (Fig. 3). Scaled sections representing the eastern and western baulks were hand drawn at a scale of 1:20 (Figs 4 and 5). A photographic archive of the excavation was also maintained.

### ***Osteological methodology***

- 2.2.9 Skeletons were brushed with a paintbrush in order to remove superficial soil and decayed remnants of coffin wood and sawdust that adhered to the bone surface. In the vast majority of cases, this cleaning was sufficient for the osteologist to clearly observe the surface of the bone and identify any features, or pathological lesions. In *c.* 10% of cases, brick earth had adhered to the bone making cleaning the bone more problematic. Nevertheless, it was still possible to visualise the bone surface, and it is highly doubtful that traditional washing of the bone would have revealed more detail.
- 2.2.10 Rapid osteological analysis was undertaken on site in accordance with the methodology set out in the Written Scheme of Investigation prepared by OA in July 2008. The analysis included assessment of bone condition and skeletal completeness. A pictorial inventory of elements present was supplemented by written bone counts of the number of ribs, carpals, tarsals, metacarpals, phalanges and vertebrae, such that future calculation of true pathological prevalence is possible. Age, sex, stature and pathological lesions were recorded, as well as additional features, such as evidence of activity-related changes to the bone, and some more prominent non-metric traits (e.g. metopism, spina bifida occulta and one bregmatic bone). Morphological features suggestive of non-Caucasoid ancestry were also noted, and identified as warranting more detailed analysis at a later stage. Preliminary results are presented below (see 3.1.20 onwards).
- 2.2.11 Following analysis, the skeletons were re-bagged and placed in acid-free cardboard boxes. Human remains and their associated coffin fittings were bagged separately,



and where possible, were boxed together. In the majority of cases, however, this was not possible due to space restrictions of the skeleton boxes. The human remains, coffin fittings and other artefacts were moved to the tower of St Paul's Church by CBR and OA staff following completion of site work and the osteological analysis.

### 3 RESULTS

#### 3.1 Description of the archaeology

##### *Trench location and area*

3.1.1 The location of the trench was set out by CBR, and lay broadly within the central southern part of the footprint of the proposed development. The trench was later extended by *c.* 1.5 m to the south to include the area of the proposed southern piling trench. Collapse of sections of the western and eastern baulks also necessitated the excavation of a slightly larger area. The final area, measured from the base of the trench using CAD, was 60.3 m<sup>2</sup>.

##### *Description of layers*

3.1.2 Five layers (001-005) were identified. The lowest was a layer of loose yellow-orange gravel and sands (004) that extended across the base of the trench, and appeared to rise towards the north-west. This natural geology was excavated to a depth of *c.* 0.5-0.7 m. It was this layer that proved most unstable and made the sides of the trench prone to collapse. Deeper graves had been excavated into these gravels and into the overlying layer of natural geology- a compact orange clay-silt brick earth (003). This layer was encountered at approximately 1.5 m BCGL, and was 1.13 m deep. The darker brown fills within the vertical shafts of the graves cutting this layer could be clearly distinguished in plan (Fig. 3) and section (Figs 4 and 5). The brick earth was overlaid by a buried soil horizon (005), which constituted the original topsoil and subsoils of the churchyard. A few ephemeral grave cuts could be distinguished in this layer. This 0.7 m deep buried soil comprised a fairly compact dark grey- brown humic clay-silt. The slightly darker band of topsoil could be distinguished overlying the lighter subsoil within this layer. The buried soil horizon was overlaid by made ground 002, a loose medium brown layer containing considerable amounts of building debris. The date of this layer is not well understood, and may have been laid down either during the 1880s rebuilding of the church or following construction of the Hammersmith flyover (as suggested from anecdotal accounts). Overlying this layer were the 0.25 m of levelling layers and modern tarmac of the recent church car park.

##### *Description of graves*

##### *Dating of burials*

3.1.3 No non-burial archaeology was discovered and the few dateable artefacts (e.g. pottery sherds, clay pipe fragments and two worn copper alloy coins) do not appear to pre-

date the later post-medieval period. The single break coffin shapes and coffin fittings were consistent with 18<sup>th</sup>-19<sup>th</sup> century taxonomies.

#### *Spatial organisation of the burials*

- 3.1.4 Thirty-two single break grave cuts were visible from the top of the brick earth (003). All but one of these (106; see 2.2.6 above) were excavated and recorded. The west-east orientated graves were arranged in four north-south rows, with fairly even spacing between graves. Many graves of adjacent rows appeared to have been staggered, possibly to maximise the use of space within the churchyard. There was little intercutting of graves, the exception being child's grave 207 that cut graves 103 and 208. The head and foot of graves 101 and 303, 103 and 201, and 306 and 409 appeared to clip one another, but no truncation of the coffins or skeletons occurred. The dearth of charnel, lack of intercutting of graves and the formal spatial arrangement of the burials is consistent with historical documentation that indicates that this part of St Paul's churchyard was in use for only a limited period (1828-1852).

#### *Depth of burial*

- 3.1.5 Depth of burial refers to the depth of skeletons, rather than the base of graves, here. The depths of the bottom of graves are given in 4.1 below.
- 3.1.6 The burials were remarkable for their depth. The shallowest burials were 101A and B (a foetus and infant), and infants 208A and B, at 1.88-1.9 m BCGL. These were the only graves that were less than 2 m in depth. The majority of burials (n = 63) were recovered at depths between 2 - 3 m BCGL. The remaining 13 burials lay at depths greater than 3 m, the deepest being burial 104C, lying at 3.73 m BCGL. The human remains in all the graves were removed, with the exception of burial 106, where only a small area of the lower body protruded beyond the western section.

#### *Multiple interments*

- 3.1.7 In several cases the neat single-break outline of the adult-sized grave cuts suggested that re-cutting of the graves had not occurred. This is particularly interesting as most graves (26 of the 31 excavated graves) contained multiple interments (up to five individuals). The most common pattern seen in the arrangement of burials within each grave was that the larger adult coffins were overlaid by smaller child, then infant, then foetal coffins. This hierarchy in age-at-death and coffin size suggests that interments in these graves occurred as one event or very closely spaced in time, before either the corpse or the coffins had decayed (the skeletons being fully articulated and coffins being intact). Scenarios to explain this phenomenon are (1) that these were family graves in which several members of the family died and were buried within a very short time of one another (possibly dying from virulent epidemics, such as smallpox, typhus or cholera). Thus, graves were re-opened when back-fills were relatively fresh and could be easily dug, resulting in little trace of the activity surviving today (2) that individuals within the graves were not related, but

were buried together as a 'job lot' (this scenario was not unknown amongst poorer members of society at this time), or (3) the burials were relocated from elsewhere (probably from the northern or eastern churchyards) and reburied in the new western extension to the original churchyard.

- 3.1.8 The lack of evidence of disturbance of the skeletons and the integrity of the coffins would indicate that any re-organisation of burials must have occurred soon after their original interment, and thus seems the least plausible hypothesis. Such hierarchy of coffin size with each grave was not ubiquitous, however, with the two child burials within grave 104 (B and C) overlaid by an adult female (A), and child burial 206E overlaid by two adults (C and D) and two subadults (A and B). It is thus possible that these multiple burials were indeed family plots, whilst the majority were not. Historical research, osteological analysis of hereditary non-metric traits, and DNA analysis may shed more light on this question in the future.
- 3.1.9 Due to stacking of the coffins within the graves, slumpage of skeletal elements and body parts were common, with some parts of a skeleton recovered up to 30 cm below the rest of the body. The presence of on site osteologists greatly facilitated bone recovery and the successful union of elements of individual skeletons. This process was greatly aided by the diverse age-at-death, sex and physique of the skeletons.

