YORK ARCHAEOLOGICAL TRUST

ARCHAEOLOGICAL WATCHING BRIEF AND EXCAVATION AT TYBURN, TADCASTER ROAD, YORK

EXCAVATION REPORT

Report Number 2014/17 October 2014

YORK ARCHAEOLOGICAL TRUST

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NON-TECHNICAL SUMMARY

An archaeological watching brief was carried out between the 16th and 28th of November 2013 on behalf of Interserve during the excavation of a trench for the installation of an 11kv cable. The trench was monitored where it crossed the A1036, Tadcaster Road, from the Knavesmire to Little Hob Moor, a little to the south of the York Tyburn memorial (Figure 1). Burials associated with the Tyburn were encountered on both sides of the road. As a result two small archaeological excavation trenches were opened on the east and west sides of Tadcaster Road to facilitate excavation of the burials in an appropriate manner. On the east side, in Trench 1, a mass burial containing 11 individuals was found below that of a single inhumation. On the west side of the road, in Trench 2, two more graves were encountered with five skeletons in one and a further two in the other. A southwest branch to the main cable trench was also opened as part of the installation work. It was decided that this ancillary trench would be abandoned and re-routed on the discovery of further mass burials along its line.

KEY PROJECT INFORMATION

Project Name	Interserve 33 Core Utility Trench, York Tyburn
YAT Project No.	5730
Report status	Final
Type of Project	Watching Brief
Client	Interserve
NGR	SE 59053 50392
Museum Accession No.	YORYM : 2014.5
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Author	B. Savine
Illustrations	B. Savine
Editor	D. Aspden
Report Number and Date	2014/17 [31/10/14]

1 INTRODUCTION

Between the 16th November 2013 and the 28th of November 2013, YAT carried out an archaeological watching brief on the excavation of an electricity cable trench running across Tadcaster Road from the Knavesmire to Little Hob Moor (Figure 2), York (NGR: SE 59053 50392). This was to enable the recording and excavation of archaeological remains encountered during the excavation of the trenches, before the laying of electric cable ducting. The work was carried out on behalf of Interserve. The monitoring was required as the trench was located within York's Area of Archaeological Importance as defined in the Scheduled Monuments and Archaeological Areas Act 1979 and had the potential to encounter significant archaeological remains. On excavation of the trench it became apparent that it ran through the area of unknown area of burials potentially associated with the Tyburn gallows. In order to ensure that burials were appropriately excavated two small excavation trenches were excavated in the west and east sides of Tadcaster Road, in consultation with the City of York Archaeologist.

2 METHODOLOGY

The excavation of the utility trench was undertaken in two phases to allow the continued use of Tadcaster Road to road traffic. The first phase of excavation was from the middle of the road running southeast onto the Knavesmire. The carriageway and footpath were both excavated to a width of 1m and to a depth of 1.2m. Ducting was then laid and the trench backfilled before the road surface and path re-laid. The continuation of the trench, into Tyburn Wood on the Knavesmire, was increased in width to 2m continuing at a depth of 1.2m. A 2.8 ton tracked mechanical excavator, with a 1.0m wide ditching bucket, was used for all excavation work to the point where archaeological deposits were encountered at which point an archaeologist commenced hand excavation as necessary. Where no archaeology was found, and working space allowed, ducting was laid and the ground reinstated. In the event the remains of five individuals were encountered within the extent of the trench. One skeleton was wholly within the trench with the remaining four seen to continue beyond the trench to the southwest. Advice given by the City of York Archaeologist, John Oxley, was to extend the trench to enable the removal of human remains found largely within the line of the cable trench, specifically of those five initially encountered. Any further human remains found within the trench extension were to remain *in situ* excepting any lower limbs extending into the line of the cable trench and its maximum depth extent of 1.2m below ground level. These were to have their location recorded before immediate reburial within the trench extension.

The second phase of work again involved the excavation of the utility trench from the middle of Tadcaster Road, in this instance to the west. As before the carriageway was excavated to a width of 1m and to a depth of 1.2m. Ducting was then laid and the trench backfilled before the road surface was reinstated. A wider section of trench measuring 1.8m wide and 1.2m deep over a length of 4m was then excavated from west to east along the path on Little Hob Moor, through a gateway and across the pavement to join with the section excavated across the road. A branch measuring 1m wide then projected for a short distance to the southwest as part of a joint bay. Any human remains found within the line of this trench were to be recorded and retrieved.

Archaeological deposits excavated were recorded using the standard YAT single context recording system. All contexts were recorded in plan at a scale of 1:20 and in section at 1:10 or 1:20 as deemed appropriate. Digital photographs were taken of each context and general trench views were taken at regular intervals. The site records are currently stored with York Archaeological Trust under the project number 5730.

3 LOCATION, GEOLOGY & TOPOGRAPHY

The site is located approximately 1.5 km to the southwest of the historic core of the City of York, and situated at a point less than 0.5 km south of the high point of a moraine ridge. The moraine was created during the last glaciation and runs across much of the low lying Vale of York (RCHMY 3, xxxvii – xxxviii). The utility trench lies broadly on an east to west axis across the A1036, Tadcaster Road, the line of a major Roman road, and approximately 30m south of the site of the York Tyburn.

The solid geology of the site is Bunter and Keuper sandstones, overlain by a drift geology that is generally boulder clay over lacustrine clays with deposits of sand and gravel, lying within and over the clay in places (Geographical Survey 1967).

There is a significant slope on a west to east axis across the site. The existing ground level is at around 15.85m aOD on the west side of Tadcaster Road. The road itself lies at between 15.67 and 15.5m aOD from which point the ground falls away steeply to c. 14.0m aOD in the east.

4 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

The site lies approximately 1.5km to the southwest of the city walls, which are thought to correspond to the line of a Roman defensive circuit around the town (*Colonia*) southwest of the river Ouse (RCHMY, 49). The site also lies close to the line of the main southwest Roman approach road to York from Tadcaster (RCHMY 1, 3; Road 10), which is broadly followed by Blossom Street, The Mount, Mount Vale, and Tadcaster Road.

The principal evidence for Roman activity lies to the north of the site. This is largely in the form of burials in a large cemetery which extended along the line of the approach road from the southwest, from at least as far away from the Roman town as Trentholme Drive, about 0.9km from the city walls. Apart from excavations at Trentholme Drive in 1951-2 and 1957-9 (Wenham 1968), and excavations at 35-41 Blossom Street in 1989-90 (1989.21 and 1990.21), most information about the cemetery comes from chance discoveries made during 19th and early 20th century building work (Hunter-Mann 2005). To the southwest of the site further evidence for Roman activity has been found in the area of Dringhouses, including the continuation of the southwest approach road, associated settlement and a small cemetery (Macnab 1997).

A monument to York Tyburn is situated approximately 30m to the north of the site on the east side of Tadcaster Road. Records of executions in York show that the Tyburn was used as a place of execution by the Crown's justice from 1379 to 1801. These records demonstrate that the scale of executions ranged from that of individual and small groups to larger groups of ten, twenty or more and that not all of these individuals were recovered by their families for burial at their own parish.

In the mid 17th century during the English Civil War, a sconce, or fort, was situated on the Mount, northeast of the site (Hunter-Mann 2005).

5 RESULTS

Results are given below listed by trench number, trench 1 being the excavation on the east of Tadcaster Road and trench 2 that on the west. The results are presented stratigraphically starting with the most recent contexts. A complete list of contexts observed and their descriptions is detailed in Appendix 2.

5.1 Trench 1

This trench was excavated from the centre of Tadcaster Road on a northwest to southeast axis. It was situated approximately 30m south of the Tyburn monument. The initial part of the trench, cutting into the road and pavement measured 1.0m wide. A sequence of build-up deposits relating to the modern road surface was revealed, no archaeological deposits were encountered.

Beyond the pavement the trench extended for a further 22m at a width of 2.0m. Turf and topsoil was observed to a depth of approximately 0.20m below ground level, this overlaid loose dark brown subsoil which extended a further 0.20m in depth. A layer of re-deposited natural was identified in section (Figure3), varying in depth from 0.21m to 0.40m, this in turn overlaid a buried soil, context 1020. The buried soil was encountered at c.13.50m aOD (Plate 2) and varied in thickness from 0.16m to 0.22m. This deposit was seen to overlie context 1007, the backfill of a grave cut 1008.

A grave was encountered at 13.24m aOD. The north and west extent of the grave was disturbed during the machine excavation of the trench. What remained intact of the grave cut (context 1010) measured 1.80m long, 0.50m wide and 0.20m deep. A single inhumation (context 1002) was found in the grave, it was laid supine on a southwest to northeast orientation, (the head located to the southwest and feet to the northeast). It was clear that grave 1010 cut into the north corner of an earlier grave (context 1008), Plate 3 shows the left leg of skeleton 1002 overlying the skull of the eastern most skeleton (context 1012) found at the north end of grave 1008. The entirety of skeleton 1002 lay within the extent of the cable trench thereby necessitating its recovery. In addition despite the west side of grave cut 1010 being lost during the course of machine excavation it was clear that skeleton 1002 was the sole occupant of that grave, as no other human remains were discovered at the same depth or could be seen in the south west facing section of the trench.