#### *Coffins and coffin fittings*

- 3.1.10 Coffin wood preservation was generally poor (see paragraph 3.7.1), but it was possible to distinguish that coffin shape was of the single-break type, ubiquitous from the early 18<sup>th</sup> century (Litten 1991). With the exception of fetuses 208D and 401B, each individual was interred within a single-layered wooden coffin. The fetuses lay within the coffins of adults. The remains of 26-week old foetus 208D lay within the coffin of mature, adult female (36-45 years) 2008C, presumably its mother. The foetus appears to have been delivered, and had been placed over the left hand of 208C. It is probable that both died as a result of an obstetric emergency. Foetus 401B (34-36 weeks gestation) was also recovered within an adult coffin (401C), but sexing from the skull alone indicated that this adult was possibly male.
- 3.1.11 During the Georgian/Victorian period, coffins were decorated with a series of fittings of various styles. A full suite of coffin fittings comprised one to four departum plates (an inner and outer breastplate, a headplate and a footplate), lid motifs, escutcheons, grips and grip plates. In addition, brass or iron studs, originally used to secure the upholstery to the wooden case, had become a decorative device, being arranged to create complex patterns on the lid and side panels of the coffin.
- 3.1.12 The vast majority of coffin fittings found at St Paul's were made of iron (circa. one in three) and were very corroded. Although many of the coffins had breastplates, these were too corroded to identify the names of any of the individuals. All iron coffin fitting plates fragmented significantly on lifting.

- 3.1.13 The majority of coffin fittings comprised upholstery studs. These were found on the majority of coffins, although in many cases they appeared to have been limited to a single row of studs delimiting the margins of the coffin lid and side panels. More complex stud designs were confined to small groups of studs arranged as triangles or rosettes along these margins.
- 3.1.14 Iron breastplates and grips and grip plates were commonly found, but were very corroded (all iron) and hence, it was problematic to identify the styles. Grips were by no means ubiquitous. Often breastplates and upholstery studs were recovered without the grips being present. Lid motifs and escutcheons were rare.
- 3.1.15 More elaborate coffins sported lid motifs and escutcheons and one, a lead breastplate. Overwhelmingly, however, the coffin assemblage was typical of the more affluent working classes (probably skilled workman or artisans).
- 3.1.16 Most of the coffin fitting styles matched those from predominantly London assemblages (for example, Christchurch, Spitalfields and St George's Bloomsbury), and presumably were manufactured in the Metropolis. It was possible to identify a small number (approximately four) of coffin types that have not been seen elsewhere, but all were fragmented and hence styles were incomplete.
- 3.1.17 All coffin fittings were collected, bagged and labelled and are stored with the skeletons in the tower.

#### *Organic preservation*

- 3.1.18 Organic survival was very poor, with coffin wood surviving only as a stain, or small fragments adhering to metal coffin fittings or nails. Due to this decay it was problematic to distinguish between decayed wood of the coffin base and decayed sawdust within the coffin. The best preserved wood was in coffin 409D. Interestingly, this contained the only skeleton that showed a degree of disarticulation. The skeleton remained broadly in articulation but there had been some movement of thoracic and lumbar vertebrae, ribs, pelves, hand bones and the skull and mandible from their original anatomical position (Plate 4). This disturbance is consistent with putrefaction within a sealed watertight environment, allowing movement of smaller bones in the coffin liquor as the body decays. This tentatively suggests that coffin 409D was either waterlogged (improbable in this gravel substrate) or the coffin joints had been sealed. Sealing joints with Swedish pitch/ Stockholm tar is known in other post-medieval coffins (Litten 1991), and may account for the containment of coffin liquor in this wooden coffin.
- 3.1.19 Human remains included very little soft tissue. Surviving fragments of scalp and hair were occasionally found adhering to copper alloy shroud pins, as were small fragments of loosely woven textile (probably shroud). Upholstery textile (probably baize) was recovered from two coffins. These organic remains have been damped and bagged, and are available for future analysis.

#### *Grave goods and grave clothes*

3.1.20 Very few artefacts were found with the burials. Small shell buttons were recovered from the pelvic area of several male interments, and may have been fastenings of an undergarment. Two small rings of copper alloy may be the remnants of cartwheel buttons. A large horn or tortoise shell comb was recovered from the head area of adult female 104B (Plate 10), presumably holding her final hairstyle in position. No other artefacts were recovered.

### ***The human skeletal remains***

3.1.21 A full description of the methods employed to record the remains is provided in Appendix one of OA's WSI (2008). A total of 80 individual skeletons were recorded and are summarised in Table 1, Appendix 2.

#### *Condition and Completeness*

3.1.22 Skeletons were judged to be in either a good or excellent condition with limited erosion affecting bone surfaces. In particular, the bones from infants and the small bones of the hands and feet were very well preserved. Less well preserved skeletons were those that were buried in the deeper gravel. The area of the chest, where breastplates were found, was also less well preserved in some skeletons.

3.1.23 Over half of the skeletons were over 50% complete, with a large proportion being 75-100% complete. Most of the least complete skeletons comprised those with remains that were not fully excavated because they lay beyond the baulk (see Table 1 Appendix 2; Table 1).

3.1.24 Fragmentation of bone was low, and this facilitated the rapid osteological analysis that was employed, particularly in terms of estimating age and sex and stature.

*Table 1: Completeness of skeletons*

<b>Completeness %</b>	<b>Number of graves</b>	<b>Number skeletons lying beyond the baulk</b>	<b>Total Number of skeletons</b>
<b>&lt;25</b>	7	6	13
<b>25-50</b>	3	5	8
<b>50-75</b>	13	5	18
<b>75-100</b>	41	0	41

#### *Demography*

3.1.25 The assemblage comprised 23 males or possible males, 24 females, or possible females and 33 individuals of unknown sex, including 32 adults and 1 adult. There are currently no accepted methods for estimating the sex of sub adults, which is why they have been classified as 'unsexed'.

3.1.26 Skeletons have been assigned to the following age categories:

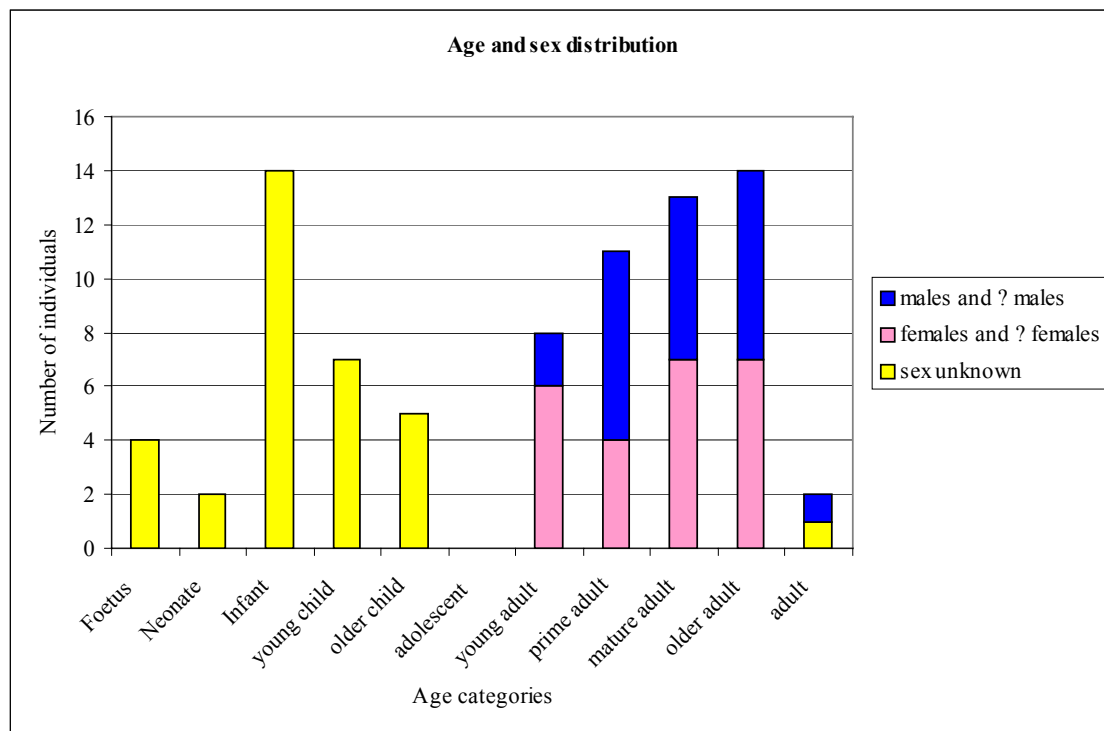
*Table 2 Age categories employed in the analysis*

Age group	Age range
Foetus	< 0 years
Neonate	0-1 months
Infant	0-1 years
Young child	2-5 years
Older child	6-12 years
Adolescent	13-17 years
Young adult	18-25 years
Prime adult	26-35 years
Mature adult	36-45 years
Older adult	> 45 years
Child	2-12 years
Subadult	< 18 years
Adult	> 18 years

3.1.27 There were 32 sub adults and 48 adults. Of the juveniles, most were infants. Of the adult, most were mature or older adults. There were more females than males in the young adult age category. This is probably a result of obstetric casualties among this age group. Only a few skeletons could not be aged more precisely than 'adult' (>18 years), because of missing elements. This is a reflection of how well preserved the remains are.

3.1.28 The assemblage is interesting because of its high number of infants. Whether this is a result of burial practice, or whether this reflects a high infant mortality rate, requires further investigation.

*Figure: age and sex distribution of assemblage (N=80)*



### 3.2 *Stature and physique*

3.2.1 Stature was calculated for all but 8 of the adults. In most cases, estimations employed the maximum length of the left femur. Where the left femur was not available, and a different long bone was used, this has been noted in Table 1, Appendix 2.

3.2.2 Female heights ranged from 145.94 - 175.65 cm, with a mean of 158.7 cm, 5 ft. 2". Not included here is one possible female who was 185 cm tall (6 ft.). Male heights ranged from 161 - 182.79 cm, with a mean of 169.6 cm, 5 ft 5".

3.2.3 Very pronounced muscle attachment sites were observed on many of the adult skeletons. Hand and finger bones frequently had prominent muscle attachment sites, and in one skeleton (405A) this was so marked that the metacarpals showed considerable bowing from mid way along the shafts (Plate 14). There was also new bone growth around the joint margins ('osteophytosis'). These changes are probably unlikely to be the result of fractures, but radiography would be required to confirm this.

3.2.4 Several skeletons had cranial features that were suggestive of non-caucasoid ancestry. A more formal assessment of skulls would be required to explore this further.

#### *Pathology*

3.2.5 A range of pathological conditions was observed. Only basic quantifications of different conditions are given here, as more detailed statistical analysis, for example true prevalence (which is possible using the data gathered thus far) is beyond the scope of this report.

- 3.2.6 Cribra orbitalia (a bony change in the orbits that is believed to represent childhood iron deficiency anaemia) was observed on 11 skeletons, which is less than expected for a post-medieval population. Other metabolic conditions were also lower than expected. For example, no scurvy was observed. However, there were 9 possible cases of rickets. Dental enamel hypoplasia (defects in tooth enamel arising from health stress encountered in childhood) was also infrequent. All of these conditions are identified on the skeleton by noting changes that can vary in their degrees of expression. Thus, it is possible that more subtle cases were missed as a result of the rapid analysis employed.
- 3.2.7 Degenerative joint disease, including osteoarthritis, was frequently observed. Common joints to be affected were those in the cervical spine (in the neck) and the elbow. Although the aetiology of all joint disease is multi-factorial, activity is a major component in the aetiology of degenerative disease in the elbow joint (Jurmain 1999).
- 3.2.8 Non-specific infection was limited to periostitis involving the lower leg (16 skeletons), and occasionally the ribs. Periostitis is a non-specific inflammation of bone and may arise as a result of many conditions, including infection and mild trauma. When it involves the ribs it is usually attributed to respiratory disease, and when it involves the tibiae, it is usually attributed to mild trauma. A single case of tuberculosis (Skeleton 206C Plate 12) was observed on a mature adult male.
- 3.2.9 Trauma in the form of healed fractures mainly involved ribs (8 skeletons) and nasal bones (5 individuals). Fractures involving other bones were rare. One individual had lost the distal first toe bone. The distal articulating surface of the proximal phalanx was absent and the 'stump' was remodelled. Another interesting traumatic injury was observed on Skeleton 405A who had a slipped femoral epiphysis which had subsequently formed a pseudo or 'false' joint (Plate 13).
- 3.2.10 Craniotomies (the surgical removal of the calvarium in the horizontal plane after death) had been performed on 2 adults (1 male and 1 female) and 2 infants. Post-mortem investigation was not uncommon at this time, especially if the circumstances of death were unusual or were caused by an undiagnosed illness.
- 3.2.11 A pipe notch, or a facet formed between teeth as a result of habitual smoking, was observed on the dentitions of 6 individuals, males and females. Also frequent among the dentitions caries (cavities), antemortem tooth loss and calculus, conditions that are common among post-medieval populations.
- 3.2.12 Ossified costal, thyroid and cricoid cartilages were common and were observed in young and old individuals. It is not unusual for cartilages to ossify with age, but it is unusual to see this phenomenon in young individuals.

## 4 DISCUSSION AND CONCLUSIONS

### 4.1 Summary



4.1.1 This initial exploratory excavation phase ('Stage 1'), comprising an area of 60.3m<sup>2</sup>, has revealed 32 graves, of which 31 contained between one and five burials each (one grave was not excavated), yielding a total assemblage size of 80 skeletons. The layout of the graves was well organised and there was limited inter-cutting between graves. They were found at depths of between 1.88 m and 3.73 m below current ground level, with the bottom of graves lying at depths of between 2.10 m and 3.83 m BGCL (Table 2). Coffin furniture survived, but overall this was poorly preserved. There was a limited number of artifacts found within the graves.

*Table 2 Summary of graves and their depths below current ground level (BCGL)*

Grave No.	Context cut through by grave	No. of skeletons	Depth of base BCGL (m)
101	Cuts through brick earth 003	5	3.21
103	Cuts through brick earth 003	2	2.86
104	Cuts through brick earth 003	3	3.83
105	Cuts through brick earth 003	3	2.65
106	Cuts through brick earth 003	Not known	Not excavated. Lay outside the limit of excavation
201	One adult Cuts through brick earth 003	3	2.86
202	Cuts through brick earth 003	3	2.27
206	Cuts through brick earth 003	5	3.70
207	Truncates graves 103 and 208	1	2.10
208	Cuts through brick earth 003	4	3.38
209	Cuts through brick earth 003	1	2.89
210	Cuts through brick earth 003	1	2.30
211	Cuts through brick earth 003	1	2.58
212	Cuts through brick earth 003	1	2.97
213	Cuts through brick earth 003	2	2.73
214	Cuts through brick earth 003	3	2.75
215	Cuts through brick earth 003	4	3.10
216	Cuts through brick earth 003	2	2.90
301	Cuts through brick earth 003	6	2.84
302	Cuts through brick earth 003	6	3.69

303	Cuts through brick earth 003	4	2.72
304	Cuts through brick earth 003	2	2.82
305	Cuts through brick earth 003	1	2.42
306	Cuts through brick earth 003	2	2.98
401	Cuts through brick earth 003	3	2.88
402	Cuts through brick earth 003	2	2.80
405	Cuts through brick earth 003	1	2.65
406	Cuts through brick earth 003	1	2.70
407	Cuts through brick earth 003	1	2.77
408	Cuts through brick earth 003	2	2.43
409	Cuts through brick earth 003	4	3.50
501	Cuts through brick earth 003	1	3.10

## 4.2 The archaeological potential of the assemblage

- 4.2.1 The preservation of the skeletons (both in terms of condition and completeness) is such that the full suite of osteological analyses, including estimation of age, sex and stature, and analysis of non-metric (or familial) traits and pathology could be applied in most cases. The assemblage therefore has considerable potential to add to existing knowledge of health, demography and disease in Victorian London, as outlined in the WSI (OA 2008).
- 4.2.2 Coffin furniture is less well preserved. Owing to poor preservation no biographical details have survived, suggesting low potential for the survival of named individuals in the western graveyard overall. Despite their poor condition, however, useful information (for example, on style) could be retrieved from this material. Through a more detailed analysis this material has potential to inform about burial practice in terms of how coffins were decorated and the extent to which wealth was displayed, as reflected in ornamentation, design and materials. Surviving information on coffin construction is limited.
- 4.2.3 In addition to its excellent preservation, the assemblage is notable for the following:
- The way in which burials have been stacked (see 3.5.1)
  - The high number of infants.
  - Preliminary observations suggest a population that did not experience a heavy burden of chronic disease and that hard physical activity, over an extended period

of time, had a greater impact on skeletal health (both in terms of joint disease and modifications in areas of muscle attachment).