Cut 1008 was a large north to south aligned grave found to contain the remains of eleven individuals. Four of these skeletons (contexts 1003, 1004, 1011 and 1012), situated at the north end of grave cut 1008, were found to lie largely within the impact area of the cable trench, however they also extended beyond it to the southwest. On consultation with the City of York Archaeologist, John Oxley, it was decided that the recording and recovery of contexts 1003, 1004, 1011 and 1012 in their entirety was desirable and some extension of the trench was to be undertaken if necessary. It was also stipulated that beyond the original trench line any further human remains encountered were to be recorded, but only uncovered where appropriate and were not to be removed from the trench. To facilitate this work the trench

was extended along its southwest side adjacent to the location of grave cuts 1008 and 1010. The extension measured 4.5m x 2.3m on a northwest to southeast axis. Here evidence for a further seven individuals (contexts 1005, 1006, 1013, 1014, 1015, 1016 and 1017) within grave cut 1008 was found. Lying largely outside the impact area of the cable trench these remains were only partially uncovered. The skeletons were initially identified where their skulls were visible at the top of the unexcavated part of grave backfill (context 1007), and later in the areas where their legs intersected with the skeletons that were recovered (contexts 1003, 1004, 1011 and 1012).

The majority of grave cut 1008 was exposed in the trench extension however both the southwest and southeast corners continued a little beyond the excavation area. It was roughly square in plan and measured 2.90m by 2.85m with a depth of 0.50m. The highest surviving point of the grave cut was at 13.19m aOD.

The eleven skeletons encountered in grave 1008 were laid out in two neat rows, one at the south end of the grave where five individuals were found, the remaining six at the north end. The six at the north end of the grave (contexts 1003, 1004, 1005, 1006, 1011 and 1012), were each laid out supine on a north to south alignment. Of these skeletons four were exposed and recovered in their entirety (contexts 1003, 1004, 1011 and 1012), with a further one (context 1005) partially exposed before reburial. The limbs of each skeleton located at the north end of the grave were seen to overlap with their neighbours. The overlapping is a clear indicator that they were placed into the grave from its east side one at a time (Plate 4). Excavation of skeletons 1003, 1004, 1011 and 1012 further revealed that they overlay at least four of the five individuals identified at the south end of the grave (Plate 5).

The relative positions of the skeletal remains indicate that those at the south end of the grave were the first to be laid out. This was done on a south to north alignment, the opposite of the skeletons at the north end of the grave. Of these, four were partially exposed (contexts 1014, 1015, 1016 and 1017) during the excavation of the skeletons at the north end of the grave. The positioning of the legs indicates that they were laid out supine. An order to their deposition could not be determined as none of the exposed bones over lapped.

After the recovery of skeletons 1002, 1003, 1004, 1011 and 1012 but before backfilling of the trench extension, the lower legs of skeletons 1015 and 1016 were removed from the line of the cable trench and reburied with the remainder of each relevant individual.

Enough of their layout could be determined to give a good impression of how most of these seven individuals related to each other within the confines of the grave. Plate 5 shows skeletons 1011,1012,1015,1016 and 1017 situated from the southeast corner of the grave, it demonstrates to an extent the order in with they were laid into the grave. Skeletons 1013 and 1014 lie at the south end of grave 1008 and although unexcavated they were identifiable by skull fragments seen in the grave backfill. A gap of approximately 0.90m lies between the skulls of skeletons 1013 and 1014. This is much greater than the 0.20m – 0.40m spacing seen between the other skeletons. A gap of this size infers the location of an additional, as yet undiscovered, individual, the remains of which lie below the depth limit of excavation. After the recovery of skeletons 1002, 1003, 1004, 1011 and 1012 but before backfilling of the trench extension, the lower legs of skeletons 1015 and 1016 were removed from the line of the cable

trench and reburied with the remainder of each relevant individual. All other remains were left *in situ* as they would not be impacted by the continuation of the utility trench works.

The stratigraphic sequence and spatial distribution of the graves in Trench 1 indicates that the mass grave was of a single burial event with the lone burial probably following soon after, probably while the location of the larger grave remained visible on the ground. The buried soil identified in the section of Trench 1 seals over the top of the mass grave where it provides a clear indicator of the graves shallow depth at the time of burial, the base of the grave being a mere 0.50m below the buried soil.

5.2 Trench 2

Trench 2 was excavated on a southeast to northwest axis from the centre of Tadcaster Road, deviating slightly south, but remaining on a southeast – northwest axis, at the junction with the path across Little Hob Moor. The initial section of the trench was cut into the road, here measuring 1.0m wide and 1.2m deep. A sequence of build-up relating to the modern road surface was revealed, no archaeological deposits were encountered.

At the junction with the path an area 4.0m long and 1.8m wide was excavated as far as the gate. This section of the trench was the focus of excavation on the west side of the road. Beyond the gateway the trench continued to the northwest, cutting through the path, at a width of 1.0m with an additional branch extending to the southwest. The trench was dug to a depth of 1.2m throughout. The positioning of the trench at the junction of an actively used footpath and cycle route across Little Hob Moor with Tadcaster Road did not leave any scope for extending the trench beyond that of the cable trench. A procedure was agreed with the City of York Archaeologist whereby if human remains were encountered only those parts directly impacted by the cable trench would be recorded and recovered.

19th and 20th century activity appears to have related to access onto Little Hob Moor. The existing gatepost, which appears to be of an early 20th century date, had been set in to the top of a substantially deeper posthole, context 2011, most likely that of an earlier gate post. The existing path, its bedding and rubble levelling account for the initial 0.60m to 0.80m below ground level which lies at 15.85m aOD (plate 6). A number of modern services were also found to run across the line of the trench. Those encountered in the southwest branch truncate to an extent beyond the depth of excavation. Services encountered in the main east – west line of Trench 2 do not extend below a depth of 15.20m aOD (Plate 6).

In the southwest facing section of the trench at its far northwest end part of a substantial cut feature (context 1015), probably a pit, was seen (Plate 6). This feature had a vertically cut southeast side and was seen to contain a number of sandy and clayey deposits tipping down to the northwest. No dateable material was recovered from this pit. It lay stratigraphically below the path levelling deposits and appeared to cut the west side of a grave cut 2009 (Figure 4).

A thin layer of re-deposited natural (context 2017) was seen in section below the path make-up. It overlay the backfills of two graves (contexts 2004 and 2009) found within the extent of the 1.8m wide part of Trench 2 (Figure 4). Although no dateable material was recovered from this deposit it appears to be similar to context 1020, a buried soil that overlies the mass grave 1008 in Trench 1.

The southwest end of a grave cut (2004) extended in to Trench 2. From the northeast side of the trench it ran for a length of 0.50m on a northeast – southwest axis. It measured 0.70m wide and was observed in section to extend from 15.06m aOD down to 14.48m aOD (Figure 4). Below a backfill 0.58m thick (context 2001) two skeletons (contexts 2002 and 2003) were uncovered within grave 2004 and seen to have been laid supine on a southwest to northeast alignment (Plate 8). The skulls and a small part of the upper torso and arms of skeletons 2002 and 2003 were recorded and recovered. Any other surviving elements of these individuals lay beyond the northeast extent of the excavation.

Adjacent to the southeast side of the gateway leading on to Little Hob Moor and extending across the width of Trench 2 was grave cut 2009. The northeast end of the grave lay beyond the extent of the excavation and the southwest end of the grave was truncated by posthole 2011. The northwest side of the grave was disturbed during the course of machine excavation of the cable trench, from which point parts of several burials were accidentally removed. Grave cut 2009 was aligned northeast to southwest and measured 1.60m long. In section it measured 2.14m wide and 0.45m deep with its highest point at 15.36m aOD (Figure 4). Parts of five individuals (contexts 2005, 2006, 2007, 2012 and 2013) were identified and recorded in 2009; none of these skeletons lay in their entirety within the excavation area, and as discussed below only parts of each could be recovered.

Skeleton 2005 was at the top of the sequence of five individuals recovered from grave 2009. It was aligned northwest to southeast and laid supine. The majority of the upper part of this individual lay beyond the northeast extent of the trench and could not be recovered. The right hand was tucked under the right side of the pelvis and was recovered along with the left leg and foot as well as parts of the lumbar vertebrae and sacrum. The right leg and foot were lost during the course of machine excavation of the trench. Skeleton 2006 was laid supine up against the southeast side of the grave with its legs and right arm underlying the left leg of skeleton 2005 (Plate 9). The skull and upper part of the torso lay beyond the northeast extent of the trench, in addition the lower parts of the right arm and leg including the hand and foot were lost during the course of machine excavation of the trench. Skeleton 2007 was situated towards the southeast side of the grave. It was laid supine on a southeast to northwest alignment (Plate 9). Again parts of the body were lost during machine excavation. The skull, right arm and hand along with the majority of the torso, pelvis and upper part of the legs were recovered. The lower parts of the legs extended beyond the northeast edge of the trench. Only the right leg and part of the pelvis of skeleton 2012 were found, their size is indicative of a juvenile (Plate 9). Skeleton 2012 was found underlying the left side of the torso of skeleton 2007 on a southeast to northwest axis and appeared to have been laid prone or on its right side. Also underlying skeleton 2007, in this instance the right femur, was a foot, context 2013, part of which extended in from the northeast side of the trench. No other part of this individual was encountered within the excavation area.