- 4.2.4 These findings require further, detailed investigation and comparison with other assemblages.
- 4.2.5 The potential of the assemblage will be addressed in further detail when the remains are formally assessed (OA 2008).

### 4.3 Implications and recommendations for future works

#### *Archaeological methodology*

##### *Speed of excavation*

- 4.3.1 Due to the great depth of the burials, a considerable amount of time was taken in machining down to the level of the burials. However, recording and lifting of both skeletons and coffin fittings was efficient once the required depth had been achieved. This was facilitated by the lack of stratigraphic complexity (very little intercutting), but slumpage within the graves did require some care in determining which skeletal elements were part of which skeleton. The presence of on site osteologists was extremely beneficial in this respect, and the lack of mixing of skeletons greatly increased efficiency in the osteological recording stage. In addition, small bone recovery was very good, a factor largely attributable to the presence of osteologists on site.
- 4.3.2 Due to the depth of burials and size of area a larger JCB would greatly increase the speed and efficiency of the site work.

##### *Shoring*

- 4.3.3 Due to the great depth of burial (in many cases exceeding 3 m) excavation into the loose gravel and sands (004), underlying the compact brick earth (003), was necessary. Up to this point, the necessity for shoring was avoided by stepping and battering the sides of the trench (removing the unstable made ground and some of the buried soil). The brick earth itself was very stable. Slumpage of the sides of the trench occurred due to weathering and rainfall, and stability was greatly undermined by the instability of the gravel and sand layer (004). This layer appeared to rise towards the north, and hence, may have more significant implications in Stage 2.
- 4.3.4 Short sections of the trench sides were boarded in more unstable and enclosed areas. The stability of the sides noticeably reduced over time, and this has considerable implications for the more lengthy second phase of works. Due to repeated ground reduction by machine as deeper burials are revealed, boarded shoring will not be appropriate. Nor will it be possible to batter the sides, due to space restrictions.

### ***Osteological methodology***

- 4.3.5 One of the aims of the present report was to review the osteological methodology that is described in the WSI (OA 2008). At the time of writing the WSI it was planned that only a sample of the total number of skeletons that lie in the footprint of the proposed development would receive full osteological examination following Stage 2 of the works. The WSI therefore proposed rapid analysis of all skeletons on site, in order to generate a database that would a) allow informed sampling to take place and b) yield useful demographic and palaeopathological information about the population, a proportion of which would potentially be re-buried without any further analysis. This was proposed as an alternative to other methods that propose to informally select a sample, with those not selected receiving no formal examination at all before being re-buried (see PCA 2005b).
- 4.3.6 The rapid osteological analysis employed here (as described in 2.2.9 onwards) is of a higher resolution than traditional osteological assessment (Mays et al. 2002), but less detailed than full analysis (which includes formal metrical and non-metrical analysis and detailed recording and investigation of pathology).
- 4.3.7 It should be noted that this rapid analysis was never intended to take the place of full analysis, but was aimed at rescuing valuable information in a scenario where immediate re-burial was to take place for a proportion of the assemblage. This may not now happen and plans to retain the remains in an ossuary are being explored.
- 4.3.8 If the assemblage is retained in its entirety, then less work will be required to fully examine the remains (than is usually the case), given the level of data collected thus far.
- 4.3.9 The only drawback of this rapid analysis methodology relates to time. The excellent condition and complete nature of the skeletons meant that rapid analysis operated at a slower than expected rate, although this was not greatly slower. Timings should therefore be revised to allow for this during Stage 2.
- 4.3.10 Very limited washing was undertaken. A more formal washing programme could be employed on site during phase 2. Based on the skeletons seen thus far, extensive cleaning will not be necessary and therefore a washing programme will not greatly impact on cost or the overall programme of works.
- 4.3.11 Undertaking the washing on site would be the most efficient and effective way to proceed, both in terms of assisting with the rapid analysis and the amount of time it would take to transport the material off site for washing.

### ***Estimation of the total number of burials in the western churchyard***

- 4.3.12 Based on the findings of this excavation it is possible to estimate the total number of graves and skeletons that might be impacted upon by the proposed extension.
- 4.3.13 The footprint of the proposed extension, including the piling trenches, is approximately 583 m<sup>2</sup>. For the purposes of the present exercise it is assumed that the

entire development will involve the excavation of burials to a maximum depth of 4 m (the maximum depth of burials found during stage 1), or 2,332 m<sup>3</sup>.

- 4.3.14 The following calculations assume that burial density is consistent throughout the western Churchyard. The organised nature of the burials excavated thus far suggests that there is no reason why this will not be the case.

*Estimated number of graves*

- 4.3.15 Based on the number of graves revealed within the excavation trench (32) and the total volume of soil excavated (241.2 m<sup>3</sup>; 60.3 x 4), the density of graves is estimated to be approximately 0.1 graves per every cubic metre. This therefore suggests that a maximum number of 309 graves are present in the western graveyard (0.1 x 2,332 m<sup>3</sup>).

*Estimated number of skeletons*

- 4.3.16 Based on the number of skeletons revealed within the excavation trench (80) and the total volume of soil excavated (241.2 m<sup>3</sup>), the density of graves is estimated to be approximately 0.3 skeletons per every cubic metre. This therefore suggests that a maximum number of 773 skeletons are present in the western graveyard (0.3 x 2,332 m<sup>3</sup>).

#### 4.4 Conclusions

- 4.4.1 The remains excavated and examined thus far from the western churchyard at St Paul's Hammersmith comprise a valuable assemblage. The coffin fittings are frequent but are generally in poor condition. Information recovered from these has been maximised by having analyses undertaken on site by specialists.
- 4.4.2 The skeletons are very well preserved and therefore hold considerable potential for further, more detailed analysis. The rate of recovery of the remains and osteological information has been maximised by having the excavation and analysis undertaken on site by specialists. Data collected thus far from the skeletons is of a level that will reduce the amount of time required to undertake a full analysis of the remains.
- 4.4.3 It is estimated that a total number of 309 graves containing 773 skeletons lie within the development area. Thus, it is anticipated that a further 277 graves containing 693 skeletons will be encountered during Stage 2.

## APPENDIX I ARCHAEOLOGICAL CONTEXT INVENTORY

Context No.	Type	Length (m)	Width (m)	Depth/thickness (m)	Comment	Finds
001	Layer	9.60+	6.80+	0.28	Tarmac and bedding	
002	Layer	9.60+	6.80+	0.62	Made ground	
003	Layer	9.60+	6.80+	1.13	Brick earth	
004	Layer	9.60+	6.80+	1.10+	Gravel layer	
005	Layer	9.60+	6.80+	0.69	Buried topsoil/subsoil	
101	Cut	1.90	0.48	3.21	Grave cut	
101A	Skeleton			1.90	Foetus	Coffin nails
101B	Skeleton			1.98	Infant	Coffin fittings including nails
101C	Skeleton			3.11	Female	Coffin fittings including nails
103	Cut	1.95	0.65	2.86	Grave cut	
103A	Skeleton			2.50	Infant	Coffin fittings including nails
103B	Skeleton			2.76	Female	Cu alloy coin, coffin fittings including nails
104	Cut	1.92	0.80	3.83	Grave cut	
104A	Skeleton			3.25	Female	Coffin fittings including nails
104B	Skeleton			3.52	Child	Coffin fittings including nails and a Pb breastplate
104C	Skeleton			3.73	Child	Coffin fittings including nails
105	Cut	1.85	0.57	2.65	Grave cut	
105A	Skeleton			2.40	Child	Coffin fittings including nails
105B	Skeleton			2.30	Female	Coffin fittings including nails
105C	Skeleton			2.55	Female	Coffin fittings including nails
106	Cut	0.65+	0.35+	?	Grave cut, unexcavated	
201	Cut	1.55+	0.65	2.86	Grave cut	
201A	Skeleton			2.62	Male	Coffin nails
201B	Skeleton			2.52	Male	Coffin nails and screws
201C	Skeleton			2.76	Male	Cu alloy ring, coffin fittings including nails
202	Cut	1.70	0.50	2.27	Grave cut	
202A	Skeleton			2.19	Male	Coffin fittings including nails

202B	Skeleton			2.22	Infant	Coffin fittings including nails
206	Cut	1.92	0.6	3.70	Grave cut	
206A	Skeleton			2.38	Child	Coffin fittings including nails
206B	Skeleton			2.70	Infant	Cu alloy cartwheel button, coffin fittings including nails
206C	Skeleton			2.50	Female	Coffin fittings including nails
206D	Skeleton			3.40	Male	Coffin fittings including nails
206E	Skeleton			3.60	Child	Coffin fittings including nails
207	Cut	0.72	0.30	2.10	Grave cut	
207A	Skeleton			2.08	Infant	Coffin fittings including nails
208	Cut	1.58	0.54	3.38	Grave cut	
208A	Skeleton			1.89	Infant	Coffin fittings including nails
208B	Skeleton			1.88	Infant	Coffin fittings including nails
208C	Skeleton			3.30	Female	Coffin fittings including nails
208D	Skeleton			3.25	Foetus	
209	Cut	1.69	0.74	2.89	Grave cut	
209A	Skeleton			2.79	Female	Coffin fittings including nails
210	Cut	0.72	0.28	2.30	Grave cut	
210A	Skeleton			2.25	Infant	Coffin fittings including nails
211	Cut	1.65	0.53	2.58	Grave cut	
211A	Skeleton			2.48	Female	Coffin fittings including nails
212	Cut	0.93+	0.71	2.97	Grave cut	
212A	Skeleton			2.87	Male	Coffin fittings including nails
213	Cut	1.25+	0.47	2.73	Grave cut	
213A	Skeleton			2.45	Female	Coffin fittings including nails
213B	Skeleton			2.68	Child	Coffin fittings including nails
214	Cut	1.82	0.5	2.75	Grave cut	
214A	Skeleton			2.65	Female	Coffin fittings including nails
214B	Skeleton			2.80	Female	Coffin fittings including nails
214C	Skeleton			2.65	Female	Coffin fittings including nails
215	Cut	2.12	0.69	3.10	Grave cut	
215A	Skeleton			2.35	Child	Coffin fittings

						including nails
215B	Skeleton			2.48	Male	Coffin fittings including nails
215C	Skeleton			2.71	Male	Coffin fittings including nails
215D	Skeleton			3.00	Male	Coffin fittings including nails
216	Cut	1.93+	0.57	2.90	Grave cut	
216A	Skeleton			2.80	Female	Coffin fittings including nails
216B	Skeleton			2.80	Male	Shell button, coffin fittings including nails
301	Cut	1.20+	0.61	2.84	Grave cut	
301A	Skeleton			2.16	Child	Coffin fittings including nails
301B	Skeleton			2.86	Female	Coffin fittings including nails
301C	Skeleton			3.17	Female	Coffin fittings including nails
301D	Skeleton			3.19	Male	Coffin fittings including nails
301E	Skeleton			2.79	Foetus	Coffin fittings including nails
301F	Skeleton			Recovered from section collapse	Foetus	
302	Cut	1.80	0.66	3.69	Grave cut	
302A	Skeleton			2.53	Infant	
302B	Skeleton			2.73	Child	Coffin fittings including nails
302C	Skeleton			2.79	Child	Coffin fittings including nails
302D	Skeleton			2.93	Female	Coffin fittings including nails
302E	Skeleton			3.46	Female	Coffin fittings including nails
302F	Skeleton			3.60	Male	Coffin fittings including nails
303	Cut	0.50+	0.50+	2.72	Grave cut	
303A	Skeleton			2.43	Adult	
303B	Skeleton			2.43	Adult	Coffin fittings including nails
303C	Skeleton			2.50	Female	Coffin fittings including nails
303D	Skeleton			2.62	Male	Coffin fittings including nails
304	Cut	0.20+	0.20+	2.82	Grave cut	
304A	Skeleton			2.53	Female	
304B	Skeleton			2.72	Male	
305	Cut	0.79	0.44	2.42	Grave cut	
305A	Skeleton			2.42	Child	Coffin fittings including nails



306	Cut	2.08+	0.63	2.98	Grave cut	
306A	Skeleton			2.50	Male	Coffin fittings including nails
306B	Skeleton			2.88	Male	Coffin fittings including nails
401	Cut	1.55	0.65	2.88	Grave cut	
401A	Skeleton			2.40	Infant	Coffin fittings including nails
401B	Skeleton			2.77	Foetus	
401C	Skeleton			2.78	Male	Coffin fittings including nails
402	Cut	1.65+	0.50	2.80	Grave cut	
402A	Skeleton			2.56	Male	Coffin fittings including nails
402B	Skeleton			2.70	Female	Coffin fittings including nails
403A	Skeleton			2.45	Infant, in grave 202	Coffin fittings including nails
404A	Skeleton			2.50	Female, in grave 101	Coffin fittings including nails
404B	Skeleton			2.33	Infant, in grave 101	Cu alloy ring, glass bead, coffin fittings including nails
405	Cut	1.73`	0.60	2.65	Grave cut	
405A	Skeleton			2.55	Male	Coffin fittings including nails
406	Cut	2.10	0.50	2.70	Grave cut	
406A	Skeleton			2.59	Female	Coffin fittings including nails
407	Cut	1.90	0.53	2.77	Grave cut	
407A	Skeleton			2.67	Male	Coffin fittings including nails
408	Cut	1.38	0.39	2.43	Grave cut	
408A	Skeleton			2.17	Infant	Coffin fittings including nails
408B	Skeleton			2.38	Child	Coffin fittings including nails
409	Cut	1.95	0.55	3.50	Grave cut	
409A	Skeleton			2.63	Child	
409B	Skeleton			2.74	Male	Shell button, coffin fittings including nails
409C	Skeleton			3.10	Male	Shell button, coffin fittings including nails
409D	Skeleton			3.40	Male	Coffin fittings including nails
501	Cut	2.00	0.57	3.10	Grave cut	
501A	Skeleton			3.00	Female	Coffin fittings including nails

**APPENDIX 2 SUMMARY OF SKELETONS**

Table 1: Summary of osteological analysis

Burial	Skeleton	Age category	Sex	Completeness (%)	Stature	Pathology summary	Other comments
101	A	Infant	-	80-90		Cribrā orb	
101	B	Foetus	-	95		-	
101	C	young adult	Female	99		-	
103	A	Infant	-	25-50			
103	B	young adult	Female	50-75	158.09	L tib periostitis. Rickets?	
104	A	Prime adult	Female	75-100	159.3	-	
104	B	young child	-	75-90		Rickets	
104	C	older child	-	75-90		-	
105	A	older child	-	95-100		Rickets?	
105	B	mature adult	Female	90	164.02	ossified rib cartilage, OP spine, OP shoulder & elbow, periostitis L Humerus	
105	C	older adult	Female	95	156.1	ossified rib cartilage. OP spine.	
201	A	mature adult	Male	75-90	164.23	Pipe notch (upper L 2-3), L nasal healed fracture, middle rib healed fracture, L max sinus sinusitis. Rickets?. DJD clav, scap and spine. SNs Tv. Right upper arm muscle attachments suggest trauma.	
201	B	older adult	Male	50-75	180.1	pipe notch (upper L M1). Ossified thyroid cartilage. DJD R elbow and shoulder. Spine OP. OA CV2. SNs TV.	
201	C	mature adult	Male	90	172.3	ossified thyroid cartilage. Open metopic suture. R nasal healed fracture. TB. Spine OP. DJD head of ribs. OP rotator cuff. Pipe notch upper left 2-3.	
202	A	Prime adult	male ?	70	162.3	OP TV. Rickets? Cribrā Orb.	
202	B	Infant	-	<25		-	
206	A	Infant	-	50		Cribrā orb	
206	B	young child	-	75-90		cribrā orb. Rickets?	
206	C	young adult	Female	90	162.6	S3-5 unfused, incomplete S1 & 2 spina bifida occulta. SNs 6-7TV. Syphilis ? Poss caries sicca, erosive lesions parietals & occipital.	
206	D	young child	-	50-60		cribrā orb.	
206	E	older child	-	50-75			
207	A	Infant	-	<25		-	Fe or Ni pin
208	A	Infant	-	70		cribrā orb.	
208	B	Neonate	-	50-75		cribrā orb	
208	C	mature adult	female	75-80	160.5	periostitis L & R tibia & fibula. Open metopic suture.	
208	D	Foetus	-	<25			found in coffin with 208C
209	A	older adult	Female	50-75	175.65	L&R tibia healed periostitis. OP lower spine. Ossified thyroid cartilage. R ulna periostitis.	