Beyond the northwest side of the gateway on to Little Hob Moor a branch off the main line of the trench was excavated. This was 1.0m wide and ran from the west corner of the main trench for a short distance to the southwest. Two live cables were encountered running across the width of this part of the trench down to a depth of c.1m. These services were seen to

disturb an unknown number of individuals, which may represent another mass grave. Further excavation of this branch was halted and it was subsequently backfilled.

6 DISCUSSION

The opening of a substantial extension on the southwest side of Trench 1 has made it possible to see close to the full extent of two different graves, and in doing so develop some understanding of how they relate to each other and fit into their surroundings. Without seeing a broader picture in Trench 1 it would have been more difficult to form a cohesive overview of the graves in Trench 2 where only a narrow window was available.

The stratigraphic sequence and spatial distribution of the graves in Trench 1 indicates that the mass grave (context 1008) was of a single burial event with a lone burial (context 1010) probably following soon after while the location of the larger grave remained visible on the ground. The buried soil identified in the section of Trench 1 (context 1020) seals over the top of the mass grave where it provides a clear indicator of the graves shallow depth at the time of burial, the base of the grave being a mere 0.50m below the buried soil. Although the majority of grave backfill 1007 was left unexcavated, enough of the layout of the eleven individuals in grave 1008 could be determined to give a good impression of how they related to each other within the confines of the grave. Plate 5 shows skeletons 1011,1012,1015,1016 and 1017 situated in the southeast corner of the grave, it demonstrates to an extent the order in with they were laid into the grave. Skeletons 1013 and 1014 lie at the south end of grave 1008 and although unexcavated they were identifiable by skull fragments seen in the grave backfill (context 1007). A gap of approximately 0.90m existed between the skulls of skeletons 1013 and 1014. This is much greater than the 0.20m – 0.40m spacing seen between the other skeletons. A gap of this size infers the location of an additional, as yet undiscovered, individual the remains of which lie below the depth limit of excavation.

The care with which individuals were laid into the graves does vary, the greatest contrast being between those in mass graves 1008 and 2009. In both cases the graves survive to a depth of less than 0.5m, the overlying stratigraphy suggests neither would originally have been substantially deeper, and individuals were orientated in a combination of north-south and south-north. What stands out is the orderly arrangement of individuals in grave 1008 in comparison to the jumbled deposition of those in grave 2009.

There is extensive evidence of a large Roman cemetery following the line of the main southwest Roman approach road to York from The Mount up to the city walls. Typically for a Roman cemetery advantage had been taken of a prominent road side location, in this case a widely visible aspect when approached from the southwest. In contrast to The Mount the Tyburn area does not share such favourable characteristics for Roman burial activity, and although close to the known southwest extent of The Mount Roman cemetery, the graves found near the Tyburn appear unlikely to be a continuation of that cemetery. The topographical setting of the two sites contrasts considerably with a steep rise in ground level between them of around 4-5m, this is further exaggerated in the area of the Tyburn by the low lying Knavesmire on the east side of the road. Significantly no cultural material, deliberately deposited or casually discarded, was recovered from any of the grave backfills in Trench 1 with those in Trench 2 yielding only seven sherds of medieval and post medieval Ceramic Building

Material. This paucity of material contrasts with Roman burials found in the vicinity of The Mount, the burials in that cemetery are broadly representative of those of the Roman period in that an abundance of finds were associated with them. In addition, despite the acidic nature of the sandy material backfilling the graves, the bone was found to be in relatively good condition, itself suggesting a more recent date for interment.

Radiocarbon analysis of two individuals, undertaken by the Scottish Universities Environmental Research Centre (SUERC), confirms a late medieval date for both of the mass graves. The sample from the first mass grave, skeleton 1004 (SK3) gave a date of 1467 AD ±30 years, with that of the second mass grave, skeleton 2013 (SK12) providing a date of 1516 AD ±30 years, placing the burials in the range of the late Plantagenet and early Tudor periods. As pointed out by Whyte (2014) both of these dates are of interest and offer some intriguing possibilities in light of her analysis and the historical context.

Of the twelve individuals studied two were identified as sub-adult, including a juvenile of unknown age and an adolescent approximately 17 -19 years or age. The remaining ten were found to be adults with an age at death range of 25-45 years old. The sub- adults were not sexed however the remaining ten were recorded as either probable or possible males. One individual SK12 (2013) was too incomplete to sex (Whyte, 2014).

Whyte (2014) highlights that analysis has determined 'a group of men of similar age and stature with similar types of pathology, buried together, suggesting that they may have had similar backgrounds in life'. With this and the radiocarbon dates in mind Whyte (2014) raises the intriguing theory that these individuals could have been soldiers around the end of the Wars of The Roses (1455-1487).

The close proximity of the Tyburn monument, approximately 30m to the north of Trench 1 on the east side of the road, is particularly relevant. The likelihood is that the graves are of individuals executed at the Tyburn during the late medieval period. The radiocarbon dates point to this and are further supported by a small quantity of datable material, seven sherds of Ceramic Building Material, recovered from the graves in Trench 2. In addition the graves follow the same northeast-southwest alignment as the road rather than the typical east-west alignment of Christian burials, this may be an indication that criminals or outcasts were being interred within them. Records show that the Tyburn was in use from 1379 to 1801 with a mix of single and multiple executions, there is also the suggestion that not every executed individual was taken away for burial at their own parish. This can be seen to further the theory that the burials, at least in the case of the first mass grave (1008), may be those of Lancastrian soldiers who likely died far from home. A location for burial close to the place of execution is probable. This fits with the burials encountered and their proximity to the Tyburn momument.

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Author	B. Savine
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Illustrations	B. Savine
Photography	S. Collison and B. Savine

APPENDIX 1 – INDEX TO ARCHIVE

Item	Number of items
Context sheets	47
Levels register	4
Photographic register	-
Levels register	-
Drawing register	1
Original drawings	12
B/W photographs (films/contact sheets)	-
Colour slides (films)	-
Digital photographs	158
Written Scheme of Investigation	-
Report	1

Table 1 Index to archive

APPENDIX 2 – CONTEXT LIST

Trench	Context no.	Description
1	1000	Unstratified
1	1001	Skeleton. Same as 1002.
1	1002	Skeleton. Single inhumation in grave cut 1010.
1	1003	Skeleton. In grave cut 1008.
1	1004	Skeleton. In grave cut 1008.
1	1005	Skeleton. In grave cut 1008.
1	1006	Skeleton. In grave cut 1008.
1	1007	Upper backfill of grave 1008. Firm, mid brown sand.
1	1008	Cut of a mass grave.
1	1009	Backfill of grave cut 1010. Firm, mid brown sand.
1	1010	Grave cut.
1	1011	Skeleton. In grave cut 1008.
1	1012	Skeleton. In grave cut 1008.
1	1013	Skeleton. In grave cut 1008.
1	1014	Skeleton. In grave cut 1008.
1	1015	Skeleton. In grave cut 1008.
1	1016	Skeleton. In grave cut 1008.
1	1017	Skeleton. In grave cut 1008.
1	1018	Lower backfill of grave cut 1008. Compact, light yellow brown sand.
1	1019	Build-up. Firm, light yellow brown silty sand. Re-deposited natural.
1	1020	Build-up. Loose to friable, mid red brown silty sand. Buried soil.
1	1021	Natural. Compacted loose, mid yellow brown sand.
2	2000	Unstratified.
2	2001	Backfill of grave cut 2004. Hard, dark orange brown sand and clay.
2	2002	Skeleton. In grave cut 2004.
2	2003	Skeleton. In grave cut 2004.
2	2004	Grave cut.
2	2005	Skeleton. In grave cut 2009.
2	2006	Skeleton. In grave cut 2009.
2	2007	Skeleton. In grave cut 2009.
2	2008	Lower backfill of grave cut 2009. Loose, mid brown grey, silty sand.
2	2009	Cut of a mass grave.
2	2010	Backfill of posthole 2011. Loose, reddish brown silty sand.
2	2011	Posthole cut.
2	2012	Skeleton. In grave cut 2009.
2	2013	Skeleton. In grave cut 2009.
2	2014	Backfill of pit cut 2015. Light grey brown to reddish yellow silty sand.
2	2015	Pit cut.
2	2016	Levelling. Loose to friable, mid brown silty sand.
2	2017	Levelling. Firm, light brown grey, silty sand.
2	2018	Upper backfill of grave cut 2008. Firm, light brown, silty sand.
2	2019	Dumping/Levelling. Firm, mid reddish brown, clay.

2	2020	Loose, gritty sand, gravel and cobbles.
2	2021	Soft, mid yellow sand.
2	2022	Natural. Compact, mid to dark yellow brown and red brown clayey sand.

Table 2 Context list

APPENDIX 3 – CERAMIC BUILDING MARTERIAL ASSESSEMENT

By J.M.McComish

A small quantity of ceramic building material (CBM) was recovered from the site (7 sherds weighing 385g). The CBM was recorded to a standard YAT methodology, where by material is recorded and only retained if it is deemed to have further potential for research. In the case of this particular site the material was mainly of value for dating the contexts in question; the small number of sherds present offered no potential for any further research, and they were therefore discarded.

The CBM from the site was of medieval or post-medieval date. Context 2003 yielded a small sherd of brick, which could be medieval (14-16th century) or later date. Context 2010 yielded 5 sherds of 13-16th century plain tile and a single sherd of 16-18th century brick. All the fabrics present were typical for York as a whole, as were the surviving dimensions (thickness on 5 sherds).

Context	Fabric	Form	Weight	Thickness	Comments
2003	M23	Medieval brick?	10	0	No edges, could be later.
2010	M6	Plain	100	14	4 non adjoining sherds
2010	M1	Plain	50	20	
2010	M37	Post medieval brick	225	0	Slop moulded

APPENDIX 4 – OSTEOLOGY REPORT

Tyburn, Tadcaster Road, York

Osteology Report

Ruth Whyte

YORK ARCHAEOLOGICAL TRUST
FORENSIC

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ENVIRONMENTAL

YORK ARCHAEOLOGICAL TRUST
OSTEOLOGY

Dickson Laboratory for Bio-Archaeology
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Contents

Report by: Ruth Whyte

Edited by: Jennifer Miller

YORK ARCHAEOLOGICAL TRUST
Dickson Laboratory

York Archaeological Trust for Excavation and Research Limited
Registered Office: 47 Aldwark, York YO1 7BX
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Registered Charity in England & Wales (No.509060) and Scotland (SCO42846)

1. Summary

Osteological analysis of the human remains recovered from Tyburn, Tadcaster Road, York was undertaken in order to establish age, sex, pathology and any additional skeletal traits. A total of twelve articulated individuals from four graves were analysed. These were found to represent ten adults and two sub-adults. Of the adults, nine male and one was insufficiently preserved to determine sex. The majority of the individuals demonstrated a range of pathological conditions. Two radiocarbon dates were obtained from the two largest multiple burials. These were found to date to 1467AD ±30 years, and 1516 AD ±30 years, placing the burials in the late Plantagenet to early Tudor periods respectively.

2. Introduction

York Archaeological Trust undertook excavation of twelve individuals at Tyburn, Tadcaster Road, York between the 16th and 28th November 2013. This work was undertaken on behalf of Interserve during the excavation of a trench for the installation of an 11v cable (Savine 2014). The recovered human remains were submitted to the Dickson Laboratory for initial rapid assessment in April 2014 (Whyte 2014) and were subsequently approved for complete osteological analysis.

3. Methodology

Osteological analysis was performed to gain an understanding of the identity of each individual and a profile of the collection overall. In order to do this, each inhumation was assessed for MNI, preservation, age, sex, metric and non-metric variation, and pathological conditions. Methods for each criterion are detailed below.

3.1 Minimum number of individuals

A count of the minimum number of individuals (hereafter MNI) was carried out as standard procedure, in order to establish the minimum number of people represented in the assemblage. The MNI was calculated by counting all major skeletal elements (cranial elements, long bones and pelvises). Each type of element was then divided into complete and incomplete, before being subdivided by side, sex and age where possible. The greatest number was then taken as the MNI. The MNI of a site is often lower than the true number of skeletons originally interred, but demonstrates the minimum number of individuals that can be proven categorically to be present.

3.2 Preservation and completion

Recording the level of completion helps us to understand the limits of the information gained from analysis, as well as indicating possible post-mortem disturbance and extrinsic taphonomic factors. The level of completion of the inhumations was recorded using five percentage categories; <5%, 6-25%, 25-50%, 51-75%, 76%+.

The preservation of each burial was also recorded. The preservation of bone is known to be affected by a wide range of factors, from age and size of the individual to the method of deposition. Preservation was assessed with reference to the six grades of erosion/abrasion to human bone detailed in Brickley and McKinley (2004), taking into account surface degradation and post-mortem breaks. Additional terminology was assigned to the grades to aid understanding; grades 0-1 – excellent, grade 2 – good, grade 3 – fair, grade 4 – poor, grade 5 – very poor. It should be noted that preservation was assessed independently to completion; thus it would be possible for an individual to have excellent preservation but be highly incomplete.

3.3 Sex determination

For each adult individual, sex was determined through consideration of a variety of factors across the body. Five sexually dimorphic cranial features; the nuchal crest, the mastoid process, the supraorbital margin, the supraorbital ridge, and the mental eminence; were scored on a 5 point scale, where 1 denotes a probable female, 2 a possible female, 3 indeterminate, 4 a possible male, and 5 a probable male. This was completed with reference to diagrams of each stage from Walker, in Buikstra and Ubelaker (1994). As recommended in Brickley and McKinley (2004), additional sexually dimorphic aspects of the mandible were observed subjectively; namely the overall size, the width of the ascending ramus, the flaring of the gonial angle and the shape of the chin.

Four elements of the pelvis were recorded to aid sex determination. The greater sciatic notch was scored in a scale from 1-5, as before, with reference to diagrams from Walker in Buikstra and Ubelaker (1994). The ventral arc and subpubic concavity, which are only present in females, were also considered. Similarly the difference in the shape of the media aspect of the ischiopubic ramus, which is sharp in females and blunt in males, was observed.

Once all available factors were recorded, the results were assimilated in order to give an estimation of sex. As noted by Mays (1998) the pelvic area is the most reliable source when sexing, and thus was given more weight when determining final results.

3.4 Age determination

As with sex, age was determined using a number of different factors across the body. For juvenile individuals age was estimated through observation of the stages of fusion and epiphyseal closure for each skeletal element, with reference to Schaefer, Black and Scheuer (2009). The stage of eruption of dentition was also considered, with reference to Ubelaker (1978), Hilson (1996), and Schaefer, Black and Scheuer (2009).

The age of adult individuals was recorded using a range of factors. The surface of the pubic symphysis was observed with reference to Todd's (1920) ten age phases of pubic symphysis modification, and the Suchey-Brooks six phase pubic symphysis scoring system from Brooks and Suchey (1990). Similarly the auricular surface was observed with reference to Lovejoy's scoring system of modal changes to the auricular surface with age from Lovejoy et al. (1985). The level of dental attrition was also recorded with reference to Brothwell (1981) and Hilson (1996).

Where applicable, pathological conditions commonly associated with age have been used as a secondary indicator of age. However, as advised in White and Folkens (2005), degenerative conditions have not been used as a primary deciding factor for age of individuals.

Once all available factors were recorded the results were then considered as a whole for each individual, in order to give an estimate of age. Each individual had been assigned into one of the following categories; foetus (up to 40 weeks in utero), neonate (around time of birth), infant (newborn to 1 year old), juvenile (1-12 years old), adolescent (13-17 years old), young adult (18-25 years old), middle adult (26-45 years old), mature adult (46+ years old), and adult (where age could not be determined more accurately than 17+). Where possible, more specific age approximations have been suggested, however these are not definitive.

3.5 Pathology

For each individual, all skeletal elements were examined closely in order to ascertain the presence of any pathological conditions. This was done in reference to Brothwell (1981), Hilson (1996), Mays (1999), Brickley and McKinley (2004), White and Folkens (2005), Waldron (2009), Roberts (2009) and Roberts and Manchester (2010). As always it must be remembered that only a small minority of pathological conditions affect the skeletal system. An assessment

of skeletal pathology gives insight into the conditions present, but does not provide a complete picture of health or disease.

3.6 Stature

Where possible, stature was estimated for each adult through measurement of complete long bones. These lengths were then placed into Trotter's (1970) formulae for stature estimations. As stated by White and Folkens, Trotter's stature formula for tibiae demonstrated too high an error rate (White & Folkens 2005). Tibiae were consequently not measured. As with sex, stature estimations were not attempted for sub-adult individuals. Stature estimates have been presented as either a single number or a range, depending on the number of complete long bones available for measurement. It should be noted that mathematically, an estimated stature range derived from multiple long bone measurements is more reliable than a single measurement.

3.7 Non-Metric Variation

Non-metric traits are minor skeletal anomalies that are recorded by presence, not measurement. The causes of many traits are currently unknown, although some are thought to have genetic or lifestyle influences (Mays 1999). Any non-metric traits present in the individuals were recorded, with reference to Berry and Berry's (1967) 30 points of cranial non metric variation, and Finnegan's (1978) 30 points of sub cranial non-metric variation.

4. Results

The results of the osteological analysis are detailed below, organised by category. A summary of results per individual can be found in appendix 1. Due to the relatively small number of individuals in the assemblage, the data has not been used to create quantitative models. The data has instead been discussed in a qualitative manner.