210	A	infant	-	65		cribra orb.	
211	A	young adult	Female	75-100	155.37	Periostitis on L&R femur, tibia and fibula. Osteitis on shaft L&R tibia. Craniotomy. Dimples parietal & occipital. OP Tv.	
212	A	Prime adult	Male	25-50	173.6	metopism. 1 bifid rib. Fracture 11th rib. OP at articular end of ribs. OP Cvs.	
213	A	mature adult	Female	50	162.29	tibial periostitis L&R.	
213	B	older child	-	50-75		-	
214	A	Prime adult	female	75-90	153.64	pipe notch. Lower r 3-4. OP Cv and LV. Periostitis R tibia.	
214	B	older adult	Female	75-95	158.09	ossified thyroid cartilage. OP Cv, Tv, Lv.	
214	C	mature adult	female	90	158.83	OP spine. OP L&R glenoid fossa.	
215	A	young child	-	90		-	
215	B	Prime adult	female	75-100	149.69	Periostitis on hips, femora and tibiae and fibulae.	
215	C	older adult	Male	75-90	168.51	OP spine. SNs LV. Periostitis left humerus. New bone growth on shaft left fibula. Rib head end new bone growth.	
215	D	mature adult	male	75-90	168.51	ossified rib cartilage. 2 CV fused. Lumbarisation of S1. SNs and OP Spine. Periostitis fibulae.	
216	A	mature adult	Female ?	75-90	154.38	OP spine. Abnormalities upper chest area.	
216	B	Prime adult	male	75-90	171.37	Healed fracture ribs. OP Tv. Left Tibia new bone growth, periostitis, healed fracture ?	
301	A	young child	-	50-75%		?rickets slight A-P bowing of femora.	301 F found with these bones
301	B	older adult	Female	25-50	162.47	Upper limb enthesophytes - humeri distinct ridges at M insertion sites of deltoid and rotator cuff & extensors of forearm. Intertrochanteric groove both cortical defects and enthesophytes on R humerus (abductor of shoulder & pec maj). R radial tuberosity enthesophytes, L&R clav enlargement of lig attachment sites. L&R acro of scapula additional bone growth beyond clav artic joint. exaggerating the 'hook.' clear line. Not os acromiale. L glenoid cavity moderate lipping. SDJD OP on bodies C4-6 moderate-severe, C7-T7 slight -moderate. OP on articular surfaces C1,2,T5-3. OA on T9. 'orange peel' on parietals and occipital. SNs 2x TVs. ossified thyroid cartilage. facial morphology flatter than normal.	

301	C	older adult	Female	40-50%	145.94	OA R 1st MC . OP T10-L5 bodies and facets. Ankylosis of sup & inf articular facet of 4 mid thoracic vert. C2 EB . DJD L ulna, or elbow, R ulna too. L radial head moderate lipping. Enthesophytes - R humerus marked attachments. R radial tuberosity and R oelcranon moderate enthesophytes. healed fracture 2x rib. L&R radius prox Js marked EB. R humerus distal capitulum EB and OP.	green stain of R distal radius
301	D	older adult	Male	40-50%	164.15	L&R nasal bones healed fracture nose leans to right. Right 9x ribs healed fractures (6x posterior shaft, 3x anterior chest). Upper rib bony spur. Infection rib periostitis Left side on visceral and occ. anterior. Active x11 ribs. Sternum new bone formation on manubrium & body. DJD L&R glenoid fossa lipping, L&R humeral heads Lipping. L&R dist lat epicondyle humerus new bone just lateral to joint surface ?fracture - extensor muscle marked attachments. SDJD C3-7 OP OA mid clavs. OA C2,3,4,5. T1-12 OP marked. L1-4 moderate OP. PH frontal & parietal. ossified costal and other cartilage.	baize adhering to sternum below breastplate.
301	E	Foetus	-	20-25%		-	
301	F	Infant	-	<25%		-	bone recovered from amongst bones of Sk 301A. Charnel or unrecognised burial.
302	A	Infant	-	25-30%		-	
302	B	young child	-	75-90%		-	
302	C	young child	-	95%		-	
302	D	older adult	Female	95%	159.32	Bifid rib (11/12). Prominent muscle attachments upper limbs. OA R 1st MT eburnation. Bunions L & R feet. R 1st MC eburnation . R trapezius eburnation. OA thumb. L3-S1 osteophytosis and porosity. Ankylosis of C3-4, OP and PO of C5. OA Dens of C2 and C1. Fracture 1 rib shaft healed.	green cu alloy stain distal R radius and R mandible. Small area of hair preserved beneath pin.
302	E	mature adult	Female	75-80%		Lipping vert L1-5, T 1-7. OA marked lipping C7 & PO . Moderate OP & PO S1, T4-6. Infection , periostitis tibia shaft prox 1/2. L tibia slight healed periostitis. L fibula small patches of Periostitis. Healing fracture of 1 rib shaft. DJD slight lipping glenoid fossa and acetabulae.	small area of short hair and green stain to R temporal bone & R frontal bone

302	F	older adult	Male	95%	165.42	periostitis R distal Tibia, striated largely healed. Muscle attachments upper limb defined, cortical defect r humerus. 7x Left ribs active and healed periostitis on visceral surface - chronic respiratory disease. No TB indicators. Fracture of L rib shaft healed. perimortem? fracture of R patella medial, lines visible on A & P. amputation of distal 1st toe on L prox phalanx missing distal epiphyses. cribra orb stage 2. PH on parietals. ossified rib, crichoid and thyroid cartilage	
303	A	Adult	Unknown	< 25%	-	-	303A and B may be same individual
303	B	mature adult	? Male	< 25%		Tvs slight OP activity	
303	C	Prime adult	? Female	<25%	-	2 pipe notches. Lipping glenoid fossa. Verts OP Cvs and rib facets of Tv.	
303	D	Prime adult	Male	<25%		2 pipe notches. Healed fracture nasal and left maxilla. Hyoid unusual morphology one side - healed fracture ? Ossified thyroid cartilage. Additional facet on L of atlas and occipital. Partial metopism. Porosity 'orange peel' on occipital and parietals. OP C1 C2 and 4x TV bodies.	
304	A	young adult	Female	< 25%		OP on margins on upper and lower TV x2.	
304	B	young adult	male	<25%		C5&6 OP marked.	
305	A	Infant	-	75-80%		cribra oribitalia (slight)	
306	A	mature adult	male	95%	168.99	craniotomy	
306	B	young adult	Male	60-75%	182.79	Slight kyphosis on L5, slight scoliosis on L2 to left. Spondylolysis on L5. Anterior compression of body L5. OP 1st MT & phalanx. Marked muscle attachment on MCs. OA elbow. Distal epiphyses of L&R ulnae and radii not fused, due to frequent strain/age.	
401	A	Neonate	-	<25%		-	
401	B	Foetus	-	50-75%		-	
401	C	Prime adult	? Male	40-50%	161	active periostitis on rib shafts x7 (L). R clavicle different morphology to L, poss well-healed fracture. Muscle attachments marked esp. L&R ulnae.	Green staining L distal radius
402	A	older adult	male	50-60%	173.63	Periostitis 1st rib & visceral sternum (? Resp. disease); SDJD, Schmorl's nodes	
402	B	older adult	Female	50-60%	152.72	S1 OP. SDJD on entire spine.	green staining and hair surviving on R cranium and left frontal.
403	A	Infant	-	75-80%		Craniotomy	
404	A	young adult	? Female	95%	185.01	enthesophytes- arms & legs; prominent M attachments on MC; bunions; ossicle at bregma	
404	B	infant	-	<10%		Craniotomy	