4.1 Minimum Number of Individuals

The minimum number of individuals in the recovered assemblage is 10. This is the most conservative estimate of individuals that can be proven mathematically to be present. This is lower than twelve, the number of individuals thought to be in the collection. This is a consequence of many of the individuals being only partially recovered. When burial details are taken into account, we can be confident that the actual number of individuals present is twelve.

4.2 Preservation & Completion

The preservation of the twelve individuals was generally fair to good, with only three (SK6, SK10, and SK12) rated as grade 4, i.e. poor. Age of individual did not appear to have any effect on preservation. However, there was a slight difference between the graves. Most notably mass grave (1008) displayed some of the best preservation, and mass grave (2009) the poorest. This may either be due to a difference in date of deposition, or alternatively due to slight differences in localised environment.

The level of completion was generally quite low, with only 4 of the individuals being over 50% complete. However, this does not take into account the known limits of excavation. SK6 – SK12 all extended past the limits of excavation, and consequently were all only partially recovered. When this is taken into account, the low levels of completion can be understood more fully. The individuals recovered in their entirety; SK1 – SK5; demonstrated better completion, with three of the five being over 76% complete.

4.3 Demography (age and sex)

Although this is a relatively small assemblage, the distribution of both sex and age was note-worthy. Two individuals, SK1 and SK11, were sub-adult. SK1 was found to be adolescent,

approximately 17-19 years old. SK11 was deemed to be younger and was recorded as juvenile. Unfortunately very low completion meant that this age range could not be narrowed down any further.

The remaining ten individuals were adult, of which three were insufficiently complete to allow more definitive aging. The seven individuals that could be aged further were all assigned to the category of middle adult. Their age clustered almost exclusively between 35-45 years old, with the exception of SK2, who was approximately 25-30 years old.

The distribution of sex was similarly clustered. In accordance with common protocol, the two sub-adult individuals were not sexed. Of the ten adults, nine were recorded as either possible or probable male. Only one individual, SK12, was too incomplete to sex.

4.4 Stature

Of the ten adults recovered, seven had complete long bones suitable for stature measurements. Of these seven, six individuals demonstrated estimated stature ranges of between 165cm – 171cm ±4.32cm (c. 5'4" to c. 5'8"). The remaining individual was 182.08-182.31cm ± 3.27cm (c. 5'11"). This range of heights is certainly not unusual for a group of men from the medieval to post-medieval period.

4.5 Non-metric variation

Only one non-metric trait was found in the entire assemblage. This was a transverse foramen bipartite of the 5th cervical vertebra of SK2. This is noted by Finnegan to be a frequently recorded trait (Finnegan 1978). On its own, however, this tells us very little about the individual or the population from which they originated. As demonstrated here, profiling of non-metric variation cannot be completed meaningfully in such a small assemblage.

4.6 Skeletal Pathology

4.6.1 Joint disease

Degenerative joint disease (hereafter DJD) was one of the most prevalent conditions in the assemblage. Seven individuals demonstrated DJD in the spinal column to varying degrees. The youngest of these individuals was SK2, aged 25-30. As Roberts and Manchester note, DJD at this age is not uncommon (Roberts & Manchester 2010: 140). Yet, increased prevalence is also associated with older age. DJD is thought to be a stress related condition. The level of occurrence of DJD in relatively young individuals in this assemblage may indicate that they had an increased level of physical activity.

4.6.2 Infectious disease

A single case of generalised infectious disease was noted in SK3, where periosteal new bone formation (hereafter PNBF) was present in both tibiae (Figure 1). PNBF is an inflammation of the periosteum, or outer bone surface, caused by an accumulation of bacteria. Pathological causes can range from varicose veins to tuberculosis and various forms of cancer. The exact cause is impossible to trace in the archaeological record, however the presence of it is notable as a general indicator of pathology.

4.6.3 Trauma

Several cases of trauma were recorded in the collection. SK1 demonstrated a healed break in the right clavicle (Figure 2). SK3 demonstrated a badly healed break in the distal third of the right humerus (Figure 3), in addition to healed breaks in two right ribs and four left ribs. The most notable case of trauma was in SK5. An unhealed break was observed in the distal third of the left ulna (Figure 4). The fracture was in the first cellular phase of healing, indicating that the individual died within two weeks of gaining the injury. SK5 also displayed compression fractures in two mid thoracic vertebrae from an earlier date.

4.7 Dental pathology

4.7.1 Caries (cavities)

Dental caries are one of the most common of dental conditions both in modern day and in archaeology (Roberts & Manchester 2010: 65). Caries were recorded in SK1 and SK10. The fact that they were not recorded in any other individuals may indicate a diet low in sugars and starches. Alternatively this may be a statistical anomaly of a small population. It is likely to be a combination of both; dental caries were certainly less prevalent in the medieval period than they are today, however it is impossible to note reliable trends in a sample this small.

4.7.2 Calculus (plaque)

Dental calculus is another highly common dental condition. This was recorded in six of the seven individuals for whom teeth were recovered. Calculus is the mineralised form of dental plaque; a build up of oral bacteria. The prevalence noted in this collection is not surprising, as Roberts and Manchester note that calculus is common in all periods (Roberts & Manchester 2010).

4.7.3 Periodontal disease

Periodontal disease, more commonly known today as gum disease, is a common condition, and one of the most common causes of ante-mortem tooth loss (Roberts & Manchester 2010:73). Periodontal disease was recorded in four individuals. However none of these individuals displayed significant tooth loss, indicating that the periodontal disease was not at a critically advanced stage.

4.7.4 Dental Enamel Hypoplasia

Dental enamel hypoplasia is characterised by misshaping of the enamel surface; most commonly in horizontal grooves. Enamel hypoplasia occurs in the developmental stages of the teeth, and consequently persists through adulthood. It is commonly known as an indicator of stress at the time of dental development, and has been associated with trauma, disease and dietary deficiency (Roberts & Manchester 2010:75). Four individuals in the assemblage displayed enamel hypoplasia. This prevalence is not abnormal for the medieval to late-medieval period. Associations have been made between prevalence and low socio-economic status; however these links are not simple as there are a number of possible causes of enamel hyperplasia.

5. Discussion

This collection contains a group of twelve individuals; ten adults and two sub-adults. The ten adults represent nine men and one indeterminate individual, with an age at death range of 25-45 years old. The height range of these individuals was 165cm to 182cm. The two sub-adults included a juvenile of unknown age and an adolescent between approximately 17-19 years old. The pathology present in the assemblage displayed distinct themes with a prevalence of fracture traumas and degenerative joint disease, but an absence of metabolic and neoplastic (tumourous) diseases.

None of the results displayed here are unusual in themselves. The demographic of individuals and pathological conditions on display are common throughout the past. Yet a distinct profile of these individuals begins to emerge. A group of men of similar age and stature with similar types of pathology, buried together, suggest that they may have had similar backgrounds in life. Specific individuals appear particularly interesting on their own, such as SK3 with a healed break in their right arm and several healed breaks in their ribs, degenerative wear in their vertebrae and periosteal new bone formation in their tibiae. Similarly interesting is SK5, who died with an unhealed broken arm.

Care must be taken in the interpretation of these results. A population size of twelve is too small to give an idea of true demographic patterns. Any trends that are present may be down to statistical anomalies. Consequently we cannot put too much interpretative weight behind these patterns as representative for a wider population. This is of particular relevance given that further individuals were noted as present at the time of excavation, but were not recovered (Savine 2014). The recovered individuals are only a small sample. Therefore absence of evidence cannot be taken as evidence of absence. Instead any interpretation must treat the collection as self contained, and not reflective of a wider population of the time.

Although of interest intrinsically, the results become more significant when put into historical context. Savine (2014) previously noted the likelihood that the individuals were excavated at the Tyburn during the medieval to post medieval period and so a radiocarbon date from each of the two mass burials was submitted in order to place the burials within a more precise time scale. Consequently samples of bone from SK3 (1004) and SK12 (2013) were submitted to the Scottish Universities Environmental Research Centre (SUERC) for radiocarbon dating.

The sample from SK3 (1004) provided a date of 483±30 BP (before 1950 AD); translating to a date of 1467 AD ±30 years. The sample from SK12 (2013) provided a date of 434±30 years BP (before 1950 AD); translating to a date of 1516 AD ±30 years. These dates certainly provided interesting insight when combined with the results of the osteological analysis. The date of the first multiple inhumation places it directly at the end of the Plantagenet era; directly around the time of the Wars of the Roses (1455-1487). The possibility that these three individuals are directly associated with this cannot be ignored. The remains recovered from this grave represent three male individuals, all male adults between the ages of 25-39 years old. This information is certainly conducive to the theory that these individual may have been soldiers around the time of the war. When also talking into account the nature of their burials; in non Christian alignment, in a mass burial, and in a burial area associated with criminals, this certainly captures the imagination. Their location in proximity to the city of York may indicate that they were Lancastrian soldiers captured and executed at the Tyburn by Yorkist supporters. This is certainly an enticing theory; however it is not entirely conclusive. It must be noted that this is only a theory, and a range of other explanations are also possible. The individuals could also be Yorkist soldiers buried by Lancastrians, or they could have been criminals buried at the Tyburn with no association to the political climate of the time.

The date of 1516 AD ±30 years from SK12 (2013) is equally intriguing. The date range places the second multiple inhumation slightly later than the first. Dated directly after the Wars of the Roses, and into the beginning of the Tudor period and the reign of Henry VIII, the historical context for these individuals is slightly different, but no less intriguing. The remains represent four adults and one juvenile. Of the four adults, three could be identified as males, between the ages of 25-45 years old. There are distinct similarities between this group of individuals and those from the first mass grave; but there are also distinct differences. These individuals display much less trauma, and more degenerative conditions. Proposed theories as to the lives of these individuals are not as clear as those in the first mass grave. Yet they are buried in similar circumstances.

Any further osteological analysis of the collection is unlikely to provide new information, although there are a number of further avenues of biomolecular research that could be considered, if so desired. The dating process has provided the $\delta^{15}N$ and C/N ratio required for stable isotope analysis on SK3 and SK12. Closer study of this data would give insight into the diets of the individuals and possible migration. The new and developing technique of

proteomic analysis on dental calculus from the individuals could also provide further information on the pathology of the individuals, as well as making meaningful contributions to current archaeological research. Due to the historical implications of the remains, particularly those from the first mass grave, the findings presented in this report would be highly suitable for publication in an academic journal such as the International Journal of Osteoarchaeology.

6. Appendix 1 – Individual result summary tables

Skeleton	SK1
context	1001-1002
Comleteness	51-75%
Preservation	Grade 2 – good
Age	Adolescent – 17-19 yo
Sex	N/D
Stature	N/D
Non metrics	None
Skeletal pathology	Healed break to right clavicle
Dental pathology	Dental calculus, dental caries in LLM2, URM2, ULM2, periodontal disease, dental enamel hypoplasia

Skeleton	SK2
context	1003
Completeness	76%+
Preservation	Grade 3 – fair
Age	Middle Adult – 25-30 yo
Sex	Possible male
Stature	167.80cm – 168.99cm ± 3.27cm (measurements from femora)
Non metrics	Transverse foramen bipartite on right side of 5th cervical vertebra
Skeletal pathology	DJD throughout spinal column, deformed shaping of ribs
Dental pathology	Dental calculus, dental enamel hypoplasia

Skeleton	SK3
context	1004
Completeness	26-50%
Preservation	Grade 3 – fair
Age	Middle adult – 35-40 yo
Sex	Possible male
Stature	169.35cm – 171.00cm ± 4.32cm (measurements from radius & ulnae)
Non metrics	None
Skeletal pathology	Healed break of distal end of right humerus, healed breaks to two right mid ribs, healed break to four left mid ribs, DJD in lumbar vertebrae, periosteal new bone formation on right and left tibias
Dental pathology	N/P

Skeleton	SK4
context	1011
Completeness	76%+
Preservation	Grade 2 – good
Age	Middle adult – 35-39 yo
Sex	Probable male
Stature	165.90cm – 171.17cm ± 4.32cm (measurements from humerus, radii, ulna, femora)
Non metrics	None
Skeletal pathology	DJD throughout spinal column
Dental pathology	Uneven dental attrition on right side of mandible, periodontal disease, dental calculus

Skeleton	SK5
context	1012
Completeness	76%+
Preservation	Grade 2 – good
Age	Middle adult – 25-39 yo
Sex	Probable male
Stature	168.60cm – 169.63cm ± (measurements from humerus & radius)
Non metrics	None
Skeletal pathology	Unhealed break in distal third of left ulna, compression of vertebral body of two mid thoracic vertebrae, DJD in thoracic and lumbar vertebrae
Dental pathology	N/P

Skeleton	SK6
context	2002
Completeness	5-25%
Preservation	Grade 4 – poor
Age	Adult
Sex	Possible male
Stature	N/P
Non metrics	None
Skeletal pathology	DJD in cervical vertebrae
Dental pathology	Dental calculus, dental caries URM3, ante-mortem tooth loss LLM1, dental enamel hypoplasia

Skeleton	SK7
context	2003
Completeness	5-25%
Preservation	Grade 3 – fair
Age	Adult
Sex	Possible male
Stature	169.93cm ± (measurements from humerus)
Non metrics	None
Skeletal pathology	None
Dental pathology	Periodontal disease, dental calculus, dental hypoplasia, dental caries in ULI2.

Skeleton	SK8
context	2005
Completeness	5-25%
Preservation	Grade 3 – fair
Age	Middle adult – 40-44 yo
Sex	Possible male
Stature	N/P
Non metrics	None
Skeletal pathology	DJD in articulating facets of sacrum
Dental pathology	N/P

Skeleton	SK9
context	2006
Completeness	26-50%
Preservation	Grade 2 – good
Age	Middle adult – 35-45 yo
Sex	Possible male
Stature	182.08cm – 182.31cm ± 3.27cm (measurements from femora)
Non metrics	None
Skeletal pathology	Early signs of DJD in spinal column
Dental pathology	N/P

Skeleton	SK10
context	2007
Completeness	5-25%
Preservation	Grade 4 – poor
Age	Middle adult – 25-39 yo
Sex	Possible male
Stature	171.36 cm ± 4.32cm (measurements from ulna)
Non metrics	None
Skeletal pathology	None
Dental pathology	Dental calculus, dental caries in URM1, URPM2, ULPM1, LRM2, periodontal disease, ante mortem tooth loss of URPM1, LLM1, LLM2

Skeleton	SK11
context	2012
Completeness	<5%
Preservation	Grade 3 – fair
Age	Juvenile
Sex	N/D
Stature	N/D
Non metrics	None
Skeletal pathology	None
Dental pathology	N/P

Skeleton	SK12
context	2013
Completeness	<5%
Preservation	Grade 4 – poor
Age	Adult
Sex	N/P
Stature	N/P
Non metrics	None
Skeletal pathology	None
Dental pathology	N/P

7. Figures

Figure 1 – SK3 Periosteal new bone formation on right tibia

Figure 2 - SK1 healed break in right clavicle

Figure 3 - SK3 healed break in right humerus

Figure 4 - SK5 unhealed break in left ulna

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APPENDIX 5 – RADIOCARBON DATING ANALYSIS

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RADIOCARBON DATING CERTIFICATE
05 August 2014

Laboratory Code	SUERC-54293 (GU34567)
Submitter	Ruth Whyte Northlight Heritage (York Archaeological Trust) Block 2.01, Kelvin Campus West of Scotland Science Park 2317 Maryhill Road, Glasgow, G20 0SP
Site Reference	York Knavesmire
Context Reference	1004
Sample Reference	SK3
Material	human bone : L foot phalanx
$\delta^{13}C$ relative to VPDB	-20.8 ‰
$\delta^{15}N$ relative to air	10.8 ‰
C/N ratio (Molar)	3.2
Radiocarbon Age BP	483 ± 30

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal4).

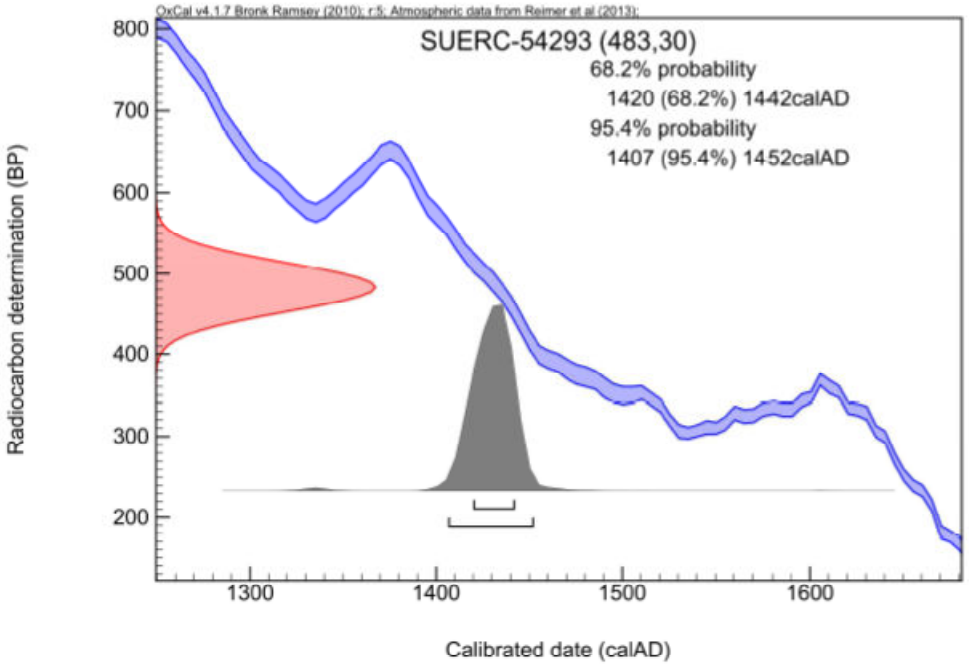
Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- Date :- 05/08/2014

Checked and signed off by :- Date :- 05/08/2014

University of Glasgow

Calibration Plot



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RADIOCARBON DATING CERTIFICATE

05 August 2014

Laboratory Code	SUERC-54297 (GU34568)
Submitter	Ruth Whyte Northlight Heritage (York Archaeological Trust) Block 2.01, Kelvin Campus West of Scotland Science Park 2317 Maryhill Road, Glasgow, G20 0SP
Site Reference	York Knavesmire
Context Reference	2013
Sample Reference	SK12
Material	human bone : foot phalanx
$\delta^{13}C$ relative to VPDB	-19.4 ‰
$\delta^{15}N$ relative to air	13.1 ‰
C/N ratio (Molar)	3.2
Radiocarbon Age BP	434 ± 30

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal4).