405	A	older adult	Male	95%	174.32	rickets; enthesophytes & marked M insertion of arms and legs; DJD & OA; slipped epiphysis of femoral head & pseudo-joint; # nasal bones, trapezius; SDJD & neck OA	
406	A	older adult	male	75-80%	171.6	SDJD & OA (TV & LV); Schmorl's nodes	
407	A	Adult	? Male	25-30%		-	
408	A	Infant	-	75-80%		-	
408	B	older child	-	75-80%		? Rickets (slight); cribra orbitalia (slight); ? Osteitis, ? Healed # of R fibula; slightly stunted	
409	A	Infant	-	50-60%		-	
409	B	Prime adult	Male	95%	162.56	L tib & fib: marked thickening of shaft- ? Osteitis; enthesophytes arms, hands, elbows, shoulder, knees; SDJD	
409	C	Prime adult	Male	90%	170.89	marked M attachments arms	
409	D	mature adult	Male	95%	167.32	SDJD; marked muscle attachments MC, MT; enthesophytes triceps (olecranon), soleal line, rectus femoris; DJD big toe	
501	A	mature adult	Female	95%	166.24	periostitis L & R tibiae; Schmorl's nodes	

**APPENDIX 3 BIBLIOGRAPHY AND REFERENCES**

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**APPENDIX 4 SUMMARY OF SITE DETAILS****Site name:** *St Paul's Church, Hammersmith***Site code:** *PQC09***Grid reference:****Type of archaeological work:** *Excavation and recording of 80 post-medieval burials***Date and duration of project:** *January 2008 (18 days)***Summary of results:** *A total of 31 discrete graves contained the remains of 80 unnamed coffined individuals (dated 1828-185). Coffin fittings suggested that this was a working class population. Rapid osteological recording undertaken on site revealed a high infant mortality rate and adult longevity consistent with this interpretation. The assemblage is interesting in the relatively low prevalence of deficiency diseases and trauma compared to other London assemblages, but has very poor dental hygiene and evidence of strenuous upper body activities. Four examples of craniotomy (two on infants) were present.***Location of archive:** *The paper archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES, and will be deposited with the Museum of London in due course, under the following accession number: PQC09. The human remains and artefacts will be securely stored within the Church of St Paul, Hammersmith.*