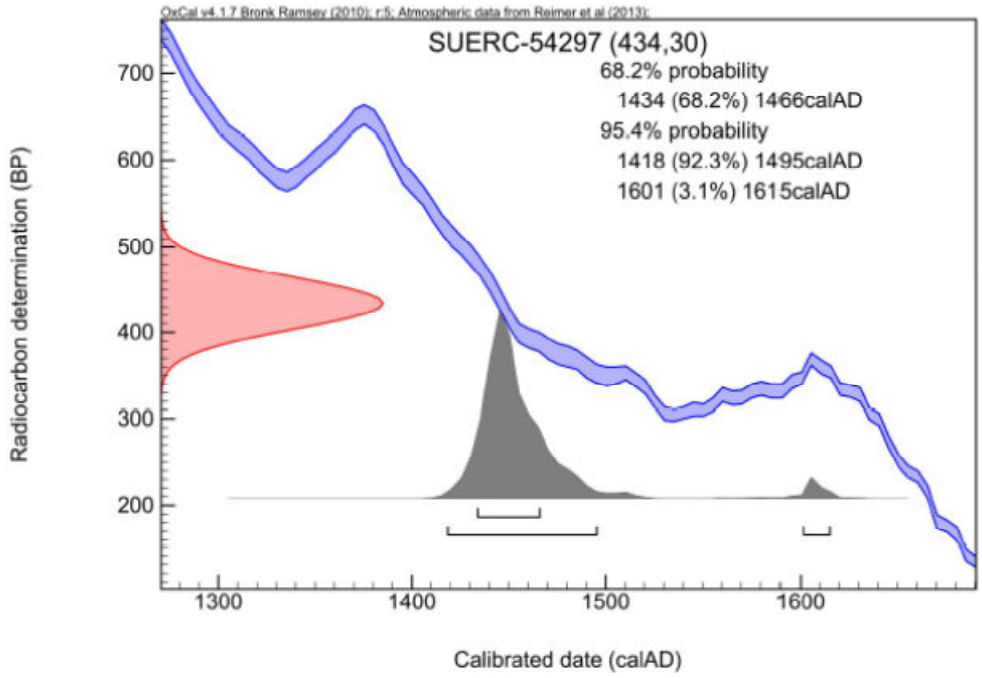
Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- Date :- 05/08/2014