Scale 1:25,000

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Figure 1: Site location

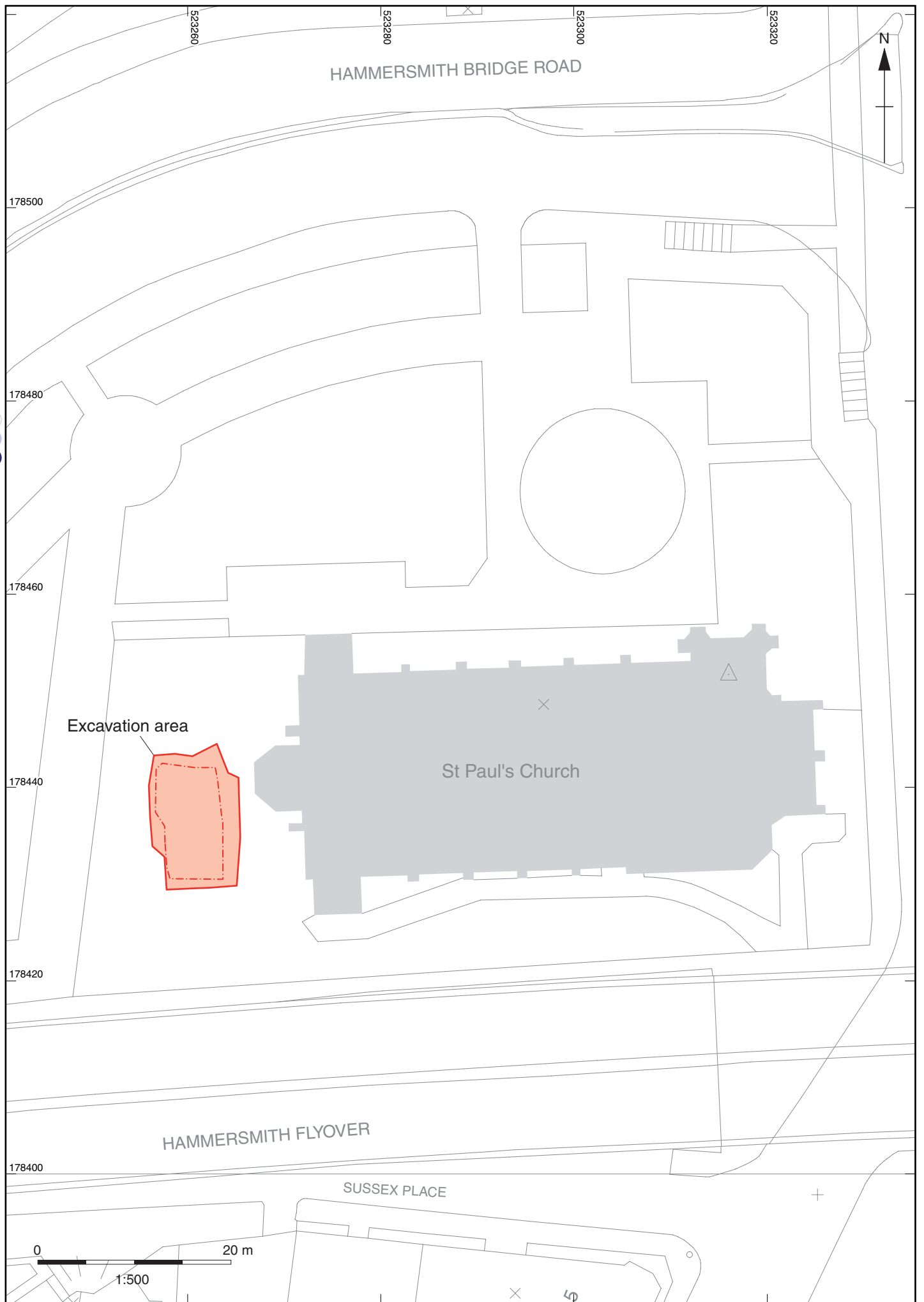


Figure 2: Location of the excavation area within the churchyard of St Paul



Figure 3: Site plan of the excavation area showing the location of burials

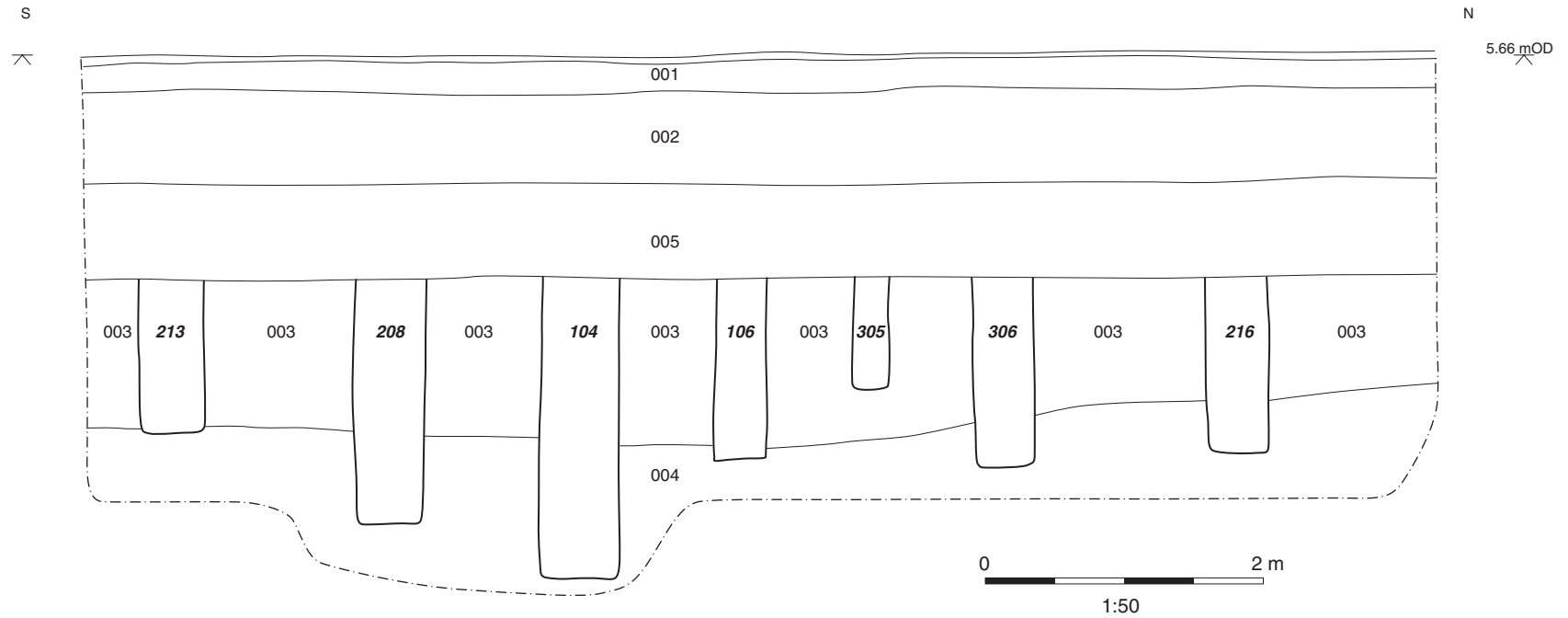
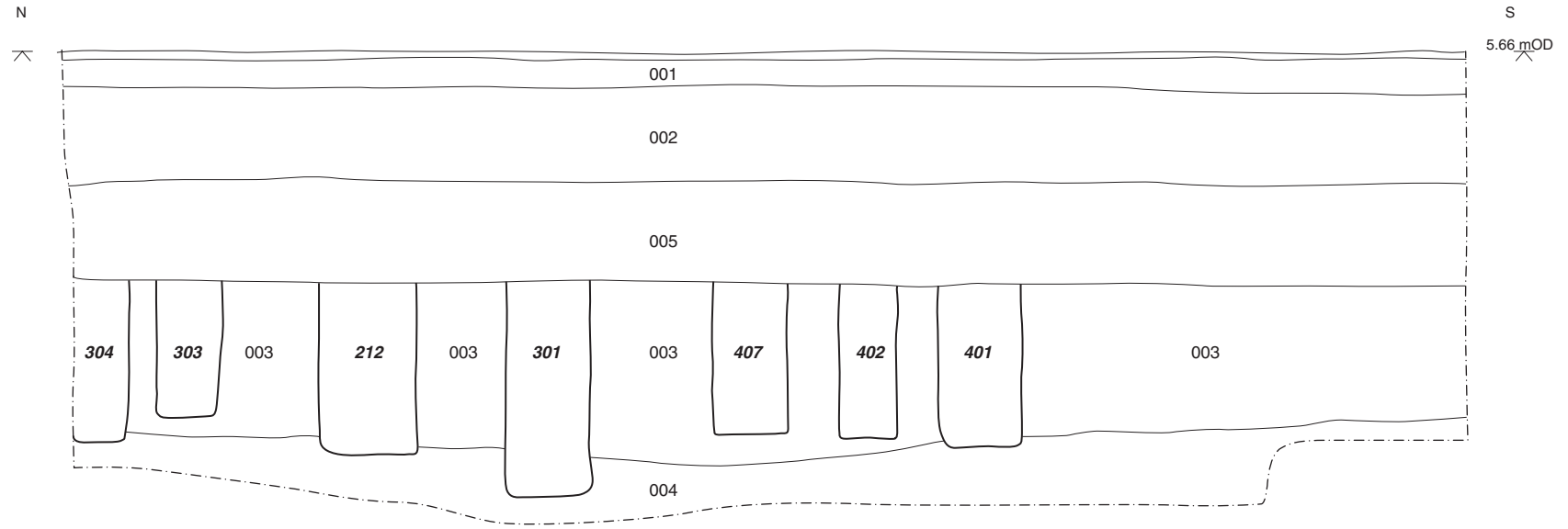


Figure 4: Sections 1 and 2



Plate 1: Skeleton 215D showing supine extended body position within single break coffin stain



Plate 2: Stacking of skeletons within a single grave cut (skeletons 301C and D)



Plate 3: Skeleton 211A with craniotomy



Plate 4: Partly disarticulated skeleton 409D





Plate 5: Skeleton 409D showing slumping of body parts within the grave



Plate 6: Excavation of skeletons



Plate 7: Osteological analysis on site



Plate 8: Trench showing depth of excavation

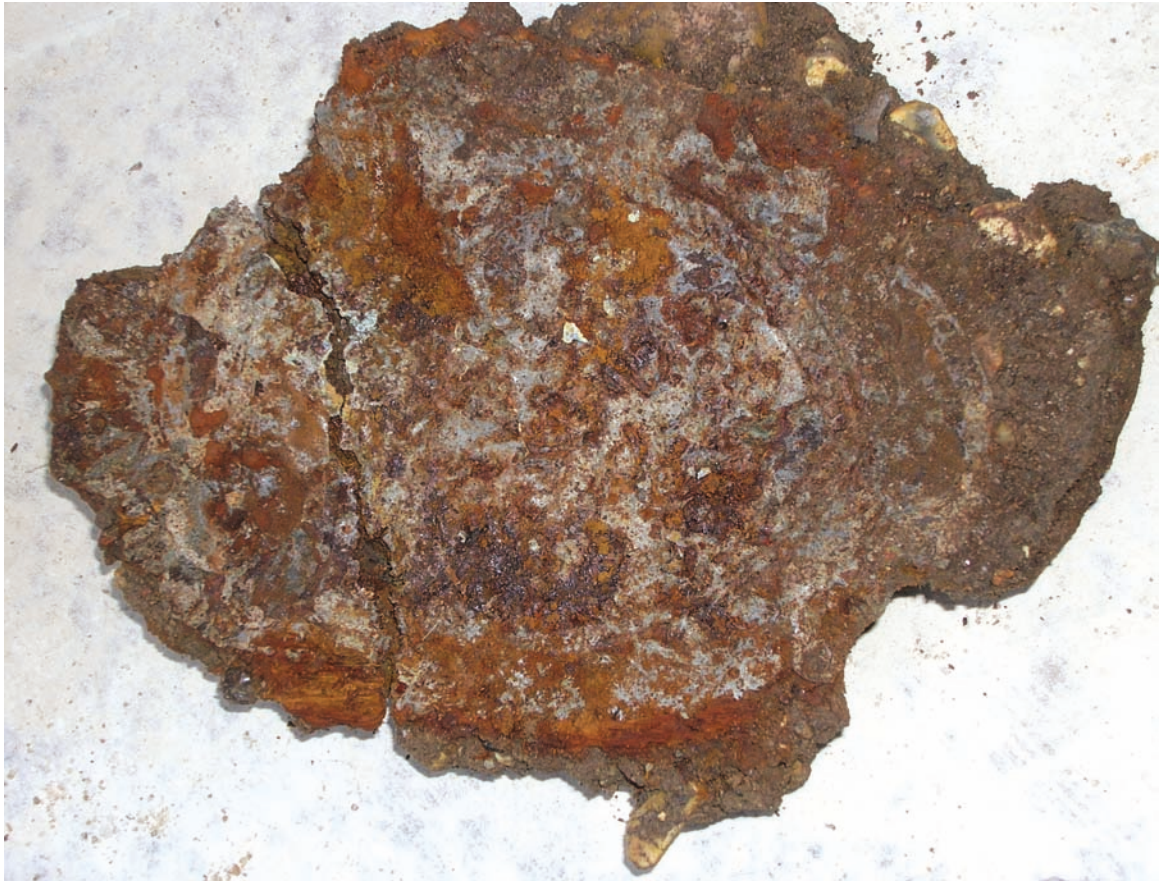


Plate 9: Reverse of lid motif 103A



Plate 10: Tortoise-shell comb found with skeleton 103B



Plate 11: Skeleton 405A- nasal fracture



Plate 12: Skeleton 201C- tuberculosis of the lumbar spine



Plate 13: Skeleton 405A- Slipped epiphysis of left femur and associated new bone growth



Plate 14: Skeleton 405A- Bowing of the metacarpals and osteophytosis



Plate 15: Infant skeleton 403A- craniotomy



Plate 16: Skeleton 211A - craniotomy



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