Checked and signed off by :- Date :- 05/08/2014

University of Glasgow

Calibration Plot



FIGURES

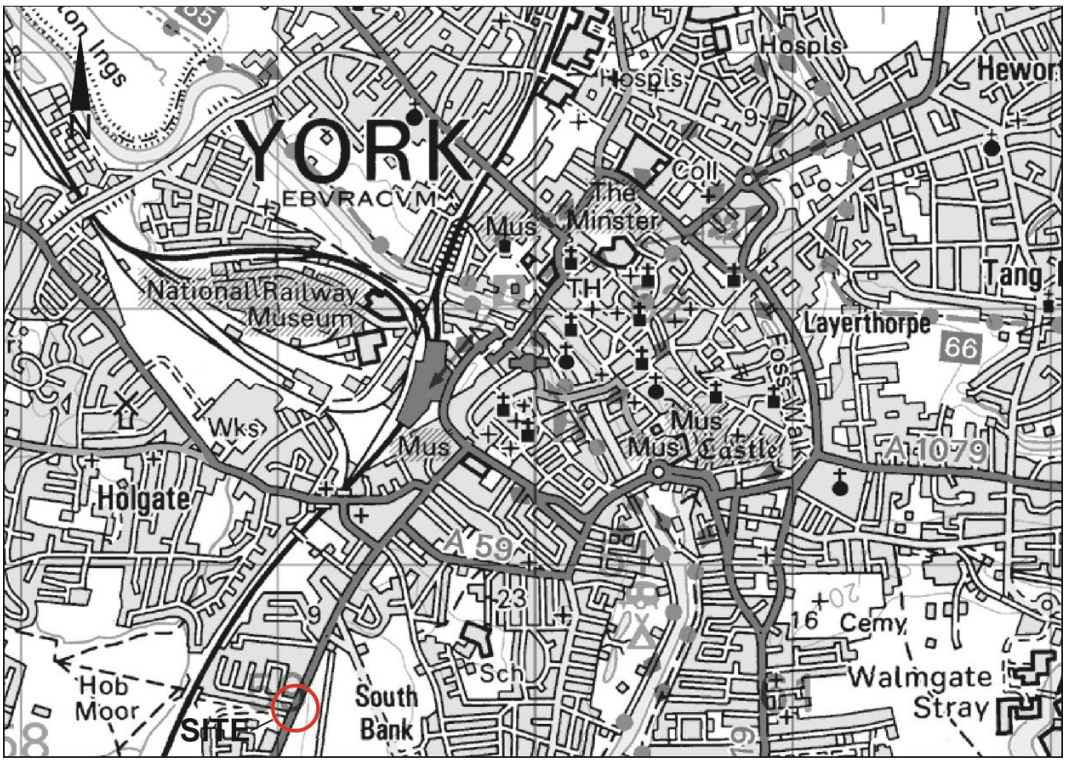


Figure 5. Site location

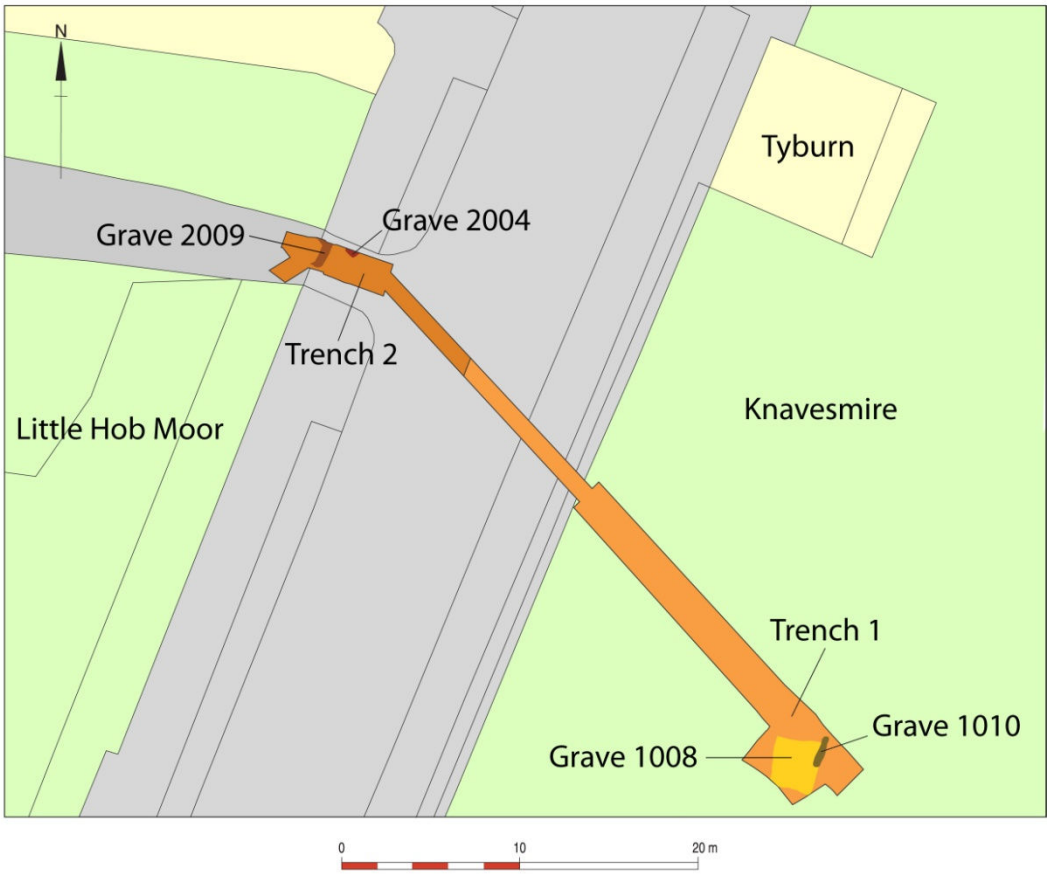


Figure 6. Trench location

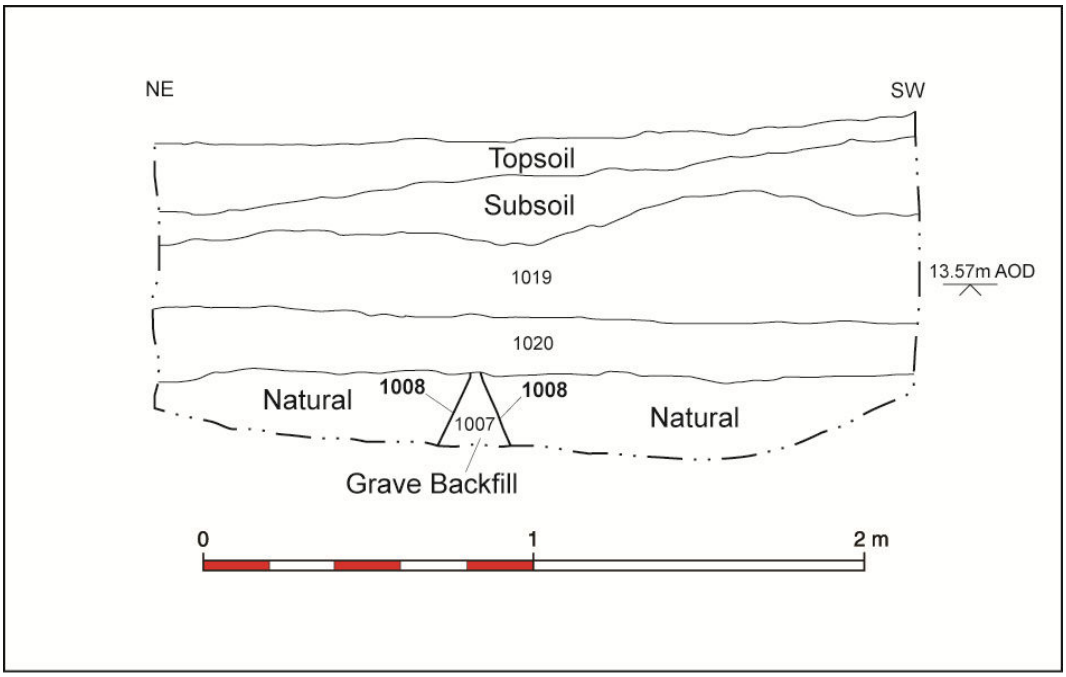


Figure 7. Trench1, northwest facing section

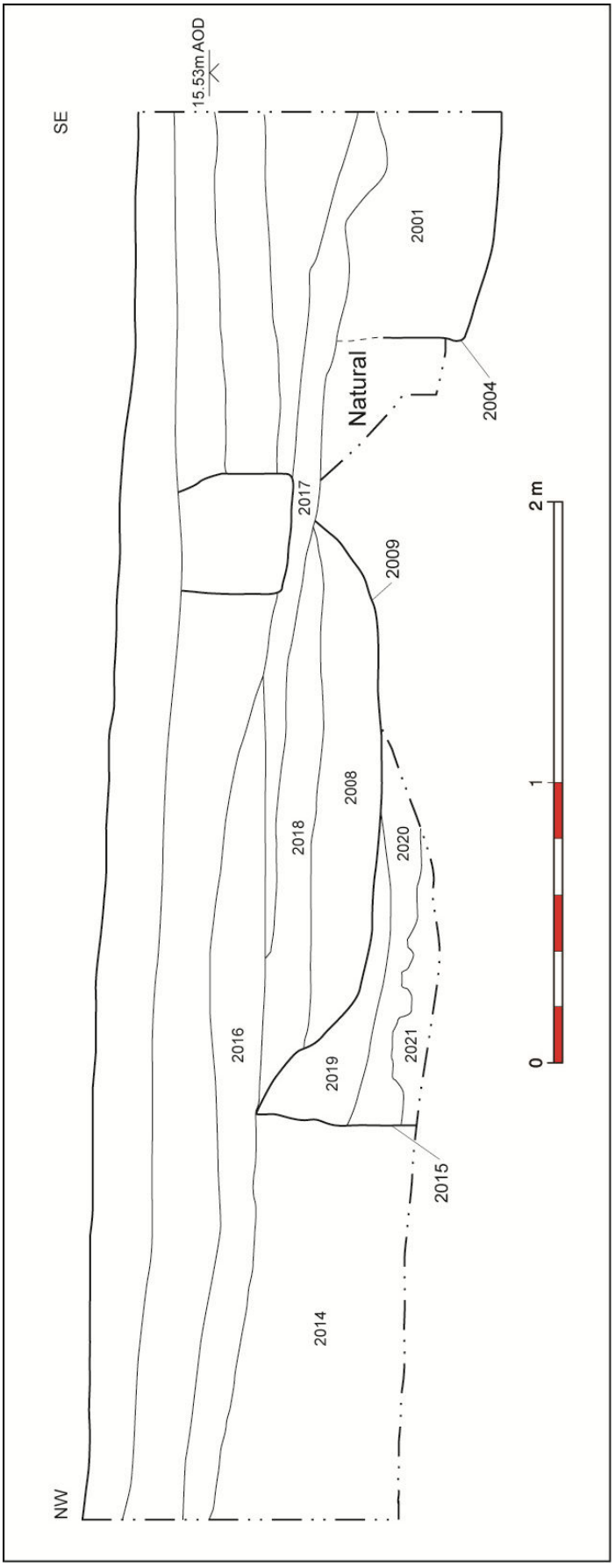


Figure 8. Trench2, southwest facing section

PLATES

Plate 1. Trench 1, northeast facing section of through east side of Tadcaster Road

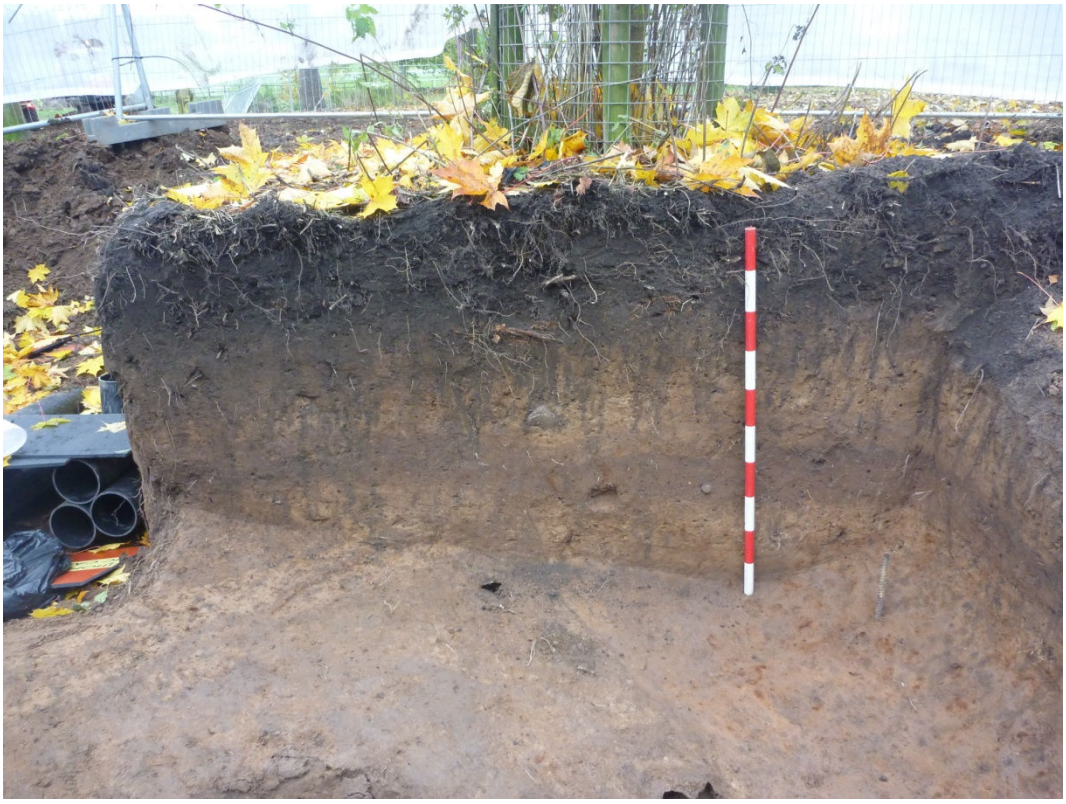


Plate 2. Trench 1, northwest facing section in trench extension

Plate 3. Trench 1, Skeleton 1002 in grave 1010 cutting into the NE corner of mass grave 1008

Plate 4.Trench1, detail showing over lapping arms of Skeletons 1003 (top of frame) and 1004

Plate 5. Trench 1, skeletons 1011 and 1012 overlying the lower limbs of skeletons 1015, 1016 and 1017

Plate 6. Trench 2, south facing section showing the path make up sequence, a large pit to the west (left of frame) and grave cut 2009

Plate 7. Trench 2, east end of south facing section, grave cut 2004 is in the centre

Plate 8. Trench2, grave cut 2004

Plate 9.Trench 2, burials in grave cut 2009